

**Welcome to the Public Information Centre for
The Municipality of Clarington
Robinson Creek and Tooley Creek Subwatershed Study
(Phase 1: Characterization)**

**Wednesday
November 13, 2019**

6:30 - 8:00 pm

**Garnet B. Rickard
Recreation**

**2440 Highway 2,
Bowmanville, ON**



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The Municipality of Clarington
Robinson Creek and Tooley Creek Subwatershed Study
(Phase 1: Characterization)**

This is a drop-in session. Please take a few moments to read through the material on each of the boards. Staff from Aquafor Beech and the Municipality are here to answer any questions you may have.

Please complete the questionnaire and deposit it in the comment box at the sign-in table. This questionnaire will also be available to complete on-line.

All materials will be posted on the project website:

[Presentation Material \(www.Clarington.net/RTSubwatershed\)](http://www.Clarington.net/RTSubwatershed)

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Garnet B. Rickard Recreation
2440 Highway 2, Bowmanville, ON



Clarington

The Study Team in attendance at tonight's Public Information Centre.

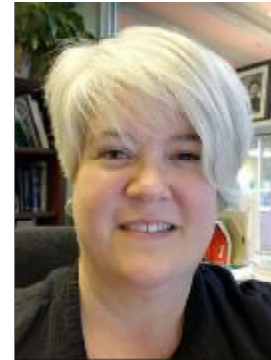
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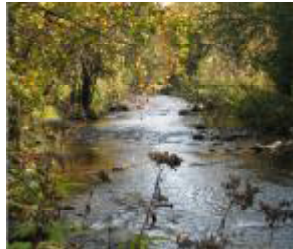
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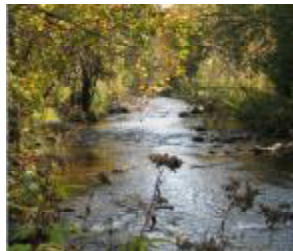
What is Watershed Planning?

“Watershed planning is an opportunity for municipalities and other planning authorities to work collaboratively towards watershed objectives by creating a framework for the management of human activities, land, water, aquatic life and resources within a watershed, and for the assessment of cumulative, cross-jurisdictional and cross-watershed impacts.” - Ministry of Environment Conservation and Parks, 2018

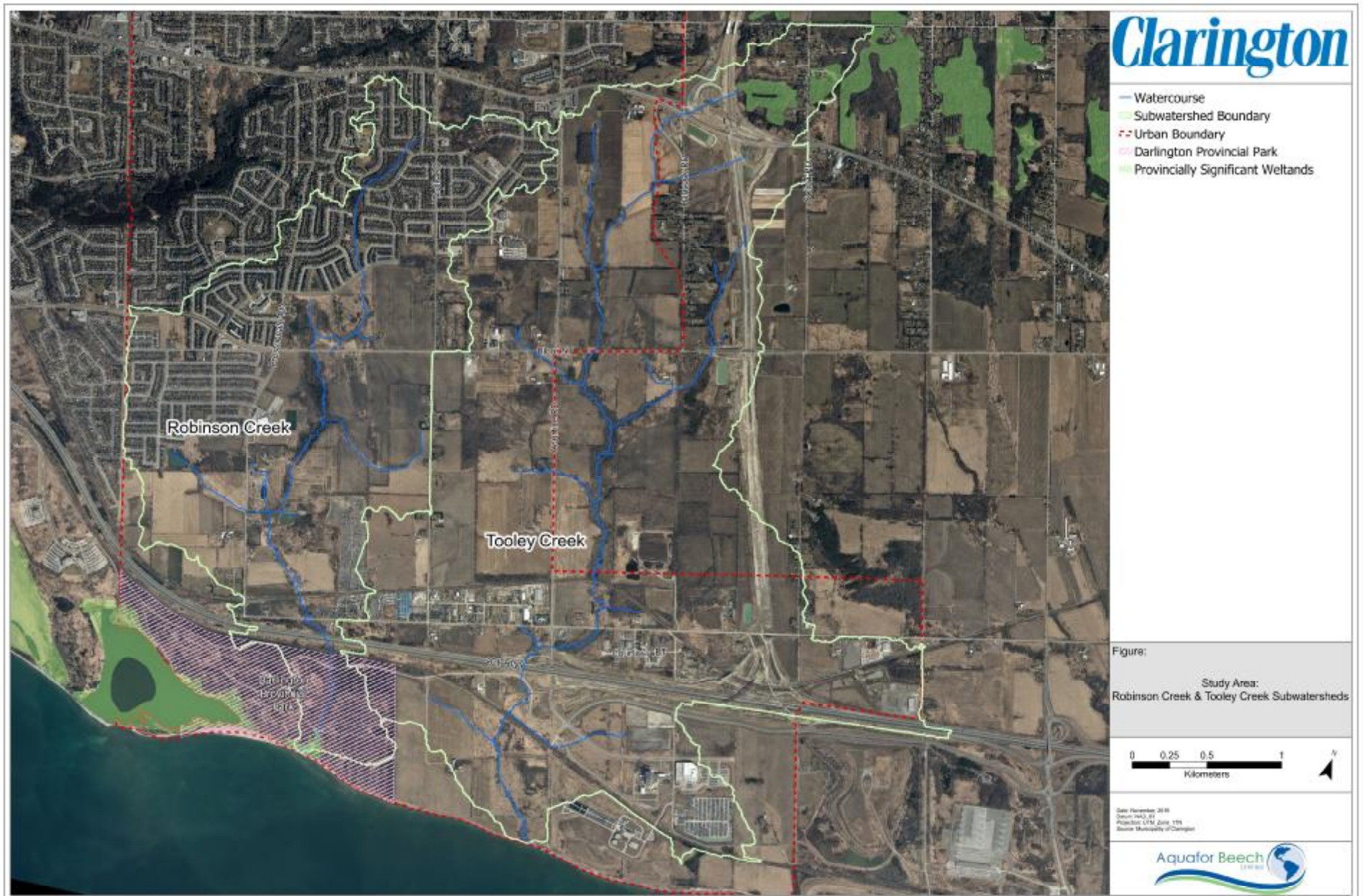


How will this watershed plan impact our community?

- § Create an environmental vision, with a set of goals, objectives and targets;
- § Identify areas to be protected, enhanced and rehabilitated as development occurs through the Secondary Planning Process;
- § Provide a stormwater management plan that respects natural hydrologic processes; and
- § Detail the requirements for ongoing monitoring and verification of defined targets.

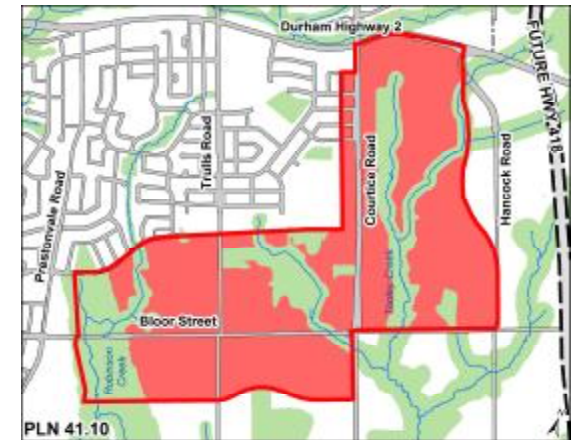


Study Area



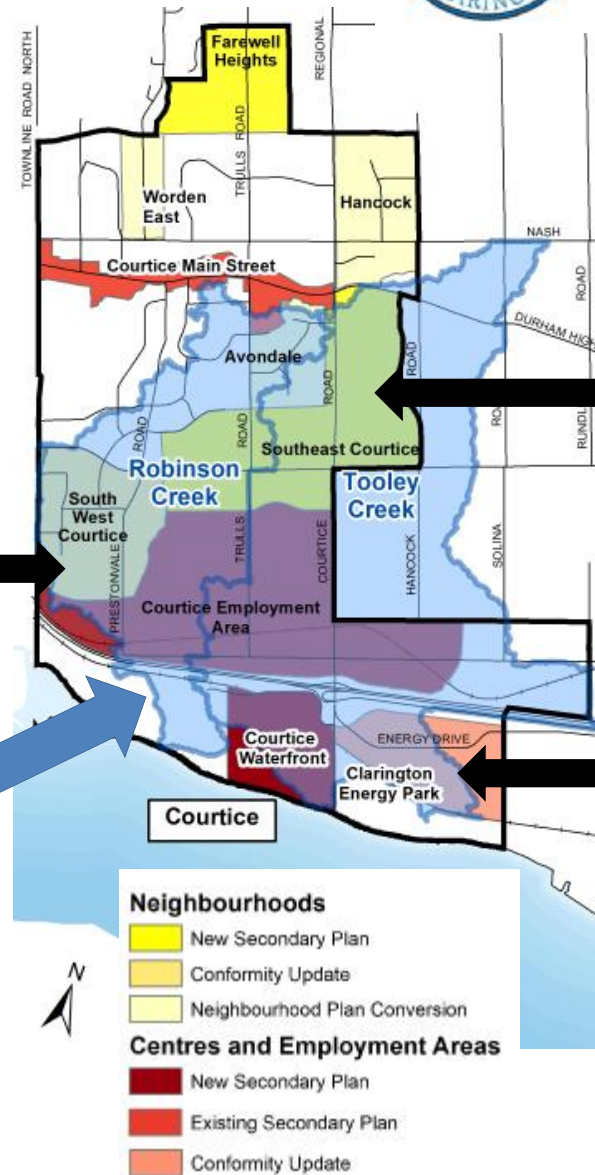
Secondary Plans

within the Subwatershed Study Area



- Southeast Courtice

- Southwest Courtice
- Courtice Employment Lands



- Clarington Energy Park & Courtice Waterfront

Subwatershed Study Area



Subwatershed Study Process

&

Secondary Plan Process

Public Engagement

Inventory existing environmental conditions

Identification of environmental constraints & opportunities

Impact analysis for future land use changes

Problem/opportunity identification

Develop alternative subwatershed management strategies

Evaluate alternative subwatershed management strategies

Select preferred subwatershed management strategy

Develop implementation plans

Environmental monitoring recommendations

Subwatershed Study Phase 1

Subwatershed Study Phase 2



Background Studies

Opportunities & Constraints

Preliminary Land Use Options

Preferred Land Use Plan

Urban Design & Sustainability Guidelines

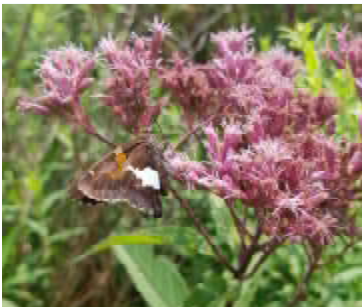
Secondary Plan

Public Engagement

Study Purpose

Study Purpose

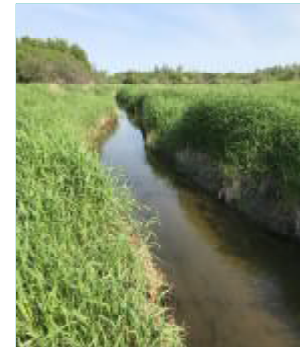
To support future growth and the development of Secondary Plans for the Courtice area, the Municipality initiated a Subwatershed Study for the Robinson Creek and Tooley Creek subwatersheds, to develop a plan that allows sustainable development while ensuring maximum benefits to the natural and human environments on a watershed basis.



Study Purpose (Contd..)

Purpose of Tonight's Meeting

- § Introduce the study area
- § Provide an overview of the Subwatershed Study purpose
- § Review the Subwatershed Study process
- § Provide an opportunity for the public to review the work completed to date as well as upcoming work
- § Invite the public to provide input to the study, and to discuss questions and issues with the staff of the Municipality of Clarington and the members of the Project Team



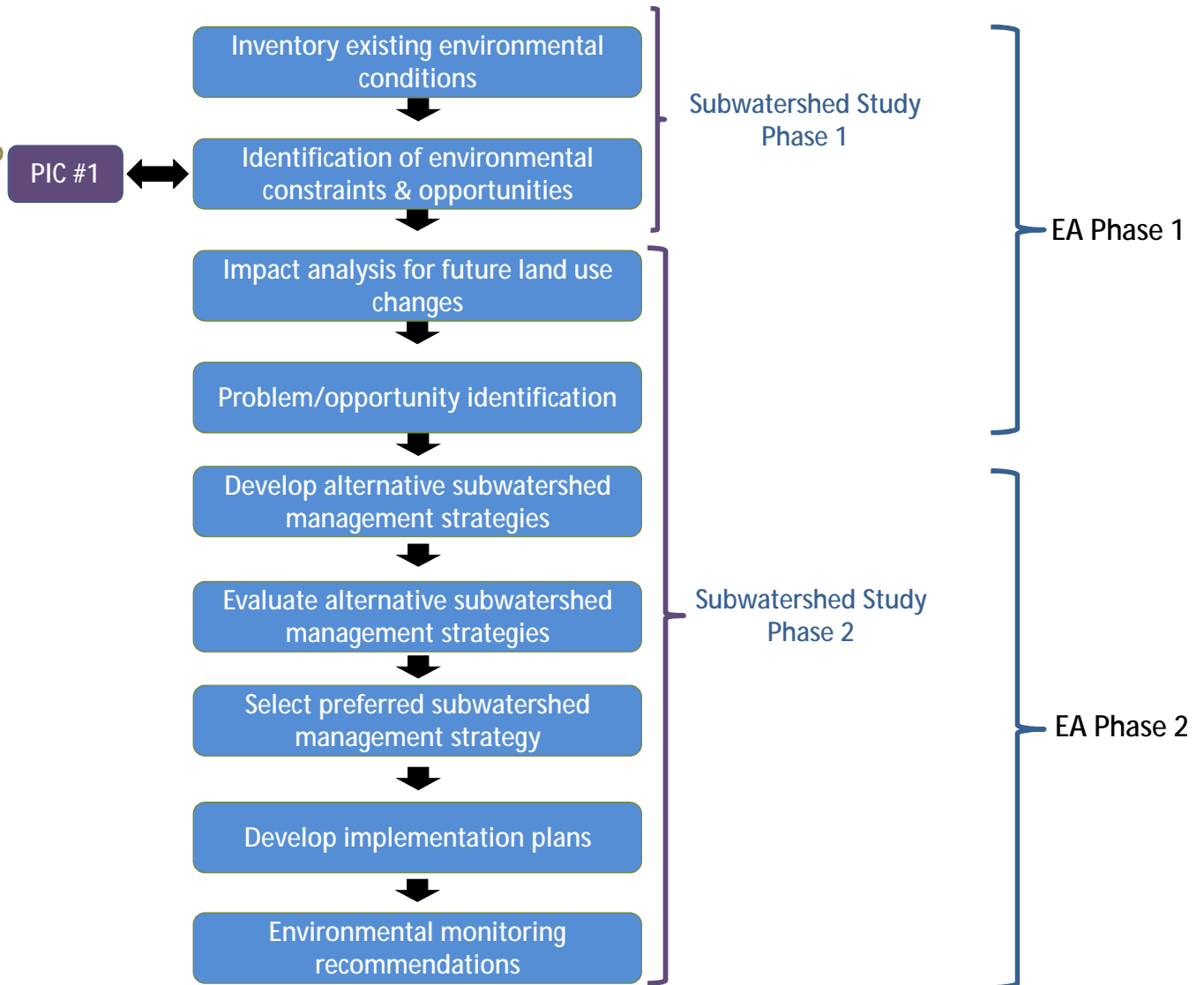
The Subwatershed Study is being conducted in the spirit of a Master Plan

Environmental Assessment Process. The Subwatershed Study will cover Phases 1 and 2 of the Municipal Class Environmental Assessment Act (Class EA) process.

This will involve a process of problem/opportunity identification, evaluation of alternative solutions, and selection of a preferred solution. In the spirit of the Environmental; Assessment process, stakeholder consultation is an important component of the study.

Consultation with Stakeholders, the Public, and Agencies

Subwatershed Study Process



Existing Conditions – Groundwater Resources

Objectives

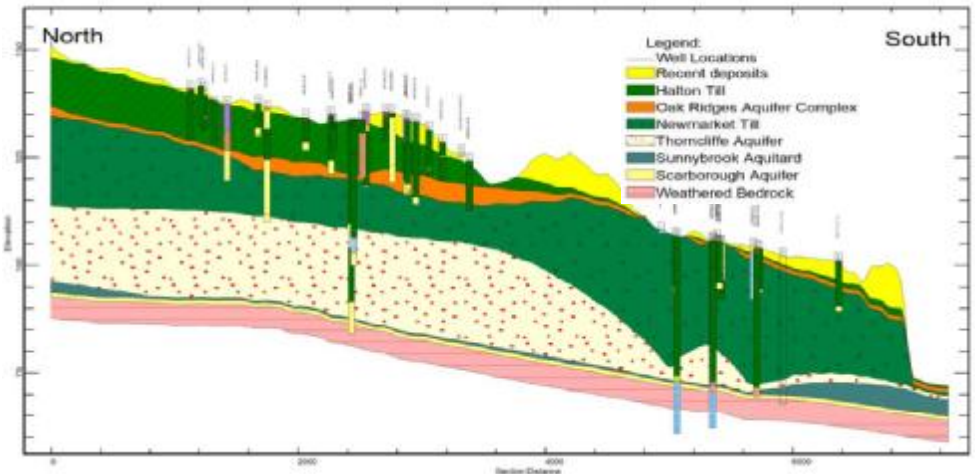
- Compilation and review of existing information and datasets related to hydrogeologic conditions;
- To identify critical gaps in the current knowledge base; and,
- To provide recommendations for the next steps.

Study Tasks

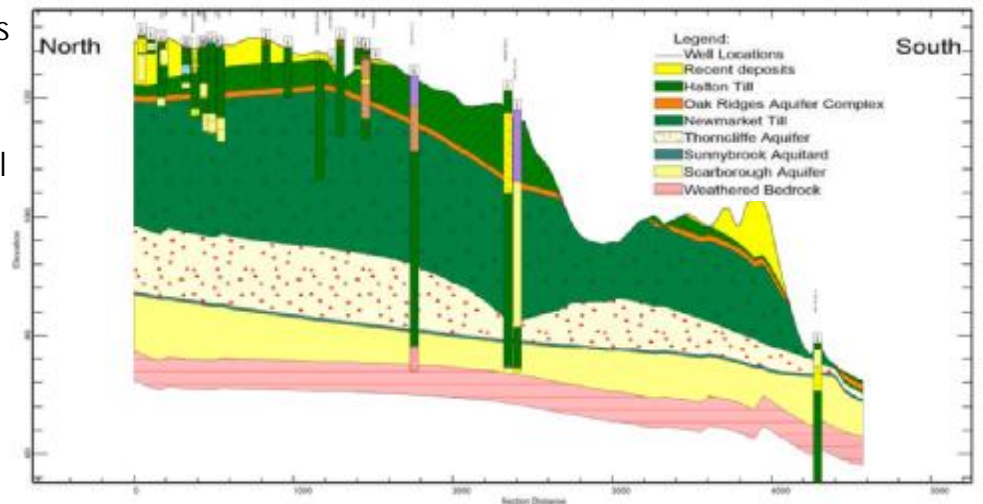
- Assessment of the existing hydrogeological conditions within the Robinson and Tooley Creek subwatersheds;
- Review of shallow and regional groundwater systems; and,
- Identification of significant groundwater recharge and discharge areas

Findings

- Robinson and Tooley Creek are located near the bottom of a regional groundwater flow system that is driven by flow between the Oak Ridges Moraine and Lake Ontario.
- Both watersheds have a net positive recharge to groundwater, and this excess recharge, while not large on a regional scale, supports both local streams and wetlands near the Lake Ontario Shoreline.
- Increased urbanization in Robinson, without preservation of groundwater recharge, will likely impact groundwater seepage into the McLaughlin Point wetland.

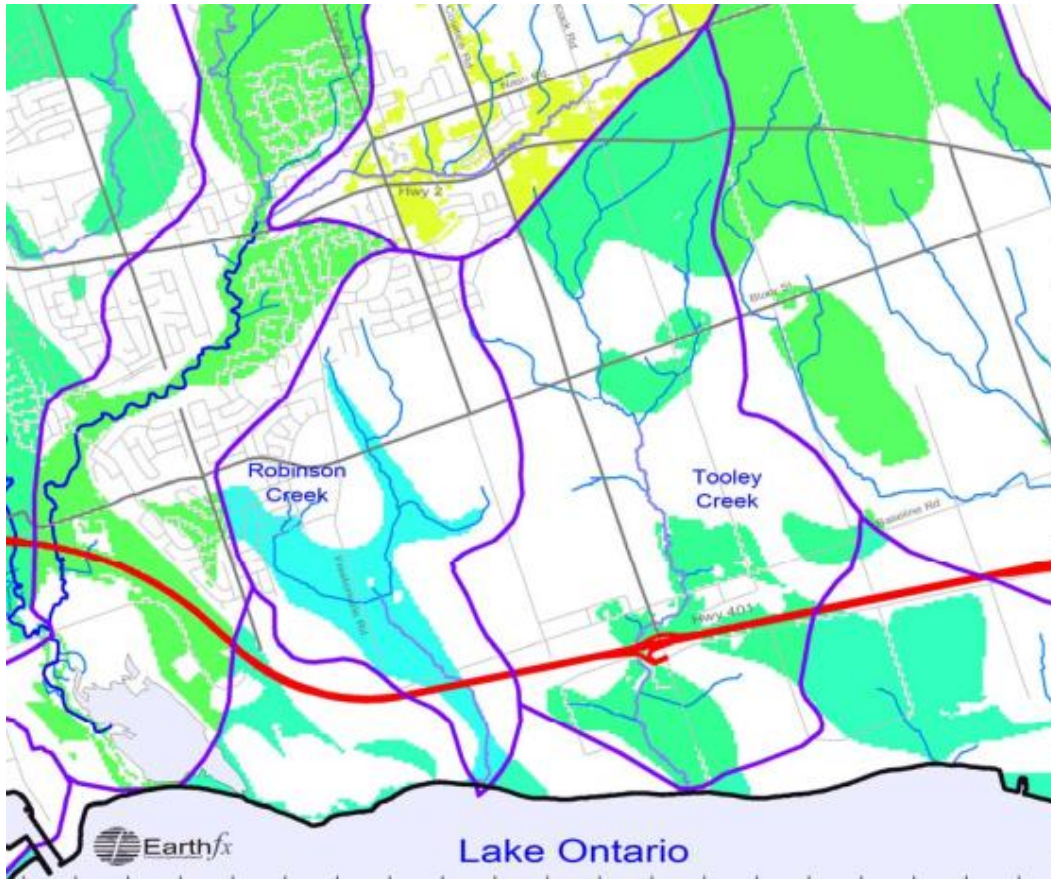


Tooley Creek Geologic cross section along Hancock Road



Robinson Creek Geologic cross section along Prestonvale Road

Groundwater Recharge and Water Budget



Water Budget Element	Robinson	Tooley
PRMS Recharge Model Results:		
Robinson Average Observed Precipitation (mm/yr)	868.0	872.3
Average Net Precipitation (mm/yr)	732.7	711.5
Avg. Net Precip. after EV(DP) Losses (mm/yr)	695.4	683.5
Average Potential ET (mm/yr)	762.6	761.4
Average Actual ET (mm/yr)	424.1	401.2
Average Interception Losses (mm/yr)	133.9	159.2
Average Depression Storage Losses (mm/yr)	37.3	28.0
Average Total ET (AET+INT) (mm/yr)	557.9	560.4
Average Runoff (mm/yr)	203.4	184.4
Average GW Recharge (mm/yr)	106.7	127.0

Note:
 ET = Evapotranspiration
 Observed Precipitation = Total measured precipitation from climate stations
 Net Precipitation = Precip. that reaches the ground surface (after interception losses to plant canopy)
 Interception Losses = Water captured by the plant canopy and lost to evaporation
 Depression Storage Losses (DPS) = Evaporation lost from small closed depressions on the ground surface
 Net Precip. after EV and DP = Net precip. that reaches the ground surface (after interception and depression storage losses)
 Potential ET = The amount of water that could evaporate if the soil was always saturated
 Actual ET = The amount of water that actually evaporates based on actual available soil moisture.
 Runoff = Water that flows along the ground surface downslope
 GW Recharge = Water that passes through the unsaturated zone to reach the groundwater table
 GW Discharge = Groundwater that discharges to streams and wetlands (baseflow)

Above: A summary of the water budget elements for each subwatershed is shown in the table. Small differences in the interception and evapotranspiration components are related to the greater degree of urbanization in the Robinson Creek subwatershed. Runoff is also correspondingly higher in Robinson, both due to urbanization and a lower percentage of surficial sand deposits.

Left: The High Volume Recharge Areas map areas generally correspond to the location of surficial sand and gravel deposits, however as these are based on the average recharge in the local subwatershed, some silt deposits in Robinson Creek are also considered locally important.



Aquifer Search
Clarington
 Earthfx
 Robinson Creek and Tooley Creek
 Subwatershed Study

Note: Subwatershed boundaries shown above are approximated from regional groundwater study

Existing Conditions

Fluvial Geomorphologic Resources

Objectives

- Characterize existing channel morphology for Robinson and Tooley Creek
- Define the geomorphic constraints for development around watercourses and the stream erosion potential under existing and future conditions
- Provide recommendations for stream restoration opportunities

Study Tasks

- Reach delineations and characterizations for Robinson and Tooley Creek including classification of geomorphic stability through use of Rapid Geomorphic Assessments (RGAs)
- Assessment of erosion potential using results of field assessment-based reach characterizations
- Meander belt delineation
- Delineation of a long-term stable slope setback, approximated using the CLOCA slope hazard lines provided for this study
- In stream restoration opportunities identified during field assessments



Above: Willow lined channel with undercut banks on Tooley Creek. Poor quality riparian vegetation due to cattle grazing.



Above: Meandering low gradient channel. Highly erodible banks. Confined valley system with limited to no valley wall contact.

Existing Conditions

Fluvial Geomorphologic Resources

Findings

- Number of assessed reaches throughout Robinson Creek and Tooley Creek were determined to be in a state of geomorphic adjustment
- The erosion potential within both Robinson Creek and Tooley Creek was determined to be as high as 15 m/100 years.



Above: Willow lined channel with undercut banks on Tooley Creek. Poor quality riparian vegetation due to cattle grazing.



Above: Meandering low gradient channel. Highly erodible banks. Confined valley system with limited to no valley wall contact.

Existing Conditions – Hydrology and Hydraulics

Objectives

- Characterize runoff response to significant rainfall events
- Define development constraints associated with regulatory floodplain limits
- Define flow rates in key tributaries which will inform the development of Phase 2 stormwater management targets

Study Tasks

- Review existing Hydrologic (rainfall and runoff) and Hydraulic (creek flow) modelling for Robinson Creek and Tooley Creek
- Extend floodplain mapping into Secondary Plan Area tributaries
- Update Hydrologic (rainfall and runoff) and Hydraulic (creek flow) models to reflect new development areas and analyse associated impact (Phase 2)
- Update Hydrologic (rainfall and runoff) and Hydraulic (creek flow) models with stormwater management solutions to determine mitigation strategies for flooding and erosion (Phase 2)



Above: Hard surfaces, such as roadways and parking lots, associated with urban development reduce the amount of water absorbed by vegetation and infiltrated into the soil. The excess runoff can result in an increased risk of flooding. The above photos were taken during a large rainfall event in the Greater Toronto Area in 2013.

Existing Conditions – Hydrology and Hydraulics

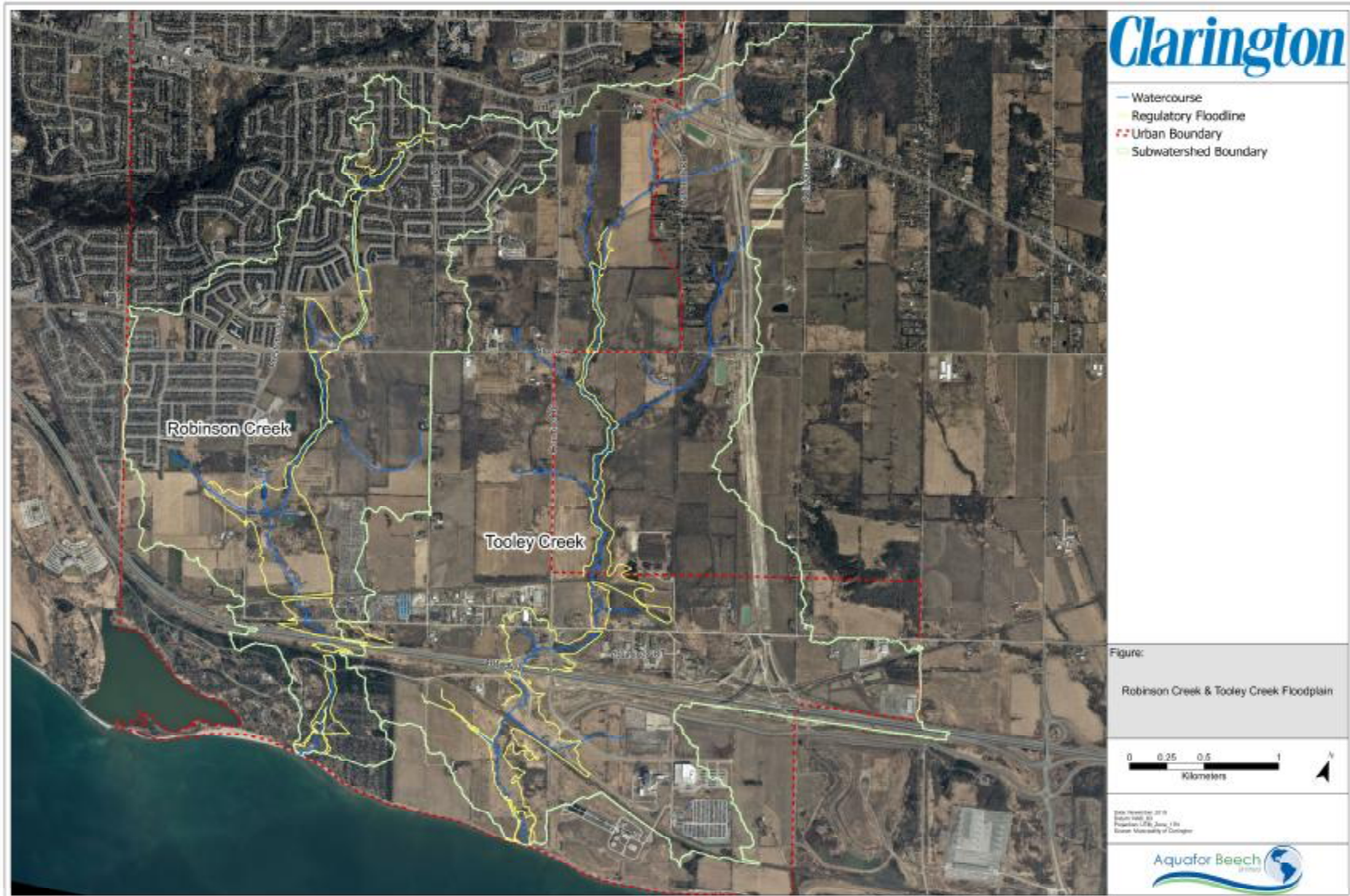
Findings

- It is recommended that Low Impact Development (LID) practices including lot level source control and conveyance control within the municipal right-of-way be considered along with end-of-pipe stormwater ponds to ensure that new development will have minimal impact on surface water resource.



Above: Hard surfaces, such as roadways and parking lots, associated with urban development reduce the amount of water absorbed by vegetation and infiltrated into the soil. The excess runoff can result in an increased risk of flooding. The above photos were taken during a large rainfall event in the Greater Toronto Area in 2013.

Existing Conditions – Floodplain



Above: Throughout the study area, the regulatory floodplain mapping developed and approved by CLOCA is used to establish development constraints. Per the Municipality of Clarington's Official Plan, no new buildings or structures shall be permitted on lands identified as natural hazard lands. The project team is currently extending the coverage of floodplain mapping on tributaries in the secondary pan areas.

Characterization – Terrestrial Resources

Objectives

Define and characterize terrestrial natural heritage features and functions:

- Components of municipal Natural Heritage System
- Habitat of Species at Risk and other species of conservation concern
- Preliminary identification of linkages and restoration/enhancement opportunities

Provide a preliminary analysis of developmental constraints based on survey results

Study Tasks

- Background information review
- Vegetation community classification
- Botanical inventories
- Amphibian surveys
- Breeding bird surveys
- Incidental wildlife observations
- Species at Risk screening
- Significant Wildlife Habitat assessment
- Significant Woodland assessment



Characterization – Terrestrial Resources

Findings

Terrestrial natural heritage features generally follow watercourse corridors or occur as isolated features within a predominantly agricultural landscape. Identified terrestrial components of the Natural Heritage System include:

- Significant Woodlands;
- Wetlands;
- Significant Wildlife Habitat (candidate – subject to further study for confirmation);
- Significant Valleylands; and
- Habitat of Endangered or Threatened Species (Butternut, Bobolink).



Characterization – Aquatic Resources

Objectives

- Define and characterize aquatic natural heritage features and functions of Robinson Creek, Tooley Creek, and tributaries
- Determine appropriate management recommendations for Headwater Drainage Features (HDFs)

Study Tasks

- Aquatic habitat assessments
- Fish sampling (electrofishing)
- Benthic invertebrate sampling
- HDF assessment
- Identification of barriers to fish movement and online ponds



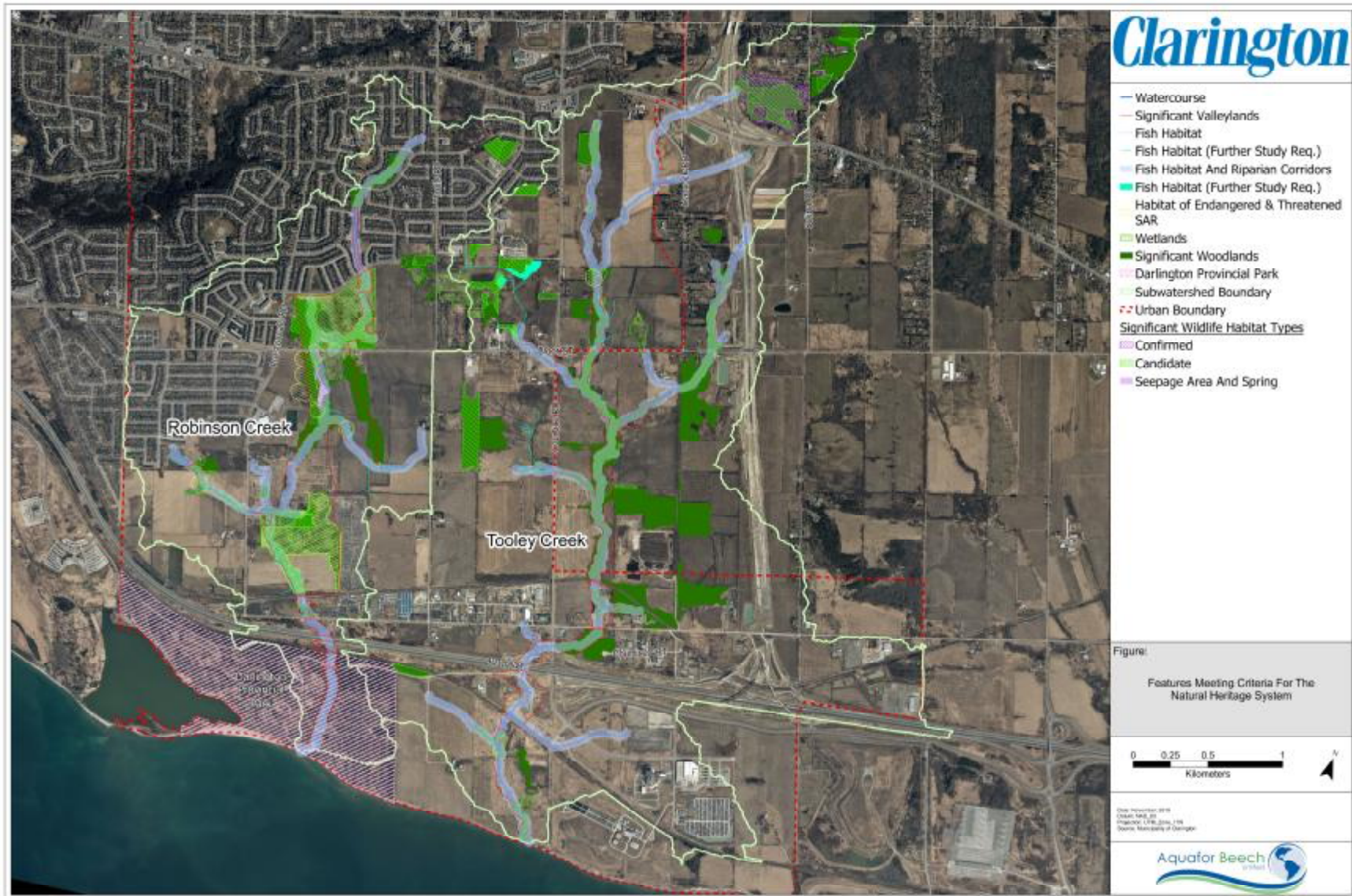
Characterization – Aquatic Resources

Findings

- Both watercourses provide varied aquatic habitat (direct and indirect fish habitat).
- Fish barriers were observed on both watercourses at the Bloor Street right-of-way.
- Benthic macroinvertebrate sampling results generally indicated poor water quality, though with potential for improvement.
- Upstream reaches/headwater areas tended to be intermittent and some were observed to be dry later in the year.
- Five fish species were recorded in Robinson Creek, representing a cool to warm water thermal regime.
- Fish sampling was not completed for Tooley Creek as the downstream reaches with permanent flow could not be accessed at that time.
- The majority of HDFs throughout both watersheds provide contributing function to watercourses.

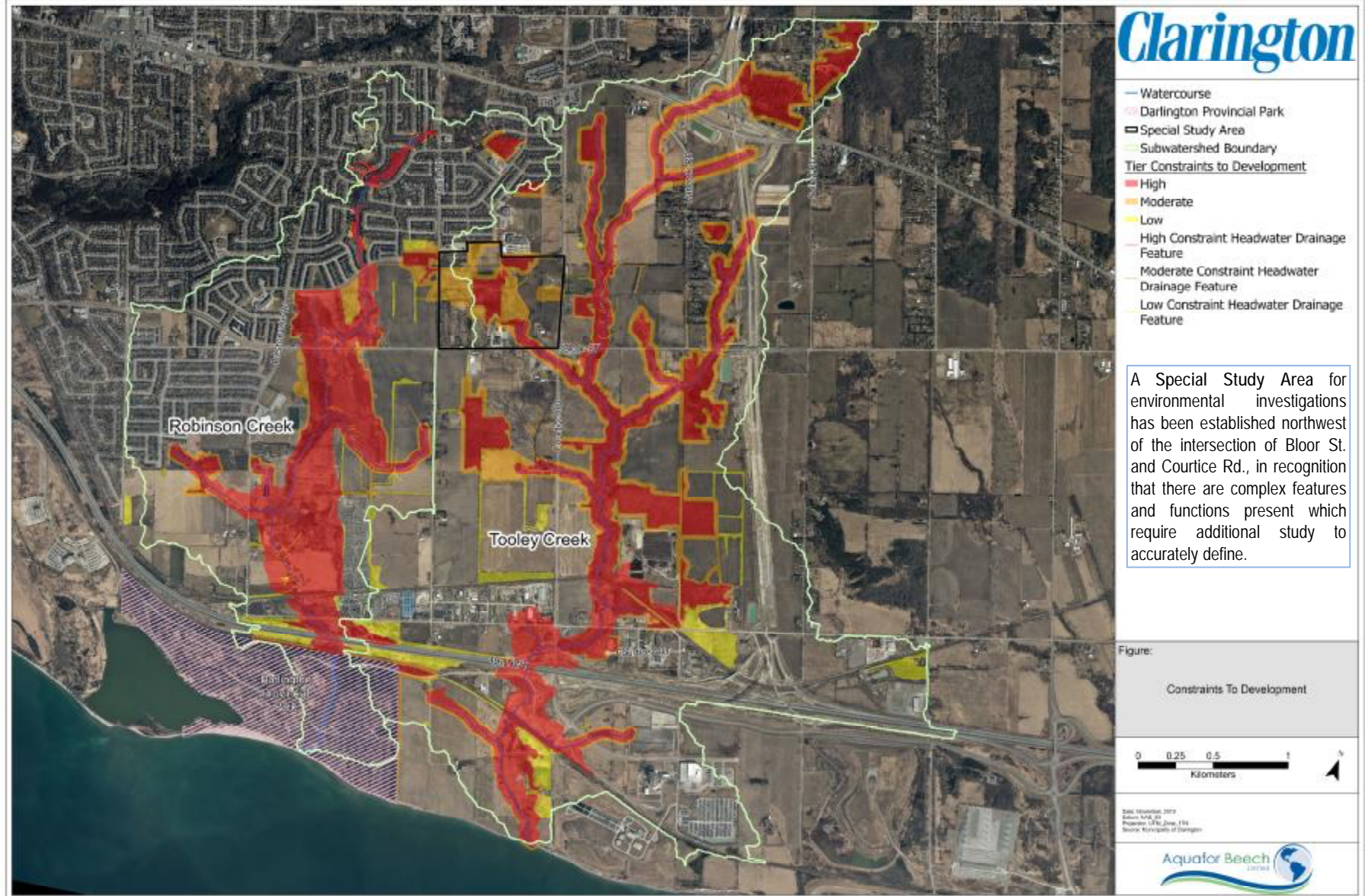


Preliminary Natural Heritage System



The above map illustrates a preliminary assessment of terrestrial and aquatic natural heritage features within the Robinson-Tooley Subwatershed Study Area, based on field investigations/assessment completed during this study. Mapping is subject to refinement following site-specific studies and consultation with the Municipality of Clarington and CLOCA.

Overview of Constraints



The above map illustrates a preliminary assessment of developmental constraints within the study area. The mapping is subject to refinement following site-specific studies and consultation with the Municipality of Clarington and CLOCA.

Overview of Constraints

High Constraint:

- Development is generally not allowable.
- Natural hazards (Meander Belt, Floodplain, Stable Slope Setback), Natural Heritage features (Significant Woodlands, Wetlands over 0.5 ha, Fish Habitat and Riparian Corridors), "Protection"-level Headwater Drainage Features.

Moderate Constraint:

- Some development intrusion may be allowable pending the results of further study.
- Most often applied to features known to require further study to accurately define feature boundaries and/or confirm sensitivity.
- Also applied to: Linkages, Vegetation Protection Zones, "Conservation" and "Mitigation"-level Headwater Drainage Features

Overview of Constraints (Contd..)

Low Constraint:

- Development intrusion is not restricted by existing policies and regulations.
- Natural heritage features not eligible for inclusion in the Natural Heritage System (e.g., isolated hedgerows, small woodlands, successional meadows) but which are encouraged to be retained as parks, stormwater management blocks, etc.

Next Steps

- Finalized Phase 1 Subwatershed Study Report (Nov. 2019)
- Preferred land use strategy to be developed (Winter 2019/20)

SWS Phase 2

- Evaluation of potential impacts of land uses on the Natural Heritage System
- Development and evaluation of preferred subwatershed management strategies
- Selection of preferred subwatershed management strategy
- Present preferred strategy to the public (PIC #2)
- Implementation

Thank You for Participating!

After this Public Information Centre, the study team will consider verbal and written comments in order to refine tasks taken as part of the Environmental Assessment.

For more information on this project, please submit your comments or feedback, by November 27th to one of the following contacts:

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Clarington

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