

A photograph of a parking lot with several cars parked. In the foreground, there are young trees and shrubs planted in the parking spaces, illustrating green infrastructure. A blue banner with white text is overlaid on the bottom half of the image.

Urban Water Symposium – from Amsterdam to Toronto Green Infrastructure

Phil James P.Eng
January 20th, 2020

The water component of STEP is a collaborative of:



About STEP

The Sustainable Technologies Evaluation Program (STEP) is a conservation authority led initiative developed to support broader implementation of sustainable technologies and practices within a Canadian context.

Current partners:



Lake Simcoe Region
conservation authority



**Credit Valley
Conservation**
inspired by nature



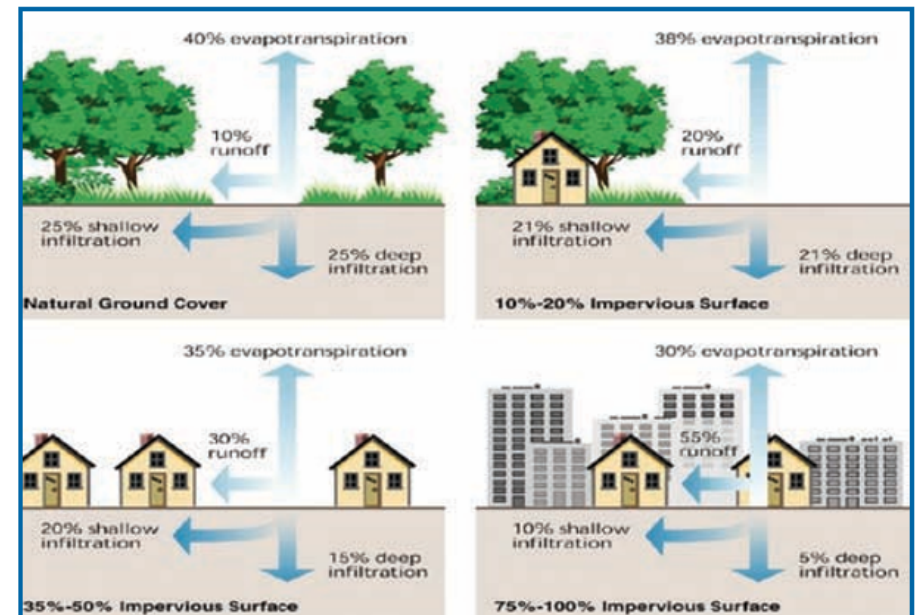
**Toronto and Region
Conservation
Authority**

Program objectives:

- Carrying out research, monitoring and evaluation of clean water technologies
- Develop strategies to overcome implementation barriers
- Develop tools, guidelines and policies
- Education, advocacy, and knowledge transfer

Green Infrastructure

- Practices that help to preserve or to restore predevelopment hydrological and ecological functions.
- For restoration, it uses distributed structural practices that filter, detain, retain, infiltrate, evapotranspire and harvest stormwater.
- Remove sediment, nutrients, pathogens and metals from runoff, and they reduce the volume and intensity of stormwater flows.



Residential, Parks & Schools



Residential Home LID Retrofit, Alton, ON



Portico Church, Mississauga, ON



Glendale P.S., Brampton, ON

Road Allowances



Institutional, Commercial, Industrial



LSRCA Head Office, Newmarket, ON



IMAX Office, Mississauga, ON

Performance Monitoring

Metric	Criteria	Performance at Elm*	Criteria Met?
Peak Flow Reduction (%)	100-Year Post equal to Pre	60% Reduction	N/A
Runoff Volume Reduction	15 mm	24 mm	✓
TSS Removal (%)	80%	88%	✓
Total Phosphorous Removal (%)	50%	91%	✓
Effluent Zn Removal (%)	20 µg/L	12 µg/L	✓

Criteria/ Anticipated Performance Sources:

City of Mississauga Stormwater Credit Program (Peak and Total Volume)

MOE Stormwater Management Planning and Design Manual 2003 (TSS, TP)

LSRCA Technical Guidelines for Stormwater Management Submission (Phosphorous)

*Based on data 2011 to 2015 (inclusive)

Knowledge Transfer & Translation

- Wiki Guide
- Modelling Tools
- Standard Operating Procedures
- Training



Passive and Active Controls

Passive

- Use of stagnant hydraulic structures such as weirs, drains, orifice plates to regulate the release of water



Active

- Valve configuration and controller used to regulate discharge
- Controller programmed to optimize release of water
- “Smart” system approach



Why Hasn't Wide Scale Adoption Occurred?

- Return on Investment key determinant for property owner expenditures in on-site SWM
- Current incentive programs do not tip the scales in favour of adoption
- Small- to medium-sized businesses cannot afford up front capital costs, but comprise 95% of all businesses

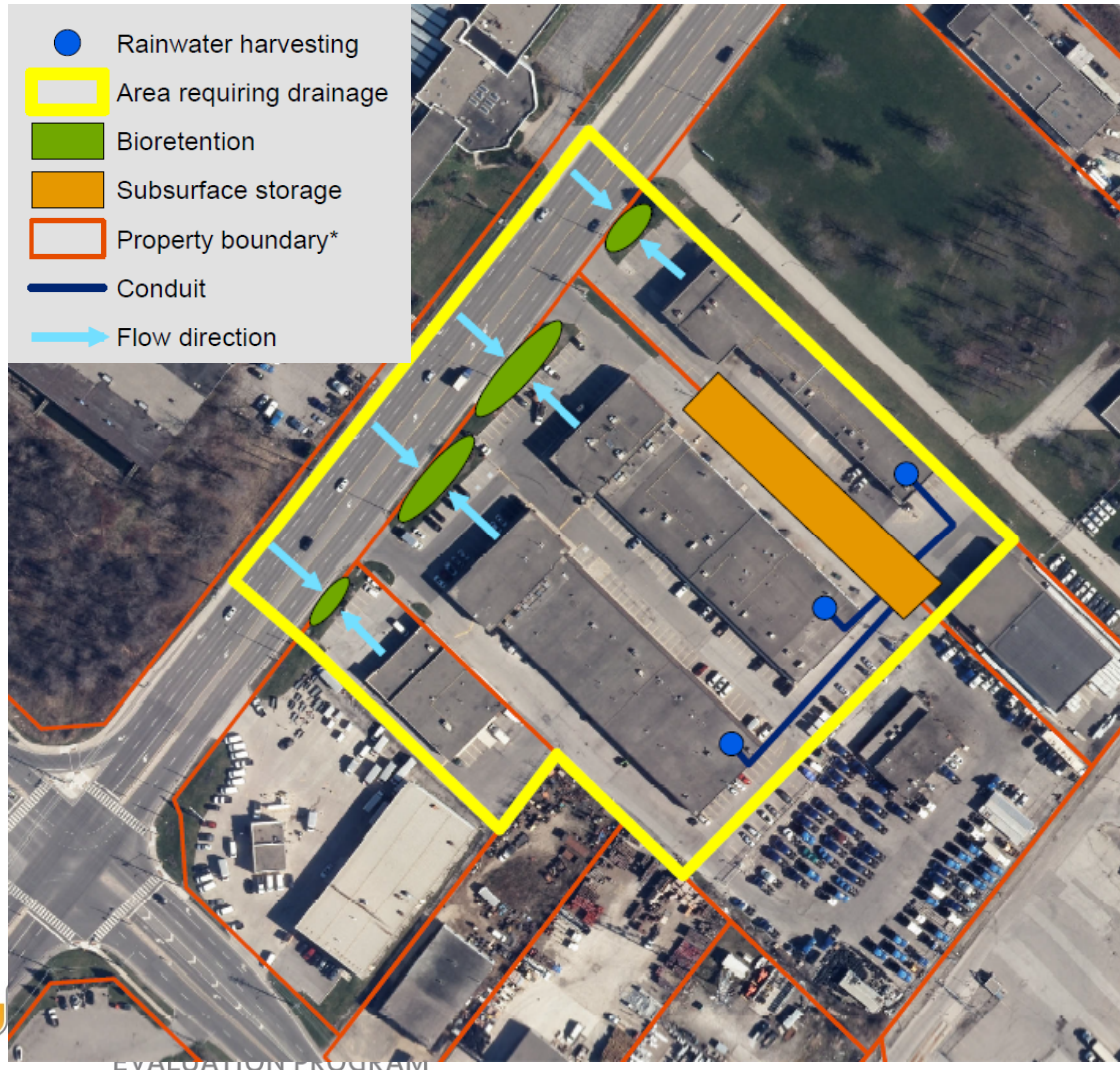


Making GI Mainstream

*Exploring the technical
and financial feasibility of
implementing communal
stormwater management
systems on private
property*



Communal Stormwater Management



Cost is distributed fairly between landowners.

- Economies of scale
- Maximize performance
- Maximize savings (stormwater, water, energy)



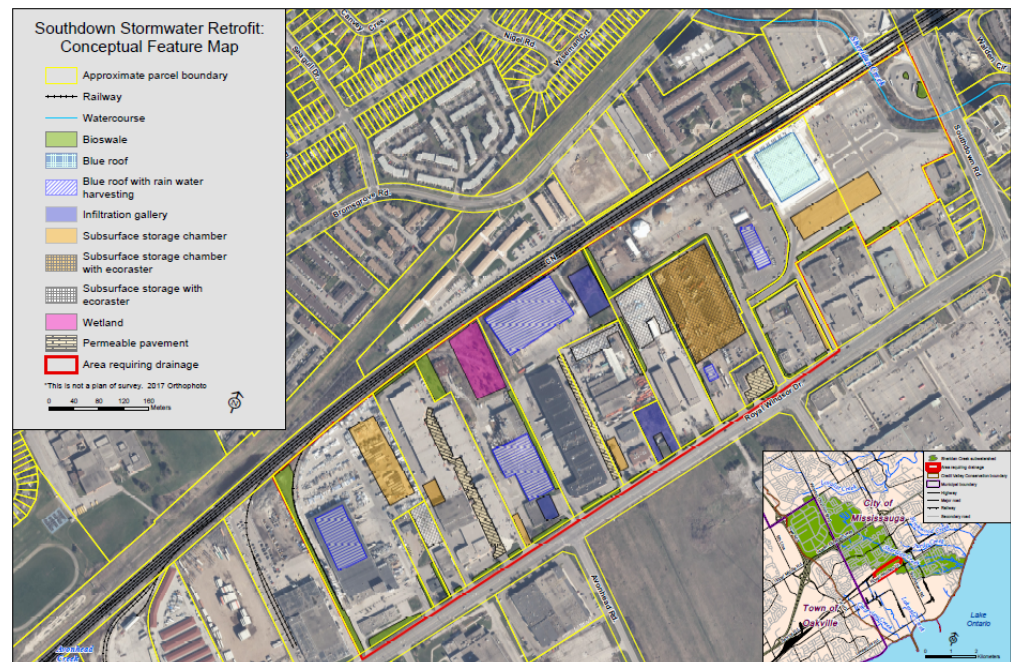
Tree Bioretention

Enhanced Swale

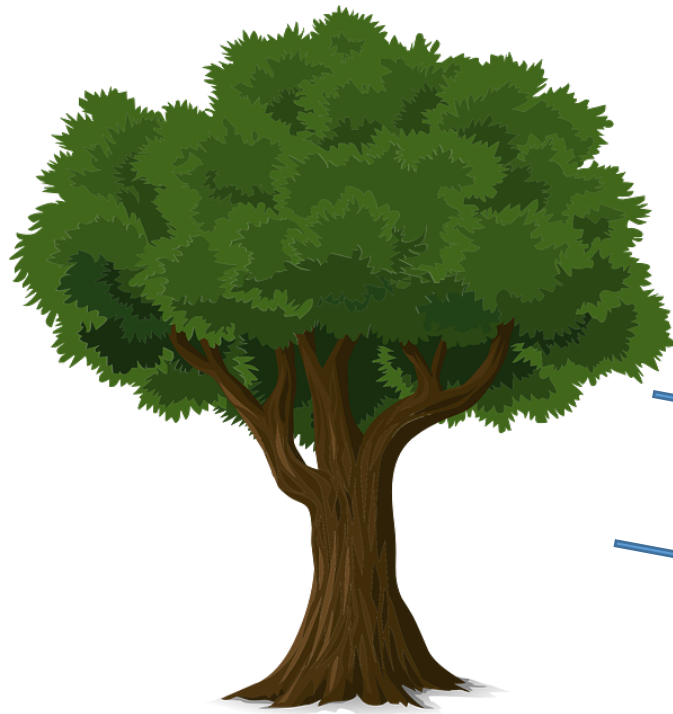
Storage

Operate & Maintain as a System

- Inspect and maintain the system as a whole
- Share in the inspection and maintenance costs (proponents and actors)
- Ensure system functions into the long term



Co-Benefits



Air quality improvements
\$-\$\$

Urban heat island reduction
\$-\$\$

Water Conservation
\$-\$\$

Reducing I&I
\$-\$\$

Exploring the Use of the Drainage Act

- The Drainage Act is an Ontario Statute that provides a process for the construction and maintenance of communal drainage works on private lands and public roads.
- Provides methods for assessing benefits, allowances and apportioning costs.
- Infrastructure is protected under a bylaw

Aggregated, Communal Approaches to Green Infrastructure Implementation

The STEP Water partners have developed and monitored many successful projects that demonstrate the benefits of green infrastructure (GI) and low impact development (LID) for stormwater management. Despite the proven success and benefits of GI, there are still barriers preventing wide-scale implementation, particularly on private property in existing developments. This is largely due to the associated capital costs. The aim of this project is to find ways to overcome this hurdle through aggregation, where private and public properties are grouped together to facilitate the communal and cost-efficient management of stormwater. As part of this project, the potential of the provincial Drainage Act (R.S.O., 1990) to assist in the aggregation process is being considered, since applying the mechanisms available within the Act will result in cost savings as well as the optimization of feature selection, sizing and overall performance.



<https://sustainabletechnologies.ca/>

Thank You – Questions?

For more information:

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