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Green Infrastructure Opportunities

Tim Van Seters

March 7, 2019

The water component of STEP is a collaborative of:

Lake Simcoe Region conservation authority

Credit Valley Conservation inspired by nature

Toronto and Region Conservation Authority

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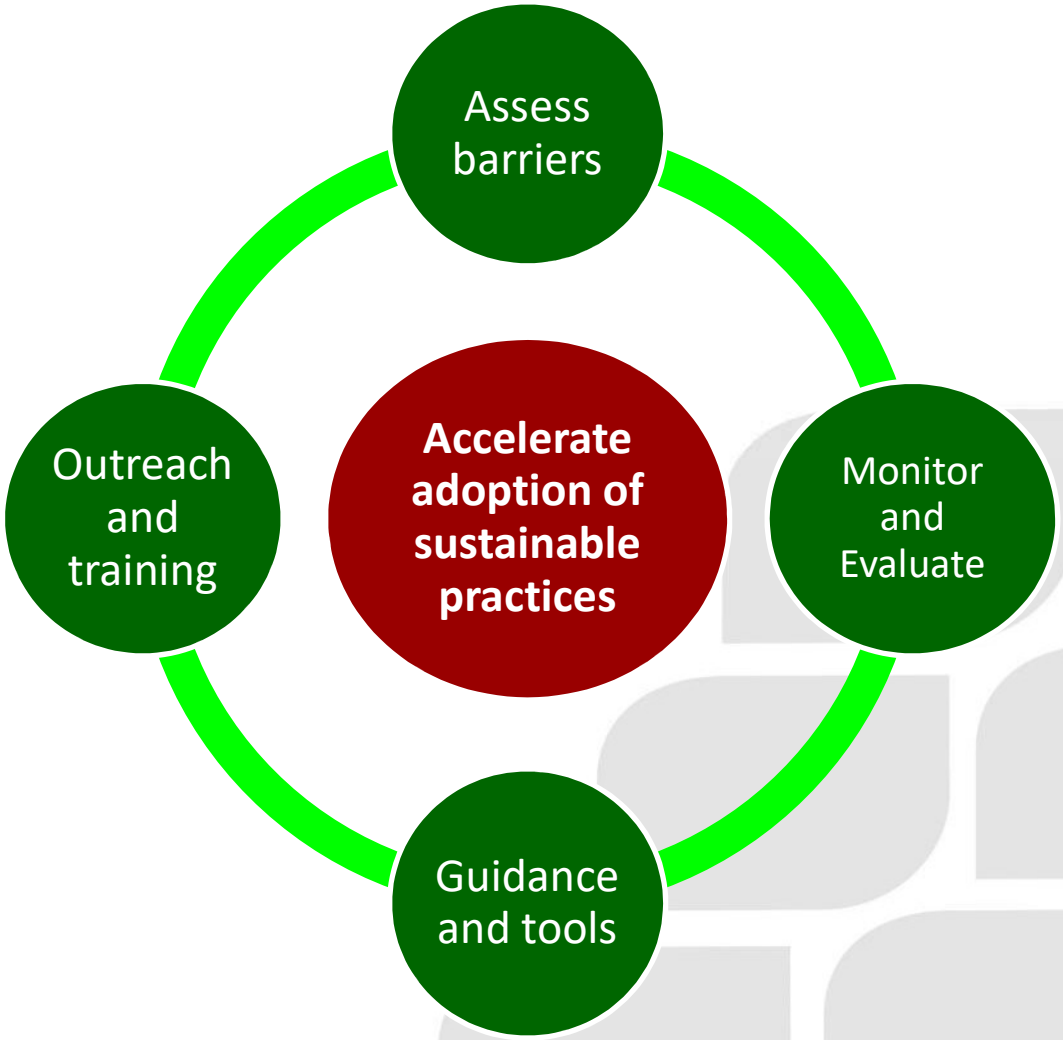
Sustainable Technologies Evaluation Program



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Enhancing Natural Cover in Cities

Parking Lots

Road right of ways

Parks

Private Property

Buildings

Subdivisions

Walkways

Laneways

Trails

Roadside Opportunities

Lakeview Retrofit, Mississauga

92% Volume Reduction
93 % TSS reduction
83% TP reduction

BEFORE

AFTER

Vegetated bio-swales

Grass swales

Manicured Gardens

Gardens with curb cuts

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Seattle Street Edge Alternative (SEA) Streets

BEFORE

- Wide streets with grass swales
- Low infiltration

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AFTER

- Narrow streets with curves
- flush curbs, deep swales
- Shorter driveways, overflow sewers

Seattle SEA Streets

99% Volume and TSS Reduction

Front yard rain garden

Sidewalk and flush curb combination

Vegetated and mulched bioswales

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Parking Lots

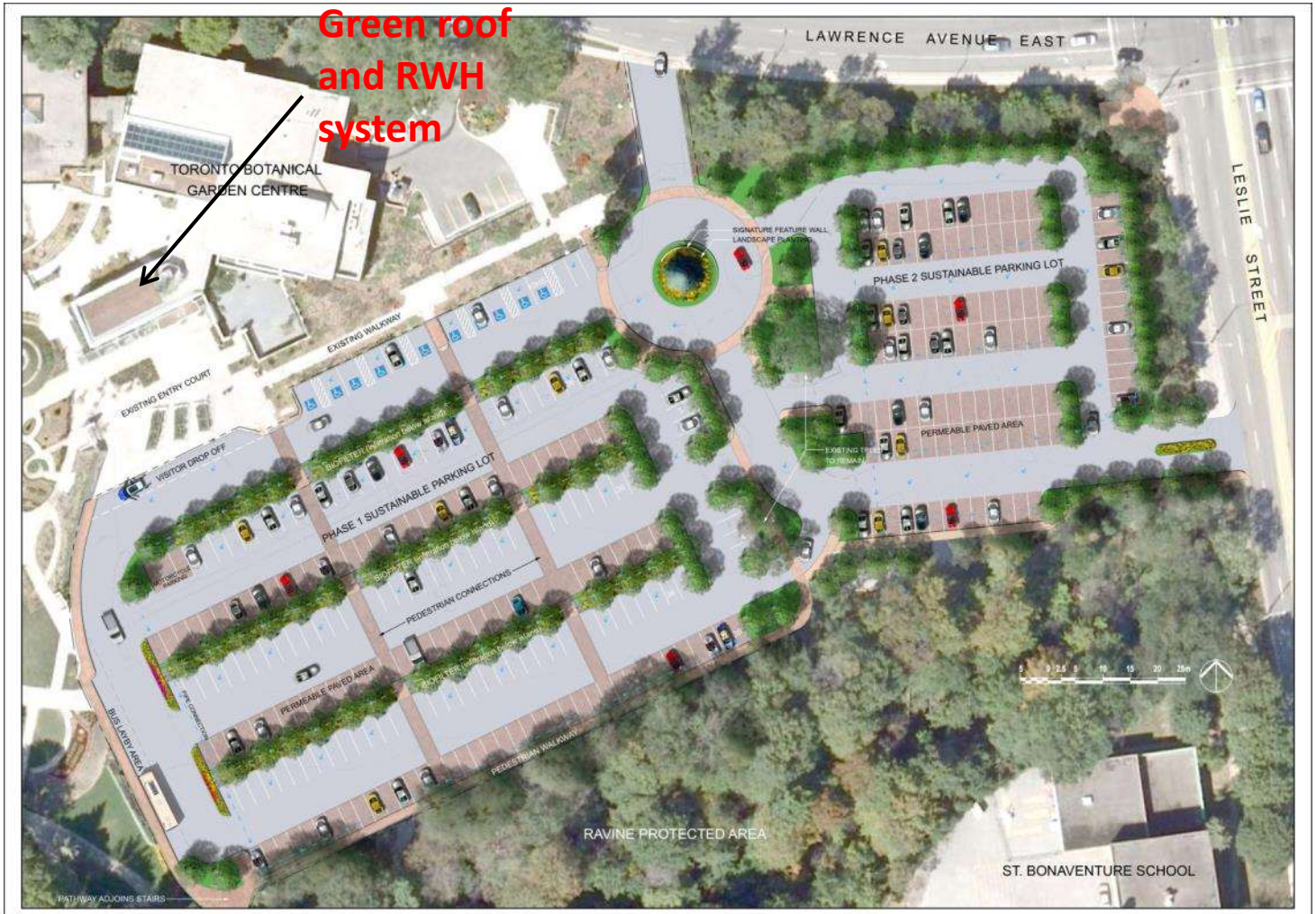
Edwards Gardens, Toronto

Before

- 89% asphalt
- 11% lawn
- 20 trees

After

- 24% PP
- 50% asphalt reduction
- 85 trees
- 1.2 km exfiltration pipe and tile drain



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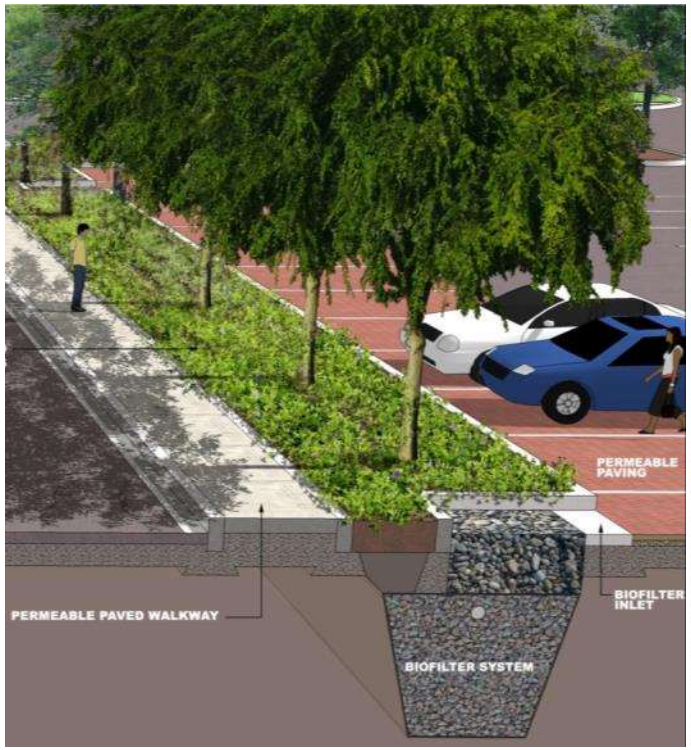
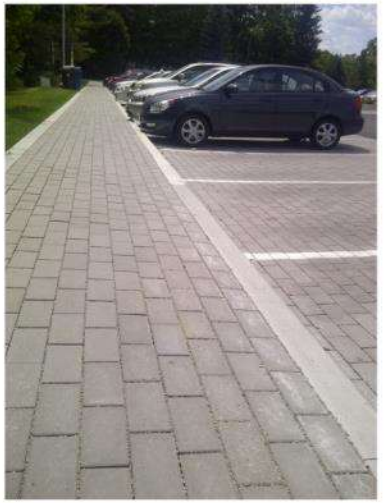
Courtesy: Schollen & Co. Inc.

Edwards Gardens





Bioretention system

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Courtesy: Schollen & Co. Inc.

New Seasons Market, Portland

Bio- swales ring the site

Planters drain road runoff

Roof runoff drains to bio-retention cell with public art

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Commercial and Institutional

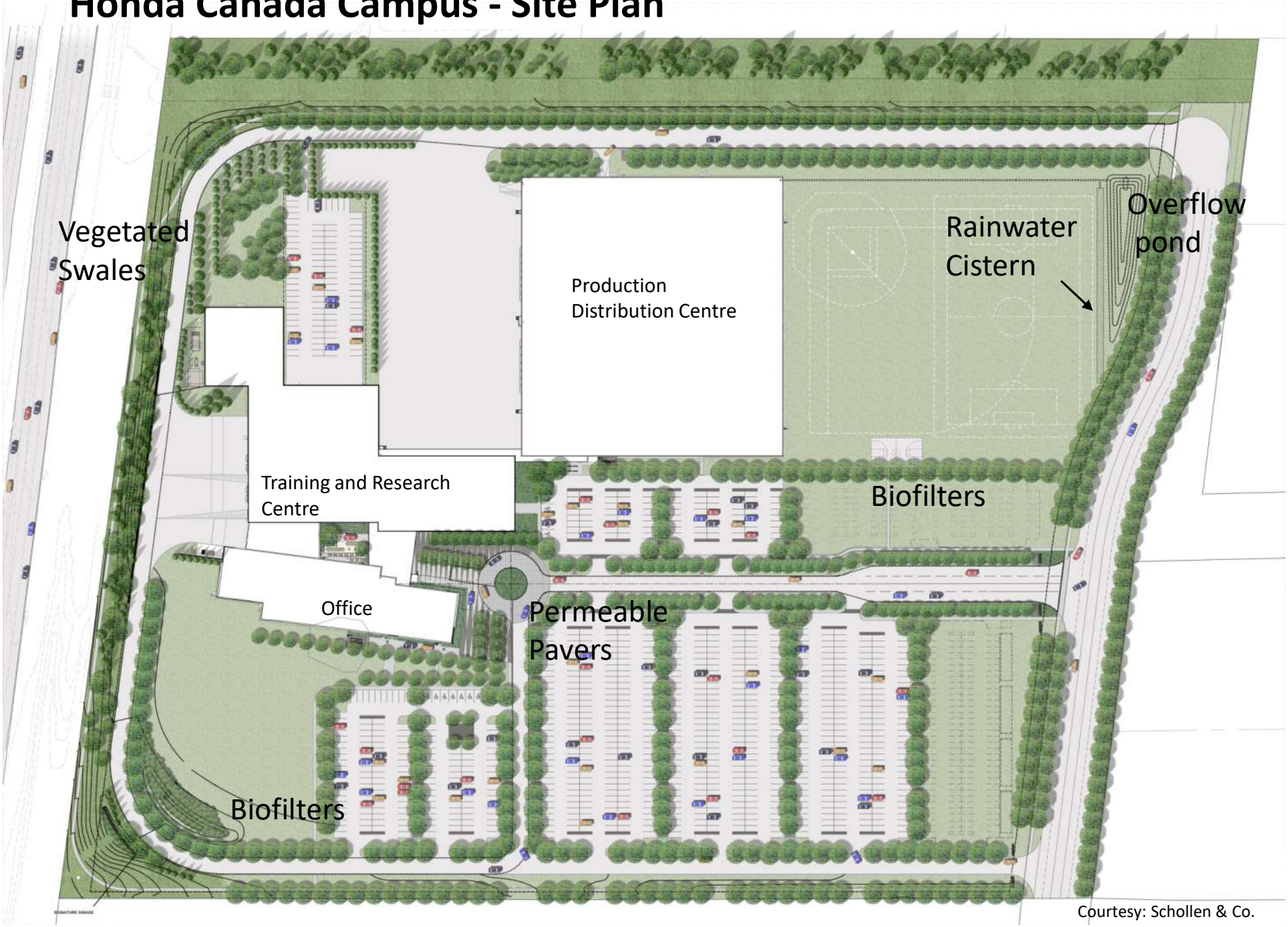
Commercial Parking Lot
Honda Campus, Markham

Objectives:

- Stormwater management
- Optimize efficiencies
- Utilize the landscape as a functional system
- Sustainability vision and clean, minimalist aesthetic
- Achieve LEED certification

ZAS HOK Architects
Schollen & Company Inc.
Sabourin Kimble and Associates

Honda Canada Campus - Site Plan

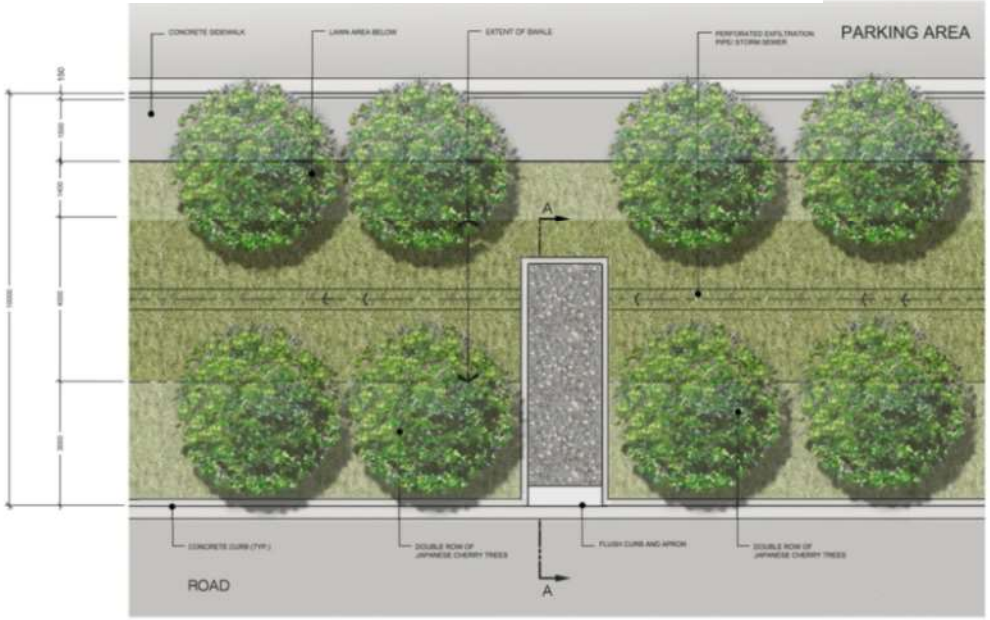


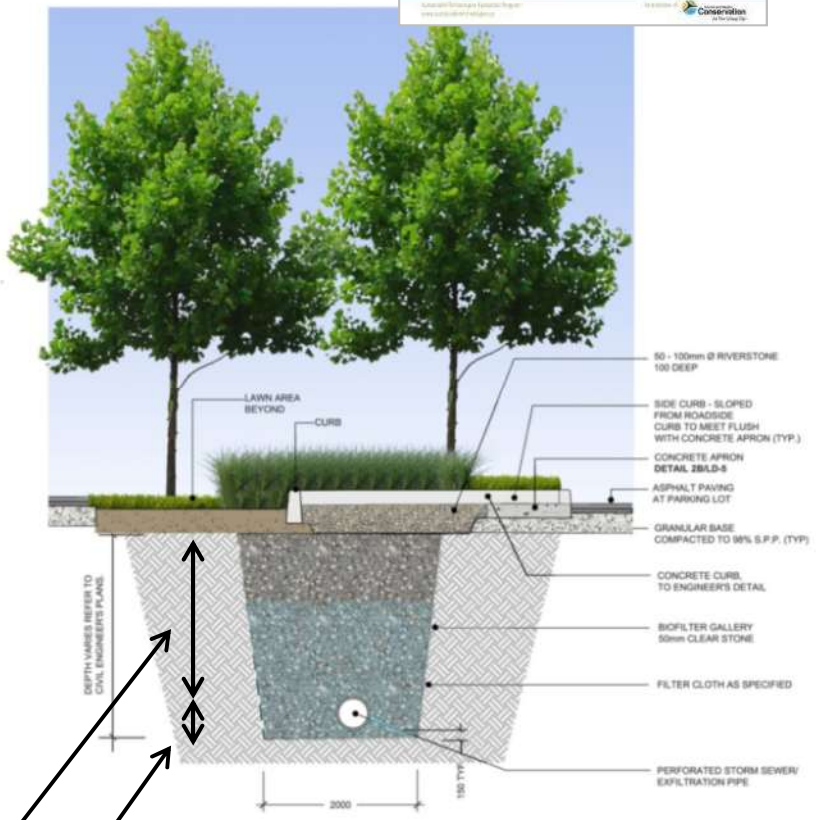
Courtesy: Schollen & Co.

Biofiltration System

Meets 100 yr peak flow control, water quality and water balance criteria

Study Report on effectiveness





Active flood control storage

Water balance/water quality

Courtesy: Schollen & Co.

Site Photos

10% Less Expensive
Maintenance similar to conventional curb and gutter


Natural drainage


Paving and vegetation in courtyard


Permeable Pavers


Rainwater cistern


Fitness path and drainage swale


Biofilter

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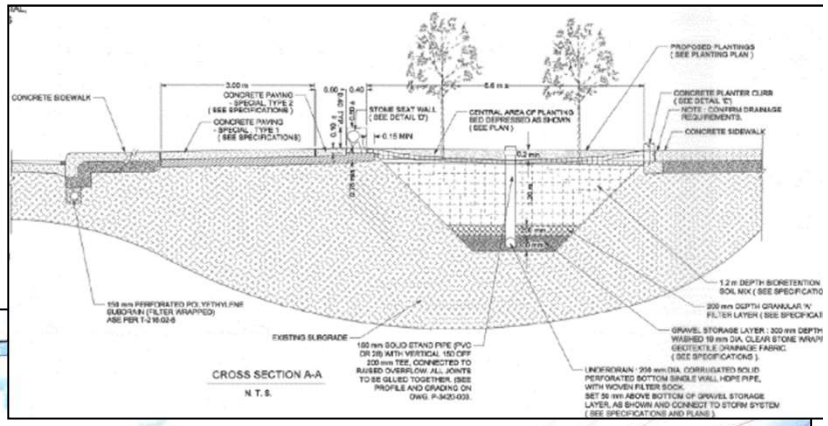
Courtesy: Schollen & Co.

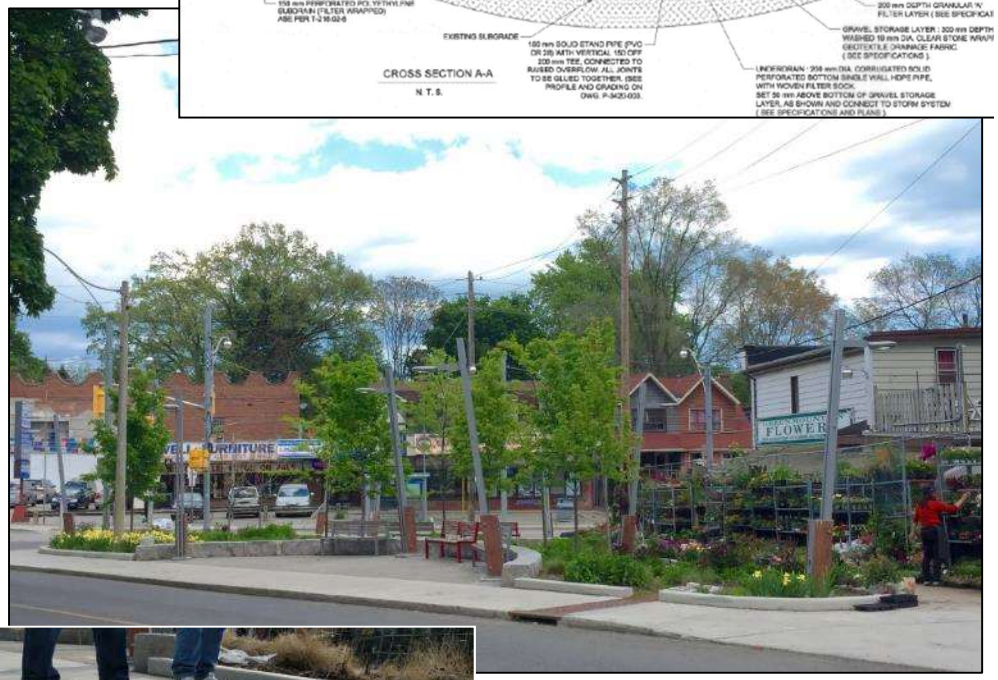
Parkette Opportunities

Fairford – Coxwell Parkette

BEFORE

AFTER





Photos: courtesy of Sheila Boudreau

Outreach

Resilient Parks, Resilient City: The role of green infrastructure and parks in creating more climate-adaptive cities

by Jake Tobin Garrett | Jul 25, 2017 | Blog, Building Solutions | 0 comments

TORONTO GARDENS

A NOUN. A VERB. A BLOG.

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GARDENS + DESIGN

PILOT RAIN GARDEN PARKETTE AT FAIRFORD AND COXWELL

JUNE 1, 2017 9 COMMENTS

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CASE STUDY

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Low Impact Development Series

Fairford Parkette, Toronto Green Streets

Image courtesy of City of Toronto

Opened in the fall of 2015, the Fairford Parkette is an official Toronto Green Streets pilot project completed as a partnership between City Planning and Toronto Water. The site was first identified as a priority location for improving traffic flow and pedestrian safety in 2014, and the City took the opportunity to retrofit it as a green infrastructure demonstration site. For the project, the right turn lane from Fairford Avenue eastbound to Coxwell Avenue was eliminated and the space was used to build a landscaped bioretention area and public seating.

Incorporating green infrastructure when performing upgrades or replacing existing infrastructure is one method the City of Toronto is using to help improve its resiliency to storm events while enhancing neighbourhood aesthetics. This is also in line with recommendations from the City's Basement Flooding Protection Program, which investigated the causes of basement flooding and recommended strategies for building capacity and resilience in the City's stormwater sewer network.

While the construction of green infrastructure in public right-of-ways can raise some challenges (e.g. space constraints, working around existing infrastructure), the features can create functional stormwater management areas that also serve as attractive and practical public spaces. By locating eye-catching Green Streets pilot projects in public spaces and designing the sites such that passersby can see how stormwater moves through the system, these demonstration sites can also help to enhance public comprehension and support of green infrastructure.

Toronto's Green Streets Technical Guidelines provide advice on the integration of green infrastructure within typical street elements (image courtesy of City of Toronto).

Featured practice:
- Bioretention

Groups involved:
- Urban Design within City Planning
- Toronto Water
- Transportation Services
- Parks, Forestry and Recreation
- Parks, Capital and Operations and Maintenance
- Engineering and Construction Services

Budget:
$350,000
Actual: $320,000

Construction:
July 2014 to September 2015

Résilience Urbaine Toronto (4 part film),

Chrystelle Maechler, Creative Content, Director, Producer.

Tree Canopy Enhancement Opportunities

Maximize benefits

Traditional tree trench

Standard Soil Volume = 15 m^3
Compacted soil
Approx 20 year life span
Smaller canopy
Limited stormwater benefits

Soil Cells

Target Uncompacted Soil Volume = 30 m^3
50 year life span
Large Canopy
Stormwater volume reduction
Stormwater treatment

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Soil Cells are Popular in Canadian Cities

Sugar Beach, Toronto

Bloor Street (6 Blocks), Toronto

Lorne Street, Downtown Regina

The Armature, Downtown Edmonton

Civic Square, Mississauga

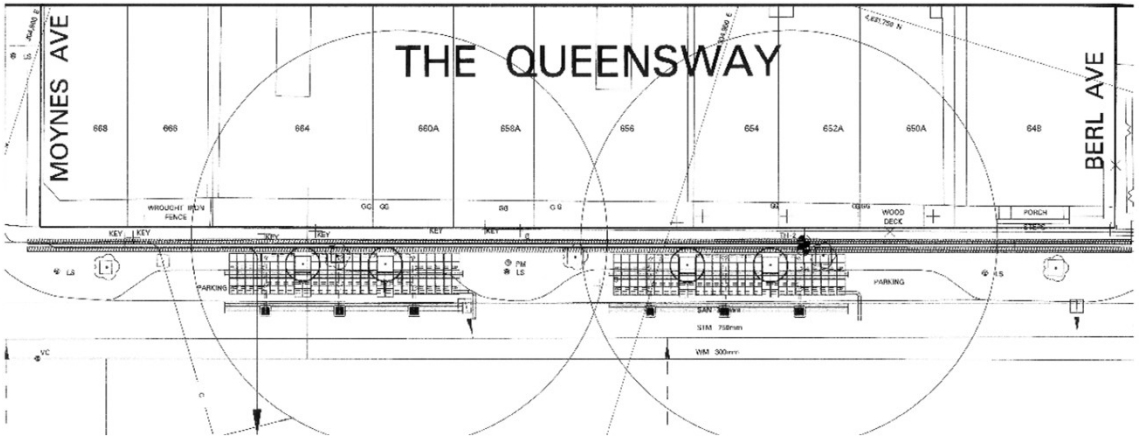
Queen's Quay, Toronto

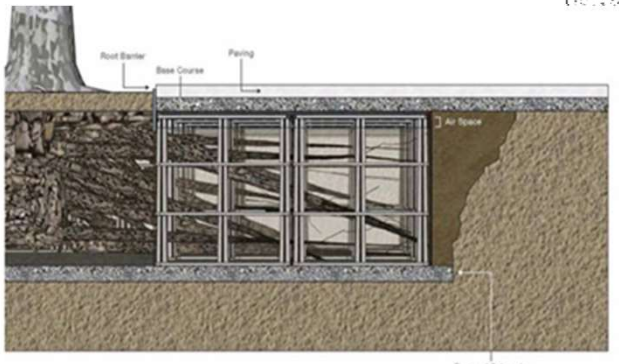
Source: DTH and Deep Root

Queensway Sustainable Sidewalk Pilot

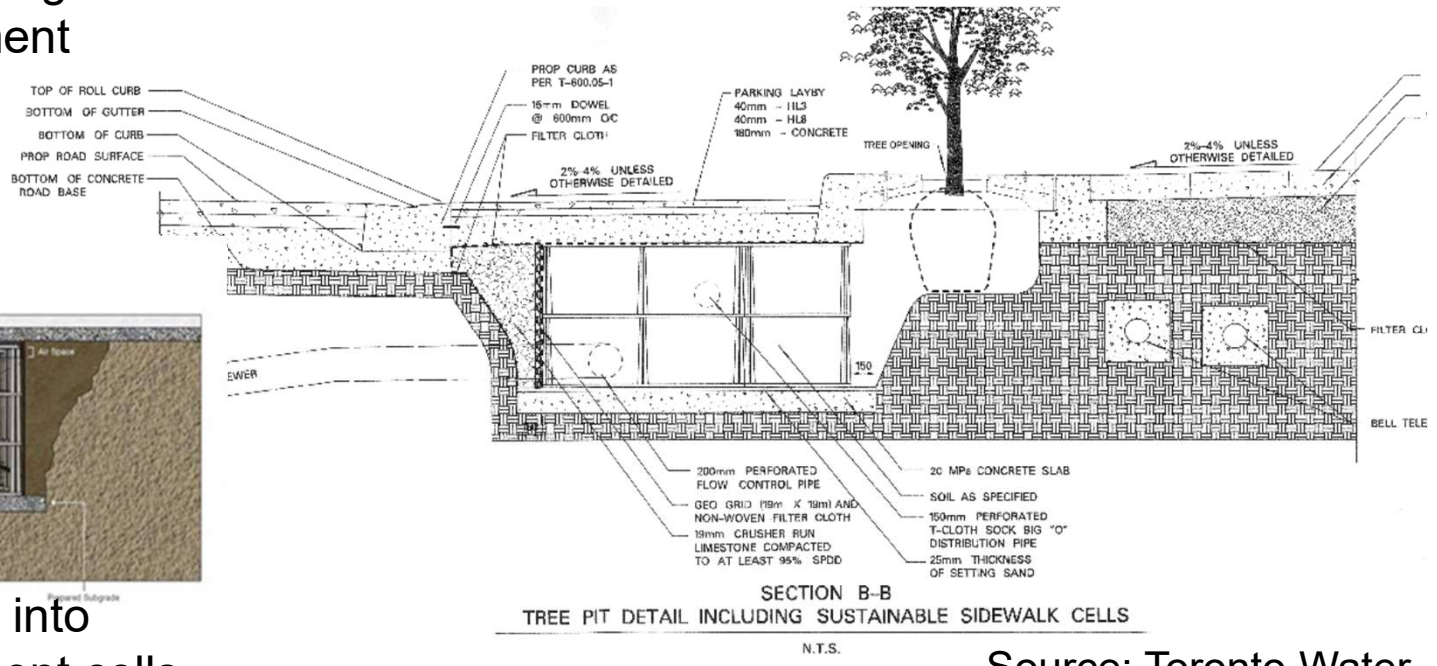
97% TSS reduction
87% TP reduction
At least 85% loss

Utilities weave through suspended pavement openings





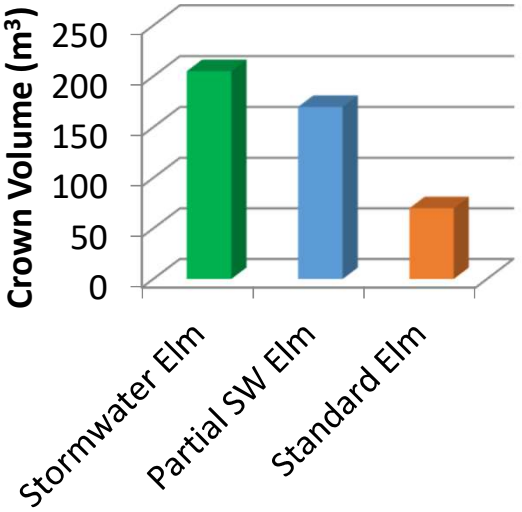
Tree roots expand into suspended pavement cells



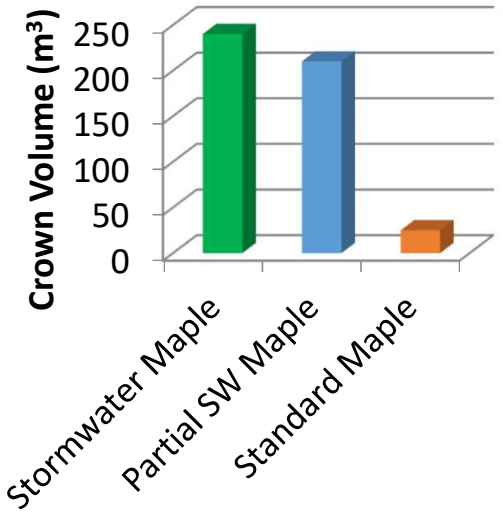
Source: Toronto Water

Photos: June, 2018

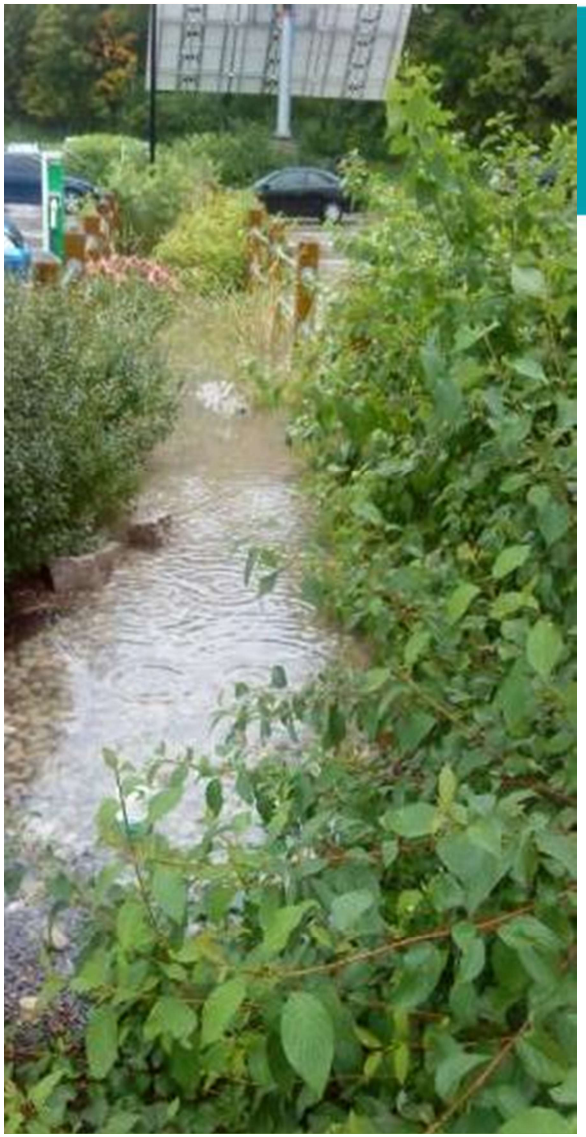
Receives stormwater since installation in 2008



Receives stormwater runoff during first 2 years only



Standard street trees (**no stormwater**, same age)



Key Take-homes

- Climate benefits maximized through:
  - Conservation
  - Impervious cover conversion
- Optimize costs by building only what you need
- Stormwater performance typically exceeds expectations
- Don’t do it if you can’t maintain it
- Make it easy to maintain
- Focus on win-wins

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Lots of Resources Available

LID Planning and Design Guide now in a Wiki

Resource library

Thank you for listening!

For more information:

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Durham Region Natural Environment Climate Change Summit

Brought to you by: the Natural Environment Climate Change Collaborative, with support from the Region of Durham and Enbridge

thank you

thank you