Strategies for developing green infrastructure operation and maintenance capacity in the City of Toronto

STEP Webinar

September 16, 2021

Overview

- Green Streets at the City of Toronto
- Asset Management and Maintenance Framework- Who owns and maintains what?
- Right-of-Way Horticulture- Green Streets & Orphan Spaces
- GreenForceTO – pilot update, successes and challenges
- Questions

Green Streets

Overview of Green Streets at the City of Toronto

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Green Streets

A Green Street is a road or street that incorporates green infrastructure. As defined in the Official Plan green infrastructure means natural and human-made elements that provide **ecological** and **hydrological** functions and processes. Green infrastructure in the right-of-way may include components such as stormwater management systems, street trees and permeable surfaces.

Byng Avenue, Etobicoke
Green Infrastructure: Bioswale

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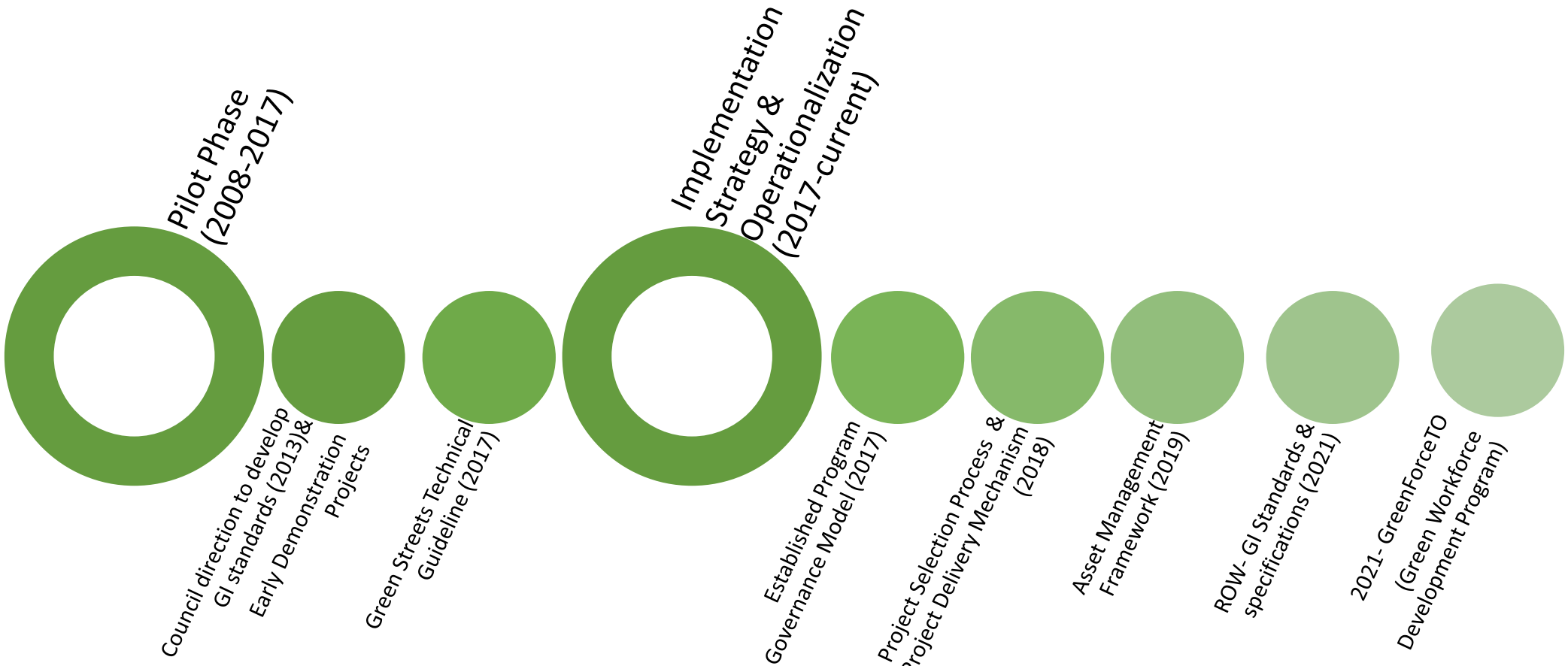
GREEN STREETS TIMELINE – Past to Present



Ongoing Training, Workshops & Engagement






Sustainable Technologies
EVALUATION PROGRAM

Fostering Sustainability
Through Innovation

the green infrastructure
leadership exchange
A practitioner network supporting green infrastructure communities

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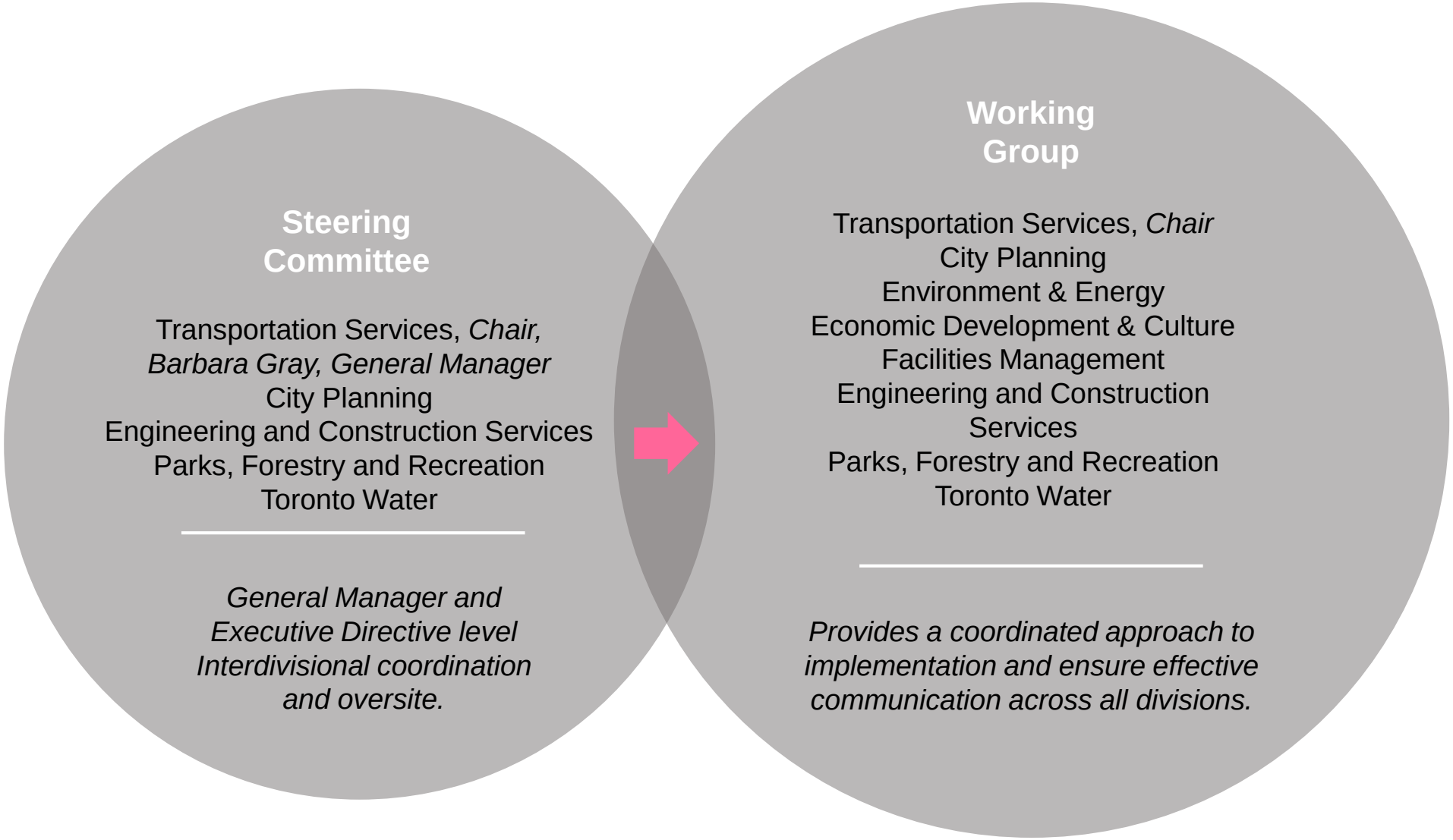
Green Streets Governance Model (established 2017)



RYERSON AVENUE

Delivered through Transportation Services Neighbourhood Projects Team- this project at Wolseley St/Carr St intersection used continuous soil trenches for street trees and installed (8) bio-retention planters; widened the sidewalk, shortened the pedestrian crossing and amended accessibility issues for the Theatre building.

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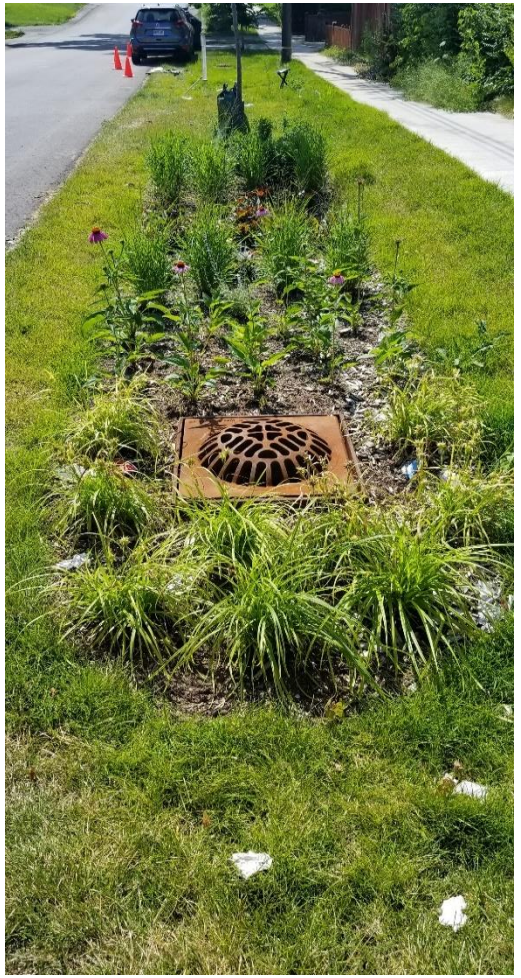
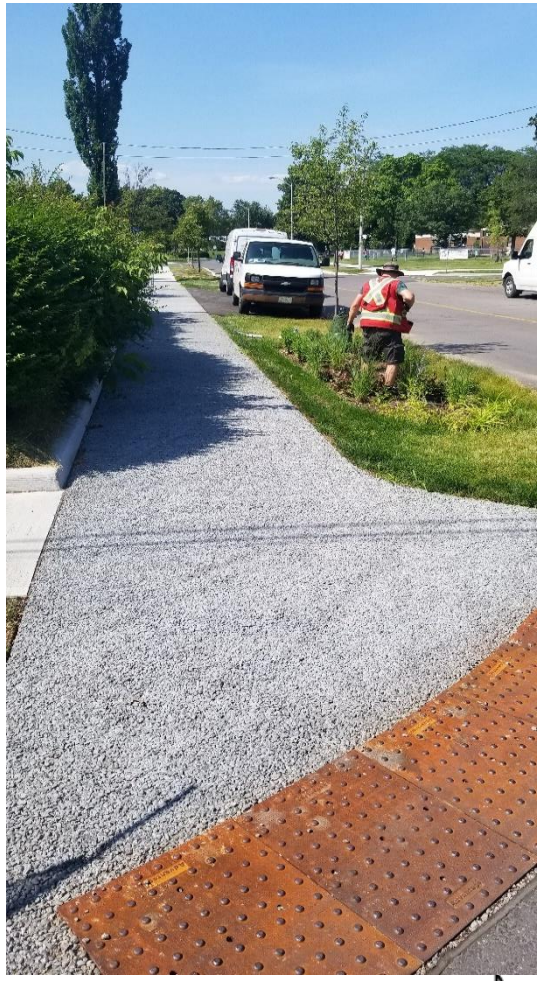
BYNG AVENUE RECONSTRUCTION





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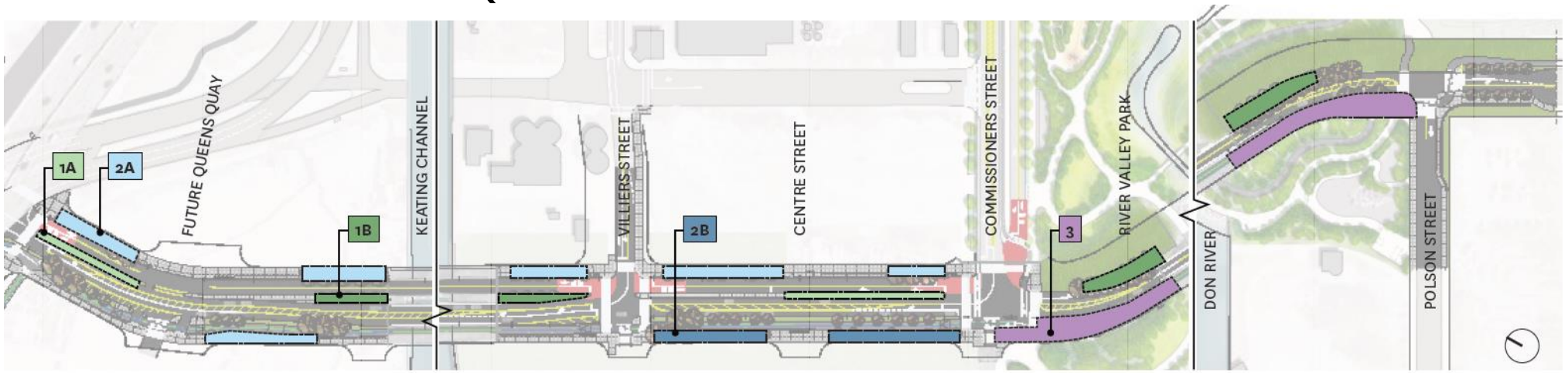
CHERRY STREET (PORT LANDS FLOOD PROTECTION)



1A ENHANCED GRASS SWALE

CHARACTERISTICS:

- Treat and convey road runoff
- Snow storage
- Low maintenance
- Max. ponding depth of 150mm

1B BIOSWALE

- Treat and convey road runoff
- Snow storage
- Low maintenance
- Max. ponding depth of 150mm

2A OPEN PIT PLANTER

- Treat and convey sidewalk runoff
- Uses structural soil cells below slab

2B PASSIVE IRRIGATION UNDER OPEN PIT PLANTER

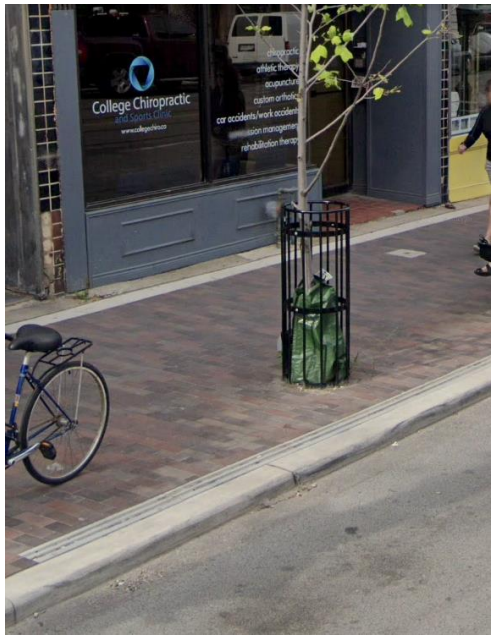
- Treat and convey sidewalk and multi-use trail runoff
- Uses structural soil cells below slab
- Stormwater reuse as passive irrigation

3 R.O.W. EDGE DRAINAGE

- Convey sidewalk and multi-use trail runoff into Park

Design for Maintenance

- Operations review of designs is critical to ensure ongoing functionality;
- Include access for maintenance considerations (trucks, equipment, road closure requirements);
- PRE-TREATMENT- Keep sediment where it’s easier to clean out (forebays, sediment pads)
- Preventative maintenance vs reactive maintenance



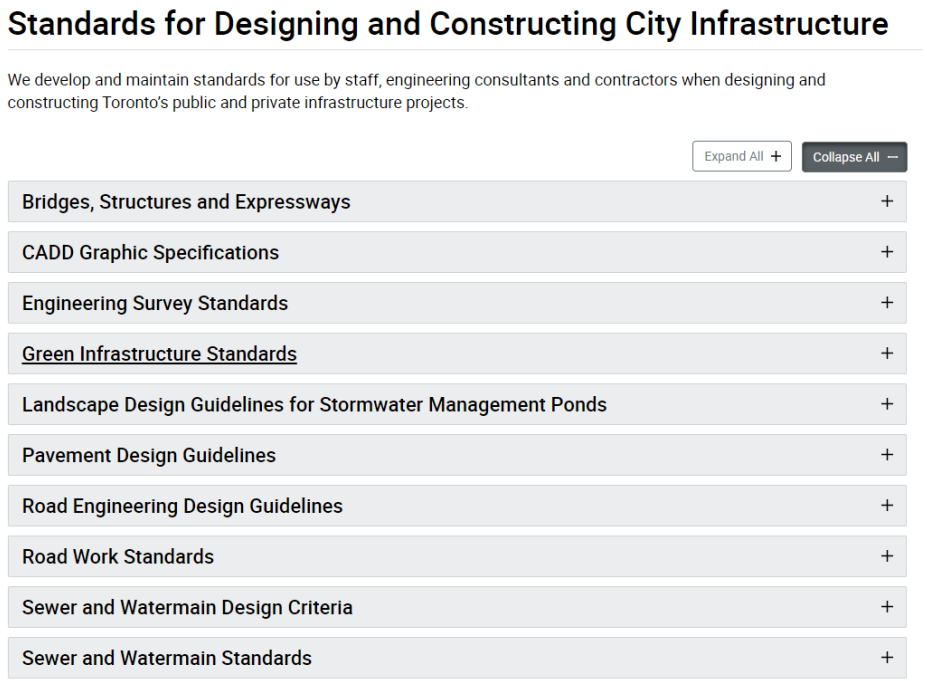



Development of Standard Drawings, Construction Specifications and Guidelines for the Implementation of Green Infrastructure in the Right-of-Way (ROW)

Green Infrastructure Systems included in this project:

- Street Trees and Stormwater Tree Trenches
- Bioretention Planters and Rain Gardens
- Green Gutter
- Vegetated Filter Strip
- Infiltration Trench
- Pervious Concrete
- Porous Asphalt
- Permeable Interlocking Pavers
- Component Parts
  - Monitoring Well
  - Check Dams
  - Beehive Catch Basin
  - Curb Cuts & Drains

Maintain open feedback/communication channel between operations staff & designers/reviewers to ensure continued maintainability of design.



https://www.toronto.ca/services-payments/building-construction/infrastructure-city-construction/construction-standards-permits/standards-for-designing-and-constructing-city-infrastructure/

Life Cycle Activities for GI in the Right-of Way

This manual provides the recommended maintenance and monitoring activities to ensure the longevity of our Green Infrastructure assets.

FIELD INSPECTION DATA FORM: BIORETENTION SYSTEM

GENERAL INFORMATION:

GI Identifier:	**Inspection Type (Check one):** Construction ☐ Warranty ☐ Routine Operation ☐ Maintenance Verification ☐ Performance Verification ☐
Address:	**Location:**
GI Construction Date:	**GI Warranty Date:**

VISUAL INDICATORS:

Inspection date and time: MM/DD/YYYY HH:MM:SS	**Weather (24 hours prior to inspection):**
Inspected by:	**Inspection duration (minutes):**

COMPONENT	INDICATOR	CONDITION	FOLLOW-UP
Contributing Drainage Area	**Contributing drainage area condition:** Area differs by >10% from design or as-built drawing; Excessive trash, debris, sediment or other pollutant load is present or impairing function of the GI; Land cover has changed	Comment/Measurements:	Action:
		Pass ☐ **Fail** ☐	Timeframe:

Maintenance and Asset Management Framework

Green Streets Asset Management

- Transportation Services received a collaborative grant through the **Green Infrastructure Leadership Exchange** to develop a *Green Stormwater Infrastructure Asset Management Resources* toolkit including case studies, example plans, and guidelines.
- Critical next steps towards achieving O.Reg 588/17 for GI Assets - Asset Management Planning for Municipal Infrastructure

the green infrastructure leadership exchange

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Green Infrastructure ONTARIO COALITION

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Green Streets Maintenance Framework

GI Asset Category	Primary Asset Ownership	Maintenance Responsibilities
Permeable Paving	Transportation Services	Transportation Services
Aboveground Stormwater Projects (Bioswales and Rain Gardens)	Transportation Services	Transportation Services Toronto Water
Stormwater Tree Trenches	Transportation Services Urban Forestry (Trees)	Transportation Services Urban Forestry (Trees) Toronto Water

Framework leverages existing divisional maintenance responsibilities

Current Maintenance Practices

ROW Horticulture (including Green Infrastructure) is maintained through various practices:

a. **Private property** owners are responsible for the maintenance of the boulevard fronting their property
b. **Community Partnerships** support requests through communities to plant and maintain horticulture within the right-of-way.
c. **Orphan Space Program** a maintenance program initiated by TS to maintain right-of-way green spaces without a private property maintenance partner (e.g., traffic islands, centre medians, etc.).

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Right of Way Horticulture

Green Streets & Orphan Spaces

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Right-of-way Horticulture – Green Streets & Orphan Spaces

Programs administered through Transportation Services' to increase & maintain greening of the City:

- **Green Streets** launched in 2017, is an interdivisional program that has been initiated to implement right-of-way green infrastructure (GI) to contribute to Resilience efforts. Green Streets projects are often designed with ***stormwater functionality*** and includes horticulture *as well as hard surfaces* like tree trenches and permeable sidewalks. Currently, there is a responsibility gap for maintaining these GI assets.

- **Orphan Spaces**, is a maintenance program initiated by TS to maintain right-of-way green spaces without a private property maintenance partner (e.g., traffic islands, centre medians, etc.). Orphan Spaces sites are ***always softscape*** (sod or horticulture). Orphan Spaces is a combination of contracted landscape services and a partnership with Parks Operations.

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Gaps and Impacts

(GI only) Ownership of assets **cross divisional boundaries** (PFR/TS/TW)

- Muddled maintenance responsibility for GI assets
- Often, Assets/Components installed without maintenance plan (i.e. sidewalk trench drain)

Limited expertise (internal & external) for ROW horticulture & other GI-specific maintenance.

Gap/Grey Area in policy*:* ROW improvements create “new” maintenance responsibility for adjacent property owner not covered by <Municipal code - Chapter 747 – Article 4>.

No proactive Right of Way horticultural maintenance program

Limited implementation - typically sod, asphalt, or concrete implemented due to limited maintenance capacity of City, reducing ecosystem services of site. (vs. native plantings)

VS

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Impacts of Maintenance Gaps

Who's responsible for these weed-choked flower beds? It's a perennial peeve

By **Jack Lakey** Contributing Columnist
Fri., Oct. 30, 2020 | 2 min. read

Article was updated 3 days ago

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GreenForceTO- a workforce development pilot (and beyond)

A long-term, locally-powered solution for Right-Of-Way Green Spaces

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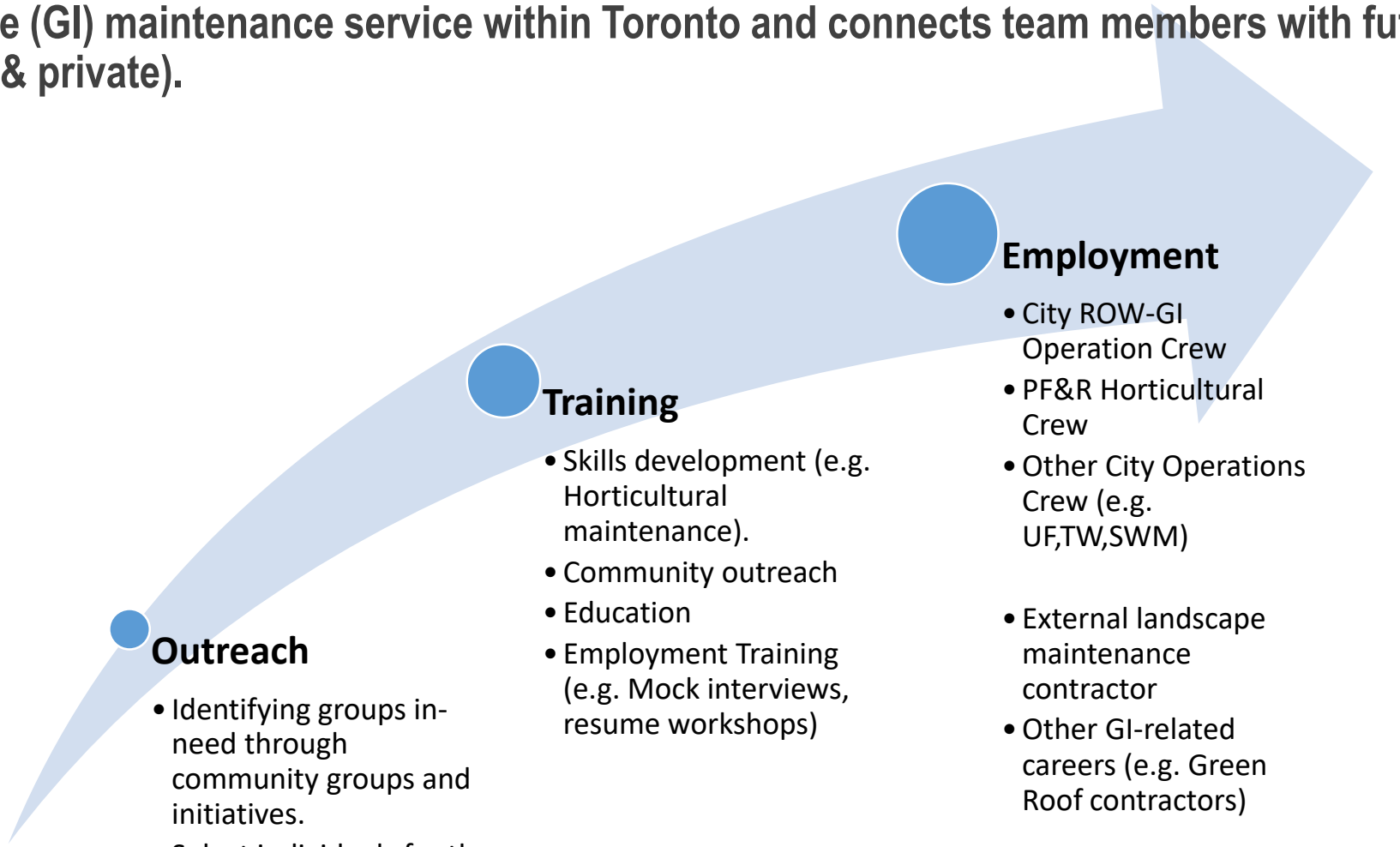
What is GreenForceTO?

Our Vision: A robust, diverse workforce development program that nurtures the talent pool in broad Green Infrastructure (GI) maintenance service within Toronto and connects team members with future employers (both public & private).



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How do we get there?

- **Establish clear responsibility for Right-of-Way Green Spaces**
  - Led by Transportation Services- Road Operations- Green Streets and Sidewalks unit that has responsibility for Green Streets and Orphan Spaces.
- Create a robust and **diverse employment network–** where community partners aide the training and development of community members to ideally, be employed to serve the local community.
- Create a **qualified talent pool** that meet the hiring standards for City's internal operation crews, landscape contractors, and other GI-related opportunities;
- **Evaluate success** of pilot, identify point of improvement, and devise **scale-up strategy** for other geographic communities.
- Explore possibilities to **further enhance communities.** Some examples:
  - Infrastructure: phased pollinator corridor /micro forests – minor retrofits/planting program
  - Education & engagement: Walking tours, pop up information booths, etc.

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Precedents

Philadelphia

- City of Philadelphia are using PowerCorpsPHL—an AmeriCorps program designed to support environmental stewardship and other initiatives—to train at-risk youth for green infrastructure maintenance jobs.

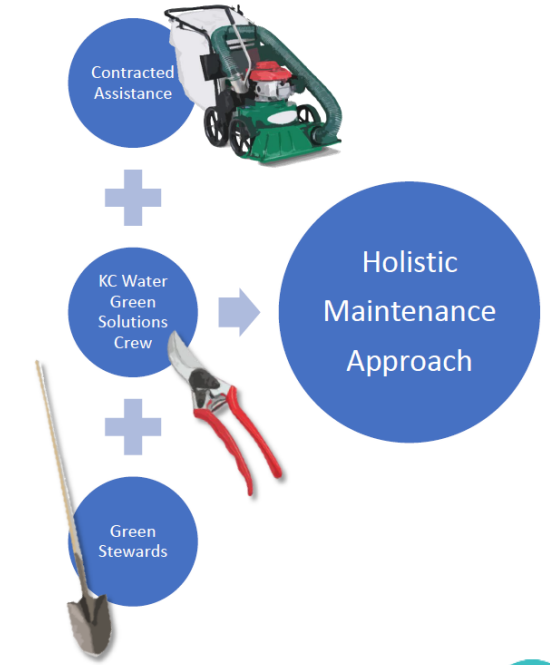
Kansas City

- Green Stewards program, partnership with NFP

Buffalo's 'PUSH Blue' eco-landscaping work cited as model for Great Lakes

By T.J. Pignataro Mar 6, 2018 0

The three-year-old program employs residents from low-income and minority neighborhoods to build green infrastructure projects across Buffalo. The U.S. Water Alliance devoted a page about the program in its **38-page report**.



2021 Pilot Planning

Project Goals:

(a) Through an EOI process, designate a partner non-profit organization to aid design, manage, and run the 2021 pilot

- Has experience in horticulture stewardship, maintenance OR workforce development
- City to provide funding and potentially equipment(s) to partnering NPO.
- The designing and execution of the program will be done in collaboration with City staff.

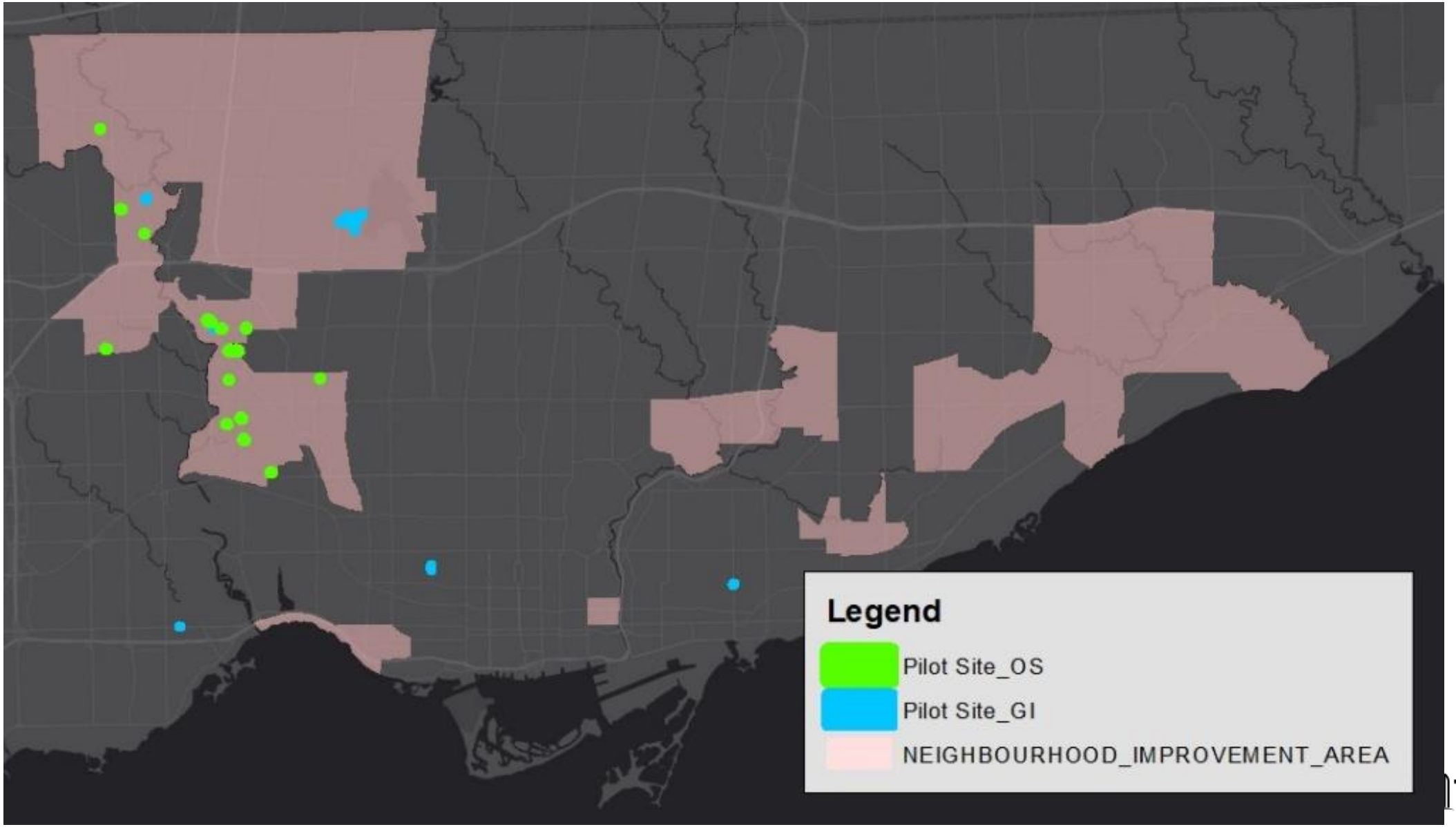
(b) Recruit 3-6 individuals for pilot, (paid work)

- Training provided: GI, horticulture, equipment, and H&S training.
- Perform GI maintenance work under supervision of field expert.

(c) Provide program participants a work-and-learn experience in ROW horticulture maintenance for a certain term (May- November – growing season)

(d) Evaluate pilot success from both workforce development and ROW horticulture maintenance perspective.

2021 Pilot Area + City Wide GI Sites



2021

- Obtain NFP partner
- Initiate Pilot at Mt. Dennis NIA area
- Determine training program
- Maintain 40 OS + 24 GS parcels

2022

- Evaluation of year 1 and incorporate improvements
- Expand outreach, community education & stewardship components
- Pilot pollinator corridor mini-project
- Addition of new sites assumed by the City

Project Milestones

2023

- Projected additional 30+ parcels of GI
- Continued expansion of GreenForceTO crew (model TBD)
- Projected hire of TS – dedicated ROW-GI crew
- Projected first hire/promotion in early 2023

2024+

- Continue to grow GreenForceTO model along with projected assumptions of Green Streets sites and in coordination with internal crew expansion.
- Consider expansion of scope to include GI beyond ROW (Green Roofs? Parks?)

GreenForceTO

Pilot update, successes and challenges

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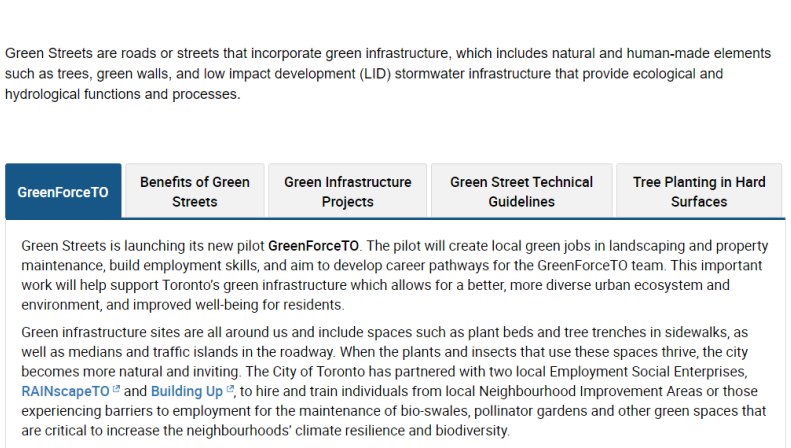
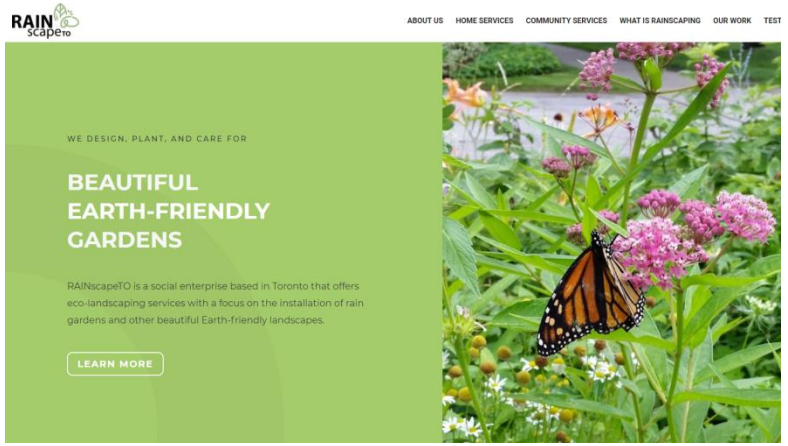
GreenForceTO- Project Partners



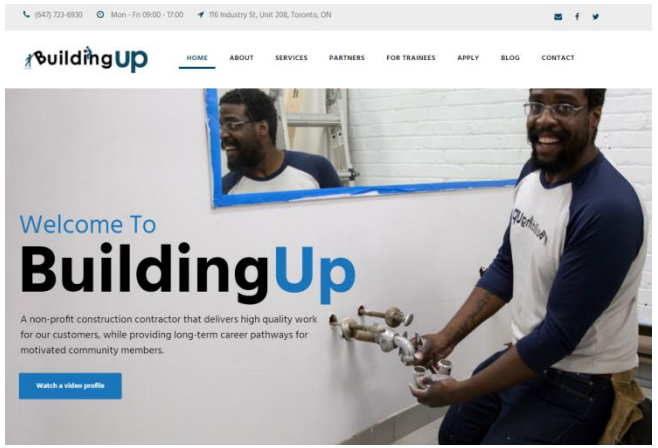
City of Toronto partners include Transportation Services, Energy and Environment Division and Social Development, Finance & Administration.

www.Toronto.ca/GreenForceTO



RAINscapeTO is a social enterprise based in Toronto that offers eco-landscaping services with a focus on the installation of rain gardens and other beautiful Earth-friendly landscapes.

https://rainscapeto.ca/



BuildingUP is a non-profit social enterprise that creates a pathway for individuals experiencing barrier to enter a career in trades, as well as improve Toronto's environmental efficiency and affordable housing stock.
https://www.buildingup.ca/

Pilot Project Timeline

Green Workforce Development Pilot Project EOI

December 2020

RAINscapeTO & Building Up joint proposal accepted

January 2021

Phase 1: Program Development

- Outreach
- Community Advisory Committee
- Develop training program
- Develop maintenance schedules
- Develop monitory and evaluation framework
- Develop communication plan

February - March 2021

Phase 2: Launch Program

- Recruit & onboard candidates
- Start field work
- Coordinate tools, equipment & transportation
- Document work before & after maintenance
- Conduct ongoing training

April-November 2021

Phase 3: Evaluation & Future Planning

- Submit final report to CoT documenting outcomes, key recommendations for improvement and next steps
- Prepare draft work plan for project expansion for 2022 with new sites

November - December 2021

EOI Pilot Objectives (short-term):

- Provide program participants a work-and-learn experience in ROW GI and horticultural maintenance
- Enable the City to explore a new model for ROW horticulture (currently underserved)

EOI Pilot Objective (long-term)

- Build a robust community-led workforce development program that grows the talent pool in broader green infrastructure maintenance service and connects graduates with future employers

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Project Goals

Positive Impact (project goal)	Outcome	Output
Climate resilience	Mitigate flooding events & stormwater mgmt	Area of plantings & permeable pavement maintained
	Carbon capture	Number of plants installed Type of plants installed
	Enhance air quality	Number of plantings located on arterial streets
	Biodiverse landscapes	Number of native plants installed
	Productive landscapes	Number of pollinator plants installed
	Mitigating urban heat island effect	Number of trees monitored
	Energy conservation	Hours of shade provided by trees
Long-term meaningful employment	Positive and supportive work environment	Overall degree of job satisfaction, pride in work & confidence
	Financial Stability	Salaries earned by target demographic; Housing situation (before, during and after); Numbers of trainees who move on to secure and well paid jobs in any industry
	Skill-building capacity	Hours of paid training; Number of trainees who move on to higher education?
	Community empowerment and self-organizing	Number of trainees who self-organize to take over green infrastructure maintenance in their communities?
Public awareness	Community support of green infrastructure and taskforce	Number of interactions (in person and virtual) with members of the public

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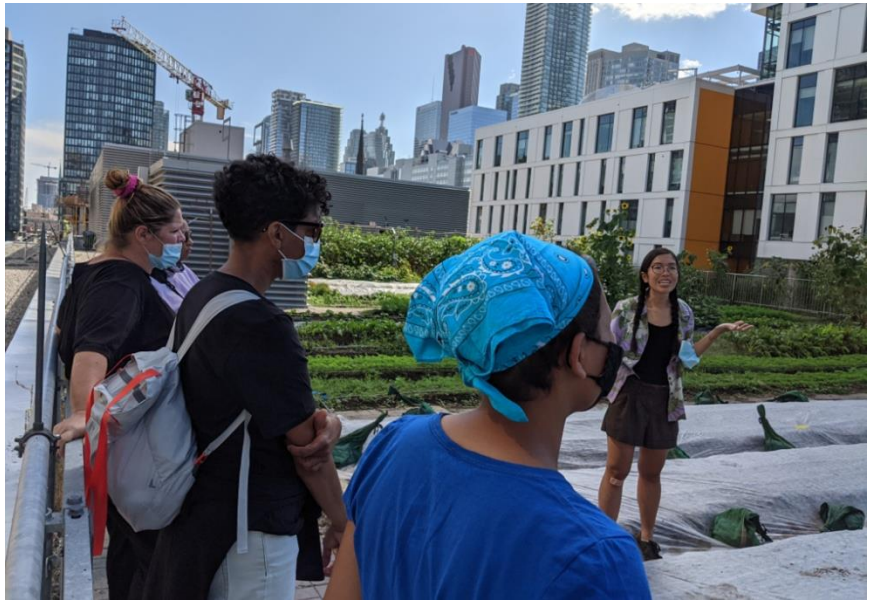
Logistics

- Based out of Mount Dennis since many sites are nearby and in Weston and Rockcliffe-Smythe
- Approximately two dozen green infrastructure and orphan spaces that are maintained on a bi-weekly basis
- Crew – three trainees; crew van and rental trucks when necessary
- Bi-weekly meetings with city & integration with TS operations
- Community Advisory Committee – established through outreach
- Every week there is one day reserved for crew online training to be completed at home

Training

- Health and Safety training: WHMIS, First Aid, Book 7 (traffic), CoT H&S
- GI training: Rain Garden Class, Green Roofs, Kortright Centre
- Native plants: Pollinator Partnership Canada
- Productive plantings: Homestead T.O.



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RAIN GARDEN MASTER CLASS

Rain Garden Master Class is Coming Back MARCH 2020!
Classes will include engaging discussions with lots of photos, case studies with guest speakers, and activities to help you design your own rain garden.
Course Fees ($200.00) include:
Six training modules covering topics such as:

- Basic Hydrology
- How to identify property-level stormwater sources and pathways
- How to direct and manage stormwater into the landscape
- Soil infiltration testing
- Introduction to Rain Gardens
- Rain Garden Sizing and Placement
- Choosing Appropriate Rain Garden Plants

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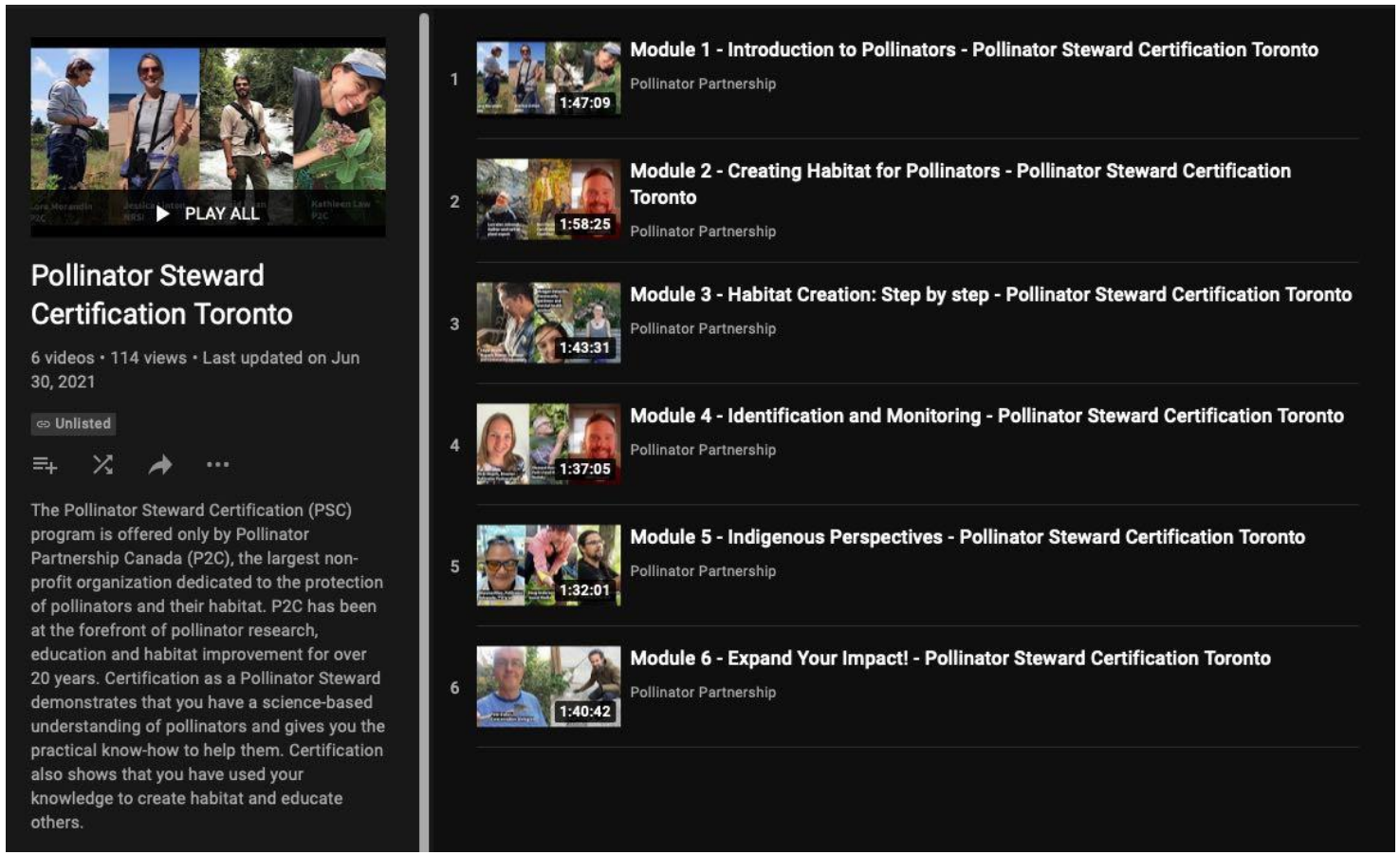

Homestead T.O.

GROW, EAT, AND LIVE LOCAL

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Progress Photos: Green infrastructure planter on Ryerson Ave

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Progress Photos: Green infrastructure planter on Ryerson Ave

Progress Photos: Green infrastructure planter on Ryerson Ave

Progress Photos: Green infrastructure planter on Ryerson Ave

July

Progress Photos: Green infrastructure planter on Ryerson Ave

July

Progress Photos: Green infrastructure planter on Ryerson Ave

Wolseley Street construction photo/video

In May 2021, we saw a construction crew rinsing their concrete equipment and wheelbarrows on the street adjacent one of the green infrastructure planters. The river rock were coated with concrete slurry and most of the plants died. There was a lot of construction and food debris in the planter.

Progress Photos: Green infrastructure on South Station Street

Progress Photos: Green infrastructure on South Station Street

Beginning of April

Early May

Progress Photos: Green infrastructure at Fairford Parkette

End of May

mid-July

Progress Photos: Green infrastructure at Fairford Parkette

Progress Photos: Jane & Lawrence Parkette

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Progress Photos: Dundas & Bathurst Planter

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Planted end of June

One month growth

Progress Photos: Dundas & Bathurst Planter

Beginning of September

Progress Photos: Dundas & Bathurst Planter

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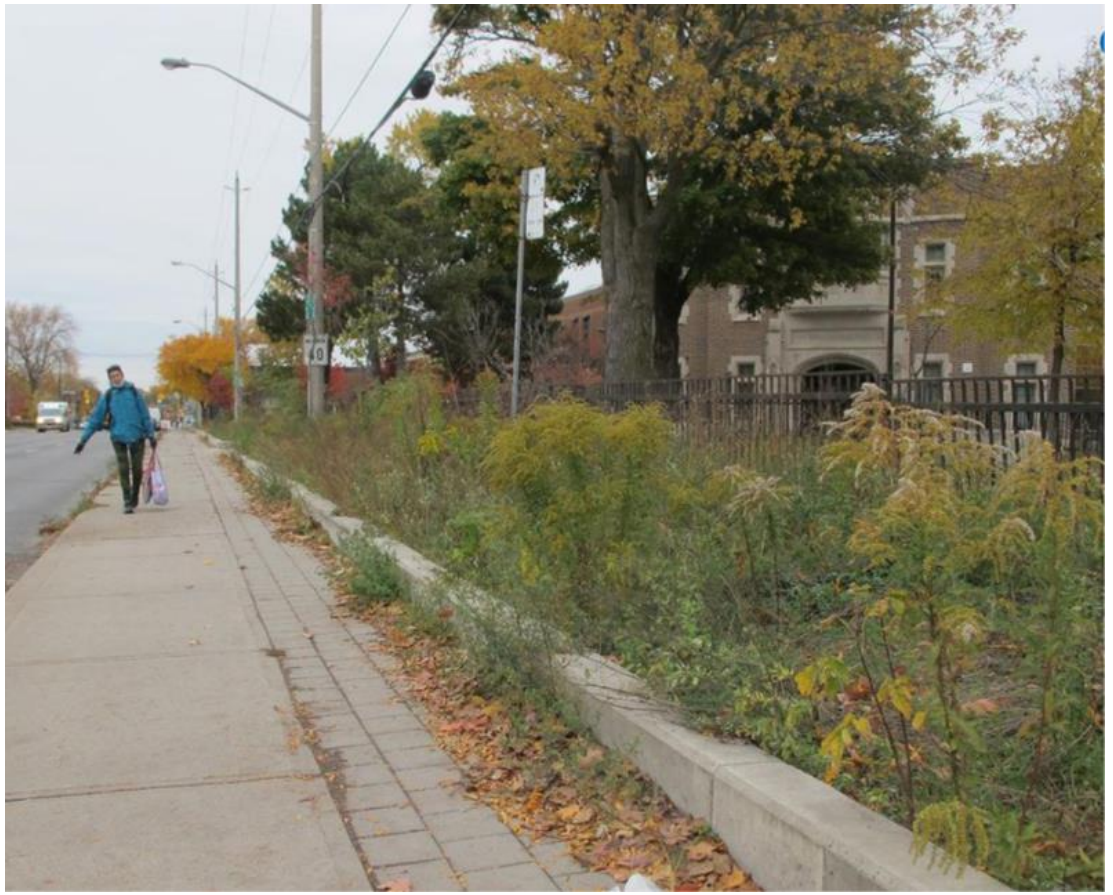

Guiding Principles to Build a Scalable Program

- Defined lifecycle activities & delivery mechanism
  - Lifecycle includes: design, construction, warrantee, assumption, maintenance, rehabilitation.
  - Delivery mechanism may consider funding sources, delivery partners, potential partnerships.
- Standardized GI components designed for maintenance.
- Scalable data strategy
  - Central inventory & established asset intake process.
- Tracking metrics to back-up business case for staff & resources.
  - Scale up operations in line with project assumptions
  - Plan ahead – staff capacity, training, budgeting, equipment (integration with 10 year forecast)
- Consultation with operations staff.
- Continuous Training/Education
- Establish Partnerships – Universities, Conservation Authorities, Not for profit organizations

Once the above are achieved, we can now establish a “scalable” program that can address changes in volume in a predictable manner.

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Questions?

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