



Are Trees Green Infrastructure? Municipal policy and green infrastructure definitions

TENLEY CONWAY

UNIVERSITY OF TORONTO MISSISSAUGA

AAG 2018

Green Infrastructure and Urban Residents Project

A green infrastructure approach is:

- Decentralized, requiring many urban landowners participation
- Uses a new concept that may not be familiar to many people
- Defined in a variety of ways



Green Infrastructure Defined

1. Living Green Infrastructure:

- a. “strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services”. (European Commission 2013)
- b. “parks, public green-space, allotments, green corridors, street trees, urban forests, roof and vertical greening” that contribute to ecosystem services (Cameron et al. 2012)



Green Infrastructure Defined

2. Green Stormwater Infrastructure:

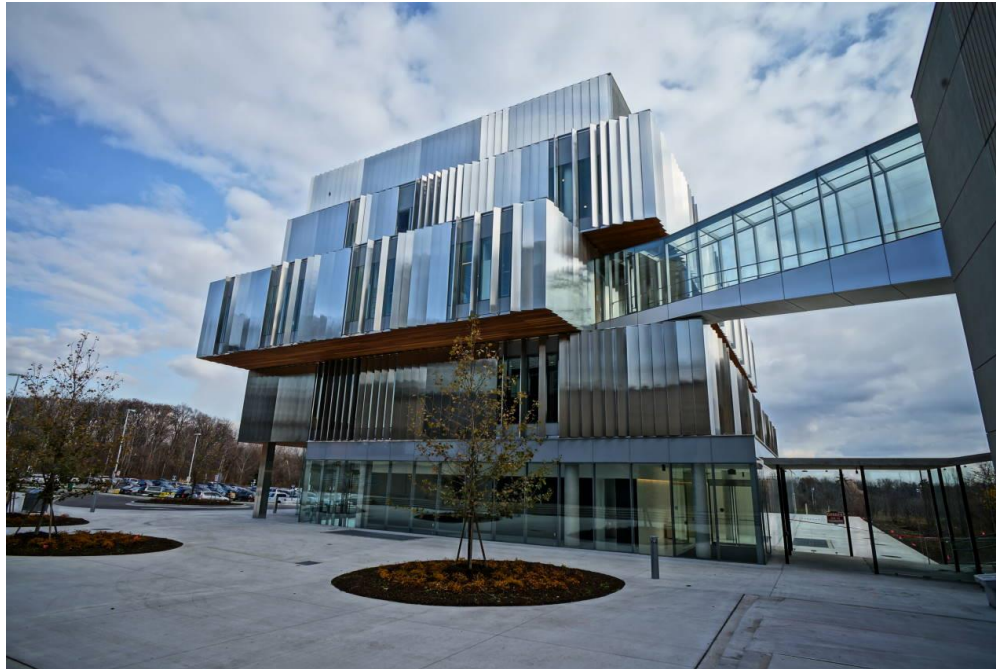
“a set of techniques, technologies, management approaches, and practices that can be used to eliminate or reduce the amount of stormwater and nonpoint source runoff including water and pollutants that run into combined sewer overflow systems” (CWAA 2011)



Green Infrastructure Defined

3. Energy or Built Green Infrastructure:

“a palette of green engineering technologies and their application in urban design” (Davies and Lafortezaa 2017)



Certified LEED
Gold

Green Infrastructure Defined in Ontario

1. Living Green Infrastructure:

Ontario land use policies (2014, 2017)

Ontario Climate Change Strategy (2015)

2. Green Stormwater Infrastructure:

Ontario land use policies (2014, 2017)

3. Energy or Built Green Infrastructure:

Federal Budget (2016), Canada Infrastructure Bank, Natural Resources Canada

Phase 1 Research Questions

Is the term 'green infrastructure' used in municipal policy?

➤ If Yes, how is it defined?

Hypotheses

1. Urban forestry policy is the most likely to use 'green infrastructure'
2. Larger municipalities are more likely to have incorporated the term
3. Definitions that incorporated living and non-living features will be most common

Study Area and Policy Examined

- 25 Municipalities
- A total of 138 documents:
 - Official Plans
 - Urban Forest Management
 - Stormwater Management
 - Climate
 - Energy
 - Sustainability
 - (Green) Design Plans



Summary of Municipal Policy Examined

[illegible]

Methods: Content Analysis

Key word searches:

- Green Infrastructure
 - Green space
 - Open space
 - Green
 - Tree
 - Forest
 - Park
 - Vegetation
 - Green roof
 - Green wall
 - Garden
 - Bioretention
 - Bioswale

Questions asked:

- Is the term “Green Infrastructure” used?
- Yes: Is it clearly defined?
 - How is it defined?
- No: Are living green infrastructure features discussed without using the term?

Use of term “Green Infrastructure”

	Yes	No
Official Plan	7	18
Urban Forestry	10	8
Stormwater	4	27
Climate	2	9
Energy	0	17
Sustainable	8	16
Design	2	11

Use of the term 'Green Infrastructure'

[illegible]

Defining Green Infrastructure:

Only Living Green Infrastructure

	Only Living
Official Plan	1
Urban Forestry	9
Stormwater	2
Climate	1
Energy	
Sustainable	3
Design	

“Green infrastructure: Natural features that are managed by humans and often incorporated into conventionally built infrastructure to provide ecosystem services in urban zones. Examples include green roofs, living walls, and engineered wetlands.”

(Aurora, Urban Forestry)

Defining Green Infrastructure:

Only Living Green Infrastructure

	Only Living
Official Plan	1
Urban Forestry	9
Stormwater	2
Climate	1
Energy	
Sustainable	3
Design	

““Green infrastructure means those lands associated with storm water management facilities, hydro transmission lines, gas pipelines and major transportation corridors.”

(Burlington, Sustainability)

Defining Green Infrastructure:

Green Stormwater Infrastructure

	Non-Living and Living
Official Plan	3
Urban Forestry	1
Stormwater	2
Climate	
Energy	
Sustainable	
Design	1

““Green infrastructure (permeable paving, bioswales, green roofs, trees, green spaces) can assist with the absorption and detention of some of that rainfall, mitigating the impacts of flooding.”

(Toronto, Design standards)

Defining Green Infrastructure:

Other/No Definition Green Infrastructure

	Other/No Definition
Official Plan	3
Urban Forestry	
Stormwater	
Climate	1
Energy	
Sustainable	5
Design	

“Encourage....The use of green infrastructure technologies and best practices in sustainable development including site and building design.”

(Oshawa, Official Plan)

Defining Green Infrastructure:

Other/No Definition Green Infrastructure

	Other/No Definition
Official Plan	3
Urban Forestry	
Stormwater	
Climate	1
Energy	
Sustainable	5
Design	

“The Town should include policies in its Official Plan that commit to green infrastructure practices through the building, upgrading, and maintenance of its road network, water, and sewer systems in a manner that seeks and encourages opportunities to integrate enhancements that render such services greener and more sustainable.”

(Richmond Hill, Environment Policy)

Policies not using “Green Infrastructure”: Is living green infrastructure discussed?

	No, Not Discussed	Yes, Discussed
Official Plan	0	18
Urban Forestry	0	8
Stormwater	12	15
Climate	5	4
Energy	16	1
Sustainable	4	12
Design	3	9

Other Terms Used

More common terms:

- Greenlands Systems
- Low Impact Development
- Green Technologies

➤ These are not always clearly defined

“To encourage the enhancement of the natural environment, and hence human environment, through the creation of a Greenlands System” (Milton, Official Plan)

“Encourage all development to limit impervious surfaces within a watershed by encouraging Low Impact Development (LID), green technologies and any other suitable methods or tools.” (Oshawa, Design)

Concluding thoughts

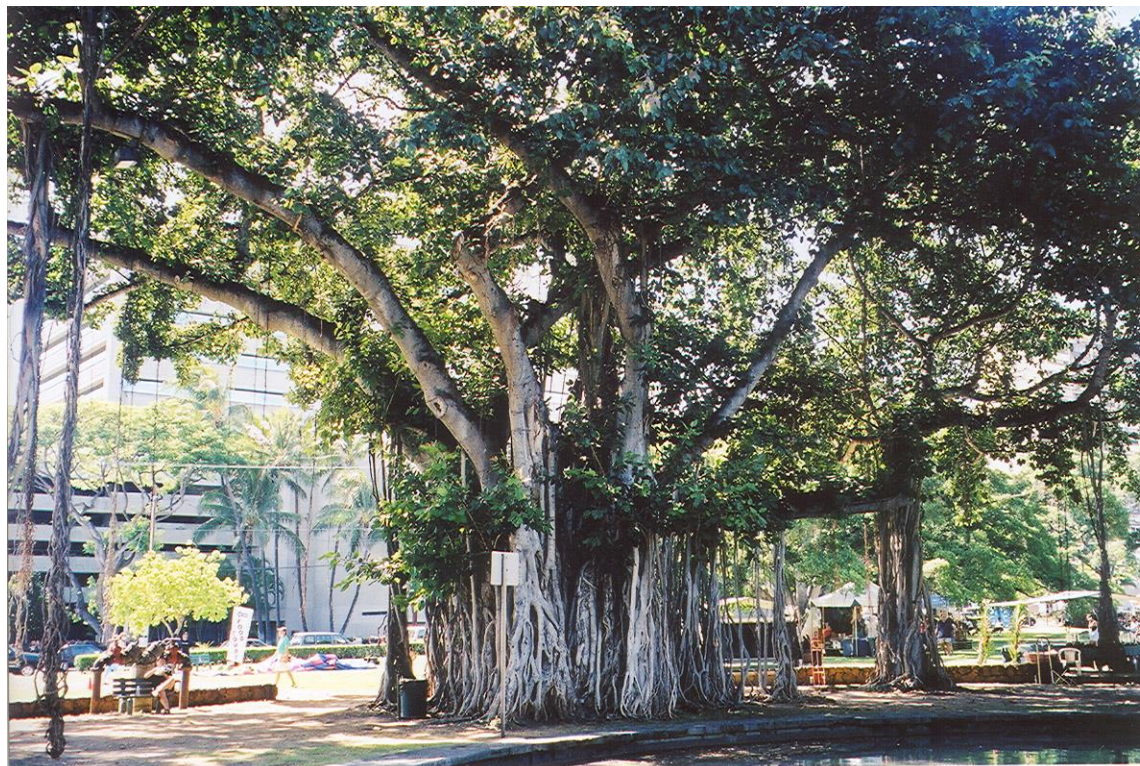
‘Green Infrastructure’ appears in 22% of policy documents examined.

- Meaning is varied and unclear
 - Many of the 138 documents use other related terms
-
- Potential to become an empty concept
 - Clear policy is more likely to be understood and implemented
 - Stakeholders (residents!) need to participate in green infrastructure initiatives and vague or shifting jargon is not helpful



Thanks to Nasra Esak, Aliza Khan and Jonathan Kitchen for help with the content analysis

<http://sites.utm.utoronto.ca/conway>



(Living) Green Infrastructure Project Definition

Living Green Infrastructure: vegetated spaces (individual trees, forests or patches of trees, wetlands, parks, green roofs and walls, rain gardens, bioswales) that can contribute to human benefits through ecosystem services.

(adapted from Demuzere et al., 2014).