



# ACHIEVING LOW-CARBON RESILIENCE THROUGH I/I REDUCTION



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# Introduction





## DEMOGRAPHICS

Population: 24,500  
Average Age: 42



## LANDSCAPE

162 km<sup>2</sup>  
16 km of shoreline



## AGRICULTURE

50+ wineries  
6,500+ acres of farmland



## DEVELOPMENT

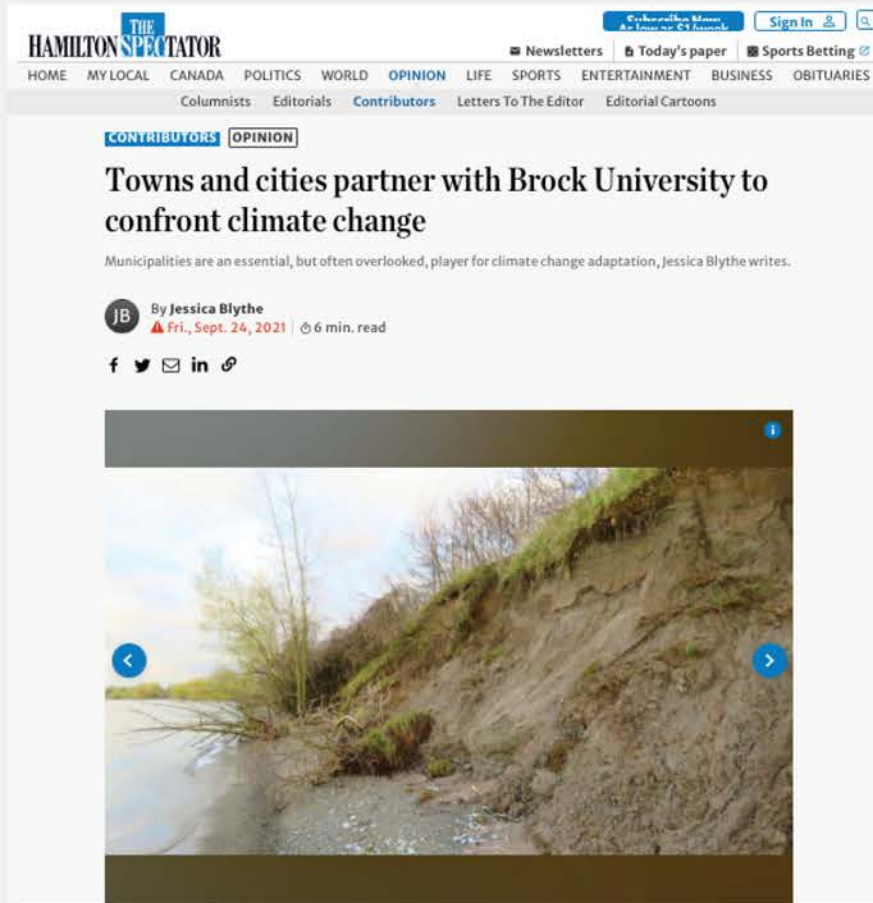
Prudhommes Landing  
1,343 new units





# Climate Change Adaptation Planning

# Case Study: Niagara Adapts



Environmental Sustainability Research Centre

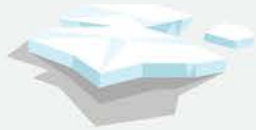


Niagara Adapts was a partnership with Brock University's Environmental Sustainability Research Centre designed to build innovative climate solutions across Niagara

Niagara Adapts supported collaborative climate change adaptation assessment, planning and implementation



# Impacts of Climate Change in Canada



Increased melting of snow and ice cover



Extreme precipitation (ex. freezing rain)



Rising air temperatures



More frequent forest fires



Rising sea levels

# By 2100, Lincoln can expect:



91 extreme hot days (>30°C) each year



Warmer summer temperatures



Milder winter temperatures (more ice & freezing rain, & less snow)



44% more heavy rainfall events (>10mm)



More frequent & severe droughts



More extreme weather events (ex. windstorms, thunderstorms etc.)



Extended growing seasons



Increased spread of respiratory, waterborne, and insect carried diseases (ex. Lyme disease)



Hottest day temperature



## LINCOLN WANTS REGIONAL PLAN TO HELP FARMERS GET THE WATER THEY NEED DURING DRY SUMMER MONTHS

 **BONNIE HESLOP**  
Thursday, March 9th 2017 - 2:20 pm



## Analysis: Are high lake levels the new normal?

NEWS 05:00 AM by [Melinda Cheevers](#) @NiagaraThisWeek.com



## High water levels affecting Charles Daley Park in Lincoln

East and west side beaches closed

NEWS May 29, 2019 Grimsby Lincoln News



Town of Lincoln, Ontario

March 10, 2021 · 🌐



While many of us are basking in today's mild weather, Hilary Bald Outdoor Rink in #LincolnON isn't faring so well under the warm sunshine. 😞 As a result, we've had to close the rink a week earlier than planned for the season. See you again next winter! 🧊



## Lincoln still recovering from spring storms

Rainfall, water levels continues to have an impact on lakeshore areas

NEWS Jun 19, 2017 by [Luka Edwards](#) @Grimsby Lincoln News



 **TownofLincoln**  
@TownofLincolnON

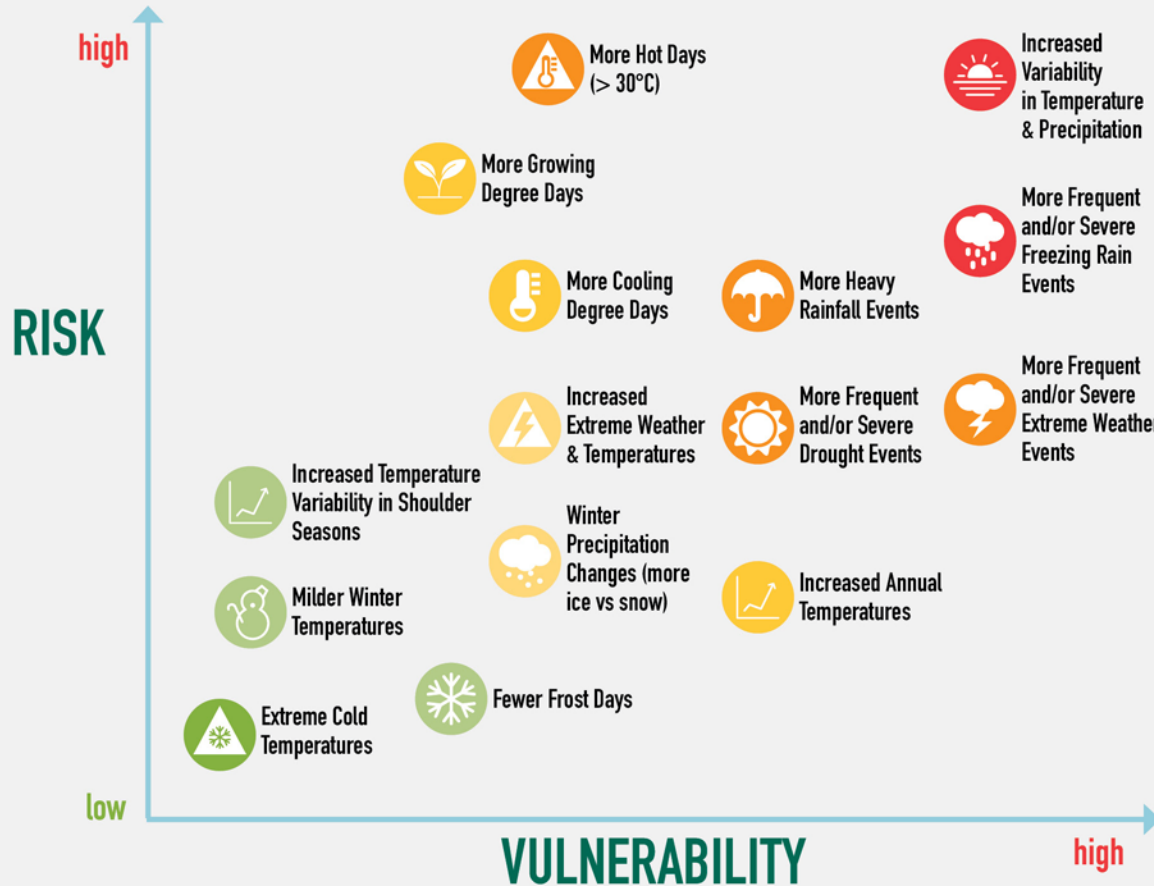
Follow

Public Service Announcement - Facility closures due to ice storm. Please be advised that all Town facilities will be closing at 2 p.m.

Small group in Niagara takes big step in dealing with climate change fallout

Towns and cities in Niagara region partner with Brock University to work out solutions to extreme weather

# Climate Change Impacts



## Climate Vulnerability Fact Sheet

### Exposure to climate change in Lincoln



Only **24%** of respondents feel that Lincoln is prepared to adapt to climate change

### Opportunities for adaptation



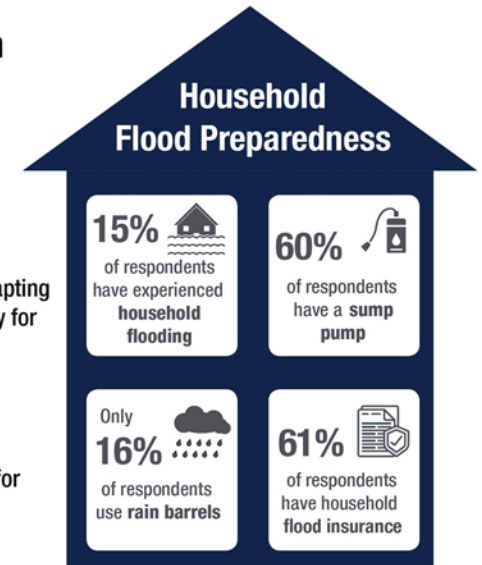
**86%** of respondents believe humans have the capacity to address climate change



For **44%** of respondents, adapting to climate change is a top priority for their households



**83%** of respondents support municipal resources being used for climate change adaptation



**Note:** Percentages reported on this page reflect the 150 people who completed surveys from Lincoln.



# Achieving Low-carbon Resilience Through I/I Reduction

**GOAL:** Preparing and protecting systems for climate change

## **APPROACH:**

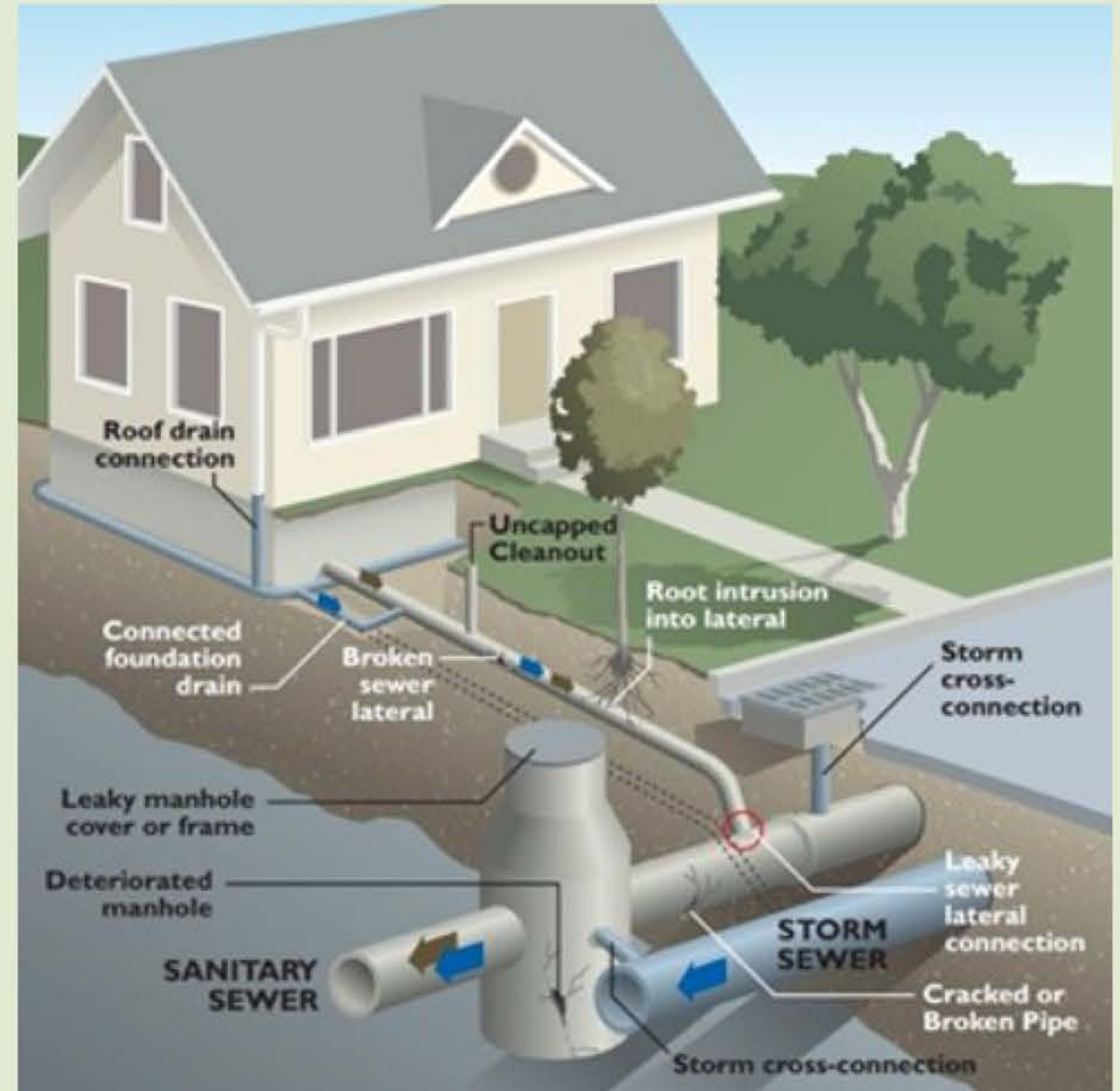
- **Holistic:** being mindful of what you have in and around your system is important when addressing I/I removal and reduction
- **Education:** need to provide education and alternatives to discourage people from discharging stormwater into the sewer system
- **Financial Support:** excellent uptake for free/subsidized programs

# Community Stormwater Management & I/I Reduction Programs



# Current Sanitary Sewer System

- Current Town System is a Separated System
- Possible sources of I/I
  - Downspouts
  - Foundation Drain/Sump Pump/Cisterns
  - Cross Connections
  - Uncapped Cleanouts
  - Broken Sewer Laterals
  - Misaligned Lateral Connections
  - Cracked or Broken Pipes
  - Leaky Maintenance Holes



# Stormwater Management & Water Efficiency Programs



## Stormwater Management

Native Tree Giveaway ●

Rain Barrel Sale ●

Neighbourhood Park  
Soil Amendments ●

Community Flood  
Preparedness &  
Mitigation Guide ●

LID/GI Design  
Guidelines ●

Rain Garden ●

## Water Efficiency Programs

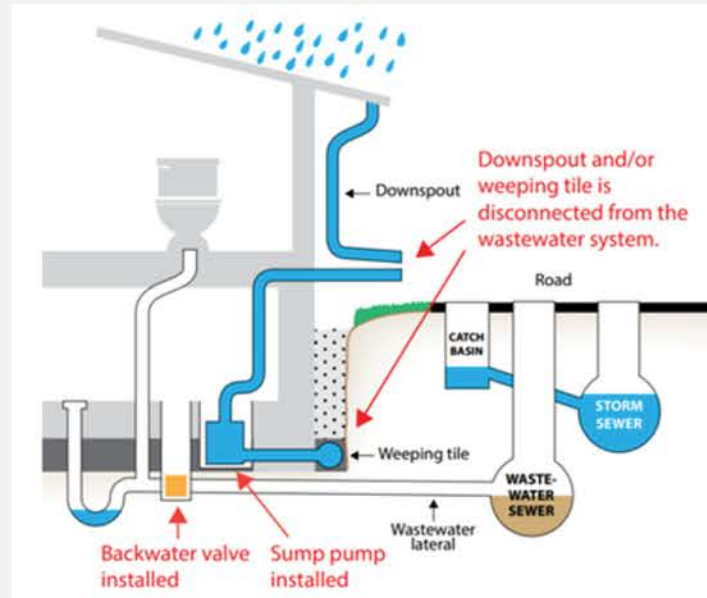
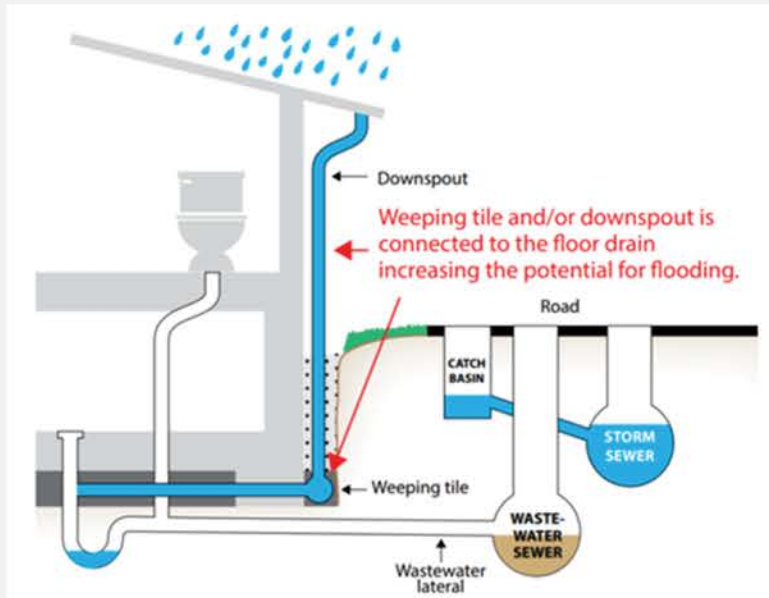
● Smart Hydrants

● Water Meter  
Replacement Program



# /// Reduction Programs

- Targeted I/I Removal Program
- Rain Barrel & Downspout Disconnection Program
- Sump Pump & Foundation Drain Pilot Program
- Sub-Division Flow Monitoring
- Neighbourhood Park Soil Amendments (Pilot)
- Community Flood Preparedness & Mitigation Guides



# Targeted I/I Identification & Reduction Program

- Target areas determined using basement flooding problem areas or identified in the PPCP
- Start with baseline flows
- Target Plan has a few approaches
  - Smoke testing for low hanging fruits
  - Visual inspection of properties in area
  - Micro flow monitoring – Chase the Flow
  - Dye testing
  - Wet weather CCTV
- Once sources are identified implement other aspects of the overall reduction program

# Rain Barrel & Downspout Disconnection Pilot Program

- First program used in Jordan Station
- Conversation starter about sources of I/I and water conservation
- Significant uptake
- Lead to Town Wide Rain Barrel subsidy



# Sump Pump & Foundation Drain Pilot Program

- Pilot Program in Basement Flooding Area
- Program includes:
  - Foundation Drain Disconnection Subsidy
  - Sump Pump Disconnection Subsidy
  - Downspout Disconnection Subsidy
  - Lateral Lining Subsidy
  - Backwater Valve Subsidy
- Program is managed through a consultant





# Subdivision Flow Monitoring

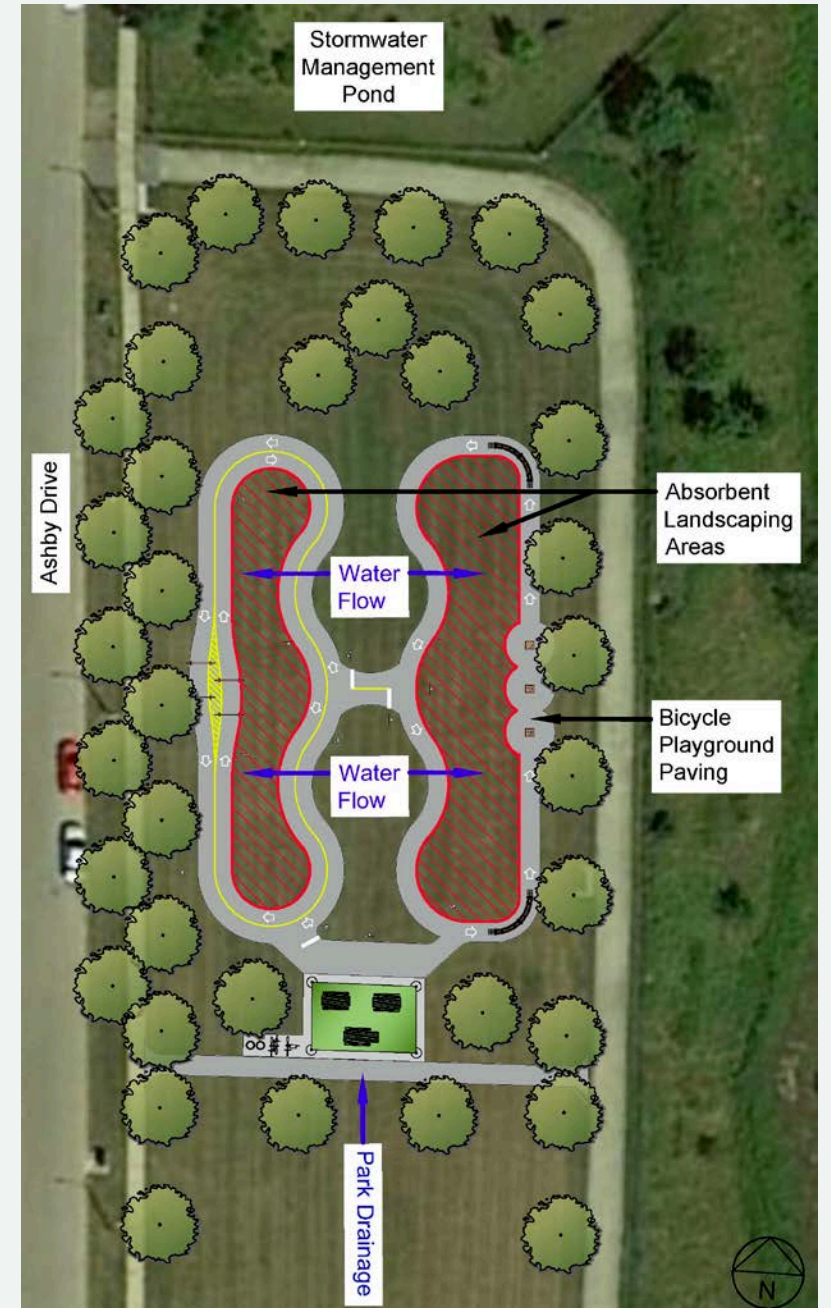
- First municipality in Niagara to include in Subdivision Agreements
- Fully funded by developer, with a flow monitoring company retained by Town
- Equipment in for at least 2 years
- Assumption not approved until Town accepts levels of I/I
- In some areas, results also determine additional density during later phases
- Problems found to date:
  - Basement draining during construction
  - Missing gaskets on MH
  - Damaged cleanouts
  - Inflow through MH
- Currently working through final I/I removals with first subdivision



# Neighbourhood Park Soil Amendments

## GOALS:

- Keep water where it is
- Support a healthy urban tree canopy
- Avoid implementing larger grey infrastructure and associated I/I impacts



# Community Flood Preparedness & Mitigation Guide

- Reduce I/I and runoff from private properties
- Inform residents about flood prone areas and ways residents can minimize risk on their property
- These materials will provide information on:
  - Emergency contacts
  - Types of flooding and flooding prevention (key areas along shoreline)
  - What to do before a flood (flood proofing, sump pump inspections, preparing a go-kit, insurance considerations)
  - What to do during a flood (including measures for both evacuation and sheltering in-place)
  - Health considerations
  - Repairing your home
  - Grant and subsidy programs



# Conclusion



# Achieving Low-carbon Resilience Through I/I Reduction

## **BENEFITS:**

- **Reduced GHG emissions from pumping and from overall sanitary sewer system**
- **Mitigates impacts of larger pipes that would be required for development**
- **Improves water efficiency from rain barrel program & green infrastructure water harvesting methods**
- **Deters runoff and drainage with improved soils and landscaping**
- **Supports a healthy urban tree canopy**

a place to  
**GROW**

a place to  
**PROSPER**

a place to  
**BELONG**

