

# NATURALIZING AND RESTORING LANDSCAPES

Presentation to Board of Town of The Blue Mountains Attainable Housing Corporation regarding 171 King Street East, Thornbury, ON

Stephanie Fletcher, July 2021

#### Introduction and Context

- Stephanie Fletcher living in Thornbury since 2020.
- Horticulture student at University of Guelph. Master Gardener in Training, Grey Bruce Master Gardener Chapter.
- Naturalizing and restoring landscapes concerned with landscape ecology. Our decisions and actions regarding building and development must be thought of in tandem with regard for ecology sustainability if we are to mitigate the future effects of climate change and provide a sustainable world for future generations.
- Sustainability in this context also means deriving benefits from our actions benefits of restoring and naturalizing landscapes can be thought of in terms of social, economic and environmental.
- Objective of this presentation to provide stimulus to think about how to restore degraded urban brownfield site while at the same time, develop for urban needs.

#### Inputs

- Resident Survey
- Hydrogeological report
- Geotechnical report
- Official Town Plan (2016) plus updated Municipal Tree Bylaw etc.
- Grey County Climate Change Action Plan May 2021

### GREEN SPACE INFRASTRUCTURE AND LOW IMPACT DEVELOPMENT TO BALANCE URBAN DEVELOPMENT.

### **Green Space Benefits**

- Definition varies. Size and scale. Parkette to national park.
- Value attributed to green space infrastructure can be quantified. Cost reduction/cost of assets.

Social	Environmental	Economic
<ul> <li>Connection to nature</li> <li>Physical and Mental well being</li> <li>Promotion of play</li> <li>Reduced crime</li> <li>Community development</li> </ul>	<ul> <li>Regulating stormwater flow</li> <li>Pollution abatement</li> <li>Promoting biodiversity</li> <li>Cooling</li> <li>Wildlife habitat</li> </ul>	<ul> <li>Increased property values</li> <li>Health care costs</li> <li>Economic revitalization</li> <li>Tourism</li> <li>Employment</li> <li>Energy savings</li> </ul>

### Low Impact Development

- Provides new technology solutions to mitigate issues brought about by urban development. Supports urban development projects and protects/rebuilds ecosystems.
- Incorporates green space design principles to supply benefits for communities.
- Encourages native plants and planting designs for lower upkeep and maintenance. Job of maintenance can be passed onto local community groups
- Total Cost comparison in relation to
  - Installation plus upkeep and maintenance.
  - Grant availability from county, provincial or federal level.
  - Climate change goal attainment e.g. reducing stormwater runoff by x%
  - Replacement cost/frequency of standard equipment e.g. asphalt paving, HVAC

# 171 King Street East

Site challenges:

- Degraded brownfield site with broken concrete and gravel, asphalt paving.
- Treed area comprises 50% of total space but portion of canopy must be removed to allow for parking and building.
- Deforestation on 10% slope may start erosion at rear of property possible storm runoff throughout property.
- Building of 90k sf will have sizeable water runoff into main drain system. Increases runoff into town waste water. Removes water from site.
- Easement at front belongs to town (not AHC land). Currently 'parks manicured' with swale
- Site location is on Beaver river recharge area needs clean filtered water.
- Site location of Nottawasaga watershed which slows, cleans, filters and stores water ready for refill to the recharge area

### Considerations

- Site surveys indicate glacial till and silty sand under current manmade covering.
- Hydrotechnological survey points to possibility of increase in stormwater runoff after removal of tree canopy and also increase in rainwater runoff from new parking and building roof.
- Residents require amenities to be included in the area: storage, bike storage, parking, public transport waiting area, play area, communal area possibly for bbq or sitting/recreation or community garden.
- Commercial business area to be on first floor, residential on upper floors. Area outside first floor of building to be kept clear. Increased requirement for parking.
- Possible sculpture park to be installed on site to attract visitors.

### Naturalization Opportunities

- Ensure tree canopy retains largest DBH trees for maximum value retention and carbon sequester
- Install permeable paving throughout parking areas to capture and stall runoff in place.
   Designed to ease burden on town wastewater runoff systems, also will prevent
- Incorporate rain gardens or conservation landscaping (depending on estimated rainfall amounts) throughout paving space to break up expanse, and to manage larger rainfall events. Can be used for communal areas
- Incorporate bio-retentive swale facilities (including inlet and outlets leading to overflow) in front of property. Encouraging town to adopt natural systems management approach rather than park like approach for whole easement area including swales will create a meadow-like area at front of property and will reduce ongoing maintenance cost.
- Public transport, bike storage and other storage facilities could incorporate green roof systems which could be drought tolerant or use irrigation from harvested rainwater (see below).
- **Rainwater harvesting** from the main building captured into cisterns either above or below ground and used for irrigation and potentially as brown water for commercial buildings.

# Opportunities cont'd

- Install % of partially covered parking spaces for registered car pooling groups. These roofs can be installed with green roofs as well.
- Install new trees at strategic points around building, linking to perimeter trees to provide pathways for wildlife, and to provide canopy shading areas for residents and visitors.
- Use natives as largest % of vegetative cover and new tree canopy. After install and settling in period, natives require far less maintenance than ornamentals and will help promote biodiversity of wildlife and pollinators.

### 1. Rainwater Harvesting

**Purpose:** captures runoff from roofs, and redirects to holding tank for reuse.

#### **Benefits:**

- Captures rainwater water for irrigation or potable water use.
- Reduces sewage runoff.
- Prevents erosion at site of runoff.
- Tanks can be placed above or below ground.
- Reuse means reduction in town water consumption

Caution: check rainwater for corrosion – e.g. lead levels.



Reference: <u>https://extension.psu.edu/rainwater-cisterns-design-construction-and-treatment</u>

# 2. Preserve or Increase Tree and Vegetation Canopy Cover

<u>**Purpose:**</u> Cools the environment. Reduces surface and air temperature by providing shade through evapotranspiration.

#### **Benefits:**

- Reduces energy use: Reduce HVAC requirements if trees are strategically located to shade the building, 2-9°C.
- Improves air quality and reduce greenhouse gas emissions. Remove air pollutants and stores and sequesters carbon
- Enhances stormwater management and water quality watershed and water recharge area
- Reduces pavement maintenance
- Noise buffering and visual aesthetic



Reference: https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands/https://thetyee.ca/News/2021/06/29/Vancouver-Shady-Inequality/

# 3. Stormwater Management

**Purpose:** Implementing a green stormwater management system helps manage impacts of stormwater damage from impervious areas. It facilitates absorption and treatment of stormwater close to where the rain falls. It cleans and filters runoff captured debris to reduce impacts on storm drain systems and local waterways.

#### **Benefits:**

Decrease frequency and severity of local flooding by retaining rainfall where it falls.

Provides opportunities for natural filtration which helps preserve streams and waterways

Decreases wear and tear on impervious surfaces such as paving

Provides water conservation opportunities

Techniques:

- A. Permeable paving
- **B. Green roofs**
- C. Rainwater gardens and conservation meadows

# A. Permeable Paving

- Absorbs rainwater where it lands eliminates impervious paving issues
- Made from 100% recycled plastic
- Can be used in tandem with traditional paving solutions
- Long life span (20yrs) reduction in maintenance costs
- Installation costs comparable with asphalt
- Grows grass or sedum between provides green coverage



#### **B. Green Roofs for bus shelters, bike storage and other outdoor** <u>buildings</u>

- Captures particulates from rainwater.
- Stores rainwater.
- Extends the life of the roof membrane
- Provides cooling and promotes urban biodiversity
- Provides green aesthetic



References: <u>https://www.jcdecaux.co.uk/state-art-bus-shelters-manchester</u> <u>https://closercities.org/cases/green-roofed-bus-shelters#no-back</u> <u>https://www.soprema.com/en/green-roof</u>

# **C. Rainwater Gardens and Conservation Meadows**

- Captures rainfall runoff.
- Holds in place until water can percolate or evapo-transpire
- Provides wildlife and native plant habitats and can be used to link eco areas together
- Provides a place for people to meet, children education, reflection with sitting area.
- Reduce traditional parks maintenance costs mowing, flowerbed maintenance
- Can be given to the local community to manage reduction in cost and builds community spirit.



References: <u>https://trca.ca/news/complete-guide-building-maintaining-rain-garden/</u> https://conservationtools.org/guides/151-from-lawn-to-meadow

#### Current plan view of 171 King St East, July 2021



# Appendix



Site Analysis:

171 King Street East is a former site location for a Foodland retail operation and adjacent parking lot. The site area is 1.1ha – 120m eastwest and 95m north-south. It has a northern aspect. The retail operation was demolished some time ago but full utilities access remains at the site. Gravel and concrete remain as does the asphalt parking lot. The site is bound by residential housing to the south and west, leading into Thornbury town. To the east is a gravel path leading to the town waste water plant and to the north and north west beyond the highway is Georgian Bay which is the eventual destination for stormwater runoff. The location has grassed swales at the front. The location has 40m of mature forested trees, unmanaged with some deterioration. The elevation is 10%. 10 meters difference between the front and back of the property. Hydrogeological and geotechnical surveys (2020) indicate the following information: the site is located within a significant groundwater recharge area; the site is located within an intake protection zone; soil composition is sand, silt and glacial till. At issue is that this site is proposed as the future home of the new attainable housing property and parking. The plan is for a 4 storey mixed use building of approximately 90,000sq ft plus parking for about 150 vehicles and storage. It is proposed that a good portion of the treed forested area is removed, leaving a small buffered area between the site and the waste water plant to the south east. The hydrological survey indicated that the stormwater currently being managed naturally by the treed forest will be limited significantly due to the build. The opportunity is to implement greenspace design and solutions into the build of this required housing solution for the town to demonstrate effective stormwater management. This will be an example for the larger issue of stormwater management within the town of Thornbury as a whole.

#### **References:**

Geotechnical report Anar Jafarov, Central Earth Engineering, Nov 12, 2020

Hydrogeological Study, Russell Wiginton, Central Earth Engineering, Nov 12, 2020

Proposed building information supplied by Sharon McCormick, Executive Director, Town of the Blue Mountains Attainable Housing Corporation