

## Appendix A

### Town Examples of Green Infrastructure and Benefits

#### Natural

- **Creeks - The town has 16 creeks with their associated tributaries.** New creek channels within development areas and creek erosion rehabilitation projects are designed and constructed using natural channel design principles and materials like natural river stone, armour stone and plantings to create a natural channel that supports healthy aquatic and terrestrial habitat. Natural channel design typically includes a shallow low flow channel which quickly overflows into the floodplain. This both serves to keep erosive forces low and helps promote a healthy ecosystem that allows flooding into the floodplain. Allowing flooding into the floodplain reduces impacts on downstream areas.
- **Shoreline - There is approximately 15.5 km of shoreline** between the town's eastern boundary at Winston Churchill Boulevard and its western boundary at Burloak Drive. The town owns approximately 8.8 km of that shoreline. Excluding the Oakville and Bronte Harbour areas, the town's shoreline has been protected with a total of approximately 93 structures (including beaches). Shoreline erosion rehabilitation projects are now designed and constructed with natural materials like armour stone and plantings to provide both erosion protection and aquatic and terrestrial habitat enhancements. The shoreline is considered an important component of the town's green stormwater infrastructure.
- **Urban Forest - The town's urban forest provides approximate 27.8% canopy cover within town limits with just over 2 million trees.** Trees are important green stormwater infrastructure. Trees reduce stormwater runoff through transpiration, interception, reducing soil erosion and increasing soil absorption capacity. Trees also help control stormwater runoff because their leaves, branches and roots slow rain from reaching the ground and then capture and store rainfall to be released later. Trees have other benefits such as improving air quality, carbon storage, natural shade and cooling and increased resiliency to climate change. Funding is in Parks & Open Spaces 2023 capital forecast to manage/rejuvenate urban forest and woodlands.
- **Parkland - The town has 1,760 hectares of parkland** within the town limits. Parkland is the primary "soft" landscape in urban environments and serves as a critical piece of green stormwater infrastructure. Green spaces like parkland help soak up and filter rainwater where it falls rather than allowing it to run into storm sewers and eventually into our creeks and Lake Ontario. Parkland can capture, retain and treat stormwater. This helps cool urban areas through natural shade and water evaporation from trees and plants, reduce flooding and create resiliency

to climate change. The town funds various town projects through the Parks and Open Spaces capital budget to preserve and acquire natural heritage lands.

### **Engineered or Human-made**

- **Stormwater Management Ponds (SWMPs) - Wet Ponds** - Wet ponds are one of the town's most effective examples of engineered green stormwater infrastructure that provide both quantity and quality stormwater benefits. From a quantity perspective, they control flows by holding back rainwater and releasing it into the stormwater network at a slower rate to prevent flooding. From a quality perspective, the wet ponds maintain a permanent pool of water that allows sediment and pollutants to settle to the bottom of the pond and reduce sediment and pollutants from reaching our creeks and Lake Ontario.

**The town currently has 43 assumed and 19 unassumed wet ponds.** The majority of wet ponds are built as part of new subdivision developments. However, the town does occasionally build wet ponds as part of town capital projects. The upcoming North Service and Eighth Line Reconstruction project that is currently in detailed design and scheduled for construction in 2026 will include the construction of a new wet pond to provide both stormwater quantity and quality benefits.

- **Stormwater Management Ponds (SWMPs) - Dry Ponds** - Dry ponds primarily provide a stormwater quantity benefit by holding back rainfall from larger storms and releasing the stormwater back into the system at a slower rate to prevent flooding. **The town currently has 9 assumed and 1 unassumed dry ponds.** Dry ponds can also provide some minor infiltration and filtering benefits.
- **Roadside Ditches** - Roadside ditches are engineered to receive stormwater runoff from the roadway surface, roadway subgrade and adjacent properties. **The town has approximately 280 kilometres of roadside ditches.** Although roadside ditches are normally considered green infrastructure, they provide only a minor quantity benefit from infiltration and a minor quality benefit from filtration.
- **Vegetated Swales** - A vegetated swale is similar to a roadside ditch. The major difference is that a vegetated swale is designed to hold water and support significant vegetation. This provides a quantity benefit by holding back water and absorbing water and a quality benefit through plant filtration.
  - A vegetated swale was constructed as part of the Fourth Line reconstruction and widening project from Wyecroft Road to Speers Road.
  - The ditch on the northwest side of the Metrolinx railway was designed and built as a vegetated swale that stores, absorbs and filters stormwater providing both quantity and quality benefits.

- **Bioswales** - A bioswale is a swale that incorporates a bioretention element promoting infiltration and filtration. It is constructed of layers of engineered soil and specially selected plants that absorb water and filter out pollutants from urban runoff. A bioswale provides both quality and quantity stormwater benefits.
  - The town constructed a bioswale project at Bronte Bluffs with community partners Conservation Halton, Bronte BIA, Bronte Historical Society, Bronte Horticultural Society, Oakvillegreen, and Evergreen.
- **Permeable Pavement** - Permeable pavement is made of a porous material such as open pore pavers, concrete or asphalt that allows stormwater to flow through it rather than over it like normal pavement. This reduces the amount of runoff and provides a stormwater quantity and quality benefit. Permeable pavements can be used for parking lots and pedestrian walkways. Permeable pavement does not have the load-bearing capacity for most roadway applications.
  - The town's North Operations Yard has permeable pavement and there are a several walkways with interlock pavers in North Oakville.
- **Tree Soil Cells** - Tree soil cells are engineered storage chambers that provide addition soil for tree health and growth. They also hold stormwater runoff which becomes available for tree uptake and groundwater recharge providing stormwater quantity and quality benefits.
  - The Downtown Lakeshore Road Reconstruction and Streetscape project from Navy Street to Allan Street included 93 street trees in soil cells to support the health and growth of street trees and to also provide stormwater quality and quantity benefits.
- **Water Quality Control Devices** - Water quality control devices are manufactured treatment devices used for water quality treatment of stormwater runoff through the removal of large particle suspended solids and associated pollutants and debris. Some devices can also trap light liquids such as oil.
  - The town currently has 85 water quality control devices located on roadways and facility parking lots. Most roadway reconstruction projects will include one or more water quality control devices to treat the roadway runoff.
  - The Roads and Works Central Operations Yard has one of the most advanced water quality control devices known as a Stormceptor – Jellyfish treatment device that is used to treat stormwater runoff from the yard and also to treat catchbasin cleaning sludge. The unit includes 23 filters that are power washed weekly.
- **Infiltration Chambers/Trenches** - Infiltration chambers and trenches are underground systems that store stormwater runoff prior to being infiltrated into the soil. They provide a quantity benefit by reducing the flows to the stormwater network. They also provide a quality benefit by filtering sediment and pollutants through the infiltration process.

- The town currently has 5 infiltration chambers. The Sixteen Mile Creek Sports Complex has an infiltration chamber in the parking lot. The Cornwall Road reconstruction project from Chartwell Road to Morrison Road included two infiltration chambers, one in the median and one in the boulevard.
- **Underground Storage Facilities** - Underground storage primarily provide a stormwater quantity benefit by holding back rainfall from larger storms and releasing the stormwater back into the system at a slower rate to prevent flooding. The storage tanks can also provide a quality benefit by allowing sediment to settle in the tank.
  - The town currently has 6 underground storage facilities. The Cornwall Road reconstruction project from Chartwell Road to Morrison Road included an underground storage tank that holds back runoff flows to prevent flooding along Morrison Creek.