Public Open House #2
Date: December 15, 2015
Location: Sir Robert Barrie Room, 2nd Floor, City of Barrie City Hall
Time: 4pm to 7pm
The City of Barrie has initiated the development of a Comprehensive Stormwater Management Master Plan (CSWM-MP) in accordance with the Lake Simcoe Protection Plan, Lake Simcoe Region Conservation Authority (LSRCA) Guidelines, and the Municipal Class Environmental Assessment Process for Master Plans.

After the first open house (held June 25, 2015), the City has proactively expanded the scope of this project to include areas of the City that are within the Nottawasaga Valley Conservation Authority (NVCA) boundary in an effort to implement a consistent City-wide stormwater management strategy.

Purpose of Tonight’s Meeting:

The first open house (held June 25, 2015) provided an opportunity for the public to review stormwater management practices and provide input on the proposed alternative stormwater management strategies and additional stormwater management opportunities within the LSRCA watersheds, the criteria for evaluation, and the selection process. Input received was used to develop recommendations for a preliminary preferred stormwater management strategy, which included additional stormwater management sites within the LSRCA Watersheds.

Tonight’s Open House will provide an opportunity for the public to provide input on the following:

- Preliminary preferred stormwater management strategy (City-wide)
- Additional stormwater management opportunities within the NVCA and LSRCA Watersheds (Park Infiltration Galleries)

Project Team members are available to answer any questions that you may have about the overall study and how the project may impact you. Public input will be used to refine the recommendations contained within the City of Barrie Comprehensive Stormwater Management Master Plan.
Comprehensive Stormwater Management Master Plan

- Study Objective & Process -

**Study Objective:**

As per the policies of the Lake Simcoe Protection Plan, which aim to protect and revitalize the Lake Simcoe basin, municipalities are required to prepare and implement comprehensive stormwater management master plans for each settlement area in the Lake Simcoe Watershed.

The City of Barrie is a settlement area located on the western shores of the Lake Simcoe watershed, and as such is required to prepare a Comprehensive Stormwater Management Master Plan (CSWM-MP).

The development of a Comprehensive Stormwater Master Plan for the City of Barrie is an important step to meet the objectives of the Lake Simcoe Protection Plan (LSPP), specifically:

- Reducing loading of phosphorus and other nutrients of concern to Lake Simcoe and its tributaries
- Reducing discharge of pollutants to Lake Simcoe and its tributaries

The Project scope has been expanded to include lands within the NVCA boundary.

**Study Process:**

The study process followed the ten (10) steps presented within the LSPP and (LSRCA) Guidelines for the Development and Implementation of CSWM-MP in the Lake Simcoe Watershed.

1. Scoping
2. Determine Study Area
3. Characterization of the Study Area
4. Divide into Management Units
5. Evaluate Environmental Impacts
6. Determine Effectiveness of SWM Systems
7. Identify and Evaluate SWM Opportunities
8. Establish Recommended Approach
9. Develop Implementation Plan
10. Develop Inspection and Maintenance Programs

<table>
<thead>
<tr>
<th>Objective</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality</td>
<td>Reduce phosphorus loadings to Lake Simcoe to 44 tonnes per year, in order to achieve a target for dissolved oxygen of 7 mg/L in the lake.</td>
</tr>
<tr>
<td></td>
<td>Reduce pathogen loading to eliminate beach closures</td>
</tr>
<tr>
<td></td>
<td>Reduce contaminants to levels that achieve Provincial Water Quality Objectives or better</td>
</tr>
<tr>
<td>Water Balance</td>
<td>Preserve and re-establish natural hydrologic cycle</td>
</tr>
<tr>
<td></td>
<td>Maintain groundwater levels and baseflows</td>
</tr>
<tr>
<td>Water Quantity</td>
<td>Minimize risk of flooding</td>
</tr>
<tr>
<td></td>
<td>Reduce stream erosion impacts</td>
</tr>
</tbody>
</table>

Lake Simcoe Protection Plan Targets and PWQO Standards:

- Prevent infiltration deficit
- Control 2-yr to 100-yr outflows to pre-development rates

Lake Simcoe Protection Plan

Comprehensive Stormwater Management Master Plan Guidelines

Guidelines for the Development and Implementation of Comprehensive Stormwater Management Master Plans in the Lake Simcoe Watershed

Apr 23, 2011

The City of Barrie

Aquafor Beech Limited
What is Stormwater?
Stormwater is water that flows across the land surfaces and is routed into drainage systems which ends up in our natural areas such as creeks, lakes, and wetlands.

Stormwater in Urban Areas
As towns and cities expand over our undeveloped, natural areas, the amount of “permeable” or “porous” areas are reduced and replaced by hard surfaces which do not absorb stormwater. With less “porous” areas available, risks of flooding and erosion may increase.

How does this effect Water Quality?
Untreated runoff carries oils and grease, pesticides, fertilizers, and other chemicals off roads, lawns, and buildings which go directly into our natural areas, such as creeks, lakes, and wetlands.

Comprehensive Stormwater Management Master Plan
- Problem / Opportunity Identification -

Significant future growth and development is expected within the City of Barrie. Land use changes can have significant impacts on stormwater quantity and quality, and on the ecological health of Lake Simcoe and the Lake Simcoe Watershed. Effective management of stormwater in existing and planned settlement areas will help to protect and restore the health of Lake Simcoe and its watershed.

This study provides an opportunity to identify, prioritize and implement Stormwater Management improvements to reduce nutrient and other pollutant loads in Lake Simcoe, mitigate reductions in groundwater recharge and maintain surface runoff to pre-development conditions (Scope expanded to include NVCA areas within City).
Barrie Creeks Watersheds

These watersheds are located within the former City limits and are, for the most part, fully urbanized. The Barrie Creeks Watersheds unit includes:
- Sophia Creek, Kidds Creek, Bunkers Creek, Dyments Creek, Hotchkiss Creek, and Whiskey Creek; and
- nine smaller drainage areas which flow directly to Lake Simcoe.

Annexation Lands Watersheds

These watersheds are located within the newly annexed lands, where the majority of the future urban growth within the City is planned. The Annexation Lands Watersheds unit includes:
- Lovers Creek, Hewitts Creek, Sandy Cove Watershed; and
- three smaller drainage areas which flow directly to Lake Simcoe.

Nottawasaga Valley Watersheds

These watersheds are located within the southwest and northeast parts of the City, and are mostly urbanized. Future growth is planned in the Annexed Lands to the south. The Nottawasaga Valley watersheds include:
- Bear, Thornton and Willow Watersheds
Characterization of Existing Conditions:

**Water Quality:**
- Typical pollutants of Concern: Phosphorus, Chlorides, Total Suspended Solids, Metals and Bacteria.

**Groundwater:**
- Much of the City is underlain by coarse sandy soils which provide an important function in infiltrating and replenishing groundwater for municipal supply.
- Many of the Barrie Creeks fall within Wellhead Protection Areas.

**Surface Water and Flood Hazards:**
- Flood and erosion hazard lands were mapped. These areas could be impacted by changes to stormwater runoff.

**Natural Heritage:**
- Significant woodlots, wetlands and streams requiring protection were mapped.

**Climate Change:**
- The City is proactively addressing climate change, specifically the increasing frequency of more intense rainfall events through a 15% increase to the rainfall intensity-duration-frequency (IDF) curves used for sizing stormwater infrastructure.

Characterization & Key Findings:
In order to develop a recommended stormwater management strategy and implementation plan for the City of Barrie, the existing environmental conditions of the study area were characterized. Special focus was given to the environmental features and functions that are relevant to stormwater quantity and quality and the effectiveness of existing stormwater infrastructure.
Comprehensive Stormwater Management Master Plan

- Study Area Characterization -

Drinking Water Supply Protection

The City of Barrie relies on a combination of surface water from Lake Simcoe and groundwater aquifers below the City for the drinking water supply. These water supplies are vulnerable to contamination by activities within the surrounding area. The vulnerable areas have been mapped as part of the Lake Simcoe and Couchiching-Black River Source Protection Area Plan, including:

- Wellhead protection areas (WHPA’s) identify the vulnerable areas that could lead to the contamination of the domestic water supply wells within the wells capture zone.
- Intake protection zones (IPZ) identify the vulnerable areas that could lead to the contamination of the surface water intake.

Development or landuse changes within WHPA’s or IPZ’s are subject to approval by the City, LSRCA, NVCA and MOECC. To prevent groundwater contamination, the application of some forms of stormwater management may also be restricted within these areas.

Natural Heritage Areas

The natural heritage features identified in the city of Barrie study area include significant woodlots, wetlands, and streams which need to be protected in order to maintain the ecological function and natural processes of the watershed, improve air and water quality, and provide a better quality of life for Barrie residents.

The City’s Natural Heritage Strategy was developed in coordination with the LSRCA and NVCA. A four tiered policy approach was developed as part of the Strategy for the preservation of the natural heritage features. The city’s natural heritage features were designated as:

- provincially significant (Policy Level 1 and 2);
- watershed significant (Policy Level 3); and
- supporting (Policy Level 4)
Comprehensive Stormwater Management Master Plan

- Environmental Impacts and Effectiveness of Existing SWM system -

(STEP 5 & 6)

As cities expand, the amount of “permeable” areas are reduced and replaced by hard surfaces which do not absorb rainfall. Without stormwater management, this can result in:

- increased runoff volumes
- increased pollutants to the receiving streams and lakes
- increased flooding and erosion
- decreased groundwater levels

Stormwater Quality Control in Barrie

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Total Area (ha)</th>
<th>Rural &amp; Environmental Area (ha)</th>
<th>Urban Area (ha)</th>
<th>Urban Area served by Water Quality Control / SWM Facilities** (%)</th>
<th>Urban Area Without Water Quality Control** (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrie Creek Watersheds*</td>
<td>3482.4</td>
<td>209.3</td>
<td>3273.1</td>
<td>11%</td>
<td>876</td>
</tr>
<tr>
<td>Base Creek Watersheds*</td>
<td>3013.3</td>
<td>1728.8</td>
<td>1284.5</td>
<td>53%</td>
<td>476</td>
</tr>
<tr>
<td>Arrowhead Watersheds*</td>
<td>3523.1</td>
<td>1752.8</td>
<td>677.3</td>
<td>42%</td>
<td>585</td>
</tr>
<tr>
<td>Total Area (ha)</td>
<td>10124.8</td>
<td>5551.8</td>
<td>8406.8</td>
<td>21%</td>
<td>806</td>
</tr>
</tbody>
</table>

* Portion of watershed within City Boundary

** Does not include private facilities. A significant portion of the City of Barrie was developed prior to stormwater management regulations.

Water Quantity & Balance:

<table>
<thead>
<tr>
<th>Proposed Landscape</th>
<th>Imperviousness</th>
<th>Soil Type</th>
<th>Annual Infiltration (mm/yr)</th>
<th>Infiltration Deficit (mm/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>Existing / Pre-Development</td>
<td>Post-Development</td>
<td>Existing / Pre-Development</td>
<td>Post-Development</td>
</tr>
<tr>
<td>Urban</td>
<td>0%</td>
<td>Phase A/ B</td>
<td>202</td>
<td>182</td>
</tr>
<tr>
<td>Residential</td>
<td>0%</td>
<td>Phase A/ B</td>
<td>202</td>
<td>101</td>
</tr>
<tr>
<td>Institutional</td>
<td>0%</td>
<td>Phase A/ B</td>
<td>202</td>
<td>67</td>
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<tr>
<td>Business</td>
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<td>Phase A/ B</td>
<td>202</td>
<td>40</td>
</tr>
<tr>
<td>Industrial</td>
<td>40%</td>
<td>Phase A/ B</td>
<td>121</td>
<td>61</td>
</tr>
</tbody>
</table>

Legend:
- The City of Barrie
- Stormwater Management Infrastructure
- Stormwater Management Infrastructure Map
- Stormwater Management Infrastructure Map of Barrie
- Stormwater Management Infrastructure Map of Nottawasaga Valley
- Stormwater Management Infrastructure Map of Rural Area

The City of Barrie

Aquaforte Beuch Limited
This study is being undertaken as a Master Plan (Approach 1) project under the Municipal Class Environmental Assessment (EA) process. The flow chart illustrates the key steps in the EA process.

**EA Project Schedules**

Projects undertaken by municipalities are assigned to various project schedules according to their anticipated level of environmental impact:

- **Schedule A** projects are limited in scale and have minimal adverse environmental effects. These projects are pre-approved and include a number of municipal maintenance and operational activities.

- **Schedule A+** projects are pre-approved, however, the public is to be advised prior to project implementation.

- **Schedule B** projects have the potential for some adverse environmental effects and require public consultation. These projects generally include improvements and minor expansions to existing facilities.

- **Schedule C** projects have the potential for significant environmental effects and require public consultation. These projects generally include the construction of new facilities and major expansions to existing facilities.
Alternative 1: Traditional Stormwater Management (Do Nothing)

This alternative allows for the consideration of maintaining traditional stormwater management systems, consisting of conventional storm sewers and stormwater detention ponds to provide water quality treatment as well as flood and erosion control applications.

**Stormwater Conveyance**

Traditional stormwater systems use conventional underground sewer pipes to convey stormwater runoff. This approach focuses on moving stormwater as quickly as possible from where it was generated to a traditional end-of-pipe treatment area, such as a detention pond, before being discharged to the receiving streams and lakes. Conveyance control measures are typically undertaken as part of roads improvement works and are therefore classified according to the EA Schedule for the roads project.

**Traditional End-of-Pipe Stormwater Facilities**

Traditional end-of-pipe treatment typically consists of a detention pond where stormwater is collected. The ponds are constructed with sufficient capacity to settle many pollutants and to hold back runoff for flooding and erosion control. For instances where stormwater treatment is achieved through other mechanical devices or upstream treatment methods, the pond may be constructed such that it is dry between storm events. These are typically constructed as part of plan of subdivision and not subject to the EA process. New facilities or expansion of existing facilities (where property is required) are classified as Schedule B projects (when municipality is proponent).

Alternative 2: Low Impact Development (LID) Stormwater Measures

This alternative consists of using LID practices to encourage the infiltration of water into the ground and reduce stormwater runoff. These natural processes improve the hydrologic water balance, and provide water quality treatment. LID does not typically provide flood protection for major storm events.

As part of this alternative, the implementation of source controls is encouraged to reduce stormwater runoff and reduce municipal operating costs. Additional non-traditional end-of-pipe stormwater opportunities have also been identified. LID measures, for the purposes of this study, have been divided into the following categories:

**Pollution Prevention Measures**

These are methods that have the intent to improve operation and maintenance of privately and publicly owned land, buildings, and infrastructure that will reduce pollution generation. Certain municipal programs such as road salt management, street sweeping and storm sewer cleaning can affect water quality. Pollution prevention measures are classified as Schedule A projects.

**Source Control Measures**

Source controls are physical measures that encourage the infiltration of water into the ground and reduce stormwater runoff and can include LID techniques such as green roofs, permeable pavement, soakaway pits, bioretention, rainwater harvesting and downspout disconnection etc. Source control measures are classified as Schedule A projects.

**Conveyance Control Measures**

Conveyance controls are linear stormwater transport systems that are generally located within the road right-of-way and encourage infiltration of water into ground, improve water quality and reduce runoff. They can include traditional curb and gutter systems and low impact development (LID) techniques such as, bio-swales, grassed channels and subsurface perforated pipe systems. Conveyance control measures are typically undertaken as part of roads improvement works and are therefore classified according to the EA Schedule for the roads project.

**End-of-Pipe Measures**

Additional opportunities to construct end-of-pipe treatment measures in areas of the city which currently have no stormwater controls were investigated. This assessment focussed on opportunities to construct non-traditional underground infiltration galleries within public lands, as well as additional opportunities to provide mechanical treatment at uncontrolled outfalls to Lake Simcoe. End-of-pipe controls are classified as Schedule A+ or B projects.

SEE INFORMATION PANELS AFTER EVALUATION TABLE FOR FURTHER INFORMATION

Alternative 3: Traditional Stormwater Management and LID Stormwater Measures

This alternative is a combination of Alternative 1 (Traditional Stormwater Management) and Alternative 2 (LID Stormwater Measures).
Comprehensive Stormwater Management Master Plan

- Evaluation of Alternative Solutions -

(STEP 7)

The page displays a comprehensive evaluation of alternative solutions for stormwater management, with a focus on the selection process. The document includes a table and diagram to help in the evaluation process.

The table likely contains criteria and scores for each alternative, allowing for a systematic comparison. The diagram may illustrate the flow or decision-making process involved.

The content is structured to support decision-making in stormwater management planning, ensuring that the selected alternative is well-suited to the specific environmental and operational conditions.
# Comprehensive Stormwater Management Master Plan

## - Alternatives - Cost Estimates and Present Funding -

**(STEP 7)**

### Stormwater Management Alternatives

<table>
<thead>
<tr>
<th>Alternative 1 – Traditional Stormwater Management</th>
<th>Components</th>
<th>Present Funding Sources and Costs (if applicable)</th>
<th>Additional Cost as Compared to Traditional SWM (Draft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Stormwater Management Infrastructure</td>
<td>Stormwater Management for New Roads/Road Widenings</td>
<td>33 Identified Stormwater Facility Pond Retrofit(^1)</td>
<td>$19.0 Million</td>
</tr>
<tr>
<td></td>
<td>Stormwater Management for Road Renewal(^2)</td>
<td>100% Taxes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stormwater Conveyance System and End-of-Pipe Facility Maintenance</td>
<td>100% Taxes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stormwater Management Facility Pond Retrofits(^1,3)</td>
<td>100% DC - $14 Million</td>
<td></td>
</tr>
</tbody>
</table>

**Alternative 2 – Low Impact Development (LID) Stormwater Measures**

<table>
<thead>
<tr>
<th>City Stormwater Management Infrastructure</th>
<th>LID Retrofits for New Roads/Road Widenings</th>
<th>100% Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The additional cost increase for LID is not included in the 2014 DC By-Law. Proposed to be added as part of next DC By-Law update.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Potential funding opportunities include:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LID Retrofits for Road Renewal</td>
<td>100% Taxes</td>
</tr>
<tr>
<td></td>
<td>Potential funding opportunities include:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Additional Stormwater Management Opportunities (Infiltration Galleries in Parks, OGS at Lake outfalls)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Additional costs are not included in the 2014 DC By-Law.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Potential funding opportunities include:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stormwater Utility User Rate</td>
<td></td>
</tr>
</tbody>
</table>

**Alternative 3 – Traditional Stormwater Management with LID Measures**

See Alternatives 1 and 2 above

**Stream Restoration**

City Stormwater Management Infrastructure

100% Taxes (DC eligible for specific projects affected by development)

Potential funding opportunities include:

- Development Charges
- Phosphorus Offsetting Programs
- Federal/Provincial/LSRCA Grants
- Stormwater Utility User Rate

Total of Alternatives 1 and 2 above = $49.5 Million

**Public Outreach/Education/Marketing:**

- Pilot Projects: $0.2 Million
- The provided implementation costs are estimates only. Actual costs can vary depending on the complexity and/or available/suitable land available for implementation.

**LID Retrofits for Road Renewal**

100% Taxes

Potential funding opportunities include:

- Phosphorus Offsetting Programs
- Stormwater Utility User Rate

Total = $17.1 Million

**Public Outreach/Education/Marketing:**

- Pilot Projects: $0.2 Million
- The provided implementation costs are estimates only. Actual costs can vary depending on the complexity and/or available/suitable land available for implementation.

**LID Retrofits for New Roads/Road Widenings**

Annexed Lands – 85% DC, 15% Taxes

Former City Boundary – 65% DC, 35% Taxes

**Public Outreach/Education/Marketing:**

- Pilot Projects: $0.2 Million
- The provided implementation costs are estimates only. Actual costs can vary depending on the complexity and/or available/suitable land available for implementation.

**Infiltration Galleries in Parks**

= $7.0 Million

**OGS's and Other Sewer retrofits in Lake outfall Catchments**

= $10.1 Million

Total = $17.1 Million

**Stormwater Management Facility Pond Retrofits**

100% DC - $14 Million

**Stormwater Utility User Rate**

= $14.4 Million

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2 As identified in the Infrastructure Master Plans (AMEC, 2013)

DC = development charges

LSRCA = Lake Simcoe Region Conservation Authority

Phosphorus Offsetting Programs are in the development stage with the Lake Simcoe Region Conservation Authority. This program is proceeding to establish a fund that the City can use to implement phosphorus reducing projects within the Lake Simcoe Watershed. Further utility rates are to be determined. Funding support is not included in the current draft of the Plan.

**Stormwater Utility User Rate** is an alternative funding source for components that are funded via tax revenue (would not apply to DC portion).
Comprehensive Stormwater Management Master Plan

Alternative Details

- Alternative 1: Traditional Stormwater Management (STEP 7)

The previous study identified and assessed 74 existing SWM pond and storm sewer outfall sites with retrofit potential. From these, 33 retrofits are recommended throughout the city, including the following:

Existing SWM ponds to be retrofitted:
- 11 sites in LSRCA watersheds
- 3 sites in NVCA watersheds

Existing storm sewer outfall sites where new SWM ponds are recommended
- 17 sites in LSRCA watersheds
- 2 sites in NVCA watersheds

The retrofit of a dry stormwater detention facility (left) to a wet stormwater management facility (right). The pond on the right provides additional water quality and erosion control benefits. (City of Barrie, LV14)

The addition of new SWM ponds at existing uncontrolled storm sewer outfalls
The following retrofit opportunities were identified as part of the Infrastructure Master Plans and have been approved by Council. The retrofits identified on this map focused on the following opportunities:

- converting dry ponds to wet ponds (provides stormwater quality treatment)
- constructing ponds at storm outfalls (where land is available)
- developing online opportunities (converting stream channels into ponds)

Comprehensive Stormwater Management Master Plan
Alternative Details
- Alternative 1: Traditional Stormwater Management
Existing Pond Retrofit Opportunities -
Pollution Prevention

Current City Practices include:

- Reduced road salt application through salt management measures and operator training
- Catch basin and storm sewer cleaning
- Source Water Protection (public outreach/education and re-evaluation of industrial, commercial and institutional activities)
- Hazardous product management at City facilities
- Septic system maintenance
- Sewer use by-laws
- Installations of mechanical stormwater treatment devices where feasible
- Street sweeping
- Free household hazardous waste dropoff

Additional measures which are proposed to augment current City practices may include:

- Requirement for salt management plans and training for ICI properties
- Public education, and business awareness (Yellowfish Road Program)
- Reduced lot grading
- Lawn care education programs (proper fertilizer use)
Examples / Opportunities
Source control measures are generally implemented on private properties. Typical stormwater techniques that are currently throughout the city were reviewed, with an emphasis on single-family residential lots. Example practices and opportunities are illustrated below.

The City and the Lake Simcoe Region Conservation Authority (LSRCA)’s Role
The City’s role in implementing stormwater source controls is to improve uptake rates of its residents and industry through social marketing programs and strategies. Existing Programs include:
- Barrie’s Rain Barrel program
- LSRCA RainScaping
- RAIN Stormwater Management Program
- LSRCA LEAP (Landowner Environmental Assistance Program)
- TRCA Greening Your Grounds – A Homeowners Guide to Stormwater Landscaping Projects
- Special Events such as CVC’s “Ask A Designer Night”

The Comprehensive Stormwater Management Master Plan
Alternative Details
- Alternative 2: Low Impact Development (LID) Stormwater Measures
  Source Control -
Conveyance controls are measures that are designed to treat stormwater as it travels overland or through pipes to the downstream outlet. Low Impact Development (LID) conveyance control methods include:

- Exfiltration trenches / perforated pipe systems;
- Grassed swales;
- Bioretention / bioswales;
- Permeable pavements; and
- Mechanical treatment devices.

The LSPP recommends that municipalities “make stormwater retrofits and the use of LID solutions a priority, due to their significant potential to reduce phosphorus loadings”. The City plans to promote their use in new development areas and within existing development areas (retrofits).

Roads improvement projects represent the most efficient way to implement these controls into existing areas. Opportunities to include these controls as part of future City roads improvement projects were reviewed:

- The City's 5-year Capital Budget for Road infrastructure
- Roads within wellhead protection areas (WHPAs) A-C were excluded
- General alternatives for rural (ditched) and urban (curb and gutter) road sections were reviewed
- Estimated pollutant loadings reductions were calculated

**Example Low Impact Development (LID) Retrofit Techniques**

**Existing Condition**

“Rural” Road Retrofit Example (Royal Oak Drive Neighbourhood)

**LID Retrofit Option**

Granular Infiltration Trench
(Mississauga, ON)

**Finished Project and Appearance**

Turf Bioswale on Top of Granular Infiltration Trench

**Existing Condition**

“Urban” Road Retrofit Example (Toronto St.)

**LID Retrofit Option Perforated Pipe System**

(Lower pipe is perforated allowing stormwater to exfiltrate into soils)

**Finished Project and Appearance**

(Toronto, ON)
Comprehensive Stormwater Management Master Plan

Alternative Details

- Alternative 2: Low Impact Development (LID) Stormwater Measures

Additional Stormwater Management Opportunities - (STEP 7)

- Additional opportunities were reviewed as part of the CSWMMP to implement underground water quality treatment in existing parks and municipally-owned lands. A typical example is shown below.

![Typical areas suitable for underground infiltration systems. After construction, the areas are restored to their original use. Construction can be scheduled to minimize impacts to playing field activities (i.e. winter/early spring construction). Source: Google Maps](image1)

![Once constructed, the playing field is restored to its previous use. Source: Google Maps](image2)

![This image illustrates a typical installation of an underground infiltration gallery. The yellow arch structures are connected to the storm sewer and provide storage in addition to the clear stone backfill allowing for further storage of stormwater in the voids between the stone. As stormwater enters this system it naturally infiltrates into the ground helping to replenish groundwater and reduce runoff to receiving streams. Source: www.Corix.com, Photo of ADS Stormtech Chamber (Alberta)](image3)

- Additional Opportunities to add mechanical treatment devices were reviewed as part of this CSWM-MP study. These devices could be added to uncontrolled outfalls to Lake Simcoe or as part of future road re-construction projects. Devices include oil-grit separators and catchbasin inserts.

![Outfall to Kempenfelt Bay](image4)

![Oil-Grit Separator](image5)
Comprehensive Stormwater Management Master Plan

Alternative Details

- Alternative 2: Low Impact Development (LID) Stormwater Measures

Additional Stormwater Management Opportunities

(STEP 7)
Comprehensive Stormwater Management Master Plan

- Alternative 3: Traditional Stormwater Management and LID Stormwater Measures -

(STEP 8)

Combination of:

Alternative 1 (Traditional End-of-Pipe Retrofits)
- Existing SWM Pond Retrofits
- New SWM ponds at existing Storm Sewer Outfalls

Alternative 2 (Low Impact Development and Additional Retrofit Opportunities)
- Pollution Prevention
- Source Control LID’s
- Conveyance Control LID’s
- Non-traditional “end-of-pipe” retrofits
Stream Restoration Measures
The City of Barrie and LSRCA have mapped known erosion sites within the Study Area. 48 erosion sites have been documented. Stream erosion and problem site restoration measures are recommended to be addressed through the completion of a future City Wide Stream Restoration Master Plan. The city-wide study would be undertaken following the Municipal Class EA process and would result in a prioritized plan for undertaking future stream works. Stream Restoration is a recommended component of all three Stormwater Management Alternatives.
Alternative Stormwater Management Strategies for the LSRCA Watersheds were evaluated in terms of a series of environmental, social, technical and economic criteria.

Alternative 3 ranked highest under the technical and environmental evaluation criteria and also ranks well under the social criteria.

Feedback received as part of the public consultation process indicated a preference for Alternative 3 with 80% of the respondents selecting this alternative.

Based on the evaluation and consideration of public feedback discussed above, Alternative 3 was selected as the preliminary preferred alternative for both the LSRCA and NVCA Watersheds.

Full Suite of Traditional Stormwater Management and LID Stormwater Measures

- **Pollution Prevention**
- **Source Control LID’s**
- **Conveyance Control LID’s**
- **Traditional “End-of-Pipe” SWM Pond Retofits**
- **Additional non-traditional “End-of-pipe”and Storm Retrofit Opportunities**
- **Stream Restoration (Future Study Recommended)**
Different components of the Recommended Approach can be expected to be applied, depending on the location within the City and the state of development (i.e. new “greenfield” development vs. existing development lands):

**New (“greenfield”) Development Lands**
- mainly located within the Annexation Lands Watersheds
- recommended works are comprised of:
  - conventional end-of-pipe techniques; and
  - LID source and conveyance practices.

**Re-Development / Infill / Intensification**
- Further smaller-scale development expected within the existing urban boundary
- Use of conventional end-of-pipe techniques is limited
- Site-specific stormwater targets to be achieved using LID measures or other BMP practices.

**Existing Urban Lands**
- Retrofit uncontrolled urban areas
- Recommended Approach consists of a full suite of stormwater measures:
  - continuation and expansion of existing pollution control measures;
  - retrofitting existing urban lands using LID source controls;
  - retrofitting existing roadways using LID conveyance controls;
  - retrofitting existing sewersheds with both traditional and non-traditional end-of-pipe stormwater controls; and
  - stream restoration works
## Comprehensive Stormwater Management Master Plan

### Summary of Stormwater Management Measures and Targets under the Preliminary Preferred Alternative

<table>
<thead>
<tr>
<th>Management Units</th>
<th>State of Development/Location</th>
<th>Water Balance</th>
<th>Water Quality</th>
<th>Water Quantity / Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annexation Area and Greenfield Development with former City Limits</strong></td>
<td><strong>Targets</strong></td>
<td>- Maintain pre-development infiltration volume (no increase in runoff volume)</td>
<td>- Enhanced flow rate of MEC Stormwater Management Planning and Design Manual</td>
<td>- Control peak flows to pre-development levels</td>
</tr>
</tbody>
</table>
|                   | **Recommended measures** | - LID controls:  
  - all developments must be directed to pervious areas, stormwater pits or equivalent practice  
  - enhanced pond vegetation, rain gardens, bioswale areas, green roof technology, grassed swales  
  - underground infiltration chambers | - Bioswale Control System (EWS)  
  - Bioswale Control System - Municipal SWD  
  - Bioswale Control System - Private SWD  
  - grassed swales  
  - enhanced grassed swale over infiltration trench and perforated pipe  
  - catch basin soakaway system  
  - Bioswales Distribution System (SDS)  
  - permeable interlocking concrete pavers (PCP), permeable pavement | - Bioswale and infiltration system (EWS)  
  - Bioswale Control System - Municipal SWD  
  - Bioswale Control System - Private SWD  
  - permeable interlocking concrete pavers (PCP), permeable pavement |
| **Re-development / Intensification / Infill in existing urban areas (Redevelopment of existing properties within an urbanized area)** | **Targets** | - Maintain existing infiltration volume (no increase in runoff volume) | - Enhanced flow rate of MEC Stormwater Management Planning and Design Manual | - No increase in peak outfalls (make best efforts to reduce peak outfalls to predevelopment conditions) |
|                   | **Recommended measures** | - LID controls:  
  - all developments must be directed to pervious areas, stormwater pits or equivalent practice  
  - enhanced pond vegetation, rain gardens, bioswale areas, green roof technology, grassed swales  
  - underground infiltration chambers | - Bioswale Control System (EWS)  
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  - Bioswale Control System - Municipal SWD  
  - Bioswale Control System - Private SWD  
  - permeable interlocking concrete pavers (PCP), permeable pavement |
| **Existing Urban Areas** | **Targets** | - Maintain existing infiltration volume (no increase in runoff volume) | - Enhanced flow rate of MEC Stormwater Management Planning and Design Manual | - No increase in peak outfalls (make best efforts to reduce peak outfalls to predevelopment conditions) |
|                   | **Recommended measures** | - LID controls:  
  - all developments must be directed to pervious areas, stormwater pits or equivalent practice  
  - enhanced pond vegetation, rain gardens, bioswale areas, green roof technology, grassed swales  
  - underground infiltration chambers | - Bioswale Control System (EWS)  
  - Bioswale Control System - Municipal SWD  
  - Bioswale Control System - Private SWD  
  - permeable interlocking concrete pavers (PCP), permeable pavement | - Bioswale and infiltration system (EWS)  
  - Bioswale Control System - Municipal SWD  
  - Bioswale Control System - Private SWD  
  - permeable interlocking concrete pavers (PCP), permeable pavement |
| **Stream Corridors** | **Targets** | - Maintain existing infiltration volume (no increase in runoff volume) | - Enhanced flow rate of MEC Stormwater Management Planning and Design Manual | - No increase in peak outfalls (make best efforts to reduce peak outfalls to predevelopment conditions) |
|                   | **Recommended measures** | - LID controls:  
  - all developments must be directed to pervious areas, stormwater pits or equivalent practice  
  - enhanced pond vegetation, rain gardens, bioswale areas, green roof technology, grassed swales  
  - underground infiltration chambers | - Bioswale Control System (EWS)  
  - Bioswale Control System - Municipal SWD  
  - Bioswale Control System - Private SWD  
  - permeable interlocking concrete pavers (PCP), permeable pavement | - Bioswale and infiltration system (EWS)  
  - Bioswale Control System - Municipal SWD  
  - Bioswale Control System - Private SWD  
  - permeable interlocking concrete pavers (PCP), permeable pavement |
### Comprehensive Stormwater Management Master Plan
#### Preliminary Preferred Stormwater Management Strategy
##### Implementation Considerations

**Table 1 of 2**

<table>
<thead>
<tr>
<th>Recommended Approach</th>
<th>Description of Recommended Approach</th>
<th>Key Next Steps</th>
<th>Future Study Requirements</th>
<th>Policy/Standards</th>
<th>Facilitator &amp; Contributors</th>
<th>Costs</th>
<th>Funding Considerations</th>
<th>Timing/ Schedule</th>
<th>O&amp;M</th>
<th>Reference Material &amp; Conformance with Other Documents</th>
</tr>
</thead>
</table>
| **Pollution Prevention, Measures and Municipal Management/Operational Practices** | - Continue ongoing practices  
- Salt management & training for IC properties  
- Public awareness and education programs  
- Lawn care programs / fertilizer use | n/a | n/a | | | | | | | | - Municipal operational policies and standards  
- City’s website content |
| **Source Control Stormwater Measures** | - Utilize multi-layered marketing strategy/program to drive uptake in residential land use, followed by commercial/industrial land use  
- Strategy should include:  
  - Visually based marketing campaign  
  - Community demonstration sites  
  - Community Viewing Sessions  
  - Recommended LID measures:  
    - downstream to porous areas (min)  
    - swaleaway pits/filtration galleries for roof runoff  
    - greased swale/filter strips for parking lots  
    - permeable interlocking concrete pavers (preferred), permeable pavement | - Continued strategic partnership with the LRCA (Rain Scaping Program) and joint downstream reduction efforts  
- Establish tracking system to document the implementation of source control measures (pilot program underway by LRCA and City)  
- Consideration of additional demonstration sites throughout City | - Utilize existing standards/guidelines until LRCA/MOE publishes new standards (Low Impact Development Stormwater Planning and Design Guide (TRCA/CVC, 2010))  
- City Stormwater Guidelines to incorporate guidance requirements in near term with supplementary guidance document, incorporated into main document during next scheduled update | | | | | | | | | | - City marketing and pilot projects: short-term (1-3 years)  
- Private sites: long-term conversion of voluntary basis  
- Alternative: Many municipalities offer credits (where stormwater utility user rates are collected) providing financial incentive to implement private property source controls  
- O&M completed by property owner  
- Simple maintenance including removal of leaf litter, cleaning pretreatment elements ensure long service life |
| | | | | | | | | | | | Conforms with source control recommendations of LGDP and Barrie Creek, Lovers Creek, and Hewitt’s Creek watershed study  
- Grey to Green Residential Retrofit (Engaging Residents to adopt Low Impact Development on their Properties)  
- Major source control LIDs are recommended to be tracked by the City (as well as LIDs that are part of ECAs) |
### Comprehensive Stormwater Management Master Plan

**Preliminary Preferred Stormwater Management Strategy Implementation Considerations**

**Table 2 of 2**

<table>
<thead>
<tr>
<th>Recommended Approach</th>
<th>Description of Recommended Approach</th>
<th>Key Next Steps</th>
<th>Future Study Requirements</th>
<th>Policy/Standards</th>
<th>Facilitator &amp; Contributions</th>
<th>Costs</th>
<th>Funding Considerations</th>
<th>Timing/Implementation Schedule</th>
<th>O&amp;M</th>
<th>Integration with Other Documents</th>
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<tbody>
<tr>
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<tr>
<td><strong>Storm Restoration</strong></td>
<td>Storm restoration</td>
<td>Develop and prioritize restoration alternatives</td>
<td>Utilize existing stormwater management standards and guidelines</td>
<td>City Storm Support: LURC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Conforms with stormwater management and restoration recommendations of LURC and Barrie Creek, Locus Creek, and Highlands Creek Subwatershed Development Strategy: Stormwater Management and Design Guide (2019)</td>
</tr>
</tbody>
</table>

*STEP 9*
Cost Summary:

- Pollution Control Measures (within existing programs)  
- LID Source Control (marketing, education, pilot projects): $0.4M
- LID Conveyance Control (perVIOUS pipe design for capital roads projects): $13.0M
- End-of-pipe Stormwater Retrofits (traditional ponds, inf. galleries, OGS's): $36.3M
- Stream Restoration (approx. 48 identified sites): $14.4M

TOTAL: $64.1M*

*Planning level cost estimates (+30% / -20%)

In addition, the City also funds other stormwater works, including

- Replacement of sewers to increase capacity
- Bridge/culvert upgrades to reduce flooding
- Operation and maintenance of existing stormwater facilities
The 2009 Lake Simcoe Protection Plan (LSPP) was introduced in 2009. The Strategy identifies goals and opportunities to achieve a long-term objective of reducing the phosphorus loadings from all lands draining to Lake Simcoe to 44 tonnes per year.

Municipalities draining to Lake Simcoe are required to produce a Comprehensive Stormwater Management Master Plan consistent with the objectives of the LSPP, namely the reduction of phosphorus loadings to the lake.

The Recommended Plan for the City of Barrie would reduce the existing and future phosphorus loadings from the City’s lands.

### Comparison of Phosphorus Loadings for Existing and Future Land Uses: With and Without Stormwater Retrofits

<table>
<thead>
<tr>
<th>Watershed / Management Units</th>
<th>Area (ha)</th>
<th>Existing Development &amp; Existing SWM</th>
<th>Future Development Scenario – full buildout with no SWM, and no retrofits in existing areas</th>
<th>Future Development Scenario – full buildout with Traditional End of Pipe Control, and Retrofits in existing areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whiskey Creek</td>
<td>655.1</td>
<td>880.2</td>
<td>896.5 1.9%</td>
<td>807 -8%</td>
</tr>
<tr>
<td>Hotchkiss Creek</td>
<td>471.5</td>
<td>745.0</td>
<td>758.0 1.7%</td>
<td>615 -17%</td>
</tr>
<tr>
<td>Dyemans Creek</td>
<td>554.9</td>
<td>596.5</td>
<td>602.0 0.9%</td>
<td>551 -8%</td>
</tr>
<tr>
<td>Bunkers Creek</td>
<td>383.6</td>
<td>484.4</td>
<td>502.5 3.7%</td>
<td>419 -13%</td>
</tr>
<tr>
<td>Kiddy Creek</td>
<td>498.3</td>
<td>624.9</td>
<td>634.3 1.5%</td>
<td>489 -22%</td>
</tr>
<tr>
<td>Sophia Creek</td>
<td>456.7</td>
<td>677.3</td>
<td>698.3 3.1%</td>
<td>607 -10%</td>
</tr>
<tr>
<td>Catchment 1</td>
<td>254.5</td>
<td>365.1</td>
<td>373.0 2.2%</td>
<td>266 -27%</td>
</tr>
<tr>
<td>Catchment 2</td>
<td>174.9</td>
<td>205.7</td>
<td>233.0 13.3%</td>
<td>156 -24%</td>
</tr>
<tr>
<td>Catchment 3</td>
<td>29.0</td>
<td>20.2</td>
<td>20.2 0.0%</td>
<td>19 -5%</td>
</tr>
<tr>
<td>Total - Barrie Creeks Watershed</td>
<td>3482.4</td>
<td>4599.4</td>
<td>4717.8 2.6%</td>
<td>3930 -15%</td>
</tr>
<tr>
<td>Catchment 4</td>
<td>20.0</td>
<td>24.5</td>
<td>24.5 0.0%</td>
<td>24 -1%</td>
</tr>
<tr>
<td>Catchment 5</td>
<td>88.8</td>
<td>61.7</td>
<td>64.4 2.7%</td>
<td>63 1%</td>
</tr>
<tr>
<td>Hewitts Creek</td>
<td>748.2</td>
<td>332.7</td>
<td>618.9 86.0%</td>
<td>386 16%</td>
</tr>
<tr>
<td>Lovers Creek</td>
<td>2461.0</td>
<td>1770.6</td>
<td>2630.9 59.9%</td>
<td>1911 8%</td>
</tr>
<tr>
<td>Sandy Cove</td>
<td>301.2</td>
<td>73.5</td>
<td>316.8 331.2%</td>
<td>131 78%</td>
</tr>
<tr>
<td>Total - Annexation Lands Watershed</td>
<td>3619.3</td>
<td>2263.9</td>
<td>3855.5 70.3%</td>
<td>2516 11%</td>
</tr>
<tr>
<td>Total LSRA Watersheds</td>
<td>7101.7</td>
<td>6863.3</td>
<td>8573.3 25.0%</td>
<td>6446.1 -4%</td>
</tr>
<tr>
<td>Baxter Creek</td>
<td>482.2</td>
<td>102.3</td>
<td>453.8 343.6%</td>
<td>190 86%</td>
</tr>
<tr>
<td>Bear Creek</td>
<td>1735.3</td>
<td>1146.8</td>
<td>1445.7 76.1%</td>
<td>1020 -11%</td>
</tr>
<tr>
<td>Willow Creek</td>
<td>805.6</td>
<td>813.3</td>
<td>830.8 2.2%</td>
<td>710 -13%</td>
</tr>
<tr>
<td>Total – NVCA Watersheds</td>
<td>3023.0</td>
<td>2062.4</td>
<td>2730.3 32.4%</td>
<td>1921 -7%</td>
</tr>
<tr>
<td>TOTAL: CITY-WIDE</td>
<td>10124.8</td>
<td>8925.7</td>
<td>13303.6 26.6%</td>
<td>8367 -4%</td>
</tr>
</tbody>
</table>

Note: Phosphorus loadings are estimated using values taken from the MOE’s “Lake Simcoe Phosphorous Loading Development Tool”. The values are for relative comparison only and do not necessarily reflect the actual loadings to Lake Simcoe.
What are the primary cost drivers of the City’s stormwater management program?

The City must operate and maintain a large and complex stormwater management system. The City’s stormwater infrastructure consists of the following (approximately):

- 96 City owned stormwater management facilities (SWMF);
- 550km of sewers;
- 107km of watercourses; and
- 23,000 stormwater related appurtenances (catchbasins, manholes, ditch inlets, oil grit separators (OGS)).

The City undertakes extensive efforts with respect to operations & maintenance, asset management, capital improvements, infrastructure/watercourse planning studies and environmental monitoring to ensure that the stormwater system is in a good state of repair and that the environment is protected. As the City increases its efforts and focus on its stormwater management system; the associated funding requirements are substantial and increase annually. The following identifies key activities that the City undertakes to operate and maintain stormwater infrastructure:

**Operations & Maintenance**
- Storm pond cleanouts, sewer/catchbasin cleaning, creek brush/debris clearing and erosion restoration

**Asset Management**
- Replacement/Rehabilitation of stormwater infrastructure based on service life

**Capital Projects**
- Storm infrastructure (standalone conveyance, road/linear drainage, watercourse improvements, watercourse crossing upgrades) for growth and non-growth driven projects, benefit to existing component only (DC contribution not included)

**Regulatory Requirements**
- Projects driven by new regulatory requirements (Lake Simcoe Protection Plan)
Comprehensive Stormwater Management Master Plan

STORMWATER MANAGEMENT FUNDING

Are we spending enough on stormwater infrastructure?
Operating, maintaining and improving stormwater management infrastructure is a major undertaking requiring significant financial resources. Combining those costs with aging infrastructure, increasing regulatory requirements, impacts from climate change, and watercourse improvements and existing needs for urban retrofits; it is clear that there is a significant stormwater infrastructure funding gap.

What is an infrastructure funding gap?
An infrastructure funding gap occurs when the amount spent on infrastructure is less than the required amount to maintain, renew, replace and expand infrastructure.

Why do we have a stormwater infrastructure funding gap?
There are a few key factors are resulting in the development of an infrastructure funding gap:

1) Infrastructure Age - As stormwater infrastructure ages, it requires increasing expenditures for maintenance and renewal activities (storm sewers, stormwater management ponds, catch basins, maintenance holes). Specific stormwater infrastructure components have reached or are approaching the end of their service life and/or require major life cycle maintenance activities.

2) Lake Simcoe Protection Plan (LSPP)/Regulatory Requirements – regulatory requirements for stormwater management have become more rigorous to ensure the environment is protected. LSPP requires enhanced level treatment, volume and erosion control. To reduce phosphorus loadings to Lake Simcoe, LSRCA is migrating towards the requirement of low impact development (LID) practices for water quality treatment as part of any project that produces impervious surfaces. As regulations become more stringent, associated costs to implement stormwater management increases.

3) Climate Change – Climate change is real and affects the City of Barrie. The City is experiencing more frequent severe localized storms that are stressing existing stormwater management infrastructure. As a component of the City’s overall climate change adaptation efforts, the City has increased the rainfall intensity-duration-frequency curves used to sized drainage infrastructure. The City is also developing a City-wide stormwater model that will be sued in a City-wide stormwater master plan to assess undersized and vulnerable stormwater infrastructure. Addressing climate change equates to additional capital, operation and maintenance costs.

4) Urban areas without stormwater management systems - Portions of the City predates the development of modern stormwater management requirements including the requirement for watershed planning. Retrofitting these areas will require substantial capital investments equating to additional capital, operation and maintenance costs.

5) Watercourse Improvements – The City’s creeks are very important as they serve as ecological habitats and major conveyance systems for stormwater. Significant capital improvements are required to increase conveyance capacity as well as restoration efforts to improve their ecological condition.

How should the City address the stormwater infrastructure funding gap?

Stormwater Infrastructure Funding Alternatives
As other municipalities have either completed or are in the process of addressing their respective stormwater funding gap, a common set of funding alternatives have been developed and summarized below:

- General Tax Revenue (Property Taxes)
- Stormwater User Rate Utility Fee
- Subdivision Agreements (Perpetual Maintenance Fee)
- Development Charges
- Stormwater Rate-In-Lieu Policy
- Infrastructure Surcharges

The alternatives listed above vary in their effectiveness and applicability (i.e. subdivision agreements and fee-in-lieu policies only apply to specific infrastructure and do not generate revenue for City owned stormwater infrastructure). The adjacent table provides a comparison between alternatives.

What have other municipalities done?
Most municipalities that are actively taking steps to address their respective stormwater infrastructure funding gaps are implementing stormwater utility fees. The Cities of Mississauga, Waterloo, Kitchener, Hamilton, London, St. Thomas, Markham, the Town of Aurora and Richmond Hill have implemented stormwater user rate utility fees. LSRCA supports utility fees as it establishes a stable funding source and encourage source control LIDs when coupled with credits (utility fee discounts). Other municipalities within the Lake Simcoe watershed are also considering these approaches to address their respective stormwater infrastructure funding gaps. Alternative funding mechanisms such as a perpetual maintenance fee (Town of Halton Hills) and fee-in-lieu policies (City of Brampton) have been implemented to address both operation and maintenance fees from new developments and offsite stormwater infrastructure upgrades.

What are the next steps to address the stormwater infrastructure funding gap?
The City has developed a plan to fully quantify the gap. Key next steps include the following:

- City-wide Stormwater Model (underway) – identify conveyance upgrade requirements (completion 2016)
- City-wide Stormwater Infrastructure Master Plan Update – identify preferred conveyance upgrade requirements through the Class EA process (2017-2018)
- Stormwater Asset Management Plan Update – identify life cycle and operations and maintenance costs using data generated from the preceding studies (2018-2019)
- DC By-Law Update (2019)
- Public Consultation/Communication Process – assess funding options to address the infrastructure funding gap (2016 – 2021)
The following next steps will be undertaken to complete the City of Barrie Comprehensive Stormwater Management Master Plan:

- Review Public Consultation Feedback and Comments;
- Finalize the Preferred Alternative Stormwater Management Strategy (including sites for additional stormwater management opportunities);
- Update the CSWM-MP document;
- Individuals who have indicated they wish to be kept informed will be mailed a letter advising of staff recommendations and when the staff report (containing staff recommendations) will be submitted to General Committee; and
- Pending Council approval, a Notice of Completion will be advertised for a review period of 30 days.

Thank You for Participating

Comments and personal information regarding this project are collected under the authority of the Environmental Assessment Act to assist in decision making and to determine further public consultation needs relating to the project. Comments and opinions which do not constitute personal information, as defined by the Freedom of Information and Protection of Privacy Act, will be shared among the Ministry of the Environment and others as appropriate, and may be included in the study documentation which will be made available for public review. Personal information will remain confidential unless prior consent to disclose is obtained.