

STORMWATER CREDIT PROGRAM REVIEW

Final Report

City of Mississauga

2019-035
December 11, 2020



storm
water
charge



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**Re: Stormwater Credit Program Final Review
Final Report**

Resilient Consulting Corporation (Resilient) is pleased to provide the City of Mississauga (the City) with our Final Report.

Please do not hesitate to contact the undersigned at (289) 943-4651 or mbassingthwaite@resilientconsulting.ca should you have any questions.

Sincerely,

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Executive Summary

Background

A stormwater credit program is a way to promote stormwater management while offering a user fee reduction to those properties that implement onsite controls. In January 2016, the City of Mississauga (the 'City') launched the stormwater fee which included a stormwater credit program. This credit was made available to institutional, commercial, industrial, and multi-residential (≥ 2 dwelling units) developments but not to single-unit residential dwellings. The stormwater credit, up to a maximum of 50%, is applied to the stormwater bill.

In May 2015, prior to implementation of the stormwater fee, the City initiated a Stormwater Outreach and Education Program with the key purpose of informing the residents and businesses in Mississauga of the upcoming stormwater user fee. In October 2015, a Notice of Motion was brought forward to Council requesting that a stormwater credit program for residential properties be considered in addition to the proposed non-residential credit program. As a result, a Working Group, made up of Councillors and staff, was formed. In June 2016, through the work undertaken by the Working Group, Council approved recommendations that an enhanced Outreach and Education program would be the best mechanism to engage homeowners, and for staff to develop and implement a residential stormwater home visit service for a two-year period. In October 2017, City staff provided a status report to Council. Council did not support staff's recommendation of increasing funding for the residential home visit program and converting two contract positions supporting the Outreach and Education Program to permanent status. This was due to concerns over the effectiveness of the approach and potential duplication of the program with other local authorities' initiatives. Consequently, staff was asked to continue with the basic outreach and education programs and report back to Council in a year's time. In 2019, Council approved a new Stormwater Outreach and Education Program focusing on an online presence to satisfy increasing digital demands.

As the stormwater fee is nearing its fifth year since implementation, a detailed review of the City's existing programs and policies has been conducted to identify recommendations for potential improvements to the non-residential credit program and a renewed assessment of existing residential incentive programs. As part of this review, fourteen (14) municipalities and agencies across North America with established stormwater credit programs were selected as benchmark programs and contacted for an interview. The purpose of these interviews was to discuss the details of their existing program and to capture the successes and challenges experienced. The benchmark reviews were separated into non-residential/multi-residential and residential credit programs to inform potential recommendations for each program. The following is a list of the benchmark municipalities / communities / agencies:

- City of Edmonton, Alberta
- City of Guelph, Ontario
- City of Halifax, Nova Scotia
- City of Kitchener, Ontario
- City of Victoria, British Columbia
- City of Alexandria, Virginia
- City of Indianapolis, Indiana
- City of Minneapolis, Minnesota
- Northeast Ohio Regional Sewer District, Ohio
- City of Philadelphia, Pennsylvania
- City of Portland, Oregon
- Prince George's County, Maryland

- City of Richmond, Virginia
- City of Washington, District of Columbia

This study achieved its goals and objectives of conducting a thorough review of Mississauga's existing program and previous initiatives, completing a benchmark analysis to better inform recommendations for potential credit program improvements, and evaluating the options available to consider financial incentives for residential properties.

Non-Residential / Multi-Residential Credit Program

All fourteen benchmark municipalities have some form of stormwater credit program available to non-residential / multi-residential property owners. Seven (7) of these municipalities have programs structured using performance-based criteria and seven (7) using presumptive-based criteria. Performance-based criteria require descriptive solutions that can demonstrate performance through monitoring or modeling. Presumptive-based criteria apply prescriptive solutions that are assumed to achieve the desired performance targets (e.g., volume or impervious area capture). The City's non-residential credit program requires performance-based approvals. The background review of these benchmark programs divided the credits applied into four (4) categories that align with the City of Mississauga's existing program. These categories include:

- Peak Flow Reduction
- Runoff Volume Reduction
- Water Quality Treatment
- Operations and Activities

In addition to these, it was noted whether the programs included presumptive criteria and if properties were served by combined sewer systems as these factors do not apply to Mississauga.

Phone interviews with the Cities of Edmonton, Guelph, Kitchener, Alexandria, Indianapolis, Philadelphia, and Washington as well as the Northeast Ohio Regional Sewer District, were conducted in the early months of 2020 to discuss details on their specific programs. These interviews were conducted with stormwater utility managers or team members who are intimately familiar with the user fee, credit program and stormwater management techniques. The findings of these investigations informed a list of twelve (12) preliminary options for potential modifications and improvements to the existing non-residential / multi-residential stormwater credit program for the City's consideration.

Overall, it was concluded that simplified credits based on presumptive criteria should not be added, that the existing credit program should not be increased in complexity, and that stormwater grants and credit trading / offsetting should not be implemented. In addition, it was concluded that the City's maximum credit (combined for all four categories) of 50% is appropriate as 9 of the 14 benchmark programs have set their maximum credit between 45-55%.

Of the options presented in this report, the following are those that may best align the program with the City's current and future objectives and can be reasonably implemented, listed by highest priority:

- 1) Formalize the practice of allowing communal facilities to share credits: The credit program and systems currently allow for this practice, however, policies and procedures to administer credits for communal facilities that serve multiple adjacent properties have not been developed. Credit amounts can be established based on contributing impervious area. This approach will increase customer flexibility and possibly encourage uptake but will require an update to the City's stormwater fee related policies and procedures.
- 2) Define variable credit criteria by geography: Consider providing credits for properties based on watershed to align with current flood control and/or water quality criteria required for

- development (e.g. stormwater management criteria. This will allow the City to benefit from onsite SWM where it will have the most impact and discourages the practice of allowing additional credit for “over-controlling” in areas where limited benefits are expected.
- 3) Apply sliding scale to geographically variable criteria (i.e., concurrently with Option 2): To provide flexibility to applicants in existing developed areas and to potentially receive additional stormwater benefits, a sliding scale is recommended for consideration. This would apply where the proposed works is not part of a new development application and the retrofit or rehabilitation activity does not increase impervious area (e.g. re-surfacing, servicing replacement, etc.) on an already developed property. This encourages uptake by property owners who are discouraged from applying for credit due to the prohibitively high cost of installing retrofit facilities that are required to fully meet the current development criteria. This option would make credits available to those who are not subject to the City’s development standards.
 - 4) Change maximum credit in any category: While the overall maximum credit of 50% compares well with the benchmark communities, an assessment could be conducted to determine the optimal maximum credits in each credit category. This provides flexibility to the City by allowing the credit to be maximized in the most influential category to achieve the City’s stormwater management objectives and provide flexibility to applicants. This option can work in conjunction with credits assigned by geography.
 - 5) Accept new practices as eligible: It is recommended to expand the list of eligible practices and to rename the “Pollution Prevention” credit category to “Operations and Activities” to increase credit opportunities. This approach will increase customer flexibility and possibly encourage uptake.

Residential Incentive Program

In April 2013, a stormwater user fee feasibility study was completed, and findings documented in a Stormwater Financing Study report. Following this study, in 2015, a Working Group was formed in response to a motion to consider stormwater credits for residential developments. A variety of corporate reports were presented to Council from 2016-2019 outlining the recommendations for implementation of this program. The recommendations presented in these reports suggested that stormwater incentives be explored for residential properties as high administration costs for a credit program may outweigh the net savings to the City’s stormwater program.

A residential Outreach and Education program was initiated prior to the start of the stormwater user fee as it presented the best value to encourage uptake of stormwater management techniques on residential properties. Since that time, the City has reviewed the need for a residential credit/incentive program but concludes that an outreach and education program, in modified forms, remains the best option for residential properties. Any change to the current program may require an amendment to the City’s By-Law 0135-2015.

The overall intent of implementing a residential incentive program is to offer mutual benefits to both the service provider and user. The City has the ability through incentives to further encourage and influence the implementation of stormwater management facilities on existing private property. One of the City’s objectives is to reduce demand on the City’s stormwater infrastructure through onsite controls to ultimately reduce capital and operating costs. The drawbacks to residential incentives include increased costs for administration, enforcement and program implementation, complexity of justifying credit amounts, and poor uptake. A poor return on investment and application process complexity were noted as leading drawbacks to achieving better uptake during the interviews with the benchmark communities. As a result, this residential review was focused on assessing the value and feasibility of implementing a residential incentive program in the City of Mississauga.

Stormwater incentives for residential properties can be divided into four program types: subsidy program, rebate program, credit program, and a hybrid program offering multiple savings. While many municipalities across North America offer some form of residential incentive, a relatively small proportion of stormwater user fees have a residential credit program. A total of ten (10) benchmark municipalities were selected from across North America that featured a mature residential credit program. A brief description of the residential incentive options explored in this report is as follows:

- 1) Do Nothing: do not provide residential incentives as the cost of implementation is high and anticipated uptake is low.
- 2) Subsidy Program: adopt a collaborative approach with the Region of Peel or local conservation authorities to offer discounted materials or to subsidize the cost of rain barrels or trees.
- 3) Rebate Program: offer a rebate, on a first-come first-served basis, available for appropriately sized SWM facilities. A sliding scale approach can be taken by offering a rebate for the minimum requirement which increases with enhancements to the facilities up to a maximum rebate. This style of program may be desirable as the City maintains control of the financial incentive available and administration activities are low.

Reference Benchmark Communities: City of Guelph, City of Philadelphia

- 4) Credit Program: offer a simplified program applying presumptive-based criteria presumptively to approve credits for facilities that treat a specific capture area or provide adequate volume and / or footprint area. This program requires additional effort to manage the billing database (e.g., the credit value must be determined in addition to the base charge for each property) and to track accounting information (e.g., proportion of unrecognized revenue attributable to credits) The administration costs of this style of program will also be higher than a rebate program.

Reference Benchmark Communities: City of Kitchener, Northeast Ohio Regional Sewer District

- 5) Hybrid Program: adapt the most efficient features of the previously listed options to provide the most flexible and attractive program to the customer. It is expected that this program would have the highest administration costs.

Reference Benchmark Communities: City of Victoria, Prince George's County

Should the City choose to implement a residential incentive program, it is recommended that they develop and include an extensive list of incentivized stormwater management facilities and techniques with supporting educational material and guidance on sizing, construction, and maintenance with the amended by-law. An extensive list of recommended facilities is provided within this report including rain barrels / cisterns, rain gardens, permeable pavement, and green roofs.

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APPENDIX B – STORMWATER FEE / CREDIT EXAMPLE CALCULATIONS

1 Introduction

The City's stormwater user fee, known as the Stormwater Charge, began billing in January 2016 and includes a credit program that reduces the fee for property owners that have installed, operate, and maintain eligible facilities or practices on their property. Credits are available to industrial, commercial, institutional, and multi-residential property owners but do not apply to low-density residential properties with a single dwelling unit. In Mississauga, the land area is approximately comprised of 70% non-residential and multi-residential properties and 30% residential properties. As it is nearing the fifth anniversary of the City's Stormwater Charge, a review of the current program is being conducted to assess improvements and required updates. As a result, Resilient Consulting Corporation (Resilient) in partnership with Computational Hydraulics International (CHI) was retained by the City to complete a thorough review of their existing stormwater user fee credit program and provide options for pursuing a residential program, and recommended enhancements and improvements to the non-residential credit program.

To facilitate these recommendations, fourteen municipalities and agencies across North America with an existing stormwater credit program were selected to form an understanding of how other programs are structured and to gauge their success. A thorough review of each program was conducted, followed by a phone interview to collect additional details about the program including lessons learned or recommendations from their credit program. The knowledge collected from these interviews was used to guide and inform recommended modifications to the City's existing credit program. A series of meetings were held with City staff between December 2019 and July 2020 to present study findings and refine the credit program suggestions that are described in this report.

2 Mississauga Background Review

The City's stormwater fee and financial incentive programs were launched in January 2016. As part of the implementation, it was decided that non-residential and multi-residential properties may qualify for an ongoing reduction in the stormwater fee, in the form of a credit. Section 2.1 discusses the City's current credit program. The decision to exclude single-unit residential properties was revisited over the years, and this is summarized in Section 2.2.

2.1 Non-Residential/Multi-Residential Credit Program

Details of the credit criteria are described in the Stormwater Charge Credit Application Guidance Manual, which is available for download at <http://www.mississauga.ca/portal/stormwater/charge>. The City's credit program is summarized in **Table 1**. To compare the City's program with the benchmark communities in Section 3, it should be noted that Mississauga has a population of approximately 720,000 and there are no combined sewer systems.

Table 1: City of Mississauga Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Peak Flow Reduction	Percent reduction of the 100-year post development flow to pre-development conditions of the site.	40%
Runoff Volume Reduction	Percent capture of first 15 mm of rainfall during a single rainfall event.	15%
Water Quality Treatment	Percent of site (hard surface) receiving water quality treatment consistent with Provincial criteria for enhanced treatment.	10%
Pollution Prevention	Develop and implement a pollution prevention plan.	5%
Maximum Non-Residential Credit Available (Capped)		50%

For a given property, a single onsite stormwater facility can be eligible to claim multiple credit categories or multiple facilities can cumulatively be applied to a single credit category. For any combination of credits, the overall maximum credit is capped at 50%. That is, the stormwater fee for any given property can only be reduced by up to 50% if all potential credits are awarded. Credit applications must be filled out by the property owner and include documentation signed and sealed by a Professional Engineer indicating the appropriate measures have been taken, correctly implemented and a plan has been developed to inspect and maintain the facilities. Credits are valid for up to five years and then must be renewed.

2.2 Residential Financial Incentives

Since 2012, through the development and implementation phase of the stormwater fee, City staff evaluated several credit programs across North America. Concerned with low uptake and that administration costs for credit applications, approvals, and processing would outweigh the savings resulting from a credit program, it was concluded that residential properties would not be eligible for user fee credits.

After implementation of the charge program, the City of Mississauga implemented a Stormwater Outreach and Education program as it presented the best value to encourage uptake of stormwater management techniques on residential properties. The program was established in 2015 in advance of the launch of the stormwater fee and served the key purpose of informing residents and businesses in Mississauga of the upcoming user fee. The Program has since evolved to general stormwater outreach and staff continues to deliver various stormwater outreach and education initiatives across the City. The need for effective outreach and education regarding stormwater remains important. The current approach for the City is a strategic shift to digital outreach, supplemented by in-person interactions, as well as a greater presence with the commercial sectors. This is an evolution of the current stormwater outreach and education program and a critical step to engage and educate the broader community in an effective manner. The timeline of events regarding study of residential incentives are outlined below in **Table 2**, highlighting activities undertaken by City staff and taken to General Committee and Council.

Table 2: Previous Credit Program Activities

Date	Items related to Residential Credit
<p>December 5, 2012 General Committee</p> <p>Adopted by Council December 12, 2012</p>	<p>A corporate report was presented to General Committee summarizing the funding recommendations for the residential stormwater credit program. The City recognizes the importance of on-site stormwater management measures on residential properties, however the anticipated high administration cost of such a program would outweigh the net savings in the City's stormwater program. Therefore, staff recommended that an incentive program be explored which offers a one-time discount on the capital cost of implementing stormwater controls such as rain barrels.</p>
<p>December 4, 2013 General Committee</p> <p>Referred to staff on December 11, 2013</p>	<p>A corporate report was presented to General Committee summarizing the revised funding recommendations for the residential stormwater credit program. The report recommended that a residential incentive program be developed with an offer of one-time incentive to homeowners for pre-approved stormwater measures such as rain barrels, rain gardens, soak-away pits, or permeable pavements. Members of Committee expressed concerns with the administrative costs and bureaucratic scale of implementing this program and referred the matter back to staff for more information.</p>
<p>May 20, 2015 – General Committee</p> <p>Adopted by Council on May 27, 2015</p>	<p>A corporate report was presented to General Committee where staff outlined the research which led to the recommendation that a Residential Outreach and Education Program would be the best approach to support single residential homeowners. This program is intended to inform local residents of the upcoming stormwater user fee. Staff research indicated that residential credit programs tend to have very low uptake, and therefore incentives were not recommended. Members of Committee requested additional information on the residential stormwater credit program being offered by the City of Kitchener.</p>
<p>May 27, 2015 - Council</p>	<p>Subsequent to questions raised by members of General Committee at the May 20, 2015 meeting on the residential stormwater credit program being offered by the City of Kitchener, a corporate report was prepared for Council with additional information related to Kitchener's residential stormwater credit program. The report concluded that the Outreach and Education Program recommended by staff for the residential sector still represents the best value to realize an uptake of stormwater best management practices on residential properties.</p>
<p>October 28, 2015 – Council Meeting</p>	<p>A Notice of Motion was brought forward by Councilor Ras requesting that Council establish a working committee of councilors and staff to consider a separate credit program for residential properties. Councilors Ras, Fonseca, Starr, Mahoney and Carlson were appointed to the Residential Program Working Group. In addition to Working Group meetings, two facilitated workshops were held on April 13, 2016 which was very well attended and received.</p>
<p>June 15, 2016</p>	<p>The Commissioner of Transportation and Works (T&W) prepared a corporate report titled 'Stormwater Program for Residential Properties' summarizing the efforts and findings of the Working Committee with respect to the Residential Stormwater credit program. These recommendations were presented to the General Committee on June 29, 2016.</p>
<p>June 29, 2016 – General Committee</p> <p>Adopted by Council on July 6, 2016</p>	<p>The comprehensive corporate report was presented to General Committee. Staff concluded that an enhanced Residential Stormwater Outreach and Education Program is the best value option to address public outreach and education desires and that a stormwater home visit service is the best mechanism through which to engage homeowners to apply general stormwater best practices to their property and should be piloted to assess long-term interest.</p>

Date	Items related to Residential Credit
	<p>The report also concluded that financial recognition programs, such as credits and rebates, are not recommended as these programs do not incentivize good stormwater management practices or provide benefits to municipal stormwater programs, typically have very low participation rates, and are costly to provide. All recommendations were approved.</p>
July 6, 2016	<p>Recommendations from the June 2016 Corporate Report were endorsed by the General Committee and adopted by council include:</p> <ul style="list-style-type: none"> • Staff to implement an enhanced Residential Stormwater Outreach and Education Program; • Implementation of two full-time contracts to support the Outreach and Education Program; • Development of a 2-year Home Visit Service to accommodate 100 residents. <p>A total additional budget of \$65,000 was proposed to accommodate the Home Visit Service.</p>
October 4, 2017 – General Committee	<p>Staff brought a report to General Committee providing an update to the enhanced Residential Stormwater Outreach and Education Program and the Residential Stormwater Home Visit Service pilot program. The report recommended:</p> <ul style="list-style-type: none"> • The Enhanced Residential Stormwater Outreach and Education program to be made permanent; • Budget to be increased to \$15,000 for promotional material; • Net funding to be increased from \$65,000 to \$145,000 for the Home Visit Service to expand the services to an additional 200 homes; • Conversion of the two full-time contracts to permanent positions with an increased cost of \$19,000; and, • The necessary by-laws be enacted. <p>General Committee did not make a decision on the report as there are concerns over the effectiveness of in-person outreach and the potential of duplication with initiatives offered by the Region and local conservation authorities. The Commissioner of T&W indicated that staff would continue with the current pilot program and will report back in a year.</p>
<p>June 26, 2019 – General Committee</p> <p>Adopted by Council on July 3, 2019</p>	<p>An updated report was brought back to General Committee. The report recommends a strategic shift to increase digital presence and outreach / education programs as the door-to-door approach was becoming less effective. This approach included making accurate stormwater related information easily available to the public such as interactive mapping. Staff recommend preparing online content such as tutorials and videos to assist residents. It is also proposed that stormwater literacy in schools be improved by releasing comic books and continuing the Yellow Fish Road program. Overall, this report recommends:</p> <ul style="list-style-type: none"> • Removal of two full-time contracts supporting the previous Outreach and Education program decreasing labour costs by \$122,290; • Increase part-time labour costs by \$29,240 to allow for two co-op students on 8-month terms to continue the Outreach and Education program; • Increase promotional material costs by \$20,000 to transition to a digital presence. <p>The proposed plan suggests a net decrease of \$73,050 in the 2020 operating budget as a result of terminating the two full-time contract staff and replacing with two 8-month co-op students. General Committee was in favor of this approach.</p>

3 Benchmark Communities Best Practices Review

3.1 Best Practices Review

A benchmarking analysis was conducted as part of this study, which involved an investigation of fourteen (14) local governments and public utility districts across North America, including five in Canada and nine in the U.S. These municipalities and agencies, each have a responsibility for city-wide stormwater management, and each has implemented a credit program for non-residential properties. There was a limited pool to choose from in Canada (approximately 40); however, there are over 1,800 stormwater user fees in the U.S. The selection of benchmarking municipalities and agencies generally favored the larger urban communities with characteristics similar to Mississauga (e.g., located at the bottom of the watershed).

Website materials from each benchmark community were reviewed and summarized in a standard table for comparison. A set of 29 questions regarding both residential and non-residential credit programs was developed as part of this study and sent to all benchmark municipalities and agencies. Each community's credit program summary table was also sent for confirmation, and the final version of the tables is presented below. A total of seven completed questionnaires were returned (50%) and follow-up interviews conducted. For benchmark communities that did not respond to the questionnaire/request for interview, information obtained from the web search was utilized.

Given the wide range in credit categories, criteria, and terminology, an overall framework for comparing credit programs was developed. All credit requirements can be categorized based on the type of criteria applied for approval of onsite stormwater facilities. For the purposes of this study, the following distinction has been made regarding the types of facilities that are eligible for financial incentives with respect to achieving specific numeric criteria:

- Presumptive-based criteria are satisfied by meeting minimum design standards for each facility type (e.g. meeting defined volume and impervious area capture targets). The expectation is that if facilities are properly designed, installed, and maintained, then they will achieve their desired performance targets.
- Performance-based criteria are satisfied through demonstrated success through monitoring or modeling.

In the comparison tables presented in this section, credits have been classified into four categories to ensure ease of comparison with the City of Mississauga's credit program. These categories include peak flow reduction, runoff volume reduction, water quality treatment and operations / activities. In addition to these fundamental categories, a separate category was defined to identify which programs calculate credits according to impervious area capture (e.g., to identify credit programs that use presumptive-based criteria as opposed to performance-based criteria). The types of facilities that are eligible for stormwater user fee credits can be further classified in a general way:

- Green infrastructure is typically sized to capture onsite surface runoff (e.g., from individual properties) and refers to facilities, practices, or measures that integrate the use of natural materials and other soft assets (e.g., vegetation and compost/soil mixtures) designed to store, filter, infiltrate, evaporate, transpire, or otherwise use stormwater prior to discharge offsite. Green infrastructure is often referred to as Low Impact Development (LID).
- Grey infrastructure is typically sized to capture surface runoff from multiple properties and includes pipes and ponds that primarily use traditional manufactured materials and other hard assets (e.g., concrete and metal) designed to convey, store, and treat stormwater prior to discharge to receiving waters.

When comparing among diverse communities such as these, another distinction needs to be made with respect to infrastructure servicing, particularly the wastewater collection systems. In the context of urban drainage, stormwater runoff can be captured in both stormwater and wastewater systems. The City separates stormwater runoff and sewage into two separate systems; sanitary sewers and storm sewers. Combined sewers on the other hand, are designed to collect stormwater runoff, domestic sewage, and industrial wastewater in the same collection system. Combined sewer systems are common in older areas of other cities. Under dry weather conditions, combined sewers transport wastewater to the sewage treatment plant, where effluent is treated to the appropriate water quality standards before being discharged to receiving waters. During significant rainfall events, the conveyance capacity of the combined sewer system can be exceeded, resulting in overflows that discharge stormwater runoff and untreated wastewater directly to nearby watercourses and waterbodies. Although the City does not operate combined sewer systems, it is important to note as eleven (11) of the fourteen (14) benchmark municipalities/agencies have combined sewer systems and therefore may have varying objectives for their stormwater fee / credit programs.

Water resources management therefore requires the overlapping disciplines of stormwater and wastewater engineering in locations with combined sewers. Green infrastructure design began as a stormwater discipline to meet desired control objectives (e.g., reduced runoff volume, increased flow attenuation and peak lagging, and improved water quality). The design and implementation of green infrastructure has evolved into the fold of multi-disciplinary professionals tasked with addressing broader urban drainage challenges (e.g., the “greening” of combined sewer overflow abatement strategies).

3.1.1 City of Guelph, Ontario

In March 2016, Guelph City Council elected to proceed with the implementation phase of a stormwater user fee and the Stormwater Service Fee began billing January 2017. Subsequently, the credit policy came into force via by-law amendment and took effect January 2018. During the implementation phase, City of Mississauga staff assisted their colleagues at the City of Guelph by sharing lessons learned and giving valuable insight into the nuances of the implementation process and how to address challenges that might arise. Like Mississauga, a stormwater credit program advisory group was formed and comprised a variety of concerned citizens and business owners. Several meetings were held with this advisory group for the purpose of presenting study findings and vetting the evolving credit program recommendations.

The City of Guelph is a single-tier local government such that public water utilities are the City’s responsibility. Initially scoped as the development of a credit policy, the intent was to identify a program similar to what the cities of Kitchener and Mississauga had implemented. However, based upon senior staff direction, efforts shifted to a more active coordination with the City’s Water Conservation and Efficiency program. Key themes arose during consultation which guided the credit program development, including:

- A strong desire for a credit program that applies to large residential and non-residential properties, and a less administratively burdensome incentive-based programs for smaller residential properties;
- The development industry is moving toward decreased impacts on stormwater management, driven by regulatory requirements for new development and should therefore be receptive to a credit program;
- The application and renewal process should be simple and easy to follow for all residential and non-residential property owners; and

- Generally favorable towards application certification by professional experts, and a 5-year renewal timeline for non-residential credit applicants.

Alternatives were developed and evaluated, culminating in recommendations for Council approval in July 2017. The Credit Application Guidance Manual was finalized and approved by Council in December 2017, along with approval of the by-law amendment to include the credit/rebate program in the stormwater service fee. The credit/rebate program took effect January 2018 and additional details (as well as the credit application guidance manual) can be downloaded from City of Guelph's website at <https://guelph.ca/living/environment/water/rebates/stormwater-service-fee-credit-program/>

Table 3 summarizes the credit program for non-residential properties. Like Mississauga, non-residential and multi-unit residential properties may qualify for a credit of up to 50% on their stormwater bills. However, the maximum credits for the peak flow and runoff volume credits are reversed, reflecting their unique program priorities (and the fact that soils in Guelph are much more amenable to infiltration than in Mississauga. It is also noteworthy that Guelph's peak flow reduction credit allows a range of storm events to be evaluated (not the 100-year event only as in Mississauga) and the applicant can choose the event that yields the largest peak flow reduction credit. There are no combined sewer systems in Guelph and the population is 130,000.

Table 3: City of Guelph Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Not included in current program	n/a
Peak Flow Reduction	Facilities that control the peak flow of stormwater discharged from the property, based on the outlet rate in comparison to natural hydrologic conditions.	15%
Runoff Volume Reduction	Facilities that control the amount of stormwater retained on the property, based on retention volume resulting from increased infiltration, evapotranspiration, or reuse.	40%
Water Quality Treatment	Facilities that control the quality of stormwater discharged from the property, based on treatment type, pollutant load reduction, or MECP level of protection.	15%
Operations and Activities	Non-structural measures including education programs and pollution prevention / risk management practices.	15%
Maximum Non-Residential Credit Available (Capped)		50%

A questionnaire was sent to City of Guelph staff and a follow-up meeting with the City's Stormwater Service Program Coordinator was conducted on January 28, 2020. A copy of the completed questionnaire is provided in **Appendix A** for reference.

3.1.2 City of Kitchener, Ontario

The Cities of Kitchener and Waterloo collaborated on a detailed evaluation of credit program alternatives and impacts in the year following implementation of Kitchener's stormwater utility which began January 2011. The City evaluated the feasibility of a credit program, and whether to include residential credits or to offer a rebate program instead. A financial impact analysis was conducted using estimated credit uptake rates, not including facilities to be constructed as part of projected new development. Program alternatives were evaluated based on a wide range of economic,

environmental, and social criteria. The preferred alternative was to implement both a non-residential and residential credit program and the credit program was initiated in 2012.

To reduce the administrative costs for offering credits to residential properties, Kitchener developed an on-line credit application system for residential properties with random site visits to check for compliance. Staff at the City of Kitchener conducted an analysis to determine the proportion of each City's stormwater program costs that could potentially be influenced by stormwater measures or activities on individual properties. As a result, it was decided that non-residential properties would be eligible to receive credits of up to 45%.

Table 4 summarizes the credit program for non-residential properties, which includes multi-family residential buildings with more than five dwelling units. Additional details on the credit program can be obtained through the City of Kitchener's website at <https://www.kitchener.ca/en/city-services/stormwater-credits.aspx>. There are no combined sewer systems in Kitchener and the population is 230,000.

Table 4: City of Kitchener Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Percentage of impervious area that is directed to an approved quantity control facility.	25%
Peak Flow Reduction	Not included in current program	n/a
Runoff Volume Reduction	Not included in current program	n/a
Water Quality Treatment	Percentage of impervious area that is directed to an approved quality control facility; Degree of quality control based on Provincial criteria for enhanced, normal, or basic treatment.	15%
Operations and Activities	Documented education program for employees, public, or students concerning good house-keeping practices for stormwater management, flood prevention, and pollution reduction.	5%
Maximum Non-Residential Credit Available (Capped)		45%

A questionnaire was sent to City of Kitchener staff and a follow-up phone interview with the City's Utilities Engineering Technologist was conducted on March 2, 2020. A copy of the completed questionnaire is provided in **Appendix A** for reference.

3.1.3 City of Edmonton, Alberta

The City of Edmonton's stormwater utility fee and credit program is currently managed by EPCOR and was initiated in 2003. The utility fee is calculated based on the area, runoff coefficient, development intensity factor (typically a factor of 1) and the unit rate. The program is focused around reducing the peak flow discharged from properties in relation to peak flows expected from a similarly zoned property. A standard reduction of 25% is typical, however, applications can request increased credit reduction by providing an engineering report to support the credit application, or reduced development intensity factor. Acceptable onsite controls contain roof, super pipe, parking lot and infrastructure storage (e.g., manholes, catchbasins, etc.) as well as wet and dry ponds. For approval, the property owner must fill in the required application form, pay the \$350 application fee and provide the supporting documentation based on the type of application (e.g., standard reduction application requires approved SWM plan). Refer to **Table 5** below for a summary of EPCOR's non-residential

stormwater credit program. There are combined sewer systems in Edmonton and the population is 930,000.

Table 5: EPCOR's Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Not included in current program	n/a
Peak Flow Reduction	Reduced "Intensity of Development Factor" on monthly bill if proven that site significantly reduces less discharge rates than similarly zoned properties.	100%
Runoff Volume Reduction	Not included in current program	n/a
Water Quality Treatment	Not included in current program	n/a
Operations and Activities	Not included in current program	n/a
Maximum Non-Residential Credit Available (Capped)		100%

A questionnaire was sent to EPCOR staff and a follow-up phone interview with a manager in EPCOR's Water Services department was conducted on March 26, 2020. A copy of the completed questionnaire is provided in **Appendix A** for reference.

3.1.4 City of Halifax, Nova Scotia

Halifax Water is responsible for collecting the municipal and regional stormwater utility fee as well as issuing stormwater credits for non-residential properties. There are two utility fees applicable for these developments. They are the onsite stormwater fee which is calculated based on impervious area and the \$40/year fee from Halifax Region (HR) to account for the right-of-way (ROW) runoff. Although the site utility fee is based on impervious land cover, the credit is based on the degree of peak flow control (e.g., controls 5-year vs. 100-year). Similar to standard quantity control requirements in Ontario, control of the 100-year event to pre-development levels is required for sites discharging to waterways, while control to the 5-year pre-development rate is required for sites discharging to municipal infrastructure. A "sliding scale" approach is accepted allowing residents to choose the design event they control. For example: control of the 25-year event provides a 40% credit, instead of the maximum 50% credit for the 100-year event. Refer to **Table 6** below for a summary of the City of Halifax's stormwater credit program for non-residential developments. There are combined sewer systems in Halifax and the population is 400,000.

Table 6: City of Halifax Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Not included in current program	n/a
Peak Flow Reduction	Facilities that control the peak flow of stormwater discharged from the property, based on the outlet rate in relation to design storm events.	50%
Runoff Volume Reduction	Not included in current program	n/a
Water Quality Treatment	Not included in current program	n/a
Operations and Activities	Not included in current program	n/a
Maximum Non-Residential Credit Available (Capped)		50%

3.1.5 City of Victoria, British Columbia

The City of Victoria manages a stormwater utility that began operation in 2016. **Table 7** summarizes the credit program for non-residential properties, which includes multi-family residential buildings with more than four dwelling units. There are combined sewer systems in Victoria and the population is 90,000.

Table 7: City of Victoria Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	All rainwater management credits are based on percentage of site impervious area treated	40%
Peak Flow Reduction	Not included in current program	n/a
Runoff Volume Reduction	Not included in current program	n/a
Water Quality Treatment	Not included in current program	n/a
Operations and Activities	Documented education program.	10%
Maximum Non-Residential Credit Available (Capped)		50%

3.1.6 City of Alexandria, Virginia

The City of Alexandria manages a stormwater utility fee that began operation in 2018. Fees and credits are applied through the City's tax billing system. It is worth noting that Virginia is not a home rule state like the other benchmark communities. Further, since Alexandria is located within the Chesapeake Bay watershed, the City is obligated under state law to have a mandatory credit category for water quality practices.

Table 8 summarizes the credit program for non-residential properties, which includes multi-family residential buildings with more than one dwelling unit. There are combined sewer systems in

Alexandria (however, the combined sewer system mitigation funds are segregated from stormwater utility funds) and the population is 160,000.

Table 8: City of Alexandria Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Includes 10% credit for peak flow reduction due to detention facilities, 20% for volume control due to green infrastructure.	30%
Peak Flow Reduction	Not included in current program	n/a
Runoff Volume Reduction	Not included in current program	n/a
Water Quality Treatment	Credit is awarded on a sliding scale, based on the coverage of site impervious area that is captured and treated.	20%
Operations and Activities	Eligibility varies by property type, includes Urban Nutrient Management Plan (up to 10% credit), Litter Cleanup Activities (up to 30% credit), New Native Tree Planting (up to 30% credit)	60%
Maximum Non-Residential Credit Available (Capped)		50%

A questionnaire was sent to City of Alexandria staff and a follow-up phone interview with the City's Stormwater Utility Manager was conducted on March 18, 2020. A copy of the completed questionnaire is provided in **Appendix A** for reference.

3.1.7 City of Indianapolis, Indiana

The City of Indianapolis manages a stormwater user fee that began operation in 2001. In 2015 the flat rate residential fee was changed to a billing unit based on measured impervious area. Along with new rate structure, the City expired all prior credits and revised the credit categories and criteria. **Table 9** summarizes the credit program for non-residential properties, which includes multi-family residential buildings with more than three dwelling units. There are combined sewer systems in Indianapolis and the population is 870,000.

Table 9: City of Indianapolis Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Direct Discharge Credit (DDC) - for properties that discharge their site runoff to a waterway rather than City infrastructure.	50%
Peak Flow Reduction	10% credit for designs that achieve City standards, 30% for those that exceeds the standards by a minimum of 10% - grouped with quality.	30%
Runoff Volume Reduction	Flat Infiltration credit for designs in accordance with City design manual.	20%
Water Quality Treatment	10% credit for designs that achieve City standards, 30% for those that exceeds the standards by a minimum of 10% - grouped with quantity.	30%
Operations and Activities	Flat Education credit to those who provide education programs concentrating on the stewardship of our water resources and to minimize the demand of the regional stormwater system.	5%
Maximum Non-Residential Credit Available (Capped)		50%

The City of Indianapolis declined responding to the questionnaire. However, a phone interview with the City's Billing Program Manager was conducted on February 19, 2020.

3.1.8 City of Minneapolis, Minnesota

The City of Minneapolis manages a stormwater utility fee that began operation in 2005. **Table 10** summarizes the credit program for non-residential properties, which includes multi-family residential buildings with more than four dwelling units. There are combined sewer systems in Minneapolis and the population is 430,000.

Table 10: City of Minneapolis Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Not included in current program	n/a
Peak Flow Reduction	Not included in current program	n/a
Runoff Volume Reduction	Applicants must demonstrate that all stormwater will be retained onsite: 50% credit is awarded for zero discharge of the 10-year design storm and 100% credit for the 100-year storm.	100%
Water Quality Treatment	A 70% reduction in total suspended solids for the 1.25-in storm event must be demonstrated through modeling.	50%
Operations and Activities	Not included in current program	n/a
Maximum Non-Residential Credit Available (Capped)		100%

3.1.9 Northeast Ohio Regional Sewer District, Ohio

The Northeast Ohio Regional Sewer District (NEORS) manages a regional stormwater management program fee that began operation in 2010. Unlike the other benchmark municipalities in this study, NEORS is a public utility district in the greater Cleveland area, that encompasses 60 municipalities across 2 counties. The District is responsible for managing both the regional stormwater and wastewater systems. The regional stormwater system includes watercourses and infrastructure that receive drainage from at least 300 acres of land. Local stormwater systems that serve tributary drainage areas less than 300 acres are owned and operated by the various municipalities.

Table 11 summarizes the credit program for non-residential properties, which includes multi-family residential buildings with more than four dwelling units. There are combined sewer systems within the District's jurisdiction which serves a population of approximately 1,240,000. As the table shows, it is possible to receive a 100% credit for exceptional sites that can demonstrate all runoff is retained onsite.

Table 11: Northeast Ohio Regional Sewer District Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Not included in current program	n/a
Peak Flow Reduction	Pre/Post peak discharge per critical storm method is required for 25% credit; 15% credit if using another municipal or District standard; 10% for facility without documentation.	25%
Runoff Volume Reduction	50% credit based on runoff volume control for the 100yr/24hr event storm. 25% credit based on 25% runoff volume reduction (or maintain pre-developed volume) for the 2yr/24hr event storm.	50%
Water Quality Treatment	Presumptive credits by facility type (25%, 20%, or 15%), multiple facilities allowed but each must achieve the water quality volume prescribed by Ohio EPA.	75%
Operations and Activities	Education credits are available for public/private schools.	25%
Maximum Non-Residential Credit Available (Capped)		100%

A questionnaire was sent to District staff and a follow-up video conferencing interview was conducted on April 24, 2020 (participants included the District's Manager of Watershed Technical Support, Manager of GIS Services, and Stormwater Technical Specialist). A copy of the completed questionnaire is provided in **Appendix A** for reference.

3.1.10 City of Philadelphia, Pennsylvania

The Philadelphia Water Department manages a stormwater management service fee that began operation in its present form in 2010. **Table 12** summarizes the credit program for non-residential properties, which includes multi-family residential buildings with more than four dwelling units. There are combined sewer systems in Philadelphia and the population is 1,580,000. The reason for the high maximum credit amount (note that a credit of 97% is rare, 80-90% is more typical) is that private properties represent a huge opportunity for flow reduction, which is a vital step towards meeting the terms of an EPA consent order to reduce the volume of combined sewer overflows. In addition to the credit program, the City administers a grant program that provides financial assistance to non-residential property owners to invest in facilities that would allow them to qualify for credits. The City expects to conduct a rate review and analysis in the next 1-2 years to identify the long-term financial viability of their credit and grant programs.

Table 12: City of Philadelphia Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Two fees/credits are applied (Gross Area and Impervious Area), all credits are presumptive based on area (maximum credit shown is for the Gross Area credit).	97%
Peak Flow Reduction	Not included in current program	n/a
Runoff Volume Reduction	Not included in current program	n/a
Water Quality Treatment	Not included in current program	n/a
Operations and Activities	Not included in current program (the Community Gardens Discount is included in Open Space designation)	n/a
Maximum Non-Residential Credit Available (Capped)		97%

A questionnaire was sent to City of Philadelphia staff and a follow-up phone interview with the City's Acting Manager of Stormwater Billing & Incentives was conducted on February 13, 2020. A copy of the completed questionnaire is provided in **Appendix A** for reference.

3.1.11 City of Portland, Oregon

The City of Portland has a mature stormwater credit program since 2006 to provide a discount on the stormwater utility fee which was initiated in 1977. The utility fee is composed of an onsite and off-site stormwater management fee. Onsite contributions are attributed to runoff from private properties, while the off-site contributions come from public properties including roadways and sidewalks.

The Clean River Rewards program offers a 100% discount on the onsite component of the utility fee, which is approximately 35% of the monthly bill. The credits are equally weighted between peak flow reduction, volume reduction and water quality treatment. The rewards are calculated based on the sizing of the facilities which depends on the contributing impervious area. The City provides online resources to assist residents in adequately sizing their BMP measures to maximize the credit. The program also offers a maximum credit of 8% for the presence of mature trees (min. 15ft tall) on private property. Each tree is credited 2.5% and therefore 4 trees onsite gives the maximum credit available for Operations and Activities. Refer to **Table 13** below for a summary of the stormwater credit available for non-residential properties. There are combined sewer systems in Portland and the population is 650,000.

Table 13: City of Portland Non-residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Not included in current program	n/a
Peak Flow Reduction	Facilities that control the peak flow of stormwater discharged from the property. Effectiveness / credit calculated based on imp. area and size of BMP.	34%
Runoff Volume Reduction	Facilities that control the runoff volume of stormwater discharged from the property. Effectiveness / credit calculated based on imp. area and size of BMP.	33%
Water Quality Treatment	Pollution Reduction. Effectiveness / credit calculated based on imp. area and size of BMP.	33%
Operations and Activities	Max 8% Credit for trees taller than 15ft on private property (1 Tree = 2.5%).	8%
Maximum Non-Residential Credit Available (Capped)		100%

3.1.12 Prince George's County (PGCo), Maryland

Prince George County's credit program is unique in that it separates credits available for industrial, commercial, and institutional (ICI) developments from the multi-residential credits (e.g., condo developments). Although the total available credit is the same for both types of development, the breakdown for ICI developments is more stringent. Similar to the City of Portland, PGCo's credit program only applies to the impact area fee component of the bill and is not applied to the standard \$20.58 administration fee.

PGCo applies presumptive-based criteria as the basis for their stormwater credit program indicating an emphasis on the amount of impervious area treated. A full credit of the impact area fee is available for multi-residential developments provided that all impervious area receives treatment. The breakdown is as follows: 40% roof area, 50% driveway, and 10% other impervious surface (e.g., sidewalk, sheds etc.). For ICI developments, a full credit is available if all roof and driveway area is treated (90%), the business qualifies as a green lawn care company (5%) and provides reforestation on pervious urban areas (5%). Partial credits are available and are determined by a field inspection. Refer to **Table 14** below for a summary of the stormwater credits available for non-residential developments in Prince George County. There are no combined sewer systems in Prince George's County and the population is 910,000.

Table 14: Prince George County Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Type of impervious area that is directed to an approved BMP or ESD measure.	90%
Peak Flow Reduction	Not included in current program	n/a
Runoff Volume Reduction	Not included in current program	n/a
Water Quality Treatment	Not included in current program	n/a
Operations and Activities	Green Lawn Care, reforestation on pervious urban	10%
Maximum Non-Residential Credit Available (Capped)		100%

3.1.13 City of Richmond, Virginia

The City of Richmond has a mature stormwater utility fee and credit system which has been in place for over a decade. The program is structured to determine the applicable credit by the type of BMP measure and the percent of impervious area treated. An approved list of quality and quantity BMP measures is available to residents to assist in maximizing credit. Each approved BMP measure is listed with the associated phosphorus removal as runoff is tributary to the Chesapeake Bay.

A 50% maximum credit is available and can be obtained through installation of quantity and quality controls measures and pollution prevention measures. Both quantity and quality controls alone can satisfy the requirements to achieve 50% credit, however 10% is available through pollution prevention measures such as green landscaping practices. Since the approved credit is dependent on the percent of impervious area, the City recognizes a sliding scale approach allowing partial credits for treatment of a portion of impervious area. Refer to **Table 15** for a summary of the credits available for non-residential developments. There are combined sewer systems in Richmond and the population is 230,000.

Table 15: City of Richmond Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Credit established based on % of impervious area treated	50%
Peak Flow Reduction	Facilities that control the peak flow of stormwater discharged from the property, based on the percentage of total site impervious area treated by BMP - grouped with volume.	50%
Runoff Volume Reduction	Facilities that control the runoff volume of stormwater discharged from the property, based on the percentage of total site impervious area treated by BMP - grouped with flow.	50%
Water Quality Treatment	Facilities that provides water quality treatment to stormwater from impervious area treated by BMP.	50%
Operations and Activities	Pollution Prevention and Environmentally sensitive lawn care.	10%
Maximum Non-Residential Credit Available (Capped)		50%

3.1.14 City of Washington, D.C.

The Department of Energy and Environment (DOEE) initiated the RiverSmart Rewards program in 2013 as a way to offer residents a credit on their stormwater utility fee. A maximum credit of 55% is offered through DOEE and an additional 20% is offered by DC Water through the Clean Rivers Impervious Area Charge (CRIAC) incentive. Both credits are applied for at the same time and is reflected on the residents DC Water bill.

The RiverSmart Rewards program is solely based on runoff volume reduction. The City offers a maximum credit of 55% for the full retention of the runoff from the impervious area during a 30mm (1.2") storm event. As opposed to defining the properties by development type, this program processes applications based on the amount impervious area coverage. Properties that have 2000 ft² or less of impervious area are processed with the "Simple Application" process. Standard Applications apply for properties with greater than 2000 ft² of impervious area. A Stormwater Management Plan is required for developments where it is already required as part of the building permit process. Renewals are processed every 3-years based on a simple checklist and photo submission. A site inspection is required for standard application renewals. Refer to **Table 16** below for a summary of the stormwater credits available through the City of Washington. There are combined sewer systems in Washington and the population is 710,000.

Table 16: City of Washington Non-Residential Stormwater Credit Program Summary

Credit Category	Description / Basis for Fee Reduction	Maximum Credit
Impervious Area Capture	Not included in current program	n/a
Peak Flow Reduction	Not included in current program	n/a
Runoff Volume Reduction	Facilities that retain the runoff volume from the impervious area of the site during a 1.2" storm event.	55%
Water Quality Treatment	Not included in current program	n/a
Operations and Activities	Not included in current program	n/a
Maximum Non-Residential Credit Available (Capped)		55%

The questionnaire was sent to City staff and a follow-up phone interview was conducted with the current and previous manager of the program on February 14, 2020. A copy of this questionnaire is included in **Appendix A** for reference.

3.2 Comparison of Benchmark Communities

Table 17 compares the City of Mississauga with the non-residential credit programs of the various benchmark municipalities and agencies. Summarized by credit category, the statistics are:

- Impervious Area Capture: 7 of 15 benchmark communities offer this type of credit and the maximum credit ranges between 25-97% with an average of 55%
- Peak Flow Reduction: 8 of 15 benchmarks, maximum credit 15-100% (average 43%)
- Runoff Volume Reduction: 8 of 15 benchmarks, maximum credit 20-100% (average 45%)
- Water Quality Treatment: 9 of 15 benchmarks, maximum credit 15-75% (average 33%)
- Operations and Activities: 10 of 15 benchmarks, maximum credit 5-60% (average 15%)
- Overall Maximum Credit: ranges between 45-100% with a median value of 50% (note the average of 70% is skewed by four combined sewer communities that offer a 100% credit)

Table 17: Non-residential Credit Program Comparison

Credit Category	Canadian Municipalities						American Municipalities and Agencies								
	Mississauga ON	Edmonton AB	Guelph ON	Halifax NS	Kitchener ON	Victoria BC	Alexandria VA	Indianapolis IN	Minneapolis MN	NEORS OH	Philadelphia PA	Portland OR	Prince Geo. County MD	Richmond VA	Washington DC
Start Year:	2016	2003	2018	2017	2012	2016	2018	2001	2005	2010	2010	2006	2013	2011	2013
Population:	721,600	932,500	131,800	403,100	233,200	85,800	160,500	867,100	425,400	1,243,900	1,584,100	653,100	909,300	228,800	705,700
Combined Sewers:	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Non-Residential Credit Categories															
Impervious Area Capture	n/a	n/a	n/a	n/a	25%	40%	30%	50%	n/a	n/a	97%	n/a	90%	50%	n/a
Peak Flow Reduction	40%	100%	15%	50%	n/a	n/a	n/a	30%	n/a	25%	n/a	34%	n/a	50%	n/a
Runoff Volume Reduction	15%	n/a	40%	n/a	n/a	n/a	n/a	20%	100%	50%	n/a	33%	n/a	50%	55%
Water Quality Treatment	10%	n/a	15%	n/a	15%	n/a	20%	30%	50%	75%	n/a	33%	n/a	50%	n/a
Operations and Activities	5%	n/a	15%	n/a	5%	10%	60%	5%	n/a	25%	n/a	8%	10%	10%	n/a
Maximum Credit:	50%	100% ¹	50%	50%	45%	50%	50%	50%	100% ²	100% ³	97%	35%	100% ⁴	50%	55%

1. Edmonton applies a standard 25% credit but allows applicants to apply for increased credit (reduced development intensity factor) which can theoretically achieve 100% credit.
2. Minneapolis, MN allows 100% credit if the applicant demonstrates total retention of the 100-year storm event.
3. NEORS, OH does not provide a cap to the maximum credit and therefore 100% credit is available for facilities with significant retention and water quality improvements.
4. Prince George County, MD maximum credit is 100% on the impact area fee of the bill and does not apply to the administration fee (approx. \$20).
5. Washington, DC defines the credit applications based on treatment of impervious area (e.g., < 2000 ft² = simple application). Therefore, these credits do not directly correlate to those offered by the City.

4 Non-Residential / Multi-Residential Credit Program

4.1 Options for Consideration

To help guide staff priorities regarding potential changes to the City's Stormwater Credit Program for non-residential properties, the following long list of preliminary options is discussed below and summarized in **Table 18**. The table also gives an indication of the relative level of effort anticipated for staff to develop and implement the option, including any interdepartmental resources that might be required for administration, potential by-law amendments, etc.

Table 18: Options for Modifying the City's Non-Residential Credit Program

No.	Description	Applicability/Compatibility	Level of Effort
1	Allow applicants the option to claim simplified credits	Not considered further	Medium
2	Define variable credit criteria by geography	Medium	Medium
3	Apply sliding scale to geographically variable criteria	Medium	Medium
4	Transfer credits with property ownership	Not considered further	High
5	Formalize process for communal facilities to share credits	High	Medium
6	Enhance initial credit pre-approvals as part of site plan review for automatic entry	Not considered further	Low
7	Increase level of complexity with application	Not considered further	Low
8	Consider grants to encourage credit uptake	Not considered further	High
9	Consider credit offsetting or trading	Not considered further	High
10	Add new practices as eligible	Low	Low
11	Change maximum credit in any category	Medium	High
12	Add new credit categories	Not considered further	Medium

1. Allow applicants the option to claim simplified credits

The current practice requires demonstrating the actual performance (through monitoring) or the anticipated performance (through calculations or modeling results), both certified by a Professional Engineer. In addition to these performance-based criteria, the City could also consider the option of simplified presumptive-based criteria. This option would allow applicants to claim credits based on the contributing impervious area to each approved facility type, without requiring Professional Engineer certification. Instead, the applicant would provide a photo and site sketch showing the cumulative impervious capture area (and agree to allow access to City staff for inspection). There is a strong precedent for this simplified process. Of the 14 benchmark credit programs, 8 have this option. Six municipalities only offer a simplified Water Quantity credit (e.g., Peak Flow Reduction or Runoff Volume Reduction). Two programs, the Cities of Indianapolis and Richmond, allow applicants the choice of a simplified Impervious Area Capture credit or a detailed Water Quantity credit. As the City's current program is well established and based on performance, it is not recommended that the City pursue a

simplified credit approach. Performance-based criteria increases the success of onsite controls and provides the City with greater assurance that implemented facilities will perform as expected.

The advantages of this proposed change include:

- An easier and lower cost process for applicants.
- Potentially reduced review time for staff (if complete submission)

Impact considerations include:

- Administering this option results in an impact to stormwater revenue.
- By removing the performance burden of proof, a “rational nexus” between credit received and benefit provided cannot be clearly demonstrated. This may weaken the legal defensibility of the fee. Presumptive criteria do not require an understanding of how a facility operates nor how performance might vary under different rainfall/loading conditions.
- Administration efforts to include a second method of applying or modifying existing credit application review process.
- Quality of applications may vary.

As a further consideration, the City may wish to reduce the maximum credit available when presumptive criteria are used.

2. Define variable credit criteria by geography

Currently, all credits are applied uniformly across the City. An option that the City may consider is credit criteria defined by geography, which would effectively establish credit zones that vary at a watershed or subwatershed level. This allows the City to benefit from the uptake of onsite stormwater facilities in areas where these would be most effective and, likewise, discouraging uptake in areas where onsite facilities would be ineffective. Discharge rate and volume controls that vary on a watershed or subwatershed basis are widely used by regulatory agencies across North America. Since the effectiveness would be based on local constraints and opportunities, the assignment of geographical zones for applying more/less stringent criteria for the various categories would be coordinated with the City’s stormwater development requirements (i.e. stormwater management criteria) and could be used to initially set the Peak Flow Reduction criteria. As some watersheds do not require peak flow control, the City could consider increasing the maximum credit available in another category, such as water quality treatment.

The advantages include:

- More flexibility to control development behaviour (and uptake levels) to focus on opportunities that are most effective.
- More streamlined business practices with respect to new development.
- Better aligned with the City’s stormwater management goals and objectives (e.g., by adopting a watershed/subwatershed-based approach).

Impact considerations include:

- Potential for increased complaints regarding impervious area is not credited equally when an impervious area based charge is a constant across all watersheds.
- Concerns from existing credit holders and future impact to their credit amount.

This option can allow for the potential to change credits available at the renewal stage.

3. Apply sliding scale to geographically variable criteria

This option is to be considered concurrently with Option 2. The current Peak Flow Reduction credit is based on the 100-year design storm event that if not met applicants can receive lesser credit. Similarly, with a geographically variable credit it is recommended that a range of design storm events be considered and that there is a varying credit depending on the development context. The City's stormwater development requirements can be used to initially set the criteria and the appropriate design storm events that might apply. A "sliding scale" approach could be considered to provide flexibility to applicants based on the type of development (e.g., new development vs. retrofit). Retrofit or rehabilitation of existing properties may not be required to meet development criteria when there is no increase in impervious area. In these cases, performance is typically limited by the cost of the facility, impervious area that can be captured, and other constraints. That is, the cost and performance of facility installations in retrofit situations will be based on available resources and subject to technical site constraints and opportunities (unlike developers who must achieve specific permitting/regulatory requirements). A sliding scale would accommodate retrofit developments who elect to do less than their new development counterparts in the same watershed, with the scale determined by the design storm event that is used to compare impacts before/after implementation of onsite facilities.

For example, in watersheds that require control of the 100-year return period post-development peak flow to the 10-year pre-development value, new development applicants that achieve the requirement and apply for a credit could receive the maximum 40% credit. For retrofit development, the scale would be different. For example, applicants that achieve the 100-year pre-development flow could receive a 20% credit versus those that meet the new development standard (e.g., 10-year pre-development flow), as stated above.

The advantages include:

- More flexibility to property owners in already developed areas who are not required to satisfy the City's new development standards.

Impact considerations include:

- Potential for increased complaints regarding impervious area is not credited equally when impervious area fee is a constant across all watersheds.
- Administering this option results in an impact to stormwater revenue.

4. Transfer credits with property ownership

When property ownership changes, the current program cancels the stormwater credit and the new owner must reapply. If desired, credits could be automatically transferred with the ownership change, along with the obligation to meet operation/maintenance requirements and granting access permission to City staff for inspections.

The advantages include:

- An easier and lower cost process for applicants.
- Reduced review time for staff.

Impact considerations include:

- Requires amendment to the City's Stormwater Fees and Charges By-Law 135-15 and related policies.
- Inability of the City to ensure that the new owner is aware of their obligations to receive a credit and maintain their stormwater management best practices.

5. Formalize process for communal facilities to share credits

Typically, a property owner claims credits for facilities on their property, but the City does allow for credits to be shared between multiple property owners. This process could be formalized to administer credits allocated to multiple property owners and that individual properties could claim fractional credits for communal facilities. The allocation could be based on contributing impervious area or some other acceptable cost-share formula between property owners.

The advantages include:

- More flexibility to control development behaviour (and uptake levels) to focus on opportunities that are most effective. This would help to encourage fewer and larger communal stormwater facilities in highly urbanized areas, rather than allowing multiple smaller facilities.
- Improved payback period for property owner investments since the construction and maintenance costs can be distributed among several parties.

Impact considerations include:

- Requires amendment to the City's Stormwater Program Policies.
- Disagreements among property owners regarding credit allocation may occur. The City will not be responsible for credit allocation between applicants, nor mediation between property owners should a disagreement occur.
- Potential increase in application complexity to outline property owner agreement on credit allocation.

Additional options and considerations include:

- Require a written multi-party agreement be in place as a condition of credit award, which specifically identifies the credit allocation and roles and responsibilities. Appoint private persons responsible that apply for, receive, and maintain the credit on behalf of multiple property owners.
- Agreement would clearly need to identify that the City will not mediate disputes between multi-parties
- For renewal applications, require agreeing parties to collectively certify that facilities have been adequately inspected on an ongoing basis, are functioning as designed, and that regular maintenance and corrective activities have been completed.

6. Enhance initial credit pre-approvals as part of site plan review for automatic entry

The same staff in the City's Transportation & Works department are involved in both site plan reviews and initial credit application reviews, however these are currently separate business practices and not formally linked. As such, based on the review completed, development applicants are informed that credits are available and pre-approved, however the property is not automatically enrolled in the credit program. Currently, the onus is on the development applicant to apply for the credit by filling out the credit application form.

The potential enhancement would be to automatically enrol the property owner in the credit program at the conclusion of the development process. The credit would be applied following inspection of final site works and written acknowledgement from the owner to satisfy operation and maintenance conditions.

The advantages include:

- An easier and lower cost process for applicants.

Impact considerations include:

- Additional staff effort to review credit applications with each development application and may require interdepartmental coordination and a change to current business practices.
- In many cases developers sell the property at the end of the development process. The new landowners may not be interested in maintenance of stormwater practices.
- Potential for increased uptake if City reviewers provide specific comments regarding stormwater credit program during the site plan review process.
- Establishing a process for the landowner to acknowledge the credit and conditions.

7. Increase level of complexity with application and applicant resources

Based on the comparison of Mississauga's non-residential credit program to other benchmark municipalities and agencies across North America, it was acknowledged that the City is among the more sophisticated credit programs, with a focus on performance-based criteria rather than presumptive-based.

The only advantage of doing this is to provide a more comprehensive technical assessment and reward system. However, making the criteria more complex may discourage and frustrate applicants. (e.g., as stated in Option 1). Given that the disadvantages far outweigh advantages, it is not recommended. Through lessons it is recommended that the current criteria be enhanced with additional clarification in the credit documentation, provide more relevant examples and calculations as a template for applicants.

8. Consider grants to encourage credit uptake

Currently, the credit program does not include grants that are specifically intended to encourage credit uptake. Other benchmark municipalities and agencies across North America offer such grants (e.g., Philadelphia and the Northeast Ohio Regional Sewer District in Cleveland). In these cases, the grant programs were initiated to help achieve the terms of their respective combined sewer overflow consent orders/decrees. These grant programs provide financial assistance to non-residential property owners to invest in facilities that would allow them to qualify for credits. By giving grant money to property owners so that they can obtain a credit, this effectively double counts the amount of unrecognized revenue for the stormwater program which translates into higher user fees. The combination of a large credit giveaway and lack of committed grant funding partners would also significantly impact the long-term financial viability of Mississauga's stormwater program.

A further distinction between Mississauga and the credit/grant programs in Philadelphia and Cleveland is the opportunity/requirement to reduce combined sewer overflow volumes. The reason for their high maximum credit amounts is that private properties represent a huge opportunity for flow reduction (e.g., the credit giveaway is more cost-effective than public capital improvement projects), which is a vital step towards meeting the terms of the EPA consent order to reduce the volume of combined sewer overflows. This situation does not apply to Mississauga, as there are no combined sewers or legislation that requires extensive volume controls for non-growth/development related activities, nor has there been sufficient study to demonstrate that funding private facilities would be more cost-effective than building public facilities from a watershed or subwatershed perspective. Further, grant funding for some benchmark credit programs is supplemented by external funding partners, both federally and at a state/provincial level. This is not a feasible approach in Mississauga and is therefore not recommended.

In short, stimulus grants to encourage credit uptake are being used in communities that have been ordered to reduce combined sewer overflows. The grant program was implemented to address regulatory violations with respect to their wet weather operations. It was commented during the interview process that without such aggressive CSO consent orders, their credit/grant programs "would

look entirely different". Such precedents do not apply to non-CSO communities like the City of Mississauga.

9. Consider credit offsetting or trading

Currently, the credit program does not allow the offsetting or trading of credits. There are other investment options for user fee credits, beyond the traditional fee reduction for individual property owners. These mechanisms go by different names (e.g. credit coupons, credit swapping or banking) and have been used interchangeably. Offsets have a geographical context (e.g., onsite or offsite, physically located within the same subwatershed or placed elsewhere), whereas trading is from a buyer/seller perspective (e.g. buyers are those property owners who don't have the opportunity to qualify for credits, sellers are those who qualify for credits but choose not to implement or have the opportunity to over-control and therefore generate tangible value in the differential above the maximum credit). Regardless of the name, these mechanisms are an attempt to monetize potential user fee reductions.

As suggested in Option 8, it is a complicated task to have a 1:1 translation of credit criteria to the City's overall stormwater management objectives, and so there is a risk that such mechanisms could lead to many unnecessary or ineffective facilities that do not achieve the overall SWM goals. Further, from a flooding perspective, over-control on one site may be acceptable to offset under control on another site if in the same watershed. However, encouraging overdesign of stormwater facilities does not necessarily provide a benefit from a stream stability, water quality, or environmental flow perspective.

Other benchmark municipalities either allow such practices or are considering them (e.g., Prince George's County and the Cities of Washington, Alexandria and Richmond). These practices make sense in communities that are faced with sensitive water quality issues, such as those within the Chesapeake Bay or locally such as the Lake Simcoe drainage basin. However, in Mississauga, market-based credit mechanisms are not consistent with the City's stormwater program goals and objectives, and therefore is not recommended.

10. Add new eligible practices

To add new practices as eligible for credit, it is recommended that the current stringent "Pollution Prevention" category be renamed to "Operations and Activities" to generalize the category and allow more flexibility for credits. It is also recommended that the 2015 Credit Application Guidance Manual be updated to expand the list of facilities eligible for credit to include new technologies and practices. Potential new credit-eligible activities under a more generalized category were discussed during project meetings, including:

Presumptive-based solutions:

- Climate resiliency measures (e.g. Climate Change Action plans and policies) that are consistent with the mitigation and adaptation goals embodied in the City's Climate Change Action Plan.
- Simplified or focused Pollution and Prevention plan (salt management plan, sustainable property programs, etc.).

Performance-based solutions:

- Innovative water quality control devices which may not meet standards required for the water quality criteria (e.g., manhole/catch basin inserts, v-notch weirs, settling tanks, high-rate filtration etc.).

It is also recommended that the 2015 Credit Application Guidance Manual be updated to expand the list of facilities eligible for credit to include new technologies and practices. New facilities added will be eligible for credits from the peak flow reduction and water quality categories. Less effective quality control measures (ie. CB/MH inserts, baffles) could be categorized under "Operations and Activities" to limit the maximum credit available.

The advantages include:

- Increased flexibility for applicants.

Impact considerations include:

- Staff need to validate the certification and performance claims of new technologies or practices and ensure they are current/applicable.

Additional options and considerations include:

- The potential credit-eligible facilities listed above should not be expected to provide similar performance benefits as the more traditional peak flow, runoff volume, or water quality treatment controls. As a result, the corresponding credits would be small. It is recommended that the "Pollution Prevention" category be renamed to "Operations and Activities" to include these facilities/measures.
- For simplicity, all items in the Operations and Activities credit category should waive the requirement for certification by a professional engineer. Professional certification should continue to be required for technical reports and performance-based criteria, but property owners can vouch for their adherence to policies and plans related to pollution prevention, tree management, climate action, etc.

11. Change maximum credit in any category

It is recommended that the current maximum credits in each category be reviewed. Given the fluctuations in annual stormwater program costs and in anticipation of changes to the credit program, it is appropriate to evaluate the optimal maximum credits in each category. This approach gives the City flexibility to maximize credits in categories that will provide the most benefit and/or align with current stormwater goals and objectives. From the benchmarking assessment, an overall maximum credit of 50% is reasonable as this was the median of all reviewed communities. Therefore, it is not recommended to change the maximum credit amount, just the maximum credit available in each credit category.

The advantages include:

- Credit allocations can be adjusted to better reflect the City's stormwater management objectives, particularly when coupled with the geographically varied credit criteria (Option 2).
- Increased flexibility for applicants.

Impact considerations include:

- Staff time to establish and implement the process.
- Concerns from existing credit holders and impact to their credit amount.

Additional options and considerations include:

- There are two different approaches to assessing revenue impacts: a short-term, year-to-year accounting that is flexible for adjusting to changing needs or program goals (e.g., to reflect

shifting priorities between flood control, water quality, and operations); or full lifecycle accounting to average out the fluctuations over the long-term.

12. Add new credit categories

It is possible that new credit categories be considered and incorporated into the program. New categories should be consistent with the design objectives for stormwater management facilities, and include:

- Hazard protection, which is intended to manage peak flows and velocities for the purpose of protecting people and property from flooding/erosion during extreme rainfall events or operating conditions.
- Environmental flow maintenance, which manages the intensity, duration, and frequency of flows over a wide operating range.
- Volume reduction, which manages stormwater in a way that mimics pre-development conditions to preserve the natural environment (commonly determined with the water budget analysis).
- Quality treatment, which manages sediment, pollution, and temperature to protect public health, habitats, and aquatic/terrestrial resources.

4.2 Implications for the City of Mississauga

A comparison to other benchmark communities in North America reaffirms that the City's non-residential credit program is in line with what other large municipalities are doing to incentivize ICI properties. Nevertheless, some communities are doing things differently and so the project team investigated alternative modifications to the City's credit program.

After considering the full list of options, the consulting team prioritized those that best aligned and would be most effective for the City's overall stormwater program and these are shown in **Table 19**, sorted by priority and anticipated level of effort.

Table 19: Prioritized Options for Modifying the City's Non-Residential Credit Program

No.	Description	Applicability/Compatibility	Level of Effort
5	Formalize process for communal facilities to share credits	High	Medium
2	Define variable credit criteria by geography	Medium	Medium
3	Apply sliding scale to geographically variable criteria	Medium	Medium
11	Change maximum credit in any category	Medium	High
10	Add new practices as eligible	Low	Low

The following options were dropped from further consideration as it was felt the City's current credit program is sufficient based on current needs, priorities, and resources:

- Option 1 (Allow applicants the option to claim simplified credits): By simplifying the process, the resulting increased uptake could result in a significant amount of unrecognized revenue, which would require a rate increase to make up the difference.
- Option 4 (Transfer credits with property ownership): The rationale for not pursuing this option is the need to amend the by-law and lack of assurance that the new owners would be aware of their credit obligations.

- Option 6 (Enhance initial credit pre-approvals as part of site plan review for automatic entry): The administrative changes required were felt to be too onerous, and there also is no assurance that future property owners would be aware of their credit obligations.
- Option 7 (Increase level of complexity with application): The City's credit criteria place it in the upper tier among its peers when considering the level of sophistication and comprehensiveness and therefore making the program more complex is unnecessary and administratively burdensome.
- Option 8 (Consider grants to encourage credit uptake) and Option 9 (Consider credit offsetting or trading): In communities that have been ordered to reduce combined sewer overflows, stimulus grants have been adopted to encourage credit uptake as well as a market-based approach that allows credit offsetting and trading. This is not the case in Mississauga; there are no combined sewers.
- Option 12 (Add new credit categories): The City's current program addresses the key stormwater management objectives of flood control, volume reduction, and water quality treatment. Yet there are some facets of stormwater management that are not currently incentivized in any of the benchmark community credit programs. Future master planning initiatives and subwatershed studies could reveal new objectives and targets that would be suitable for crediting property owners. However, these are undefined at this time and there is no need to expand the current credit categories.

5 Residential Incentive Program

For the purposes of this study, four types of financial incentives are defined for stormwater management practices and facilities on residential properties:

- Credits: ongoing reduction to the user fee charge.
- Rebates: a one-time reward, either through the user fee program or another initiative.
- Subsidies: a cost reduction on materials or supplies, provided by the City or in partnership with other agencies.
- Other: incentives are provided by an external entity (e.g., design/planning assistance, or other in-kind services).

5.1 Best Practices Review

Table 20 lists ten of the benchmark communities/agencies that currently offer user fee credits to residential property owners. The definition of credit-eligible residential properties varies by jurisdiction. For the purposes of a stormwater user fee, residential properties are defined according to the number of dwelling units:

- One residential dwelling unit: Cities of Edmonton, Halifax, Alexandria, Richmond, and Prince George's County (note that the City of Mississauga also defines residential properties in this manner).
- Two or less dwelling units: City of Portland.
- Three or less dwelling units: City of Indianapolis.
- Four or less dwelling units: Cities of Victoria, Minneapolis, Philadelphia, and the Northeast Ohio Regional Sewer District.
- Five or less dwelling units: Cities of Guelph and Kitchener.
- 2,000 or less square feet of impervious area: City of Washington DC (note the City is unique in that the basis of charge for the user fee is not property type, but rather the amount of impervious area).

Table 20: Summary of Residential Credit Programs

Municipality / Agency	Financial Incentive	Credit Description	Max. Credit
Canada			
Kitchener ON	Credits	Credits based on capture volume (200-800L = 20%, 800-3200L = 30%, >3200 = 45%). Eligible facilities include rain barrels, cisterns, infiltration galleries, rain gardens, permeable pavers.	45%
Victoria BC	Credits, Rebates	Low density residential properties are eligible to receive an ongoing credit, based on minimum volume, footprint, or roof area treated.	10%
U.S.A.			
Alexandria VA	Credits	Applicants must show that approved facilities have been effectively implemented on the property. Maximum flat credit for res'l properties is 30%, however other credits can be awarded.	50%
Indianapolis IN	Credits	Applicants must show that approved facilities have been effectively implemented (rain gardens, onsite storage, vegetated filter strips).	25%
Minneapolis MN	Credits	Applicants must identify the capture area treated by approved facilities (rain gardens and pervious pavement only).	50%
NEORS OH	Credits	Applicants must show that approved facilities have been effectively implemented (rain gardens, onsite storage, reduced impervious area, pervious pavement, vegetated filter strips).	25%
Portland OR	Credits	Residential credit based on managing runoff from roof area only.	35%
Prince George's County MD	Credits, Rebates	Based on impervious area treated - full credit if area is fully treated.	100%
Richmond VA	Credits	Credits based on type of BMP measure installed - each with a list of requirements for fully credit.	50%
Washington DC	Credits, Rebates	RiverSmart rewards is predominantly residential developments. Application based on impervious area size: simple (<2000ft ² imp. Area) and standard (>2000ft ² imp. Area)	55%

The maximum residential credit ranges from 10 to 100%, with an average of 51%. It is noted that the City of Portland and Prince George's County offer a 100% credit, however this is only applied to a portion of the bill, generally excluding credit on the administration component of the bill. The City of Portland's 100% credit is applied to the "onsite" component of the utility fee, which is approximately 35% of the bill (e.g., the effective residential credit amount). Similarly, Prince George's County offers 100% credit on the "impact area fee" and does not apply to the administration component of the bill. There was no opportunity to interview the City of Portland or Prince George's County in order to identify their rationale for offering a 100% credit (nor to confirm if there were external funding agencies to help offset the revenue loss). It is worth noting that Portland has extensive combined sewers (over 40 combined sewer overflow [CSO] outfalls) and that both Portland and Prince George's County watersheds discharge into sensitive waterbodies (the Columbia River and Chesapeake Bay, respectively).

The City of Washington has the next largest maximum residential credit of 55%, and it also has an extensive combined sewer system (60 CSO outfalls) and is located within the Chesapeake Bay watershed. As opposed to defining the properties by development type, Washington's program processes applications based on the amount impervious area coverage treated by the facility. Simplified credits are applied to facilities that treat less than 2000 ft² of impervious area. The City of Washington

has a large residential/multi-residential development coverage which contributes significantly to the receiving systems, justifying the high credit value. However, Mississauga's current program is not set-up based on impervious area coverage and therefore benchmarking other communities/agencies suggests that a 10-50% maximum credit is appropriate if the City were to pursue a residential credit program. **Table 21** summarizes the rebates and other financial incentives that are currently offered to residential property owners. The table includes all jurisdictions investigated, and no incentives could be identified for the Cities of Edmonton and Halifax.

Table 21: Summary of Residential Rebates and Other Incentives

Municipality / Agency	Rebate / Other Description	Max. Value
Canada		
Edmonton AB	EPCOR does not offer credit or rebate programs as they argue a runoff coefficient of 0.5 is fair for residential developments.	n/a
Guelph ON	Rebate programs offered through the Water Services Dep't in partnership with non-profit (Reep Green Solutions Inc.). Up to \$2,000 each for rain gardens and rainwater harvesting systems.	\$4,000
Halifax NS	The City / Region does not offer credit or rebate programs for residential developments.	n/a
Kitchener ON	The City does not have a rebate program; however, the Region of Waterloo offers reduced cost rain barrels and free gardening / naturescaping seminars.	n/a
Victoria BC	Rebates are available to low density residential properties (1-4 dwelling units) for rain barrels, cisterns, rain gardens, bioswales, infiltration chambers, and permeable pavement.	\$3,200
U.S.A.		
Alexandria VA	The City does not have a rebate program; however, a regional partnership offers reduced cost rain barrels and installation advice through a series of "build your own rain barrel" workshops.	n/a
Indianapolis IN	The City does not have a rebate program; however, the county government offers educational material on rain gardens, rain barrels, and bioswales.	n/a
Minneapolis MN	The City does not have a rebate program; however, the county government offers educational materials and a local not-for profit offers a reduced cost, 1-hour, onsite consultation.	n/a
NEORS OH	The District does not have a rebate program; however, some local City governments offer free rain barrels and installation workshops.	n/a
Philadelphia PA	The City offers free rain barrels and subsidized pricing on downspout planters, rain gardens, removal of impervious surfaces, and permeable pavers.	\$7,000
Portland OR	The City does not have a rebate program, however Portland Water District partnered with local manufacturers to offers more than 50% discount on rain barrels.	n/a
Prince George's County MD	Chesapeake Bay Trust partnered with PGC on its rain check rebate. Offers rebates based on sizing of BMP measure: \$4000 for residential and \$20,000 for non-residential.	\$4,000
Richmond VA	The City does not have a rebate program, however local associations offer rain barrel kits and educational material for cheap. The City has outreach programs for educational purposes.	n/a
Washington DC	Rebates offered through RiverSmart Rewards, part of DOEE. Operates as rebate based on sizing or co-payment to get installed. Rebates only for rain barrels, gardens, pavers, trees. Co-payment (\$50-\$100) for all applications and bayscaping.	\$2,200

Five of the benchmark communities/agencies currently offer user fee rebates to residential property owners. It is noteworthy that the City of Victoria, Prince George's County, and City of Washington offer both credits and rebates through their user fee programs. Also note that there may be additional "Other" incentives; not all have been identified as part of our investigation.

The maximum residential rebate amounts range from \$2,200 to \$7,000 per household, with a median of \$4,000. All five rebate programs include rain gardens among their eligible facilities. Counts by facility type are listed in order:

- Five of five benchmark communities/agencies include rain gardens.
- Four of five include rain barrels/cisterns, and permeable pavement.
- Two of five include removal of impervious surfaces, and tree canopy/re-vegetation.
- One of five include rainwater harvesting systems, bioswales, infiltration chambers, downspout planters, and green roofs.

5.2 Residential Incentive Program Framework

The overall intent of a user fee incentive program is to offer mutual benefits to both the service provider and the service user. The City, as owner/operator of the stormwater management system, has a responsibility for providing stormwater management services throughout its corporate boundary. The primary benefit of an incentive program from the City's perspective is the ability to encourage and influence desirable behaviours with respect to onsite stormwater management. That is, good housekeeping practices on individual properties will reduce the strain on the City's overall stormwater management program and contribute to reduced capital and operating costs. The primary benefit to property owners is an ongoing reduction in their user fee.

In practice, there are several drawbacks of incentive programs, including:

- The additional start-up costs related to program implementation as well as ongoing cost and resource requirements related to administration and enforcement.
- Given the difficulty in correlating onsite stormwater management with service delivery cost reductions, many user fee authorities adjust their rate in an arbitrary manner, and some make no adjustments. Any financial incentive awarded to property owners must be treated as unrecognized revenue from a cost-accounting perspective (e.g., the higher the uptake, the greater the overall rate needs to be to achieve the revenue requirement).
- A poor uptake of incentives is common. This often results from the expectation of a reasonable return on investment for installing onsite source controls. Reasonable payback periods (e.g., in the range of 5-10 years) cannot be achieved without awarding significant credits, and as noted above, this would have a significant impact on the overall revenue.
- With residential credit programs, a key drawback is the effort required to communicate application requirements and provide assistance in completing credit applications. Based on feedback received during the benchmark community interviews, staff spend a lot of effort advising and instructing applicants how to correctly fill out their application forms.
- With residential rebate programs, a key drawback is the uncertainty in establishing the maximum rebate value for each item. The calculation must aim to distribute the rebates across all facility types, be priced appropriately and in proportion to facility investments (i.e., a high value for permeable pavement and low value for rain barrels), and remain within the total rebate budgetary limit.

The general set of options to be considered for a residential incentive program is as follows, in increasing order of effort/complexity:

- Do not provide any residential incentives.
- Implement a subsidy program that provides low-cost materials or in-kind services to help property owners plan, design, install, operate, and maintain stormwater facilities on their properties. See Section 5.4.1 for additional details and considerations on a subsidy program.
- Implement a rebate program that offers a one-time financial incentive to approved applicants with eligible facilities on their properties. Refer to Section 5.4.2 for discussions on the rebate program option.
- Implement a credit program that offers an ongoing stormwater fee reduction to approved applicants with eligible facilities on their properties. Refer to Section 5.4.3 for options and considerations associated with a credit program.
- Implement a hybrid credit/rebate program. See Section 5.4.4 for additional details.

Decisions regarding the appropriate option for Mississauga must consider desired program goals that are weighed against the potential drawbacks described above. This can be viewed from multiple perspectives and it is the intent of this report to present an objective, factual account of considerations to help the decision-making process.

From a financial perspective, it takes significant effort to identify the optimal balance between the administrative cost of a residential credit program versus the actual cost reduction to the City's stormwater management program. The increased cost of implementing a residential Credit Program and providing credits to residential property owners would result in the need to increase the Stormwater Fee. With typically low uptake acknowledged by the benchmark communities, the above factors present an obstacle to making the case that a residential credit program is worth the effort. For these reasons, the City has not previously implemented a residential credit program.

From a technical perspective, beneficial impacts on system capacity and watershed health are more pronounced in high-density areas (e.g., within non-residential land uses) where facilities on a single large impervious property could result in substantial runoff and pollutant load reductions to the City's stormwater system. In other words, it would take a large number of residential properties to have a meaningful impact on system capacity and watershed health. Even so, the corresponding financial impact that a large uptake would have on the overall stormwater rate cannot be ignored.

One of the benchmark communities offers a cautionary tale on the importance of due process in decision-making. During the phone interview, it was suggested that Council had tried to appease residential property owners' request by adding the residential credit program into their ordinance (by-law) in a process that was rushed and without technical or financial scrutiny. This ultimately led to a repeal of the ordinance and an awkward expiration of the previous credit program.

5.3 City of Mississauga Initiatives

The feasibility study that led to Mississauga's Stormwater Charge included an investigation of financial incentives for property owners. The final report for the Stormwater Financing Study was issued in April 2013 and included the following commentary related to residential incentives:

For Mississauga, it is recommended that a credit program be developed which will provide credits to non-residential properties that provide onsite [stormwater management] measures and incentives to residential properties. Although the City recognizes the importance of onsite stormwater measures on residential properties, the anticipated high administration cost for a credit application, approval and processing program may outweigh the net savings in the City's stormwater program resulting from this initiative. As such, it is recommended that an incentive

program be explored which offers a one-time discount on the capital cost of implementing stormwater controls such as rain barrels.

Prior to the January 2016 launch of Mississauga's Stormwater Fee, staff reported to Council in May 2015 that a Residential Outreach and Education Program would be the best approach to support single residential homeowners. Their conclusion was that this represented the best value to realize an uptake of stormwater practices on residential properties. In October 2015, the City established a Stormwater Credit Working Group comprised of staff and appointed Councillors (Ras, Fonseca, Starr, Mahoney and Carlson) to consider a residential incentives program for properties with onsite stormwater control measures. This included two workshops in April 2016 that featured facilitated round-table discussions and solicited feedback from interested residents.

In June 2016, staff issued a report from the Stormwater Credit Working Group, which concluded that:

- An enhanced Residential Stormwater Outreach and Education Program is the best value option to address public outreach and education desires.
- A stormwater home visit service is the best mechanism through which to engage homeowners to apply general stormwater best practices to their property and should be piloted to assess long-term interest.
- Financial recognition programs (e.g., credits and rebates), are not recommended as these programs: do not incentivize good stormwater management practices; do not provide benefits to municipal stormwater programs; typically have very low participation rates; and are costly to provide.

Staff recommendations were approved by Council and this resulted in an enhanced Residential Stormwater Outreach and Education Program and the Residential Stormwater Home Visit Service pilot program, the latter of which reached approximately 120 homes. In June 2019, the corporate report was presented to the General Committee outlining a shift to a digital presence for the Outreach and Education program.

To summarize past efforts, excluding residential properties from the credit program has been the position of City staff from the outset. This was subsequently confirmed by the Stormwater Credit Working Group, that instead established a 'home visit' subsidy program. Circumstances that might affect the City's decision-making have not changed much since 2015.

One noticeable external change over this timeframe is that more municipalities and utilities are now offering residential credits. Despite these new efforts however, it is still common for lower than expected uptake rates. A common theme was that the implementation of residential credit programs was often influenced by political decisions as opposed to staff demonstrating success of the program or value for money.

5.4 Residential Program Suggestions

Before presenting details of the specific options, considerations for all options are described here. All options will require an amendment to the City's Stormwater Fees and Charges By-Law 0135-2015 and related policies. Amendments will identify any modifications to the City's current credit policy that has been in place since program inception in January 2016.

In general, it is suggested that a rigorous definition of eligible facility types be included as a supplemental schedule attached to the by-law. Stormwater management terminology varies widely across North America. Any stormwater practices, controls, measures, activities, or facilities that are eligible for incentives should be explicitly defined. Further, the City's website description could consider

adding educational resources that may include photos, guidance documents (for planning, design, construction, operation, and maintenance), and ideally, a summary of showcase examples across Mississauga.

A preliminary list of eligible facility types may include the following:

- Native vegetation: This includes absorbent landscaping comprised of natural species (e.g., to distinguish desirable vegetation from introduced species or less desirable cover such as turf grass).
- Tree canopy: This refers to the horizontal projection area of the tree's biomass when viewed from above (e.g., the tree crown footprint). It is also desirable to encourage native tree species, ideally of a leafy, deciduous variety to encourage rainfall interception. Desirable canopy could further be defined to only include the larger, more mature trees, based on trunk diameter.
- Rain barrels/cisterns: These facilities are designed to capture and store rooftop runoff for later use. To discourage "do-it-yourself" projects, these should either be commercially available units or, if manually constructed, must meet local/provincial building codes. Separate categories could be defined based on size/volume or setup/configuration (e.g., barrels are above ground devices typically separate from a building, whereas cisterns are underground tanks which may be incorporated into the building).
- Rainwater harvesting systems: The key distinction from the previous item is that these are designed with instrumentation and controls to deliver a desired flow rate (at an acceptable pressure) and according to a specified schedule. These will likely be more common in non-residential areas.
- Rain gardens: These storage facilities are designed as depressions in landscaped areas intended to capture and treat runoff from rooftops or impervious surfaces on the ground. They rely on vegetation and natural soil or engineered media to filter runoff, as well as retain the runoff long enough so that it is lost through infiltration, evaporation, and transpiration.
- Bioretention cells: These are similar to rain gardens with the exception that a drainage bed (consisting of gravel or other porous media, also popularly referred to as a stone reservoir) is included in the bottom layer to provide additional retention volume as a means to reduce stormwater runoff.
- Vegetated swales: These are conveyance channels designed to slow down runoff as a means of reducing runoff from private property. Separate categories could be defined for vegetated channels that primarily filter runoff (e.g., horizontal filtration through vegetation) and those that primarily infiltrate runoff (e.g., vertical filtration through soil). In any case, these go by many different names, such as filter strips, bioswales, and greenways.
- Infiltration devices: These are designed to store runoff in a drainage bed for the purpose of reducing runoff primarily through infiltration into the native soil. Devices go by different names, generally those with the drainage bed at grade are referred to as infiltration basins or trenches. Devices with the drainage bed buried below ground are referred to as infiltration galleries or chambers.
- Permeable pavement: These are designed to capture and treat runoff from impervious ground surfaces directly at its source. The surface layer can be constructed with porous concrete or asphalt materials, or a block paver system that features porous cells in between impervious blocks or paving stones. These are placed on top of aggregate layers (of sand or pea gravel), and often underlain with a drainage bed at the bottom. Like bioretention cells in landscaped areas, permeable pavement provides runoff reduction from paved areas.
- Green roofs: These are designed to capture and treat rooftop runoff directly at its source. These often feature a shallow-rooted vegetation in a layer of soil underlain by a drainage mat consisting

of porous material, and an impermeable membrane and root barrier at the bottom (to limit root and moisture impacts on the roof structure). The soil and media layers are deliberately thin, in order to minimize the overall facility weight. Like street planters (e.g., modular units of tree/soil on the ground), green roofs provide runoff reduction from the rooftop, with the exception that infiltrated water in the green roof is to be collected by an underdrain system and discharged to the downspout (whereas street planter infiltrate is to be discharged directly into the native soil).

Some benchmark communities do not consider roof downspout disconnection to be an eligible activity. In the case of the City of Guelph, it is a requirement that downspouts be connected to a rain barrel/cistern, rain garden, street planter, or infiltration gallery, etc. It is thus the outlet device that is eligible for a residential property incentive. This is consistent with City of Mississauga standards for new development, which require downspout disconnection as a means to avoid overloading of the weeping tile and foundation drains.

It should be noted that the mere removal of impervious surfaces is considered to be eligible for rebate by some benchmark communities. Rather than being eligible for credit or rebate, some municipalities suggest that impervious cover removal should be considered as an adjustment of the base fee (through the appeal process). In this way, a double incentive (e.g., a reduced base fee plus credit) is only permissible if the former impervious surface is replanted with native vegetation as defined above. This would not be the case in Mississauga however, since impervious tiers for the stormwater fee are assigned based on roofprint area. Removal of ground surface impervious materials would therefore not qualify for a reduction in the base fee.

5.4.1 Subsidy Program

The City, on its own or in partnership with the Region of Peel or local conservation authorities, can use its service expertise, resources, and bulk-purchasing power to offer materials to the general public at a discounted price. For example, the City may assist with efforts to develop a program to encourage “rainscaping” features on residential properties, analogous to the City’s support to CVC’s Greening Corporate Grounds program for non-residential properties. The incentive program can range from simply subsidizing a portion of the cost of rain barrels, tree-planting initiatives or to developing an education/outreach program to help property owners understand how individual properties contribute to the overall City stormwater management system. The latter program could be used to illustrate how properly constructed and maintained onsite facilities can have a positive impact on system capacity and watershed health, analogous to the City’s or CVC’s Pollution Prevention program for non-residential properties.

A form of the subsidy program has already been tested in Mississauga within the City’s Residential Stormwater Outreach and Education Program through the Residential Stormwater Home Visit Service pilot program. Since the Home Visit program was discontinued, a collaborative approach with local partners may prove to be more effective.

5.4.2 Rebate Program

Based on a review of the benchmark communities/agencies, it is suggested that the City of Guelph and Philadelphia are among the better examples of a residential rebate program. If Mississauga moves forward with a rebate program, it is suggested that staff start with these as a template for adapting to Mississauga’s unique opportunities and constraints.

For discussion purposes, **Table 22** shows a set of sample criteria and annual rebate amounts that could form the basis for a residential rebate program. Here, the facility types described above have been assigned to specific rebate categories. For each category, a minimum size requirement is suggested

along with an initial estimate of the total count of eligible facilities on all residential properties in the City of Mississauga as well as an assumed uptake rate. The estimated count is speculative at this point. The uptake rate varies between 20-40%, generally depending on facility investment, assuming homeowners with the more expensive or showcase-worthy installations would seek remuneration the most. The average rebate amount for each facility is shown, followed by the rebate award amount. Average rebate amounts were assigned in a relative way based on the most desired or valuable installations getting the largest cash value (e.g., mature trees, permeable pavement, and green roofs). Other options for rebate amounts include assigning a unit cash value per litre of storage volume, or per square meter of facility footprint. The total and weighted average amounts are shown in the bottom row.

Table 22: Sample Residential Rebate Program Details

Eligible Residential Rebate Categories	Minimum Size Requirement	Residential Property Estimates			Rebates Awarded
		Count	Uptake	Avg. Rebate	
Native Vegetation	35 m ² (380 sf)	1,000	20%	\$100	\$20,000
Mature Tree Canopy	35 m ² (380 sf)	1,000	20%	\$150	\$30,000
Rain Barrel	200L (50 gal)	10,000	20%	\$10	\$20,000
Cistern	800L (210 gal)	2,000	25%	\$50	\$25,000
Rain Garden	25 m ² (270 sf)	2,000	25%	\$50	\$25,000
Vegetated Swale	25 m ² (270 sf)	2,000	25%	\$50	\$25,000
Infiltration Device	25 m ² (270 sf)	1,000	25%	\$100	\$25,000
Permeable Pavement	10 m ² (110 sf)	500	40%	\$200	\$40,000
Green Roof	10 m ² (110 sf)	500	40%	\$200	\$40,000
	Total / Average:	22,000	23%	\$55	\$250,000

As an example, it is expected that 20% of the 10,000 homeowners that have installed a rain barrel will formally request a \$10 rebate from the City, resulting in a total rebate award of \$20,000.

Table 22 suggests minimum sizes based on physical dimensions that are easy to obtain (e.g. volume of rain barrels and cisterns, and footprint area of everything else). Alternatively, these could instead be based on a minimum footprint of impervious area collected, number of downspout connections, or similar metric that is easily calculated and appropriate for each facility. Additional sizing considerations for specific facility types include:

- Rather than the canopy projection area, a minimum trunk diameter could be specified for simplicity (e.g., 20 cm [8 in] or greater in diameter).
- The cistern category could include all tanks and rainwater harvesting systems larger than the suggested minimum volume.
- The rain garden could include bioretention cells without distinction (to avoid confusion).
- The vegetated swale category could also restrict the minimum channel length as well as a maximum allowable slope.
- The infiltration device and permeable pavement categories could also set a limit on the minimum drainage bed height (e.g., at least 20 cm [8 in] deep throughout). Note that the City of Victoria specifies separate permeable pavement categories in their rebate program. These are

distinguished by the presence or absence of a drainage bed layer (and the same rationale could be applied in the distinction between rain gardens and bioretention cells).

Like other benchmark communities, a sliding scale rebate amount could be used instead of the average value shown in **Table 22**. That is, a small rebate would be awarded for facilities that just meet the minimum size requirement, with increasing rebate amounts up to a capped maximum value. In any case, it is suggested that the overall rebate be capped at an acceptable amount. In this example, the initial suggestion reflects an arbitrary \$250,000 per year rebate program. If this option is recommended, a subsequent implementation study would be required to refine the estimated count, uptake rate, and rebate amount for each facility type based on the City's actual annual rebate program budget. In addition, resources to develop, implement and maintain a rebate program would require consideration.

As a policy consideration, it is suggested that a rebate program is advertised on a first come/first served basis, such that no further applications will be accepted once the annual program budget has been exceeded. Further, a window for applications could be advertised (e.g., June through August) in order to limit staff review time or to coincide with seasonal staff employment periods.

Considering all the options, a rebate program seems to offer a balance between the financial incentive requests of residential property owners with the administrative burden and cost concerns of staff. The primary advantage of a rebate program (compared to a credit program) is that the City is in control of the amount of financial incentive available (e.g., with restrictions on the program budget) as well as the time/resource commitment of program administration (e.g., with staff review time restrictions). Considering the above a rebate program requires further review of the annual amount that could practically be offered and the associated impact to the Stormwater Program.

5.4.3 Residential Credit Program

Based on a review of the benchmark communities/agencies, it is suggested that the City of Kitchener and the Northeast Ohio Regional Sewer District are among the better examples of a residential credit program. If desired, it is suggested that staff start with these programs as a template for adapting to Mississauga's unique opportunities and constraints.

Table 23 shows the sample criteria and credit amounts that could form the basis for a residential credit program. Categories are assigned to four tiers based on:

- Available volume within storage facilities (e.g., rain barrels, cisterns, rainwater harvesting systems, or other facilities that have a readily quantifiable volume). Capturing, storing, treating, or otherwise slowing down runoff is the main feature of all the facility types that were identified for the suggested rebate program. That is, their primary hydraulic function is to act as a storage facility. Only vegetated swales primarily function as a conveyance system. Despite their storage function, the calculation of available volume for onsite stormwater management is not easy to determine.
- All other facility types as listed. As suggested for the rebate program, each would have to meet the minimum size requirements to be eligible for credit.

Table 23: Sample Residential Credit Program Details

Eligible Residential Credit Categories	Storage Facility Volume	Other Facility Types	Credit Awarded
Rain Barrel	200-500 L	n/a	5%
Small	500-5,000 L	rain garden, vegetated swale	15%
Medium	5,000-10,000 L	infiltration device, native vegetation, street planter	20%
Large	>10,000 L	mature tree canopy, permeable pavement, green roof	25%
Maximum Residential Credit Available (Capped)			50%

The smallest tier is meant to include only rain barrels, and the minimum size is limited to 200L as in the suggested rebate program. The other three tiers are progressively larger for storage facilities or progressively more desirable/valuable for all other facility types, according to the same rationale presented for the rebate program. Credits are awarded per eligible facility up to a maximum limit of 50%. For example, two 300L rain barrels and one mature tree would qualify for a 35% credit, applied to the homeowner's stormwater fee.

If the City wishes to explore this further, the volume-based categories and corresponding maximum credits can be refined, using an assumed uptake rate to determine an overall program that matches the overall rebate giveaway amount (e.g., a \$700,000 per year credit program).

The option presented in **Table 23** reflects the minimum effort for the homeowner applicant and for City staff to provide the dual role of application reviewer and credit enforcer. There are alternatives, such that the applicant could be given a choice from an array of quantifiable criteria metrics, including:

- Facility Volume: Credit amounts could be assigned per L of storage volume, where the volume is determined as the actual dry storage capacity or a presumed retention volume for given facility type and size. Correctly quantifying facility dimensions and capacities is often difficult to convey to property owners. Other benchmark communities/agencies have provided detailed descriptions to guide the dimensioning and calculation of storage volumes.
- Facility Area: Credit amounts could be assigned per square meter of facility footprint, since the dimensions of the facility footprint are relatively easy to measure.
- Capture Area: Credit amounts could be assigned per square meter of impervious capture area (e.g., the total amount of contributing impervious area that is drained by gravity into the facility). This works best for facilities that receive runoff from multiple source areas, and this is directly related to the way that the base stormwater fee is calculated. Some benchmark communities require a sketch of the site showing which rooftops or paved areas will be drained to each facility as well as approximate dimensions.

The City's current non-residential credit program meets the definition of a performance-based solution (as opposed to presumptive-based as defined in Section 3.1), since the applicant is required to demonstrate facility performance, and this is to be certified by a Professional Engineer. To simplify process, it is suggested that any residential credit program satisfy the former definition, without requiring review and certification by a Professional Engineer. To achieve this, the homeowner must certify and document in their application that each credit-eligible facility:

- Has been planned and designed according to City standards/guidelines, including submission of completed checklist forms, site sketches, and photos.
- Has been installed according to City standards/guidelines and that all minimum size requirements have been achieved, including submission of site sketches, photos, construction material receipts, etc.
- Has been operated and maintained according to City standards/guidelines and will be until the next renewal period, including submission of a copy of the maintenance log, replacement material receipts, and a signed statement that grants access for City staff to inspect the facility at a mutually agreeable time and agrees to pay back the credit if the inspection reveals conditions that do not match the credit application (possibly with a penalty that recoups the City's cost of enforcement). If vegetation is involved, then submission requirements should include photos taken during the growing season (e.g., May through September).

In some cases, other benchmark communities include onsite meetings between staff and the property owner to resolve any outstanding issues as part of the application process. An allowance for the time and cost of this effort would either need to be factored into the credit program cost or could be offset by charging a fee for onsite review meetings.

Credit amount for simplified applications can be refined based on expected uptake and budget and can be made available only to Residential properties. A few benchmark communities implemented a simplified vs. standard application approach providing a base credit amount of simplified applications, and an increased credit for standard applications demonstrating successful performance. Credits could be awarded immediately upon review approval of an application, and possibly retroactive to either the installation date or January 1 of the present year for facilities installed in a prior calendar year. Alternatively, the City could award credits only for established facilities that have been through a complete rainfall season (April through October). Credit applications could also be restricted to an appropriate time window, similar to the suggested rebate program.

Although there are opportunities to restrict the timing and possible budget (e.g., on a first come, first served basis up to the defined total credit giveaway amount) this is not a common practice among the other benchmark communities as it is with their rebate programs. In any case, the administration cost of a credit program will always exceed that of a rebate program, and therefore harder to justify from strictly a financial perspective (e.g., cost/benefit).

5.4.4 Hybrid Incentive Program

The intent of this option is to combine and adapt the best or most efficient features of the suggested subsidy, rebate, and credit programs presented above.

Based on a review of benchmark communities/agencies, it is suggested that the City of Victoria and Prince George's County are among the better examples of a hybrid residential incentive program. If desirable it is suggested that staff start with these as a template for adapting to Mississauga's unique opportunities and constraints.

Compared to the other options, a hybrid program would provide the most flexibility (and presumably the most attractive from the customer's perspective). However, it would obviously require the most effort and have the highest administrative cost.

6 Conclusions

This study successfully achieved the goals and objectives as directed by City staff, including:

- Conduct a thorough review of the City's existing non-residential credit program and previous initiatives.
- Complete a benchmark analysis to better inform suggested modifications to the existing non-residential credit program.
- Investigate the options and impacts of implementing a financial incentive program for residential properties.

The following sections summarize the specific conclusions of this study.

6.1 Non-Residential / Multi-Residential Credit Program

From the list of preliminary options for modifying and improving the current credit program for the City's consideration, it is recommended that:

- Simplified credits based on presumptive criteria should not be added.
- The existing credit program should not be increased in complexity.
- Stormwater grants and credit trading / offsetting should not be implemented.
- The City's maximum credit of 50% is appropriate as 9 of the 14 benchmark programs have a maximum credit set between 45-55%.

Of the options for consideration presented in this report, the following are those that will better align the program with the City's objectives and can be reasonably implemented, listed in decreasing order of priority:

- 1) Formalize the practice of allowing communal facilities to share credits: Adjust the existing program to allow for multiple property owners to claim credits for communal facilities that serve multiple adjacent properties. Credit amounts can be established based on contributing impervious area. This approach will increase customer flexibility and possibly encourage uptake but will require an update to the City's stormwater credit related policies.
- 2) Define variable credit criteria by geography: To align with the existing stormwater criteria for the watersheds throughout the City, it is recommended that the maximum credit available to each property be dependent on the applicable watershed. This will allow the City to encourage onsite SWM where it will have the most impact and discourages the practice of achieving additional credit for "over-controlling" in areas where limited benefits are expected. This recommendation would best be coordinated with the City's current standards, otherwise it might require significant changes, increase administrative complexity and review time.
- 3) Apply sliding scale criteria: To provide flexibility to applicants in existing developed areas, a sliding scale is recommended for consideration. Different credit requirements would apply in the same watershed, depending on whether the facility is part of a new development or a retrofit on an already developed property. This encourages the uptake by property owners who are discouraged from applying for credit due to the prohibitively high cost of installing retrofit facilities that meet the current criteria. This option would make credits available to those who are not required to achieve the City's new development standards.
- 4) Change maximum credit in any category: While the overall maximum credit of 50% compares well with the benchmark communities, an assessment could be conducted to determine the optimal maximum credits in each credit category. This provides flexibility to the City by allowing the credit to be maximized in the most influential category to achieve the City's stormwater

management objectives and provide flexibility to applicants. This option can work in conjunction with credits assigned by geography (e.g., by increasing the water quality credit in locations where quantity control credits are limited).

- 5) Accept new practices as eligible: It is recommended to expand the list of eligible practices and to rename the "Pollution Prevention" credit category to "Operations and Activities" to increase credit opportunities. This approach will increase customer flexibility and possibly encourage uptake.

6.2 Residential Incentive Program

A range of residential incentive program options was explored in this study. It was not the intent of this study to recommend a preferred option, but rather to present sufficient details of each option as well as the practices and preferences of other municipalities, in order for staff to understand where Mississauga is comparatively and to aid in determining the most appropriate course of action, if any.

Residential incentive program options include:

- 1) Do Nothing: do not provide residential incentives as the cost of implementation is high and anticipated uptake is low.
- 2) Subsidy Program: a collaborative approach with the Region or local conservation authorities to offer discounted materials or to subsidize the cost of rain barrels or trees.
- 3) Rebate Program: a first-come, first-served rebate available for appropriately sized SWM facilities. A sliding scale approach can be taken by offering a rebate for the minimum requirement which increases with enhancements to the facilities up to a maximum rebate. This style of program may be desirable as the City maintains control of the financial incentive available and administration activities are low.
Reference Benchmark Communities: City of Guelph, City of Philadelphia
- 4) Credit Program: a simplified program applying presumptive-based criteria presumptively to approve credits for facilities treating a specific capture area or provide adequate volume and / or footprint area. Control of the financials is not typical practice amongst the benchmark communities but could be further explored. The administration costs of this style of program will also be higher than a rebate program.
Reference Benchmark Communities: City of Kitchener, Northeast Ohio Regional Sewer District
- 5) Hybrid Program: this program is suggested to adapt the most efficient features of the previously listed options to provide the most flexible and attractive program to the customer. It is expected that this program would have the highest administration costs.
Reference Benchmark Communities: City of Victoria, Prince George's County

Should the City choose to implement a residential incentive program, it is recommended that they develop and include an extensive list of incentivized stormwater management facilities and techniques with supporting educational material and guidance on sizing, construction, and maintenance with the amended by-law. An extensive list of recommended facilities is provided within this report including rain barrels / cisterns, rain gardens, permeable pavement, and green roofs.

Based on the consultant team's experience with other stormwater user fees across North America as well as discussions with the benchmark municipalities and agencies that were reviewed as part of this study, we believe that the City's efforts with respect to the stormwater fee and credit program meet or exceed an acceptable standard of practice.

Ultimately, the long-term success of the City's stormwater fee and credit/financial incentive program will rely on interdepartmental coordination, community engagement and education, as well as

collaboration with external entities including Region of Peel and local conservation authorities. Further, it is hoped that staff will continue to reach out to their colleagues and stormwater utility managers at other municipalities and agencies as they strive to continuously improve corporate practices and policies.

APPENDIX A

Benchmark Community Questionnaires

QUESTIONNAIRE

TO: Alexandra Marson, City of Guelph
FROM: Resilient Consulting
DATE: 23-Jan-2020
SUBJECT: Stormwater Credit Programs Questionnaire

Resilient Consulting (Resilient) in partnership with Computational Hydraulics International (CHI) was retained by the City of Mississauga to complete a thorough review of their existing stormwater user fee credit program and provide recommended enhancements and improvements. Mississauga is located in Ontario, Canada (adjacent to Toronto) and has a population of 720,000. The City's stormwater user fee began billing in January 2016 and includes a credit program that is available to industrial, commercial, institutional, and multi-residential property owners (i.e., properties with only one residential unit are excluded).

Our present study effectively represents a 5-year review of the credit program. Of the hundreds of stormwater utilities across North America, we have selected a dozen or so that have mature and innovative credit programs. We intend to collect feedback in two ways: through this questionnaire and with a follow-up phone interview of approximately 30 minutes. As part of this process, we have conducted a review of available website materials that describe your municipality's or agency's credit program. A standardized summary table demonstrating our understanding of your credit program is attached for your review and comment. Feel free to edit it accordingly, or we can discuss the details during the interview.

The purpose of this questionnaire / interview is to confirm program details and inquire about missing information to improve our understanding of your user fee and credit program. We intend to use your information as the basis for comparison to the City of Mississauga's current practices. We will contact you later next week to schedule an interview. Information collected during this process will be summarized in meeting minutes and presented to the City of Mississauga and therefore we request that any confidential information be flagged for the interviewer, so that we do not include it in our report.

Thank you in advance for your time and effort. Any feedback and lessons learned that you provide would be most appreciated by the project team, and ultimately, by the staff, citizens, property owners, and elected officials in the City of Mississauga.

Non-Residential and Residential Credit Program

1) When did the credit program start? How long have you been involved?

ICI credit program implemented in January 2018. I started in the position of Stormwater Service Program Coordinator in March 2018.

2) What changes would you make to your credit criteria or maximum credit amounts?

None at this time.

3) What changes would you make to your credit criteria or maximum credit amounts?

None at this time.

4) What is your overall opinion and experience with reviewing and approving credit applications?

a. Any differences between initial and renewal applications?

No renewal applications as of yet. There has been a wide range in the level of details provided by applicants depending on which categories they are applying under. As long as modelling and/or hydrologic and hydraulic calculations are done by a known engineer, there is not a lot of testing done through application review.

5) How are climate change and other future uncertainties reflected in your program?

Emphasis on encouraging green infrastructure and the runoff volume reduction is the highest weighted category. As intensity/duration/frequency of rain events increases, more properties will rely on site control instead of the city's infrastructure.

6) Do you feel that a 5-year renewal period is appropriate?

Yes, Guelph is 4 years but I do not see any blatant disadvantages to a 5 year renewal period. However, please keep in mind that we have not had any applicants go through the renewal process yet.

7) Do you feel that a requirement for a qualified professional to prepare the application is appropriate?

Yes when hydrologic and hydraulic calculations are being submitted. Not if applying for a credit category when this is not required like the Operations & Activities category in Guelph.

8) If your credit applications must be prepared by a qualified professional, what are the qualifications?

Professional Engineer licensed in Ontario

9) What does the credit application review process entail and what supporting information is required?

- a. Are face-to-face applicant meetings ever held at initial or renewal periods?
An initial in person meeting is often held for potential applicants to learn more about the program and requirements. We have also done on-site walk throughs of the property to see the LID/BMP facilities, but it is not a requirement of the program. This is usually done with the property owner or manager before the engineer is involved.

10) How much staff effort is typically required to review and approve each credit application?

- a. What are the staff positions involved? Stormwater Service Program Coordinator and Supervisor
- b. Approximately, how many full-time employees are required? 2
- c. What is your weekly time allocation to this program? 1 hour or less

11) How frequently do you conduct inspections / audits of approved facilities and practices?

None conducted to date although the city reserves the right and is granted permission through our by-law at any point during the term of the credit or application review process.

12) Do you have sufficient staff and resources to do the inspections / audits?

- a. If not, how many fully-time employees would be ideal?

One off inspections/audits could currently be handled by city staff.

13) How are penalties determined and applied if the inspection fails?

Credits may be suspended, reduced or cancelled as described in the Credit Application Guidance Manual.

14) Are there any administrative activities that you considered outsourcing to external agents or contractors?

None at this time.

15) Is there any contracted work that you've considered taking on yourself?

None at this time.

16) What public engagement and outreach efforts are undertaken to advertise the credit program and encourage participation at initial and renewal stages?

Transit bus ads, brochure mail outs, bill inserts, social media posts, screenscapes, Guelph Chamber of commerce web ads and newsletter, Mind your Business newsletter

17) Do the credits expire? What is the renewal period and what are the requirements for renewal?

Credits are effective for 4 years from date of approval. Credit renewal process and required documents are outlined on page 4 of the Credit Application Guidance Manual.

18) Are rebates, subsidies, grants or other incentives offered in addition to (or instead of) credit for certain sectors? If so, please describe?

2 residential rebate programs currently offered: Rainwater Harvesting Rebate and Rain Garden Rebate.

19) How many credit applications were received and how many were approved in the past year?

Two applications approved in 2019

20) What was the number of credit applications in the first year of the program and in subsequent years?

a. How do these compare to the number of utility accounts (ie. Uptake rate)?

Three applications approved in 2018, two in 2019. Combined total of nine utility accounts.

21) Have there been any noticeable trends year over year? Ie. Number of applications, uptake rate, staff approval time?

Too soon to tell. We are focusing in 2020 on word of mouth, in person contact with potential applicants and cross promotion with other department programs instead of the traditional marketing techniques (ads, social media etc) that we used in 2018 & 2019.

22) Are there any other statistics that you would be willing to share? Ie. Average credit per facility, average property size, ratio of credit application to approvals?

9 ICI utility accounts currently receiving credits. Average credit percentage 18.5%.

Average dollar impact per month \$913.95. 2020 annual dollar impact \$61,164.48 (current approved applications).

23) Has a revenue impact assessment been conducted to associate the credit uptake with actual program cost savings?

a. If so, were savings distinguished by primary function or by fixed/variable costs incurred?

- b. How successful was this assessment in forecasting the financial impact on the program in subsequent years?

None at this time, may be a component of the upcoming Stormwater Master Plan.

- 24) Do you have any other advice or lessons learned to share regarding the credit program? Program specific successes/challenges, political/financial implications, pertinent administrative details?

We have considered and may implement some sort of "small ICI" rebate program, where ICI properties less than a certain number of ERU may be eligible for a one time rebate instead of an ongoing credit. Most likely would be the same rebates available for residential properties.

Residential Credit Program Only

- 25) What level of stakeholder engagement did you conduct as part of the credit program implementation?

Rebate programs only. A survey was sent out during the early stages of development on our most recent program (rain garden rebate) that was the only external engagement done.

- 26) What are your thoughts on a strategy that only provides one-time rebates for approved facilities and measures?

Our residential properties can only benefit from one-time rebates as we cannot have an ongoing credit at less than 1 ERU.

- 27) Are there specific housing types, groups, or neighborhoods that have a higher credit uptake than others?

Single detached residential properties have the highest uptake. Both rainwater harvesting systems and rain gardens require outdoor space.

- 28) Are there specific facilities, measures, practices, or activities that have had a higher credit uptake than others?

We find that landscaping programs do really well in Guelph. People are interested in gardening and their yard and are interested in learning to do things more sustainably. We launched the rain garden rebate off of the success seen through Guelph's Healthy Landscapes program and are working to implement a tree rebate program in 2020.

- 29) Do you have any other comments on the distinction between low-density versus higher-density residential properties?

Interested in exploring opportunities for townhouse or semi-detached residential properties. Multi-residential buildings of 6 or more dwelling units would be included in our ICI Stormwater credit program. The Stormwater fees for these buildings are typically charged to a house account and not the individual unit owner/tenant.

QUESTIONNAIRE

TO: Chris Nechacov, City of Kitchener
FROM: Resilient Consulting
DATE: 23-Jan-2020
SUBJECT: Stormwater Credit Programs Questionnaire

Resilient Consulting (Resilient) in partnership with Computational Hydraulics International (CHI) was retained by the City of Mississauga to complete a thorough review of their existing stormwater user fee credit program and provide recommended enhancements and improvements. Mississauga is located in Ontario, Canada (adjacent to Toronto) and has a population of 720,000. The City's stormwater user fee began billing in January 2016 and includes a credit program that is available to industrial, commercial, institutional, and multi-residential property owners (i.e., properties with only one residential unit are excluded).

Our present study effectively represents a 5-year review of the credit program. Of the hundreds of stormwater utilities across North America, we have selected a dozen or so that have mature and innovative credit programs. We intend to collect feedback in two ways: through this questionnaire and with a follow-up phone interview of approximately 30 minutes. As part of this process, we have conducted a review of available website materials that describe your municipality's or agency's credit program. A standardized summary table demonstrating our understanding of your credit program is attached for your review and comment. Feel free to edit it accordingly, or we can discuss the details during the interview.

The purpose of this questionnaire / interview is to confirm program details and inquire about missing information to improve our understanding of your user fee and credit program. We intend to use your information as the basis for comparison to the City of Mississauga's current practices. We will contact you later next week to schedule an interview. Information collected during this process will be summarized in meeting minutes and presented to the City of Mississauga and therefore we request that any confidential information be flagged for the interviewer, so that we do not include it in our report.

Thank you in advance for your time and effort. Any feedback and lessons learned that you provide would be most appreciated by the project team, and ultimately, by the staff, citizens, property owners, and elected officials in the City of Mississauga.

Non-Residential and Residential Credit Program

1) When did the credit program start? How long have you been involved?

The credit program for the City of Kitchener started in 2012. I have been involved in the program since 2017.

2) What changes would you make to your credit criteria or maximum credit amounts?

Potentially add trees as a BMP worth credit, revisit/potentially remove education credits as not used and onerous on utility to review

3) What changes would you make to your credit criteria or maximum credit amounts?

4) What is your overall opinion and experience with reviewing and approving credit applications?

a. Any differences between initial and renewal applications?

- Residential credit applications sometimes do not have all the information required, or include every BMP when not the case.
- Lacking capacity to inspect properties – just trusting information is accurate
- Non-residential applications rarely match what was approved in the SWM report and require a lot of verifying

5) How are climate change and other future uncertainties reflected in your program?

Currently not reflected in residential credits, non-residential properties going through development now must retain 12.5mm on site which forces the property to install stormwater BMPs and mandatory credit program enrollment.

6) Do you feel that a 5-year renewal period is appropriate?

Kitchener requests OGS cleanout reports every 2 or so years to ensure OGS's are maintained, but a full application review would be challenging every 5 years.

7) Do you feel that a requirement for a qualified professional to prepare the application is appropriate?

Definitely not for residential due to the simplicity of it, for non-residential the application is rarely accurate so the utility relies on the engineer-stamped and development approved SWM report. Even if the application was perfect, the SWM report would still be reviewed by City staff so because that is already done, it isn't necessary for the non-res property owner to hire a qualified professional to submit

- 8) If your credit applications must be prepared by a qualified professional, what are the qualifications?

SWM Report requires licensed engineering with the PEO

- 9) What does the credit application review process entail and what supporting information is required?

a. Are face-to-face applicant meetings ever held at initial or renewal periods? Pdf online that property owners fill out, submit electronically to City and we proceed with reviewing/potentially requesting site inspections (for residential if property is suspect). For non-res, site plans get certified and inspected by Development engineering staff who sign off so no re-inspection is needed for non-res sites. Old sites which were approved and certified many years ago get reinspected by Utility staff, SWM report is reviewed and credit applied

- 10) How much staff effort is typically required to review and approve each credit application?

a. What are the staff positions involved?

b. Approximately, how many full-time employees are required?

c. What is your weekly time allocation to this program? (around 2 hours a week)

Assuming a streamlined program where all departments have the process down (Finance Dept for reporting annual expected credit payouts, Property Data Administrators for making sure utility bill is being billed stormwater fee and is credited etc.)

Res – 1 administrative role to receive calls and respond to basic inquiries and process simple applications

Res and Non-Res -1 engineering technologist to review complex BMP's, and to address specific engineering related questions, review SWM reports and process non-res credits, conduct inspections etc.

- 11) How frequently do you conduct inspections / audits of approved facilities and practices?

Development engineering does an inspection for non-res going through the development approval, Utilities staff do an inspection for non-res applying for credit that are older (this is rare – 1 applicant every 2 years), residential applications that are suspect are also subject to inspection (around 3 properties every year). A few years ago we hired a student to do a full random inspection program for the residential applicants (over 100 inspections) and found that the majority were true, however permeable pavers and rain garden BMPs were not understood.

- 12) Do you have sufficient staff and resources to do the inspections / audits?

a. If not, how many fully-time employees would be ideal?

Due to lack of staff, we only do inspections on suspect properties, it would be ideal to be able to do random checks throughout the year but this would require one other staff over summer. It would also be ideal to have this staff person send letters requesting BMP maintenance records for non-residential.

13) How are penalties determined and applied if the inspection fails?
If the inspection fails, the credit is terminated and full SWM fee is applied the next month, there are no back charges, though it is written that they could be back charged

14) Are there any administrative activities that you considered outsourcing to external agents or contractors?
Not to my knowledge

15) Is there any contracted work that you've considered taking on yourself?
Not to my knowledge

16) What public engagement and outreach efforts are undertaken to advertise the credit program and encourage participation at initial and renewal stages?
Utility bill inserts

17) Do the credits expire? What is the renewal period and what are the requirements for renewal?
The credit expires when the property owner moves. The credit is not automatically applied so the new resident must apply. For non-residential, the credit *should* expire if the BMP's are not maintained, or if maintenance records are not received however due to lack of staff we don't have capacity to follow-up with this.

18) Are rebates, subsidies, grants or other incentives offered in addition to (or instead of) credit for certain sectors? If so, please describe?
There are 100% credits (grants) for charity, places of worship and non for profit properties. For non-residential properties that are >30 Ha in size, with 50% of the property or more in the floodplain with a functional BMP, the property is eligible for an 85% credit

19) How many credit applications were received and how many were approved in the past year?
Residential – 248 approved and preapproved
Non-Res – 5 approved

20) What was the number of credit applications in the first year of the program and in subsequent years?

a. How do these compare to the number of utility accounts (ie. Uptake rate)?

For residential: First year approved applications (2010) shown as 2291 – Though the credit program was not in full force until 2012, there were retroactive credits available to properties with BMPs installed from 2010 onwards.

2011-2013 applications averaged 561/year

2014-2019 applications average 277/year

21) Have there been any noticeable trends year over year? Ie. Number of applications, uptake rate, staff approval time?

Since 2014 – average around 277 residential applications per year, introduced e-billing which added stormwater credit auto processing – way faster

22) Are there any other statistics that you would be willing to share? Ie. Average credit per facility, average property size, ratio of credit application to approvals?

Avg residential property is between 106-236m² = SW fee of \$185.52/year in 2020.

Overwhelming majority of applications are approved

23) Has a revenue impact assessment been conducted to associate the credit uptake with actual program cost savings?

a. If so, were savings distinguished by primary function or by fixed/variable costs incurred?

b. How successful was this assessment in forecasting the financial impact on the program in subsequent years?

Not sure

24) Do you have any other advice or lessons learned to share regarding the credit program? Program specific successes/challenges, political/financial implications, pertinent administrative details?

Overall it's been a great funding source for the utility, due to the credit program there have been some property owners that are very interested in doing what they can to reduce runoff

Even though residents were already paying for stormwater out of the property tax before the formation of the utility, once it was broken out and shown on their bill it became the source of a lot of complaints

Because the stormwater fee is shown along with water and gas consumption, residents of the city see it as they would pay for it if they use it (drain to sewer) and if not, then they should not be paying for it (if it drains to their backyard forest or seeps into the ground)

Residential Credit Program Only

25) What level of stakeholder engagement did you conduct as part of the credit program implementation?

Details are provided on our website: www.kitchener.ca/stormwatercredits

26) What are your thoughts on a strategy that only provides one-time rebates for approved facilities and measures?

I would think it would be difficult to ensure the BMP is maintained and the property owner would not move right after – but not sure how the program would look

27) Are there specific housing types, groups, or neighborhoods that have a higher credit uptake than others?

Residential Single Detached – Medium are the most common credit receivers (Detached homes with building footprint between 106-236 m²)

28) Are there specific facilities, measures, practices, or activities that have had a higher credit uptake than others?

For residential, rain barrels (<5 barrels) have by far the highest uptake – this is due to the Region of Waterloo's rain barrel giveaway program I would think. Infiltration galleries are the second highest – due to many subdivisions in Kitchener requiring lot level infiltration in order to be constructed to protect the sensitive subwatersheds

For non-residential – Rooftop storage, Oil-Grit Separators, and salt-management plans (Smart About Salt certified salt contractor used) are the most common BMPs that are used to obtain credits.

29) Do you have any other comments on the distinction between low-density versus higher-density residential properties?

QUESTIONNAIRE

TO: Michelle Poh, EPCOR
FROM: Resilient Consulting
DATE: 26-Mar-2020
SUBJECT: Stormwater Utility Credit Questionnaire

Resilient Consulting (Resilient) in partnership with Computational Hydraulics International (CHI) was retained by the City of Mississauga to complete a thorough review of their existing stormwater utility credit program and provide recommended enhancements and improvements. Mississauga is located in Ontario, Canada (adjacent to Toronto) and has a population of 720,000. The City's stormwater user fee began billing in January 2016 and includes a credit program that is available to industrial, commercial, institutional, and multi-residential property owners (i.e., properties with only one residential unit are excluded).

Our present study effectively represents a 5-year review of the credit program. Of the hundreds of stormwater utilities across North America, we have selected a dozen or so that have mature and innovative credit programs. We intend to collect feedback in two ways: through this questionnaire and with a follow-up phone interview of approximately 30 minutes. As part of this process, we have conducted a review of available website materials that describe your municipality's or agency's credit program. A standardized summary table demonstrating our understanding of your credit program is attached for your review and comment. Feel free to edit it accordingly, or we can discuss the details during the interview.

The purpose of this questionnaire / interview is to confirm program details and inquire about missing information to improve our understanding of your utility fee and credit program. We intend to use your information as the basis for comparison to the City of Mississauga's current practices. We will contact you later next week to schedule an interview. Information collected during this process will be summarized and presented to the City of Mississauga and therefore we request that any confidential information be flagged for the interviewer, so that we do not include it in our report.

Thank you in advance for your time and effort. Any feedback and lessons learned that you provide would be most appreciated by the project team, and ultimately, by the staff, citizens, property owners, and elected officials in the City of Mississauga.

Non-Residential and Residential Credit Program

1) When did the credit program start? How long have you been involved?

The credit program has been in effect since 2003, however, it has been dormant for a number of years. Michelle Poh has been involved with the program since Sept 2017.

2) What changes would you make to your credit criteria or maximum credit amounts?

Would explore incorporating a maximum credit component as site drainage is not the only contributing factor to the sewer systems (ie. ROW runoff, etc.).

3) What changes would you make to the terms and conditions of the program?

Recent changes to terms and conditions provided. These documents are draft format and must not be circulated.

4) What is your overall opinion and experience with reviewing and approving credit applications?

a. Any differences between initial and renewal applications?

Ease of review depends on complexity – large undeveloped lands or simple applications are fairly easy and quick to review. Complex applications with a variety of on-site measures can take longer and may require back and forth with the landowner/engineer. No difference between initial or renewal applications.

5) How are climate change and other future uncertainties reflected in your program?

They are not. Fee is calculated based on area and runoff coefficient. However, this is something that is being explored through our Stormwater Integrated Resource Plan.

6) Do you feel that a 5-year renewal period is appropriate?

Yes, EPCOR uses a 5-year renewal period.

7) Do you feel that a requirement for a qualified professional to prepare the application is appropriate?

Yes, EPCOR requires an engineer's stamp.

8) If your credit applications must be prepared by a qualified professional, what are the qualifications?

To qualify for the standard reduction, EPCOR requires an approved SWM plan that has been submitted to EPCOR Infill Water and Sewer Services. Should the client wish to request more credit, a sealed engineering report is required justifying increased credit.

9) What does the credit application review process entail and what supporting information is required?

a. Are face-to-face applicant meetings ever held at initial or renewal periods?

Application form, application fee, SWM Plan or Engineering report. Reports can be validated at renewal if facility is still functioning as designed as long as the report is revalidated and sealed with the current date. No face-to-face meetings.

10) How much staff effort is typically required to review and approve each credit application?

- a. What are the staff positions involved?
- b. Approximately, how many full-time employees are required?
- c. What is your weekly time allocation to this program?

Analyst and Senior Analyst review from an admin perspective, then transferred to engineers/eng techs in planning department. No full-time employees as part of this program. Not a lot of effort required – maybe 5% of the week, slow periods. Timeframe provided to customers: 6-8 weeks turnaround.

11) How frequently do you conduct inspections / audits of approved facilities and practices?

Inspections are not conducted (resource availability issues) however inspectors from the drainage department are sent out for more complex facilities / applications.

12) Do you have sufficient staff and resources to do the inspections / audits?

- a. If not, how many fully-time employees would be ideal?

No.

13) How are penalties determined and applied if the inspection fails?

Inspections, when required are mostly conducted when we are assessing the application. If the inspection fails, the application will be denied. Credit is also removed from account at the end of the 5-year period if a renewal application is not received or if customer does not notify EPCOR of changes.

14) Are there any administrative activities that you considered outsourcing to external agents or contractors?

No.

15) Is there any contracted work that you've considered taking on yourself?

No.

16) What public engagement and outreach efforts are undertaken to advertise the credit program and encourage participation at initial and renewal stages?

Not much – when mailouts are sent to non-residential customer notifying them of any changes to their stormwater bill, information about the credit program is included. EPCOR has noted that many customers do not know about program – working on improving.

17) Do the credits expire? What is the renewal period and what are the requirements for renewal?

Credits expire after 5-years. A notification is sent out at the 6-months remaining mark. Application process and requirements are the same for renewals.

18) Are rebates, subsidies, grants or other incentives offered in addition to (or instead of) credit for certain sectors? If so, please describe?

No rebates for stormwater management. EPCOR has subsidy program from backwater valve installations on sanitary connections.

19) How many credit applications were received and how many were approved in the past year?

Based on the last 12 months, we currently have 9 applications of which 7 are approved and 2 are pending under review. We expect the program to grow significantly in the next 2 years due to awareness and other changes within the stormwater utility.

20) What was the number of credit applications in the first year of the program and in subsequent years?

a. How do these compare to the number of utility accounts (ie. Uptake rate)?

Program went dormant for many years. As an estimate, less than 5 applications in first year after program was dormant. This represents a very small percentage of utility accounts.

21) Have there been any noticeable trends year over year? Ie. Number of applications, uptake rate, staff approval time?

No trends – EPCOR have been making changes to the program and therefore there are no noticeable trends yet.

22) Are there any other statistics that you would be willing to share? Ie. Average credit per facility, average property size, ratio of credit application to approvals?

23) Has a revenue impact assessment been conducted to associate the credit uptake with actual program cost savings?

a. If so, were savings distinguished by primary function or by fixed/variable costs incurred?

b. How successful was this assessment in forecasting the financial impact on the program in subsequent years?

24) Do you have any other advice or lessons learned to share regarding the credit program? Program specific successes/challenges, political/financial implications, pertinent administrative details?

Having the right staff is important – clients tend to push back on credit values. Have appropriate staff and resources to keep onto of expirations, renewals and maintenance. Customers are not going to be honest if it results in increased fees. It's also important to have staff with engineering backgrounds available as the staff administering the program do not have an engineering background.

Residential Credit Program Only

No Residential Credit Program, looking into this for the future

QUESTIONNAIRE

TO: Rachael Holland, City of Alexandria
FROM: Resilient Consulting
DATE: 28-Feb-2020
SUBJECT: Stormwater Credit Programs Questionnaire

Resilient Consulting (Resilient) in partnership with Computational Hydraulics International (CHI) was retained by the City of Mississauga to complete a thorough review of their existing stormwater user fee credit program and provide recommended enhancements and improvements. Mississauga is located in Ontario, Canada (adjacent to Toronto) and has a population of 720,000. The City's stormwater user fee began billing in January 2016 and includes a credit program that is available to industrial, commercial, institutional, and multi-residential property owners (i.e., properties with only one residential unit are excluded).

Our present study effectively represents a 5-year review of the credit program. Of the hundreds of stormwater utilities across North America, we have selected a dozen or so that have mature and innovative credit programs. We intend to collect feedback in two ways: through this questionnaire and with a follow-up phone interview of approximately 30 minutes. As part of this process, we have conducted a review of available website materials that describe your municipality's credit program. A standardized summary table demonstrating our understanding of your credit program is attached for your review and comment. Feel free to edit it accordingly, or we can discuss the details during the interview.

The purpose of this questionnaire / interview is to confirm program details and inquire about missing information to improve our understanding of your user fee and credit program. We intend to use your information as the basis for comparison to the City of Mississauga's current practices. We will contact you later next week to schedule an interview. Information collected during this process will be summarized and presented to the City of Mississauga and therefore we request that any confidential information be flagged for the interviewer, so that we do not include it in our report.

Thank you in advance for your time and effort. Any feedback and lessons learned that you provide would be most appreciated by the project team, and ultimately, by the staff, citizens, property owners, and elected officials in the City of Mississauga.

Non-Residential and Residential Credit Program

1) When did the credit program start? How long have you been involved?

The credit program was adopted in two phases in October 2017 and October 2018 following the adoption of the stormwater utility in May 2017. I have been involved since September 2017.

2) What changes would you make to your credit criteria or maximum credit amounts?

Our utility is very new, having only been adopted in 2017. We are considering evaluating our credit policies after a few years. We do not anticipate changing the maximum credit percentage (50%).

3) What changes would you make to your credit criteria or maximum credit amounts?

See response to question 2.

4) What is your overall opinion and experience with reviewing and approving credit applications?

a. Any differences between initial and renewal applications?

Applications for facilities that were approved as part of development review (aka "mandatory" BMPs or facilities) are far easier than applications for voluntarily developed facilities, which mostly account for practices on single-family properties. The initial and renewal applications for mandatory facilities are the same. Renewal applications for voluntarily developed practices are easier than initial applications. Initial application renewals for voluntary practices are challenging for the reviewer and the applicant, because the City does not already have high quality design or as-built information and in many cases the homeowner does not either. This challenge could be avoided if credits were only offered to new voluntary practices and not existing practices.

5) How are climate change and other future uncertainties reflected in your program?

Credits currently focus on structural stormwater facilities that follow state-approved designs. The state framework focuses on water quality. However, the credit policy could be amended in the future to include credits that also focus on minimizing the impacts of intense rainfall, which is a present and growing challenge to the City and its property owners.

6) Do you feel that a 5-year renewal period is appropriate?

Our credits are intended to encourage annual inspection and maintenance of structural stormwater facilities or to promote annual stormwater-friendly landscaping practices like nutrient control. As such, a 5-year renewal period would offer less benefit to the stormwater management program.

7) Do you feel that a requirement for a qualified professional to prepare the application is appropriate?

The best credits align with and offer a potential to reduce the cost of services under the program. The City of Alexandria must provide quality control inspections of each

mandatory BMP every 5 years (owners must inspect annually per a recorded maintenance agreement). The intent of the "qualified professional" requirements for the credit is to pass on the requirements of the City.

- 8) If your credit applications must be prepared by a qualified professional, what are the qualifications?

A professional engineer, architect, or landscape architect pursuant to Code of Virginia §54.1-400; a person who works under the direction and oversight of the licensed professional engineer, architect, or landscape architect; or a person who holds the Certified Stormwater Inspector certificate of competence through Virginia DEQ.

- 9) What does the credit application review process entail and what supporting information is required?

- a. Are face-to-face applicant meetings ever held at initial or renewal periods?

Face-to-face meetings may be requested by the applicant and can be useful to clarify how to apply and what's eligible for credit.

- 10) How much staff effort is typically required to review and approve each credit application? Credits for mandatory facilities are very straight forward and easy to approve. Single family residential credit applications require more time to review and process.

- a. What are the staff positions involved? Stormwater Utility Engineer

- b. Approximately, how many full-time employees are required? 1

- c. What is your weekly time allocation to this program? Credit applications are only accepted for 2.5 months out of the year during the annual credit application window. One staff member reviews the credit applications on a rolling basis throughout this time window and for several weeks following the close of the application window at a large percentage, but not the entirety of their weekly time. Additional work is required year-round to support customers and update our databases with new BMPs.

- 11) How frequently do you conduct inspections / audits of approved facilities and practices?

Inspections related solely to credit applications are performed as needed (infrequent). The City is required to inspect private BMPs every 5-years under the Virginia Stormwater Management Regulations. The City of Alexandria has one dedicated staff person who performs this function among others for about 500 private facilities.

- 12) Do you have sufficient staff and resources to do the inspections / audits?

- a. If not, how many fully-time employees would be ideal?

Yes, one.

- 13) How are penalties determined and applied if the inspection fails?

Certification of proper functioning is required for the annual application. If an inspection fails, the facility will not be granted credit.

14) Are there any administrative activities that you considered outsourcing to external agents or contractors?

No. However, the City's Department of Information Technology Services provides significant support for the program.

15) Is there any contracted work that you've considered taking on yourself?

No.

16) What public engagement and outreach efforts are undertaken to advertise the credit program and encourage participation at initial and renewal stages?

General credit outreach, as well as targeted outreach based on the type of credit-eligible facility, including rain garden workshops, build your own rain barrel workshops, information with regulatory inspection notifications, in person meetings and presentations with residents and associations, website, social media, and enews.

17) Do the credits expire? What is the renewal period and what are the requirements for renewal?

Annual application is required.

18) Are rebates, subsidies, grants or other incentives offered in addition to (or instead of) credit for certain sectors? If so, please describe?

No.

19) How many credit applications were received and how many were approved in the past year? In 2019, 25 of 25 applications for mandatory structural facilities were approved and 32 of 42 applications for single-family/townhouse flat credits were approved.

20) What was the number of credit applications in the first year of the program and in subsequent years?

a. How do these compare to the number of utility accounts (ie. Uptake rate)?

In 2019 (the first year after adoption of the full credit menu) less than 1% of accounts applied for credits.

21) Have there been any noticeable trends year over year? Ie. Number of applications, uptake rate, staff approval time?

The utility is still too new to evaluate trends.

22) Are there any other statistics that you would be willing to share? Ie. Average credit per facility, average property size, ratio of credit application to approvals?

23) Has a revenue impact assessment been conducted to associate the credit uptake with actual program cost savings? No.

- a. If so, were savings distinguished by primary function or by fixed/variable costs incurred?
- b. How successful was this assessment in forecasting the financial impact on the program in subsequent years?

24) Do you have any other advice or lessons learned to share regarding the credit program? Program specific successes/challenges, political/financial implications, pertinent administrative details?

Residential Credit Program Only

25) What level of stakeholder engagement did you conduct as part of the credit program implementation?

Stakeholder engagement was performed according to the City's adopted Stormwater Utility Public Outreach Framework, which included outreach over two years on both the newly adopted fees and credits, including over 40 meetings with homeowner, civic, and business associations; 6 open houses/public meetings; 5 different events including Earth Day; letters to tax exempt properties who would begin paying the fee; and notification through real estate assessments and billing.

26) What are your thoughts on a strategy that only provides one-time rebates for approved facilities and measures?

These may be a good option; however, they were not the option that was chosen in the City of Alexandria, whose credit framework was based on percentage of fee reduction.

27) Are there specific housing types, groups, or neighborhoods that have a higher credit uptake than others?

Single-family houses have a higher participation rate (more options), as well as properties with mandatory structural stormwater facilities that were required during development or redevelopment.

28) Are there specific facilities, measures, practices, or activities that have had a higher credit uptake than others?

Cheaper options have a higher uptake. Homeowners seem to have an interest in permeable pavement driveways; however, their cost is typically higher, so uptake does not appear to match interest.

29) Do you have any other comments on the distinction between low-density versus higher-density residential properties?

Higher-density residential properties have a wide range of impervious surface areas and fees generated. Single-family and townhouse properties have much narrower and predictable ranges of impervious area. Therefore, flat credit percentages off the fees for higher-density residential properties would not correlate with the size of the practice and stormwater management benefit provided.

QUESTIONNAIRE

**TO: David Ritter, Monica Day, and Chris Hartman, NE Ohio Regional
Sewer District**
FROM: Resilient Consulting
DATE: 25-Feb-2020
SUBJECT: Stormwater Credit Programs Questionnaire

Resilient Consulting (Resilient) in partnership with Computational Hydraulics International (CHI) was retained by the City of Mississauga to complete a thorough review of their existing stormwater user fee credit program and provide recommended enhancements and improvements. Mississauga is located in Ontario, Canada (adjacent to Toronto) and has a population of 720,000. The City's stormwater user fee began billing in January 2016 and includes a credit program that is available to industrial, commercial, institutional, and multi-residential property owners (i.e., properties with only one residential unit are excluded).

Our present study effectively represents a 5-year review of the credit program. Of the hundreds of stormwater utilities across North America, we have selected a dozen or so that have mature and innovative credit programs. We intend to collect feedback in two ways: through this questionnaire and with a follow-up phone interview of approximately 30 minutes. As part of this process, we have conducted a review of available website materials that describe your agency's credit program. A standardized summary table demonstrating our understanding of your credit program is attached for your review and comment. Feel free to edit it accordingly, or we can discuss the details during the interview.

The purpose of this questionnaire / interview is to confirm program details and inquire about missing information to improve our understanding of your user fee and credit program. We intend to use your information as the basis for comparison to the City of Mississauga's current practices. We will contact you later next week to schedule an interview. Information collected during this process will be summarized and presented to the City of Mississauga and therefore we request that any confidential information be flagged for the interviewer, so that we do not include it in our report.

Thank you in advance for your time and effort. Any feedback and lessons learned that you provide would be most appreciated by the project team, and ultimately, by the staff, citizens, property owners, and elected officials in the City of Mississauga.

Non-Residential and Residential Credit Program

1) When did the credit program start? How long have you been involved?

January 2013 we started SW billing, a lawsuit shut the stormwater program down in the fall of 2013, we restarted billing July of 2016 based on a ruling by the Ohio Supreme Court. I've been with the District since 2012

2) What changes would you make to your credit criteria or maximum credit amounts?

We continue to make changes as new and unforeseen situations arise. Max credit is 100%. We are considering exploring ways to increase the value of credits to better incentivize property owners adding new and/or retrofitting existing BMPs

3) What changes would you make to your credit criteria or maximum credit amounts?

Predictive rainfall/actuated discharge software/hardware appears to have some promise as a new way to manage stormwater...our credits do not account for this, but we are considering credits for these on a case-by-case basis.

4) What is your overall opinion and experience with reviewing and approving credit applications? Credit reviews can be time consuming with a lot of back and forth with the applicant. For our quantity / quality credits we have a consultant available for assistance as needed.

a. Any differences between initial and renewal applications?

Initial applications set the credit award per BMP. Annual renewals are used to ensure operation and maintenance of the BMPs that were awarded credits.

5) How are climate change and other future uncertainties reflected in your program?

They are not

6) Do you feel that a 5-year renewal period is appropriate?

We have a yearly renewal on quantity and quality credits and a 3 year renewal on residential. A lot can happen in a 5-yr window of time...appears too long.

7) Do you feel that a requirement for a qualified professional to prepare the application is appropriate?

No, not if the applicant has the needed information at hand. For water quality and quantity credits, we offer a reimbursement percentage if applicant needs those services. A qualified person to design the BMPs is needed, but we assume that has been completed by the time credit applications are submitted.

- 8) If your credit applications must be prepared by a qualified professional, what are the qualifications?

Credit applications are not required to be prepared by a qualified person. The supporting design calculations that are previously completed, and by which the BMPs are constructed, are required to be included as part of the credit application and must be prepared by a P.E.

- 9) What does the credit application review process entail and what supporting information is required? Please refer to our credit manual.

- a. Are face-to-face applicant meetings ever held at initial or renewal periods?

I would refer you to our manual, depends on the type of credit. When necessary, and upon request, our staff will meet with property owners to assist with initial applications and initial renewals.

- 10) How much staff effort is typically required to review and approve each credit application?

- a. What are the staff positions involved? Stormwater Technical Specialist, GIS Technician, Watershed Team Leader, Finance, IT

-
- b. Approximately, how many full-time employees are required? All combined at this point in the program 1 - 2 FTE. Plus consultant resources.

-
- c. What is your weekly time allocation to this program? 10 hours

- 11) How frequently do you conduct inspections / audits of approved facilities and practices?

Yearly renewals of quality and quantity credits require documentation of O&M. District staff does not complete inspections of credited BMPs at this time. District staff only reviews O&M documentation that is provided as part of the annual renewal.

- 12) Do you have sufficient staff and resources to do the inspections / audits?

- a. If not, how many fully-time employees would be ideal?

In order to do follow-up spot checks additional entry level staff would be needed.

Renewals are performed by the applicant or applicant's representative. Local Soil and Water Conservation District conducts inspections in many of our communities.

- 13) How are penalties determined and applied if the inspection fails?

The idea is to get BMPs functional. If an annual O&M report submitted at the time of renewal indicates a significant problem with the BMP that impacts its intended function, the property owner is given a full year to make necessary repairs. We would expect the following year's O&M report would reflect the completed repairs, and if repairs have not been made the credit will expire.

14) Are there any administrative activities that you considered outsourcing to external agents or contractors?

Many of our billing and credit process are automated now which was a huge lift. Most activities are handled in house now. Depending on complexity of application we have the resources of an outside consultant available.

15) Is there any contracted work that you've considered taking on yourself?

The district is now taking on billing and credit support from our consultants and will be managed by IT with minimal external support in the future.

16) What public engagement and outreach efforts are undertaken to advertise the credit program and encourage participation at initial and renewal stages?

Workshops, Open House, Public Events. For renewals, letters go out 30-60-90 days before expiration. We have completed targeted mailings for specific types of credits (e.g., NPDES permits)

17) Do the credits expire? What is the renewal period and what are the requirements for renewal?

Yes, quantity /quality credits and education credits expire annually, residential expire every 3 years. Renewals require an O&M report with current photos of key design features applicable to each BMP.

18) Are rebates, subsidies, grants or other incentives offered in addition to (or instead of) credit for certain sectors? If so, please describe?

For education credits, curriculum has been developed for use by schools. Green Infrastructure Grants are offered in our Combined Sewer areas funded at \$2 million/year. We offer the one-time fee adjustment for the expense incurred by a property owner to hire a PE to submit an application (maximum reimbursement equal to 10% of their pre-credit annual fee.

19) How many credit applications were received and how many were approved in the past year? 4,277 credit applications were received in 2019. 3,648 credits were applied to accounts in 2019. 7 denied in 2019. 1 approved in 2020. 5 pending. 5 received 2 incomplete, 8 renewal status.

20) What was the number of credit applications in the first year of the program and in subsequent years?

a. How do these compare to the number of utility accounts (ie. Uptake rate)?

- b. We have over 330,000 stormwater accounts. Below is a table of credits by status, past and present. I'm happy to provide a table of these credits so that further analysis can be completed.

Applied	Approved	Denied	Error	Expired	Incomplete	Pending	Received	Renewal	(blank)
5,010	305	370	11	10,688	85	34	18	60	

- 21) Have there been any noticeable trends year over year? Ie. Number of applications, uptake rake, staff approval time?

Initially and following the program re-start there were a lot of applications, since then new applications have are steady but much fewer than in the beginning.

- 22) Are there any other statistics that you would be willing to share? Ie. Average credit per facility, average property size, ratio of credit application to approvals?

To be discussed during interview.

- 23) Has a revenue impact assessment been conducted to associate the credit uptake with actual program cost savings?

- a. If so, were savings distinguished by primary function or by fixed/variable costs incurred?
b. How successful was this assessment in forecasting the financial impact on the program in subsequent years?

While SCMs may lessen our programmatic responsibilities under the Regional Stormwater Program we have not measured as there is not a direct correlation that I can think of to do so.

- 24) Do you have any other advice or lessons learned to share regarding the credit program? Program specific successes/challenged, political/financial implications, pertinent administrative details?

We have learned the savings realized from a typical credit, based on our current stormwater fee, does not provide any incentive to construct new or retrofit existing BMPs for the sake of earning a credit. The residential program is a lot of work to administer due to the communication needed with residents.

Residential Credit Program Only

- 25) What level of stakeholder engagement did you conduct as part of the credit program implementation?

Many meetings / events / phone calls...huge work load

26) What are your thoughts on a strategy that only provides one-time rebates for approved facilities and measures?

Administratively would lessen the work load, no incentive for resident to maintain operations.

27) Are there specific housing types, groups, or neighborhoods that have a higher credit uptake than others?

Single family homes with room to install a bmp are most likely to take advantage of credit. Local codes of the District's member communities impact potential residential credits (e.g., not all communities allow downspout disconnections)

28) Are there specific facilities, measures, practices, or activities that have had a higher credit uptake than others?

Vegetated filter strips and rain barrels most popular residential practices

29) Do you have any other comments on the distinction between low-density versus higher-density residential properties?

Local building codes may limit ability to implement a bmp in high density areas over fear of drainage issues. There is limited space to implement certain types of BMPs in high density residential areas (e.g., rain gardens).

QUESTIONNAIRE

TO: Phil Pickering, City of Philadelphia
FROM: Resilient Consulting
DATE: 23-Jan-2020
SUBJECT: Stormwater Credit Programs Questionnaire

Resilient Consulting (Resilient) in partnership with Computational Hydraulics International (CHI) was retained by the City of Mississauga to complete a thorough review of their existing stormwater user fee credit program and provide recommended enhancements and improvements. Mississauga is located in Ontario, Canada (adjacent to Toronto) and has a population of 720,000. The City's stormwater user fee began billing in January 2016 and includes a credit program that is available to industrial, commercial, institutional, and multi-residential property owners (i.e., properties with only one residential unit are excluded).

Our present study effectively represents a 5-year review of the credit program. Of the hundreds of stormwater utilities across North America, we have selected a dozen or so that have mature and innovative credit programs. We intend to collect feedback in two ways: through this questionnaire and with a follow-up phone interview of approximately 30 minutes. As part of this process, we have conducted a review of available website materials that describe your municipality's or agency's credit program. A standardized summary table demonstrating our understanding of your credit program is attached for your review and comment. Feel free to edit it accordingly, or we can discuss the details during the interview.

The purpose of this questionnaire / interview is to confirm program details and inquire about missing information to improve our understanding of your user fee and credit program. We intend to use your information as the basis for comparison to the City of Mississauga's current practices. We will contact you later next week to schedule an interview. Information collected during this process will be summarized in meeting minutes and presented to the City of Mississauga and therefore we request that any confidential information be flagged for the interviewer, so that we do not include it in our report.

Thank you in advance for your time and effort. Any feedback and lessons learned that you provide would be most appreciated by the project team, and ultimately, by the staff, citizens, property owners, and elected officials in the City of Mississauga.

Non-Residential and Residential Credit Program

1) When did the credit program start? How long have you been involved?
July 1, 2010. I have been involved since April 2012

2) What changes would you make to your credit criteria or maximum credit amounts?
That is TBD. PWD is currently reviewing the maximum credits percentages to confirm long term financial viability.

3) What changes would you make to your credit criteria or maximum credit amounts?
See above regarding maximum credit amounts. A better self-reporting inspection process would help with the credits application and renewal process.

4) What is your overall opinion and experience with reviewing and approving credit applications?

a. Any differences between initial and renewal applications?

It has been a very successful program to date. Initial applications are more focused on making sure system was built properly. Renewals amore on making sure system is being maintained properly.

5) How are climate change and other future uncertainties reflected in your program?
PWD is proposing to increase minimum management from the first 1" of runoff to 1.5" of runoff to account for more frequent and larger storm events.

6) Do you feel that a 5-year renewal period is appropriate?
PWD credits renewal period is 4 years and seems appropriate

7) Do you feel that a requirement for a qualified professional to prepare the application is appropriate?
In some cases. PWD offers a variety of credits and a registered professional is not always required

8) If your credit applications must be prepared by a qualified professional, what are the qualifications?
We typically see professional engineers. But any qualified professional is fine

9) What does the credit application review process entail and what supporting information is required?

- a. Are face-to-face applicant meetings ever held at initial or renewal periods?
Supporting documentation requirements are listed on application (see attached). Face to face meetings not typically required
-

10) How much staff effort is typically required to review and approve each credit application?

- a. What are the staff positions involved?

1 engineer and 1 GIS analysts

- b. Approximately, how many full-time employees are required?

The entire SW billing team is comprised of 4 GIS analysts and 4 engineers. We also have a contract with a software developer to design and maintain our tracking system. As far as just credits: at least 1 engineer and 1 GIS analyst/ programmer is necessary.

- c. What is your weekly time allocation to this program?

11) How frequently do you conduct inspections / audits of approved facilities and practices?

As part of the renewal process, every 4 years. PWD has a post construction inspection and enforcement group. So we sync our renewals with their inspection cycle (also 4 years) whenever possible

12) Do you have sufficient staff and resources to do the inspections / audits?

- a. If not, how many fully-time employees would be ideal?

We rely on the post-con group for inspections. At least 2 full time inspectors are necessary

13) How are penalties determined and applied if the inspection fails?

Credits are not renewed until all corrective actions have been resolved. If the loss of credits is not enough to provoke action, PWD also has the ability to fine and lien the property

14) Are there any administrative activities that you considered outsourcing to external agents or contractors?

The development and maintenance of the credits tracking system is done by outsourcing

15) Is there any contracted work that you've considered taking on yourself?

Not at this time

16) What public engagement and outreach efforts are undertaken to advertise the credit program and encourage participation at initial and renewal stages?

PWD public affairs unit has helped with outreach efforts

17) Do the credits expire? What is the renewal period and what are the requirements for renewal?

Credits expire and must be renewed every 4 years

18) Are rebates, subsidies, grants or other incentives offered in addition to (or instead of) credit for certain sectors? If so, please describe?

PWD also has a grant program for properties interested in stormwater retrofit projects

19) How many credit applications were received and how many were approved in the past year?

In 2019: 165 received, 143 approved

20) What was the number of credit applications in the first year of the program and in subsequent years?

a. How do these compare to the number of utility accounts (ie. Uptake rate)?

Would need more time to pull that data, but we received a high volume of applications at the start of the program since the parcel based billing program was new and we had many impacted customers. It has slowed in recent years and we have noticed a slow increase each year

21) Have there been any noticeable trends year over year? Ie. Number of applications, uptake rate, staff approval time?

Those trends get evaluated as part of each PWD rate case. Again, I would need more time to look at that in depth but could follow up.

22) Are there any other statistics that you would be willing to share? Ie. Average credit per facility, average property size, ratio of credit application to approvals?

I don't have that data readily available. But most credit applications get approved, it's just a matter of timing and what amount

23) Has a revenue impact assessment been conducted to associate the credit uptake with actual program cost savings?

a. If so, were savings distinguished by primary function or by fixed/variable costs incurred?

- b. How successful was this assessment in forecasting the financial impact on the program in subsequent years?

Revenue of credit impacts gets evaluated as part of PWD rate procedure

- 24) Do you have any other advice or lessons learned to share regarding the credit program? Program specific successes/challenges, political/financial implications, pertinent administrative details?
-
-

Residential Credit Program Only

- 25) What level of stakeholder engagement did you conduct as part of the credit program implementation?

PWD does not offer credits for residential properties.

- 26) What are your thoughts on a strategy that only provides one-time rebates for approved facilities and measures?
-
-

- 27) Are there specific housing types, groups, or neighborhoods that have a higher credit uptake than others?
-
-

- 28) Are there specific facilities, measures, practices, or activities that have had a higher credit uptake than others?
-
-

- 29) Do you have any other comments on the distinction between low-density versus higher-density residential properties?
-
-

QUESTIONNAIRE

TO: Regan Wilhelm, DOEE, Government of the District of Columbia
FROM: Resilient Consulting
DATE: 11-Feb-2020
SUBJECT: RiverSmart Rewards Questionnaire

Resilient Consulting (Resilient) in partnership with Computational Hydraulics International (CHI) was retained by the City of Mississauga to complete a thorough review of their existing stormwater user fee credit program and provide recommended enhancements and improvements. Mississauga is located in Ontario, Canada (adjacent to Toronto) and has a population of 720,000. The City's stormwater user fee began billing in January 2016 and includes a credit program that is available to industrial, commercial, institutional, and multi-residential property owners (i.e., properties with only one residential unit are excluded).

Our present study effectively represents a 5-year review of the credit program. Of the hundreds of stormwater utilities across North America, we have selected a dozen or so that have mature and innovative credit programs. We intend to collect feedback in two ways: through this questionnaire and with a follow-up phone interview of approximately 30 minutes. As part of this process, we have conducted a review of available website materials that describe your municipality's or agency's credit program. A standardized summary table demonstrating our understanding of your credit program is attached for your review and comment. Feel free to edit it accordingly, or we can discuss the details during the interview.

The purpose of this questionnaire / interview is to confirm program details and inquire about missing information to improve our understanding of your user fee and credit program. We intend to use your information as the basis for comparison to the City of Mississauga's current practices. We will contact you later next week to schedule an interview. Information collected during this process will be summarized and presented to the City of Mississauga and therefore we request that any confidential information be flagged for the interviewer, so that we do not include it in our report.

Thank you in advance for your time and effort. Any feedback and lessons learned that you provide would be most appreciated by the project team, and ultimately, by the staff, citizens, property owners, and elected officials in the City of Mississauga.

Non-Residential and Residential Credit Program

1) When did the credit program start? How long have you been involved?

Program started in 2013. Regan is the current manager of the program and has been for approx. 1-year. Matt was manager before for approximately 3-years.

2) What changes would you make to your credit criteria or maximum credit amounts?

Program is adaptively managed so no recommended changes at this time. It was discussed that the fee has only been increased once by \$0.10.

3) What changes would you make to your credit criteria or maximum credit amounts?

Skip

4) What is your overall opinion and experience with reviewing and approving credit applications?

a. Any differences between initial and renewal applications?

The review is fairly simple – 2 types of applications: simple (<2000 ft² of impervious area managed) and standard (>2000 ft² of impervious area managed). Renewal application is a series of check boxes and a photo requirement, plus an inspection for standard applications.

5) How are climate change and other future uncertainties reflected in your program?

The program focuses on implementing appropriate BMP for each site. For example, lots of narrow row homes that only have room for rain barrels. There is also a push for vegetated practices (incentive).

6) Do you feel that a 5-year renewal period is appropriate?

RiverSmart Rewards is done on a 3-year basis as inspections for regulated projects are done every 3-years.

7) Do you feel that a requirement for a qualified professional to prepare the application is appropriate?

RiverSmart rewards does not have this as a requirement, however when a SWM plan is required for the application, engineers are involved.

8) If your credit applications must be prepared by a qualified professional, what are the qualifications?

N/A

9) What does the credit application review process entail and what supporting information is required?

a. Are face-to-face applicant meetings ever held at initial or renewal periods?

Good quality pictures are generally acceptable for review. In person meetings are sometimes required for more complex applications that require SWM plans.

10) How much staff effort is typically required to review and approve each credit application?

- a. What are the staff positions involved?
- b. Approximately, how many full-time employees are required?
- c. What is your weekly time allocation to this program?

1 Full-time employee required. 2/3 people work on it but is not sole responsibility. Time allocation differs as the work is generally seasonal.

11) How frequently do you conduct inspections / audits of approved facilities and practices?

Inspections are completed every 3-years for standard applications.

12) Do you have sufficient staff and resources to do the inspections / audits?

- a. If not, how many fully-time employees would be ideal?

Inspections done by DC gov inspectors or sometimes env. engineers. RiverSmart rewards inspections are typically done by photo submissions for simple applications. Some standard applications required an inspection by an inspector branch (not RiverSmart staff) if the BMP measure is part of a regulated SWM plan.

13) How are penalties determined and applied if the inspection fails?

Regulated BMP's and voluntary BMPs that fail inspections will be temporarily taken off the discount, or fully taken off if the BMP is damaged.

14) Are there any administrative activities that you considered outsourcing to external agents or contractors?

No. The only "external" component is the collection of the SWM fee which is collected by DC Water.

15) Is there any contracted work that you've considered taking on yourself?

No.

16) What public engagement and outreach efforts are undertaken to advertise the credit program and encourage participation at initial and renewal stages?

Not too much engagement at first – typical mailers, mailers with water bill. RiverSmart Homes does more outreach.

17) Do the credits expire? What is the renewal period and what are the requirements for renewal?

3-year renewal. Simple renewal checklist and photo submission.

18) Are rebates, subsidies, grants or other incentives offered in addition to (or instead of) credit for certain sectors? If so, please describe?

There are a variety of rebate and grant options (ie. Rainbarrel rebates, permeable paver rebate) but are provided by RiverSmart Homes, not RiverSmart Rewards.

19) How many credit applications were received and how many were approved in the past year?
FY2019 – 283 new applications (223 of those 283 were automatic enrollments and 51 manual renewals)

20) What was the number of credit applications in the first year of the program and in subsequent years?
a. How do these compare to the number of utility accounts (ie. Uptake rate)?
No applications in first year (2013). 377 applications submitted in 2015.

21) Have there been any noticeable trends year over year? Ie. Number of applications, uptake rate, staff approval time?
No trends – results are fairly consistent. In 2015, auto-renewal for RiverSmart Homes started which helps keep things consistent.

22) Are there any other statistics that you would be willing to share? Ie. Average credit per facility, average property size, ratio of credit application to approvals?
See statistics provided at end.

23) Has a revenue impact assessment been conducted to associate the credit uptake with actual program cost savings?
a. If so, were savings distinguished by primary function or by fixed/variable costs incurred?
b. How successful was this assessment in forecasting the financial impact on the program in subsequent years?
No, impact assessment has not been completed. When the program was rolled out, it was first determined what they could afford to offer if every property met max credit requirements.

24) Do you have any other advice or lessons learned to share regarding the credit program? Program specific successes/challenges, political/financial implications, pertinent administrative details?
Focus on outreach and residential properties. Make requirements low for residential applications and renewal, potentially auto renew. Incentives for installation and maintenance has proven successful for uptake.

Residential Credit Program Only

25) What level of stakeholder engagement did you conduct as part of the credit program implementation?
Mailers in water bills. Approval from council and neighborhood groups.

26) What are your thoughts on a strategy that only provides one-time rebates for approved facilities and measures?

Rebates / Grants are effective and improve uptake.

27) Are there specific housing types, groups, or neighborhoods that have a higher credit uptake than others?

Not really – rebates and grant incentives help get BMP's everywhere.

28) Are there specific facilities, measures, practices, or activities that have had a higher credit uptake than others?

Rain Barrels are popular given narrow housing and rebate incentives. Rain Gardens are also popular; however, soils must pass infiltration testing.

29) Do you have any other comments on the distinction between low-density versus higher-density residential properties?

No – discount done by impervious area capture. RiverSmart Homes auditor does site by site inspections to determine best BMP measures for each site.

Question: Can we provide final report to DOEE so they can review our findings?

Additional statistics provided by Regan via email, February 18, 2020.

- So far in FY20 (for us is October 1, 2019 thru September 30, 2020) we've had 58 automatic enrollments (these are done for people who signed up for it through our RiverSmart Homes program) and 47 renewals
- In FY19 we had 223 automatic enrollments and 51 renewals
- In FY18 we had 446 automatic enrollments and 190 renewals
- In FY17 we had 330 automatic enrollments and 16 renewals
- We currently have 1,439 properties enrolled
- 1,379 are simple applications, meaning that the practices on the property manage less than 2,000 square feet of impervious area
 - o These are also mostly residential properties
- 60 are standard applications, meaning that the practices on the property manage 2,000 square feet or more of impervious area
 - o While some of these are residential properties, they are often commercial
- Total, all of the practices on currently approved applications have 8.29 million square feet of contributing drainage area

APPENDIX B

Stormwater Credit Calculation Example



Understanding your Stormwater Charge

If you own property in Mississauga, a new stormwater charge will appear on your Region of Peel water bill beginning in 2016. The charge is a dedicated source of funding to keep the City’s stormwater system in good working order and to avoid costly repairs in the future.

How is the Stormwater Charge Calculated and Billed?

The calculation for the stormwater charge is the same for all properties. Stormwater charges are calculated by multiplying the stormwater rate (\$108.20 for 2020) by the number of stormwater billing units assessed for that property. A billing unit (267m²) represents the average hard surface area on a single detached residential property in Mississauga. The rate is subject to approval by Council and will be reviewed each year as part of the City’s annual business planning and budget process.

Example Calculation:

Billing Units	0.70
Annual Rate per Billing Unit	<u>x \$108.20</u>
Annual Charge	\$75.74

The stormwater charge was added to the Region of Peel water bill beginning in January 2016. The total annual stormwater charge for your property is divided into a daily rate. For multi-residential and non-residential properties, the stormwater charge is added to the most appropriate water bill associated with each property. Each time you receive your bill, it will show the stormwater charge for the number of days that have passed since your last bill. Bills are sent by the Region of Peel on the same schedule they are today. As the number of days billed may vary from bill to bill, and charges are accrued daily, you may see varying stormwater charge amounts on each bill.

How are Billing Units Determined?

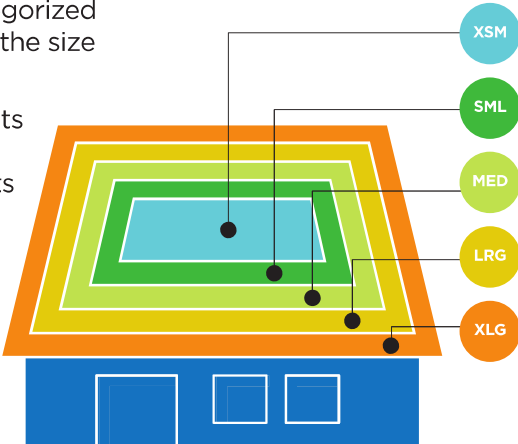
Properties in Mississauga fall into one of the following categories: residential, multi-residential or non-residential. The number of billing units is determined in two ways using the best available information including aerial images which are updated annually. For multi-residential and non-residential, the total hard surface area of each property is individually assessed. For residential properties, each house is assigned to one of five tiers based on the rooftop area which is used as a predictor of the total hard surface area on the property. This is illustrated below.

Residential Properties

Residential properties are categorized into one of five tiers based on the size of their rooftop

- Smallest (XSM) – 0.5 billing units
- Small (SML) – 0.7 billing units
- Medium (MED) – 1.0 billing units
- Large (LRG) – 1.2 billing units
- Largest (XLG) – 1.7 billing units

*80% of homes in Mississauga are in the 3 smallest tiers.

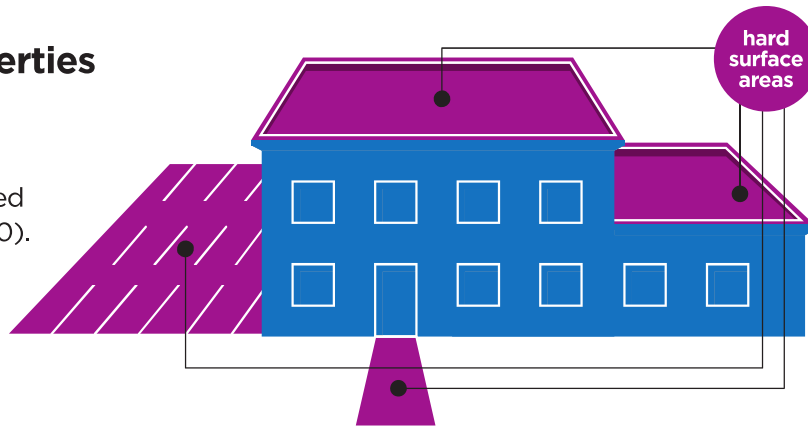


Property Size and Type	Rooftop Area in m²	Estimated Fees Per Year
Freehold townhomes and row houses	26.7 – 99.0	\$54.10
Semi-detached homes, linked homes and small single detached homes	99.1 – 151.0	\$75.74
Medium single detached homes	151.1 – 194.0	\$108.20
Large single detached homes	194.1 – 242.0	\$129.84
Very large single detached homes	242.1 and above	\$183.94

*Rooftops under 26.7 m²: no charge.

Multi-Residential and Non-Residential Properties

The total hard surface area is divided by a single billing unit (267 m²) and then multiplied by the stormwater rate (\$108.20).



Using the Stormwater Charge Estimator

The City of Mississauga's [Stormwater Charge Estimator](https://stormwatercharge.ca), found on the website at stormwatercharge.ca, provides an estimate of the charge and a picture of the area used to determine the charge for your property.

The Estimator Results Show

- Property ID:** property identification number assigned by the City
- Estimated Annual Charge:** the estimated annual charge for the property
- Estimated Daily Charge:** the estimated daily charge for the property
- Assessed Area:** areas used to assess the number of billing units (rooftop area for residential; total hard surface area for multi- or non-residential)
- Tier (Residential Only):** the tier that determines how many billing units are assessed to your property
- Calculation:** open the "how is this calculated?" link to see the charge calculation for your property
- Picture:** the City's latest aerial image of your property
- Colour Overlay:** representing the rooftop area or hard surface area that has been assessed



Please Note: The coloured overlay shown in the web tool may not be perfectly aligned with the aerial images as the photos were taken from an airplane. The City uses sophisticated software that allows it to see the building from all angles in order to assess the hard surface area shown in the coloured overlay. For some properties, the tool may display a message that says the stormwater charge estimate is not available online.

Report an Error in your Stormwater Assessment: Assessments are created by staff using technical mapping software along with aerial images to digitally measure hard surface areas. Property owners may report an error in their stormwater assessment, such as mis-measurement of hard surface area or the categorization of a single residential home as non-residential. Staff may review and adjust existing digital measurements. Site visits are not part of the review process. Assessments will not be reviewed based on: the ratio of hard surface area to total property area, soil types or individual stormwater measures like disconnected downspouts. You may [request a review of your assessment online](#) or use the [request for review form](#). Please note, the most current assessment for the property will apply and a review may not result in a lower charge.

For more information, please visit stormwatercharge.ca or call **431-1** or 905-615-4311 if outside Mississauga.