Paying for Stormwater Management: What Are the Options?

Daniella Dávila Aquije
About IMFG

The Institute on Municipal Finance and Governance (IMFG) is an academic research hub and non-partisan think tank based in the Munk School of Global Affairs at the University of Toronto.

IMFG focuses on the fiscal health and governance challenges facing large cities and city-regions. Its objective is to spark and inform public debate, and to engage the academic and policy communities around important issues of municipal finance and governance.

The Institute conducts original research on issues facing cities in Canada and around the world; promotes high-level discussion among Canada’s government, academic, corporate, and community leaders through conferences and roundtables; and supports graduate and post-graduate students to build Canada’s cadre of municipal finance and governance experts. It is the only institute in Canada that focuses solely on municipal finance issues in large cities and city-regions.

IMFG is funded by the Province of Ontario, the City of Toronto, Avana Capital Corporation, and TD Bank Group.

Author

Daniella Dávila Aquije was the recipient of IMFG’s 2013-2014 Blanche and Sandy Van Ginkel Fellowship in Municipal Finance and Governance. She holds a Master of Public Policy from the University of Toronto and a Master’s in Policy Evaluation from the University of Oxford. She previously worked in the City Manager’s Office and the Stormwater Financing Implementation Project at the City of Mississauga. She currently works as a policy consultant for Oxford Policy Management in England.

Acknowledgements

The author would like to thank Richard Stren, Dina Graser, Michelle Berquist, Jeremy Blair, and Selena Zhang for their thoughtful comments on earlier drafts of this paper. Special thanks to Enid Slack for her input and guidance throughout the publication process.

The author alone is responsible for the contents of the paper and the opinions expressed, which are not attributable to IMFG, its funders, or the City of Mississauga.

Institute on Municipal Finance & Governance
Munk School of Global Affairs, University of Toronto
1 Devonshire Place
Toronto, Ontario, Canada M5S 3K7
http://www.munkschool.utoronto.ca/imfg/

Series editor: Selena Zhang

© Copyright held by author, 2016

Executive Summary

On the afternoon and evening of July 8, 2013, heavy rains flooded parts of Mississauga, disrupting the lives of residents and damaging public and private property. The stormwater management system in the city proved inadequate to meet the levels of runoff experienced on that day.

Mississauga is not the only city in this situation. In 2007, the Federation of Canadian Municipalities estimated that the stormwater management infrastructure deficit across Canada stood at approximately $31 billion. The Ontario Ministry of Public Infrastructure Renewal (now the Ministry of Economic Development, Employment and Infrastructure) estimated in 2005 that between 2005 and 2020, water infrastructure needs in the province would require investments of $28 billion for capital renewals, $12.4 billion to reduce asset and project backlogs, and $10.1 billion for growth.

Stormwater management infrastructure controls the quality and quantity of stormwater that reaches water bodies and protects the health, safety, and sustainability of public and natural environments. The July 8 storm highlighted the need to direct significant amounts of financial and political capital towards municipal infrastructure management.

This paper evaluates the financial tools available to fund stormwater infrastructure (property taxes, development charges or cash-in-lieu payments, grants, borrowing, and user charges), and proposes user charges as the most appropriate. User charges are fees earmarked to specific projects or services. They are based on a benefits-received principle, and are considered a fair form of revenue, because the beneficiaries of a service are directly charged for their consumption of that service. Further, user charges are a dedicated and stable funding source based on clear objectives related to the city’s stormwater infrastructure needs. None of the alternative funding tools offers the same combination of stable and predictable revenues and fair pricing.

The paper also describes how the City of Mississauga is currently implementing a user charge dedicated to stormwater management, with billing introduced in early 2016.
Paying for Stormwater Management: What Are the Options?

Introduction

On the afternoon and evening of July 8, 2013, severe thunderstorms and heavy rains flooded parts of Mississauga and Toronto, disrupting the lives of residents and damaging public and private property. Within a few hours, nearly 140 mm of rain had fallen on western Toronto, 126 mm at the Pearson International Airport alone, on the eastern border of Mississauga. The intensity of the storm reached the level of a so-called “100-year storm,” causing power outages, disrupting transportation networks, and flooding thousands of properties.

In Toronto, more than 4,700 complaints about basement flooding were registered during and immediately following the storm. Interestingly, many of the affected properties were located in communities outside the City’s Basement Flooding Protection Program, which identified priority areas based on the number of properties that had experienced frequent flooding as of 2006. The fact that homes outside the program’s catchment area experienced most of the flooding indicates the unpredictability of violent storms as well as the lack of climate change adaptation techniques adopted by municipalities.

The July 2013 floods have been described as “Ontario’s most costly natural disaster.” In August 2013, the Insurance Bureau of Canada (IBC) reported that $850 million had been claimed in property damage, compared with $671 million and $228 million for storms in 2005 and 2009, respectively. According to the IBC, water has surpassed fire as the leading cause of property damage, costing insurers approximately $1.7 billion a year. The floods and the aftermath of the storm cost the City of Mississauga $1.2 million. The damage is, of course, not only economic. As Mississauga resident Connie McClure noted: “the devastation [is] beyond the material – the stress, the health… Every year I have to fear coming home to a flooded basement.”

The stormwater management system in Mississauga has proven inadequate to meet the service levels demanded by...
residents. Stormwater management infrastructure controls the quality and quantity of stormwater that reaches water bodies and protects the health, safety, and sustainability of public and natural environments. The July 8 storms highlighted the need to direct significant amounts of financial and political capital to municipal infrastructure management at a time of declining municipal resources.

**Stormwater Infrastructure and the Deficit**

The stormwater management system consists of the physical assets of storm sewers, catch basins, stormwater management ponds, bridges, and culverts; stream rehabilitation and flood mitigation programs; the maintenance and rehabilitation of existing assets; and emergency response and cleanup after storms. Through the system, municipalities plan and control the runoff from rain and melted snow, generated when precipitation is unable to percolate into the ground and flows over land as a result.\(^1\)

During a storm, the drainage system typically receives water flows from a variety of sources (homes, businesses, and streets). The runoff enters the sewer system directly (from connected roof leaders, driveway drains, and foundation drainage) or indirectly (by flowing across driveways and lawns to catch basins in the roadway).\(^2\) Storm sewers act as the spine of the system, transporting and discharging runoff into local rivers or Lake Ontario.\(^3\) Ditches and overland flow routes (such as walkways between homes, roadside ditches, and park corridors) also help direct stormwater runoff to nearby watercourses.\(^4\)

The Federation of Canadian Municipalities conducted a nationwide survey in 2007 and estimated that the stormwater infrastructure deficit across Canada stood at approximately $31 billion. The estimate is based on the cost of maintaining and upgrading water infrastructure, which includes stormwater management systems.\(^5\) The Ministry of Public Infrastructure Renewal of Ontario (now the Ministry of Economic Development, Employment and Infrastructure) estimated in 2005 that, between 2005 and 2020, water infrastructure needs in Ontario would require investments of $28 billion for capital renewals, $12.4 billion to reduce asset and project backlogs, and $10.1 billion for growth.\(^6\)

**Factors that Contribute to the Stormwater Infrastructure Deficit**

Three factors contribute to the stormwater infrastructure deficit: the expansion of impervious areas because of urbanization, shortfalls in municipal budgets and political will, and climate change.

---

**Urbanization and the Expansion of Impervious Areas**

Urbanization affects the hydrologic cycle by disrupting natural drainage paths and increasing the area covered by impervious surfaces that prevent stormwater from being absorbed into the ground.\(^7\) Impervious areas include roads, parking lots, and building rooftops, which are resistant to the infiltration of water. These areas generate runoff in greater volumes over shorter durations than natural systems,\(^8\) while increasing the probability of floods and the likelihood that pollutants and sediments will enter water bodies. Impervious surfaces ultimately reduce the stability of streams and wetland systems, degrade habitats through pollution, and make water sources unsustainable.\(^9\)

A statistical analysis performed in 2012 revealed that a single detached residential property in Mississauga has, on average, 267\text{m}^2 of impervious surface area.\(^10\) Commercial, industrial, and institutional properties such as shopping centres, office towers, and warehouses are many times larger than a residential property and have a higher degree of imperviousness. Mississauga Councillor Jim Tovey noted that the parking lot at Square One Shopping Centre “sent about 10,500\text{m}^3 of water into the municipality’s system during the July 8 storm.”\(^11\)

The link between urbanization, imperviousness, and flooding has had unfortunate consequences elsewhere. In 2007, for example, the United Kingdom experienced devastating floods and identified the increase in hard and impervious surfacing in the urban landscape as the major cause behind the incidents. Planning legislation in the country now restricts the paving of front gardens and other natural areas.\(^12\) Programs are also in place in the City of Mississauga to manage urban disruptions to natural drainage paths. For instance, the City of Mississauga and the Region of Peel fund a Voluntary Roof Downspout Disconnection Rebate Program. Downspout disconnection helps to minimize the inflow of stormwater into the sanitary system, and thus lessens the impact of basement flooding resulting from the overcharging of sanitary sewers during storms.\(^13\)

**Shortfalls in Municipal Budgets and Political Will**

Municipal governments find it extremely difficult to respond to demands for new infrastructure while investing in ongoing state-of-good-repair and maintenance needs. Not only are municipalities facing tight budgets, but they also lack the revenue tools to address the infrastructure gap.\(^14\) Although the federal government has created several funding programs that support capital projects,\(^15\) these one-time grants have focused on “shovel-ready” proposals, forcing municipalities to invest federal funds on projects based on readiness rather than need.
As Calgary Mayor Naheed Nenshi acknowledges, stormwater management infrastructure is not considered a “hugely sexy thing.” Politicians indeed may prefer showy projects that provide photo-ops rather than hidden underground drainage systems. Instead of focusing on flood protection, Southern Alberta’s municipalities invested the hundreds of millions of federal dollars they have received since 2006 on building highways, leisure centres, and event facilities. The City of Banff, for example, spent $15 million on the construction of its Centre for Creativity and Innovation. Medicine Hat, which experienced extensive floods in 2010, spent most of its federal funding on roadwork and on expanding a leisure centre. In Ottawa in 2009 and 2010, the City’s storm sewer backups “took a back seat to renovated hockey rinks…community halls and parks.” This is not a recent issue. Writing in 1988, Gary Heinke explains:

The problem in Canada is not yet catastrophic: it is either hidden in the ground or patched up successfully by ingenious engineers; it does not have the glamour of large, new public projects, which lend themselves nicely to ribbon-cutting ceremonies before elections; and it does not sell newspapers! To arouse the public before major effects on them occur is not easy, but it must be done.

Although the invisibility of stormwater infrastructure may explain the political neglect, recent storms and floods are making the problem more visible. Pressure on politicians to address stormwater management will only increase over the next few decades.

Climate Change

A report by the Intergovernmental Panel on Climate Change states that, on average, temperatures in Canada increased by more than 1.3 degrees Celsius between 1948 and 2007 – a rate of warming twice the global average. Warmer temperatures have led to more violent weather, such as more frequent and intense rainstorms. Floods and storm surges represent some of the most costly climate change-related weather events.

Current stormwater management systems were designed to withstand the maximum rainfall that was estimated to occur, based on historical records, on an average of once every two to five years. However, so-called “25-year” and “100-year storms” have become more frequent in recent decades. Traditionally, “25-year storms” have a 4 percent chance of being equalled or exceeded in any given year and, therefore, an average recurrence interval of 25 years. Similarly, “100-year storms” have a 1 percent annual probability of being equalled or exceeded. That is, they have (or had) a probability of occurring just once every century, although cities are now experiencing them in shorter intervals.

A study by the Toronto Environment Office in 2012 projected that by 2049, “the maximum amount of rainfall expected on any single day and in any single hour will more than double.” Under-investment in stormwater infrastructure makes cities particularly vulnerable. Events larger and more intense than two- to five-year storms produce water flows that exceed the carrying capacity of the underground system, ultimately causing overflows and flooding. Our stormwater infrastructure is not prepared to withstand the pressures of severe weather.

Stormwater Management Financing

Several financial tools are available to municipalities to invest in stormwater infrastructure.

Property Tax

Municipalities could either use funds collected through the general property tax fund or create a dedicated tax levy under this option.

The property tax is determined based on the value of each property multiplied by its applicable tax rate. The funds used to support the stormwater management program would be determined during the annual municipal budget process. Dedicated tax levies, on the other hand, raise revenues to provide a specific service through a fixed tax rate applied to each property. A by-law would be required to direct these funds exclusively to stormwater management.

There are advantages to using the property tax as a tool to fund infrastructure in general. First, the billing system is already established and municipalities would not have to incur any administrative costs to set up a new collection system. Second, property is immovable, which reduces the opportunity for tax avoidance. Third, those who enjoy the benefits (local residents) pay for the services they use. In this way, property taxes function as benefit taxes, as there is a connection between the services funded through the tax and the benefits incurred by residential properties. Further, the visibility of the tax and its connection to the benefits received make governments accountable to constituents for the services offered. This visibility, however, makes increases in property taxes difficult to sell politically. Indeed, property taxes are extremely unpopular, even if governments are able to justify them as a way to fund important services.

Property taxes may not be the best tool to fund stormwater management. Because property taxes are calculated based on a property’s assessed value and not on its runoff contribution, payment is not based on the benefits received from stormwater management. Individuals with a smaller impervious area but high property value may pay more for stormwater management than the residents of a
property that costs less but contributes more to stormwater runoff. Furthermore, some properties (such as government parcels or charitable organizations) are tax-exempt and would thus not pay for stormwater management at all, even though they contribute to stormwater runoff. Finally, from a budgeting perspective, it is risky to rely on property taxes to fund stormwater infrastructure, because all aspects of local government are funded by the monies collected from property taxes, resulting in competition for funds every budgeting cycle.

Development Charges or Cash-in-Lieu Payments

The Development Charges Act, 1997, gives municipalities the power to pass by-laws through which they can recover the additional costs of providing services to areas where new development or redevelopment projects are taking place. Development charges are based on the principle that development related to growth should pay for itself and not impose a burden on existing residents. Typically, they are used to finance “hard” services, such as water supply and trunk mains and roads. They can be applied to projects throughout the municipality, as long as they are directed towards covering the capital costs associated with growth. If designed appropriately, development charges should cover the full cost of delivering a service, after the costs and benefits of the infrastructure required for each new property are determined. However, development charges are an inadequate source of revenue to fund the current deficit in stormwater infrastructure, as they can be used only to fund development-related infrastructure. They cannot be used for investments in infrastructure not related to growth (such as maintenance and renewal), which represent a significant cost component of the stormwater program.

Despite this important shortcoming of development charges, there are some advantages to highlight. First, they are more equitable than property taxes because they are based on contributing area rather than property value. Second, development charges have the potential to encourage efficient land use. As noted by Mia Baumeister, development charges can be area-based or uniform. Area-specific charges are calculated based on the level of capital development required to service new construction. Thus, areas that have already been developed would have lower development charges, thereby encouraging intensification. Development located farther away from existing infrastructure would bear the cost of the capital development required to service these locations.

On the other hand, uniform development charges are based on an average cost of development in a jurisdiction. This system therefore “subsidizes development that has higher growth-related capital costs, while raising costs for higher-density development compared to low-density development.” Not only do area-specific development charges reflect the true cost of service provision, but they also encourage developers to direct growth towards already developed areas that have lower development charges. In doing so, area-specific development charges could discourage urban sprawl, a major factor contributing to the stormwater management system deficit.

Intergovernmental Transfers

Through grant programs such as the Building Canada Fund, the federal and provincial governments support the construction of municipal infrastructure. Grants are typically awarded on conditional terms. Some, for example, require municipalities and provinces to enter a tripartite funding agreement, or require that municipalities evaluate the possibility of entering a public-private partnership before applying for federal funds. Moreover, grants are meant to fund “shovel-ready” capital projects for which environmental assessments have already been done.

Grants signal a commitment from other levels of government to support municipalities’ infrastructure needs. They also encourage partnerships with both the private sector and other levels of government. Nevertheless, grants have two main disadvantages. First, they can “distort local decision-making” by requiring that local governments spend the available funds according to restrictive guidelines set up by senior governments. Also, the “shovel-ready” requirement may lead municipalities to prioritize capital projects based on readiness rather than need.

Additionally, competition for funds may lead governments to start new projects they do not have the resources to maintain (such as a recreation facility that requires staffing and upkeep). They may have the money to build the new infrastructure, but if accessing readily available funds is prioritized over rehabilitation considerations, the long-term costs to the municipalities may be significant and may worsen the existing deficit.

 Furthermore, transfers may lead to inefficient local revenue decisions, especially if they cover a large portion of capital costs, reducing the incentive for municipalities to set up cost-recovery programs or to appropriately price the delivery of a service.

Debenture Financing

Municipalities can incur debt to fund capital projects. Although many municipalities have the capacity to issue debt (bonds or debentures), they are hesitant to do so, primarily because of the costs associated with borrowing. As Harry Kitchen explains, municipal officials generally prefer to finance infrastructure on a pay-as-you-go basis.
however, allows municipalities to immediately enjoy the benefits from capital development and improvement (especially with respect to large expenditures) without needing to draw on current revenues.\textsuperscript{53}

Moreover, borrowing enhances the fairness, efficiency, and accountability of capital development, as the burden of the cost is shared with future generations. Indeed, borrowing offers a means of promoting “intergenerational equity,” as the benefits of infrastructure investments usually accrue over many generations and capital development should not be paid for solely by today’s taxpayers.\textsuperscript{54}

Borrowing is, however, not the preferred funding mechanism of municipalities. In fact, most Ontario cities remain well below their borrowing limits,\textsuperscript{55} even though borrowing in Canada is less costly than in other countries. Canada is the only G8 country accorded triple-A ratings by all major international rating agencies.\textsuperscript{56} As a result, municipalities enjoy lower interest rates and higher debt ceilings\textsuperscript{57} – indeed, “Canadian municipalities have little trouble borrowing.”\textsuperscript{58}

Although borrowing is a feasible way to fund large and expensive municipal infrastructure projects, if municipalities do not properly manage their debts, they may face additional pressures. Large amounts of debt can constrain government spending, requiring municipalities to dedicate more funds every year to pay down interest and principal costs.\textsuperscript{59} Given the large costs of maintaining and developing stormwater management infrastructure, borrowing is an appropriate financing strategy, along with other funding tools, provided that municipalities have the revenue to pay back borrowed funds.

**User Charges**

User charges are fees earmarked for specific projects or services. User charges have been proposed as the fairest funding strategy, along with other funding tools, provided that (a) each resident’s consumption can be recorded, (b) the marginal cost of providing the service can be measured, (c) correct prices are charged, and (d) non-beneficiaries are excluded.\textsuperscript{60}

There are many advantages to implementing user charges to pay for stormwater management. First, user charges represent a dedicated and stable funding source.\textsuperscript{61} User charges are predictable, because they are based on the City’s stormwater infrastructure needs. Second, they are fair because they are based on runoff contribution rather than property value. The cost of the service is mostly borne by residents based on the demand their particular property places on the system, thereby increasing equity, since pricing is founded on a benefits-received principle. Those who live or have businesses on properties whose impervious area is large will pay higher user charges than owners of properties that do not burden the drainage system to the same degree.\textsuperscript{62}

Finally, a user charge system offers the opportunity to create credit and incentive programs. Given that user charges are based on the direct burden placed on the system, a municipality can offer credits to encourage residents to reduce that burden (by reducing the amount of runoff discharged into the municipal system), and therefore reduce the charge they pay.\textsuperscript{63}

User charges have a few disadvantages. First, because they are a fee paid directly by residents, users may resist paying. They may also fail to understand the difference between user charges and taxes; stakeholder consultations show the two are often conflated.\textsuperscript{64} Moreover, the principle of payment based on benefits received that is foundational to the user charge system can open the door for claims of no benefits by constituents whose properties are on the border between Mississauga and other jurisdictions (and therefore discharge runoff to other stormwater municipal systems as well). Furthermore, some properties, such as places of religious worship, are exempt from taxes but not from fees. While places of religious worship may contribute large amounts of runoff from their buildings and parking lots, they may oppose paying a fee when they have traditionally been exempt from paying taxes. Finally, there are many administrative costs associated with the implementation of user charges, such as database management, customer service, and billing systems.

**User Charges for Stormwater Management in the City of Mississauga**

In 2011, the City of Mississauga undertook the Mississauga Stormwater Financing Study\textsuperscript{65} to better understand the value of its stormwater infrastructure, associated liabilities and risks, and options for funding stormwater infrastructure management in the future. The City’s stormwater infrastructure assets have a replacement value of $1.8 billion.\textsuperscript{66}

Most of Mississauga’s infrastructure assets are 30 to 40 years old and had an expected service life of 100 years when they were built. However, rapid urbanization and the changing nature of storms are increasing the volume of water directed to the stormwater system, thereby accelerating wear and tear on the already aging system. Moreover, emerging technologies and an evolving regulatory environment require that the system be improved over time.
Funding for the City’s stormwater program has historically been based on development charges and property taxes. As the city nears full build-out, however, development charges are dwindling. Further, development charges may not be used for costs associated with the operation, maintenance, or replacement of existing infrastructure.

Allocations from the property tax are currently inadequate to meet anticipated needs. In 2012, the portion of the tax levy dedicated to the stormwater program accounted for $8.7 million of the total $14.65 million program cost. The remainder was covered through reserves, a funding source that is not sustainable in the long term.

User charges have been adopted successfully by several cities in Canada to pay for stormwater management. The Cities of Kitchener and Waterloo introduced user charges in 2010 and fully implemented a stormwater rate system by 2011. Both cities were able to quantify appropriate levels of services and measure the imperviousness of properties in order to determine what each property owner would be charged.

The City of Stratford introduced stormwater user charges in 2007, after a recommendation to Council noted the importance of reducing the municipality’s reliance on property taxes to fund the stormwater management program.

Finally, the City of Calgary conducted a study on the viability of user charges in 2008. The study recommended that stormwater rates be based on a parcel analysis and the imperviousness of area units, as well as on the stormwater management program revenue requirements of the City.

With this information, the City could derive an appropriate base charge for different property sizes, according to its estimate of the amount of service each property would require.

**Mississauga’s Stormwater Financing Program**

In May 2015, the City of Mississauga’s Council approved corporate policies and a fees-and-charges by-law to govern a new stormwater management user charge, which came into effect January 2016. The City prices the service according to the amount of impervious area on a property.

There are two methods of assessment. Properties can be categorized as either a Single Residential Property or as a Multi-Residential and/or Non-Residential Property. In order to determine the category of a property, the City uses the best information available, including property tax classifications by the Municipal Property Assessment Corporation, information from the Planning and Building Department, and remote sensing (satellite or aerial imagery).

The assessment of the rate for Single Residential Properties is based on the remote sensing of each individual property. The roofprint area (that is, the total surface area covered by the rooftops of all buildings on a property) is used as a predictor of the total impervious area of a property, and it is used to assign a property to one of five tiers (smallest, small, medium, large, or largest). As can be seen in Table 1, a fixed number of billing units has been assigned to each tier.

The assessment of the rate for Multi-Residential and Non-Residential Properties is based on an individual assessment of the total impervious area on each property.

### Table 1: Tiered Single Residential Property Billing Units

<table>
<thead>
<tr>
<th>Single Residential Property Tier</th>
<th>Property Types Typically Found in the Tier</th>
<th>Roofprint Area (m²)</th>
<th>Predicted Total Impervious Area (m²)</th>
<th>Stormwater Billing Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallest</td>
<td>Freehold townhomes and rowhouses</td>
<td>26.7 – 99.0</td>
<td>26.7 – 147.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Small</td>
<td>Semis, linked homes, and small single detached homes</td>
<td>99.1 – 151.0</td>
<td>147.1 – 227.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium single detached homes</td>
<td>151.1 – 194.0</td>
<td>227.1 – 286.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Large</td>
<td>Large single detached homes</td>
<td>194.1 – 242.0</td>
<td>286.1 – 400.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Largest</td>
<td>Very large single detached homes</td>
<td>242.1 +</td>
<td>400.1 +</td>
<td>1.7</td>
</tr>
</tbody>
</table>
Further, the City of Mississauga governs in a two-tiered municipal system, and the division of responsibility with the Region of Peel with regards to water management is not clear to residents (the Region manages sanitary sewerage and drinking water systems, while the City manages stormwater). To simplify the administrative costs of establishing user charges, the City of Mississauga will bill property owners through the Region of Peel’s billing system. This billing arrangement may, however, add to the confusion surrounding the division of powers. Efforts to clarify the roles of the City in managing stormwater infrastructure are also part of the City’s communication strategy.

Conclusion

The infrastructure funding gap is one of the most pressing challenges facing municipalities in Canada. Infrastructure that can meet the needs of constituents is essential to the creation of productive, prosperous, and sustainable communities. When infrastructure vital to the safety of residents is compromised by its inadequacy to withstand current pressures, municipalities must devise new mechanisms to address the deficit and provide adequate levels of service.

The July 2013 storm was a catastrophic event. Many families incurred damages or losses in their homes and faced financial difficulties as a result. Climate change will continue to add pressure to the stormwater management systems of cities, and current funding levels are insufficient to respond to these challenges. The City of Mississauga’s stormwater user charge will help fill a funding void, necessary to prevent storms from shattering people’s lives. It is also a fair and dedicated way to pay for stormwater management.

Implementing credit systems for residential households is challenging from a financial perspective, however, since the administrative cost of offering credits will likely exceed the financial benefits provided by available mechanisms (such as rain barrels). Household-level initiatives to improve drainage and stormwater management practices are nevertheless beneficial, and City staff recommended stormwater outreach and education efforts for the residential sector as a better investment of program funds.

Given the lack of knowledge surrounding the need for the stormwater charge, the City of Mississauga has rolled out several communications strategies since Council approved the corporate policies. They include a video explaining what stormwater infrastructure consists of, what the charge is, and why it is necessary.
Endnotes


10 Martin Powell, Corporate Report: Stormwater Financing Study (Phase 1), 2012, 2.

11 City of Mississauga, Backgrounder: City of Mississauga’s Stormwater Program, 2012.


13 Lou DiGeronimo, Staff Report: Impact of July 2013 Storm, 2013, 6; City of Mississauga, Backgrounder: City of Mississauga’s Stormwater Program, 2012.


18 AECOM, Stormwater Financing Study: Public Information Meeting No. 1, 2012.

19 Ibid.


22 Eivor Bucht and Johanna Deak, “Planning for climate change: The role of indigenous blue infrastructure, with a case study in Sweden,” Town Planning Review 82(6), 2011, 671.

23 Region of Peel, Downspout Disconnection Rebate Program, Region of Peel, 2014; Dan Labrecque, Basement Flooding Remediation and Subsidy Program Update, City of Mississauga, Wards 1, 3, 4, 5, 6, and 7, Region of Peel Report, 2010.


36 Lou DiGeronimo, Staff Report: Impact of July 2013 Storm, 2013, 10; Shuford et al., 2010, 74.


39 Enid Slack, The Property Tax, 2011. Although benefits are received and paid for by the taxpayer in a residential property, non-residential properties are likely to pass on or share the burden of the tax with customers, who may be residents in other jurisdictions. Therefore, non-residential property taxes do not ensure that those who bear the burden are also those enjoying the benefits. See Enid Slack, Financing Large Cities and Metropolitan Areas, IMFG Papers on Municipal Finance and Governance No. 3, 2011.


43 Ibid.


46 Mia Baumeister, Development Charges, 2012.


69 Martin Powell, Stormwater Financing Study (Phase 1), 2012, 7.

70 Martin Powell, Stormwater Financing Study (Phase 1), 2012, 14.


74 City of Mississauga, Council Meeting May 27, 2015, Session 11 Minutes – City of Mississauga, 2015.

75 City of Mississauga, Council Meeting May 27, 2015, 2015.

76 City of Mississauga, Council Meeting May 27, 2015, 2015.


80 City of Mississauga, General Committee Meeting May 20, 2015, Agenda – City of Mississauga, 2015.


82 City of Mississauga, General Committee Meeting May 20, 2015, Session Minutes – City of Mississauga, 2015.


84 City of Mississauga, General Committee Agenda, City of Mississauga, December 4, 2013.
