

Appendix B to Report CW-10-19

City of Burlington Climate Adaptation – Stormwater Management Activities

1. Plumbing Permit Fee Reimbursement Program

The City established a grant program in 2015 to offset the cost of plumbing permit fees for the installation of backwater valves, disconnection of foundation drains from the sewer system and the installation of sump pumps. This program has continued through 2019.

Since the August 4, 2014 storm, 855 plumbing permits have been issued for back water valves, disconnections of foundation drains from sanitary sewer and installation of sump pumps, as of May 31, 2019.

2. Home Flood Protection Program

The Home Flood Protection Program (HFPP) was piloted in Burlington from 2016-2018 by the Intact Centre for Climate Adaptation from the University of Waterloo.

The HFPP provided a confidential, on site, 60-90 minute flood risk assessment service to owners with single detached homes, semi-detached homes and townhouses. Assessments were completed inside and outside of the dwelling. The service featured an easy-to-read summary report and an optional 15 minute follow-up conversation with the assessor.

The areas of focus were Aldershot, Headon Forest, Millcroft and Orchard, however home owners from across the city took advantage of this program. A total of 130 assessments were completed in Burlington.

The program was promoted using community events, door-to-door campaigns, door hanger campaigns, city councillor newsletters, CBC radio “The Current” interview, traditional and social media, paid advertisements, engagement with local community leaders and engagement with real estate agents.

In addition to the assessment services, the HFPP website has an extensive list of resources that can assist homeowners:

- Around the Outside of Your Home
 - Ensure downspouts are directing water away from your home
 - Check your lot grading
 - Conduct regular home maintenance
 - Additional ideas – rain barrels and rain gardens
- Inside Your Home
 - Sump pumps

- Backwater valves
- Flood proof your basement

The following achievements demonstrate the high quality of the Home Flood Protection Assessments:

- i. Response from participating homeowners has been very positive,
- ii. Insurance providers are beginning to offer home insurance discounts,
- iii. Program participation protects and enhances property value,
- iv. The HFPP's best management practices was cited as a foundation document for the 2018 Canadian Standards Association's National Flood Protection Guideline,
- v. Integration into college curriculum,
- vi. Interest from other municipalities in Ontario and Saskatchewan,

The HFPP was finalized in Burlington at the end of 2018. In April 2019, the Intact Centre released the HFPP Final Report entitled "Water on the Rise: Protecting Canadian Homes from the Growing Threat of Flooding". Currently available for viewing on our city website.

3. HFPP Recommended Continuation

HFPP assessments are still being offered by the University of Waterloo (UW) Intact Centre's contracted service provider, AET Group, in the GTA for a fee. UW has provided a national license to AET to continue to use Intact's software as a third-party assessment organization. As a result, it will be possible to have assessments available in Burlington in 2019.

Also, in order to reach a broader audience, Intact is presently developing a self-assessment app that should take residents a few minutes to complete. It will focus on 10 main actions that research has determined to be the most commonly represented flood risks at homes. These are typically the most cost-effective to address as well. Capital Works staff are working cooperatively with Intact, assisting with feedback, with the intent to potentially share the app with residents.

4. Creek Erosion and Maintenance Operations (Roads, Parks and Forestry)

Creek Debris Clean-up

- Roads, Parks and Forestry (RPF) inspect and maintain the city-owned watercourses. This program includes hazard tree removals, regular inspections of inlet/outlet grates prior to and after large storm events, debris removal and minor infrastructure repairs.

Comprehensive and Interim Creek Inspection Program

- The latest comprehensive Creek Condition Inventory Survey Report was completed in 2016. This included visual inspections of 92 kms of urban creeks, identifying creek bank and creek bed erosion, measurements of erosion protection infrastructure and identification of major debris locations.
- The latest Interim Creek Inspection (a less detailed inspection of all creeks for erosion and debris) took place in the Spring of 2019.
- The next comprehensive Creek Condition Inventory Survey Report will be completed in 2021.

Rural Ditch Maintenance

- Over past years, rural ditches have filled in with erosion sediments and vegetation, reducing the capacity to convey storm drainage.
- Roads, Parks and Forestry's rural ditch maintenance program includes the cleaning out and regrading of ditches.
- The program will improve public safety and reduce the risk of flood damage to public and private property by reestablishing appropriate drainage channels. This is an on-going annual program.

5. Coordination with Halton Region

City staff is continuing to coordinate with Halton Region staff on the following programs:

Enhanced Basement Flooding Prevention Subsidy Program

Weeping Tile Disconnection and Sump Pump Installation

- The Region's subsidy covers 100% of the invoiced cost up to a maximum of \$5,000 including materials, labour, permits and taxes for disconnection of foundation drains and sump pump installations.

Downspout Disconnection

- The Region's subsidy covers 100% of the cost up to a maximum of \$500 to re-direct the downspouts away from the home and to cap the existing pipe leading to the weeping tiles at the side of the house. This cost is inclusive of materials, labour, permits and taxes.

Backwater Valve Installation

- Homeowners qualify for the backwater valve Region subsidy if they have demonstrated that they do not have any downspout or weeping tile connections to the sanitary sewer system or alternatively are undertaking

work concurrent with measures to eliminate these connections. The subsidy is for 50% of the invoiced cost up to a maximum of \$675 including materials, labour, permits and taxes.

Sewer Lateral Repair

- The Region subsidy covers 50% of the cost up to a maximum of \$2,000 to conduct sewer lateral repair. This cost is inclusive of materials, labour, permits and taxes.

Downspout Disconnection Programs

Phase 1

In 2015-2017, Halton Region reached out to 9,300 residents in the high priority areas of the City of Burlington, offering to disconnect their downspouts at no cost to the residents. Over 1,500 downspouts were disconnected through the program.

Phase 2

Not in Burlington.

Phase 3

In 2017-2018, 5600 homes in north Burlington were canvassed and a total of 477 downspouts were disconnected.

Phase 4

In 2019, 5,900 homes in Aldershot, Roseland and Brant Hills have been canvassed so far. To date, 35 downspouts have been disconnected. This program is continuing through 2019.

Capital Works staff have been assisting with the inspections of downspout disconnection locations to ensure no new drainage issues are being created.

6. Coordination with Conservation Halton

In April 2015, Conservation Halton (CH), in association with Environmental Water Resources Group Limited (EWRG), finalized its "August 4th, 2014 Storm Event, Burlington" report.

The following are CH's report recommendations:

Recommendation # 1 - *An investigation should be conducted in partnership with the City of Burlington to determine what mitigation measures can be implemented*

to reduce future riverine flood damages along Tuck Creek upstream and downstream of New Street.

Action:

Construction of the new higher capacity Regal Road bridge is complete and channel enhancements scheduled for completion in mid 2019. The New Street and Spruce Avenue phases are planned in 2019 and 2020. CH has been closely involved throughout this project.

Recommendation #2 - *An investigation should be conducted in partnership with the City of Burlington to determine the extent of runoff diverted from Shoreacres Creek into Tuck Creek at Highway 407 ETR during the August 4th, 2014 storm event. Also, the investigation should determine what mitigation measures could be constructed to prevent or reduce any future spills from Shoreacres Creek into Tuck Creek in this location.*

Action:

This investigation has not been initiated as yet.

Recommendation #3 - *An assessment should be conducted in partnership with the Regional Municipality of Halton and the City of Burlington to inventory the number and location of telemetered rainfall and stream flow gauges within their respective networks to identify potential gaps. Expansions to the networks should be undertaken in a collaborative and coordinated manner to facilitate data sharing and enhance flood forecasting and emergency response capabilities within the City of Burlington. These improvements will help to better equip all agencies to respond to similar events in the future as more frequent short intense storms are expected as a result of a changing climate.*

Action:

Conservation Halton staff have been actively working on this initiative with the goal of developing an enhanced flood forecasting tool to improve emergency response capabilities. The following summarizes the installations which have been done in cooperation with the City of Burlington:

- The Mainway Arena rainfall gauge was replaced in late 2016 with a new model capable of transmitting data remotely.
- Conservation Halton installed a similar rainfall gauge in north Burlington, in the area of Appleby Line and Britannia Road in 2017.
- A third new city/CH rainfall gauge was installed at Fire Headquarters on Fairview Street in late 2017.
- A fourth new rain gauge is being installed at Guelph Line & 407.

- A creek flow gauge was installed in the Hager-Rambo Diversion Channel on the south side of the Maplevue Mall in the summer 2018, and
- a second flow gauge is being planned for installation at Tuck Creek in the New Street/Regal Road area.

Recommendation #4 - Consideration should be given to updating the watershed studies for Roseland, Tuck, Shoreacres, Appleby and Sheldon Creeks in an effort to explore opportunities to reduce storm runoff rates and volumes.

Action:

The watershed models for Tuck Creek, Roseland Creek, Appleby Creek, Rambo Creek and Sheldon Creek have been updated in coordination with Stormwater Capital projects, Watershed model updates and the Mobility Hubs study.

Conservation Halton is nearing completion of a revision to the modelling and floodplain mapping for Grindstone Creek.

7. Coordination with 407-ETR

The culvert crossing improvement at Ingersoll Drive was completed in the spring of 2018. The Ingersoll Drive culvert crossing has been reinstated to its original design capacity.

8. Coordination with MTO

MTO is undertaking culvert rehabilitation works for the QEW culvert crossings at Tuck Creek and Shoreacres, as a result of damage from the August 2014 storm.

The rehabilitation of the Shoreacres Creek culvert is now complete. Work on the Tuck Creek culvert was halted in March 2019 to comply with the fisheries timing window. Construction will recommence in July. Expected completion will likely be in the fall 2019.

General capital program coordination meetings are taking place two times per year, in addition to several other specific project coordination meetings related to MTO Environment Assessments and bridge reconstructions.

9. Railway Authorities

Capital Works, in coordination with CN and Metrolinx, initiated an inspection and rehabilitation design project for the city's 11 major railway culverts.

Design work has been initiated for the replacement of 4 of the 11, with plans to replace these in the next 5-10 years, subject to budget approval.

10. Burlington Official Plan

Water resource policies were updated in the adopted new Official Plan (April 2018). This included policies related to watershed management, stormwater management, natural hazards and watercourses. Updated policies reflect current stormwater management best practices, such as encouraging low impact development (LID) measures and the potential retrofit of existing ponds and stormwater management facilities to improve function. The new Official Plan more accurately reflects natural hazards and areas subject to Conservation Authority Regulations and better reflects current technical standards as well as related plans and policies.

11. Stormwater Design Standards

The city's Stormwater Management Design Standards are in the process of being updated. A report will be presented to the Committee of the Whole in the fall of 2019.

Over the past 2 years, the Ministry of Environment has been working on a Low Impact Development guidelines document. There have been significant delays in its finalization, however it will be a reference document for our new standards upon its issuance.

12. International Urban Cooperation (European Union Partnership Project) – Växjö, Sweden

Funded by the European Union, the International Urban Cooperation (IUC) programme supports the achievement of bilateral policy objectives as well as major international agreements on urban development and climate change, such as the Urban Agenda, the Sustainable Development Goals, and the Paris Agreement.

City-to-City Cooperation on Sustainable Urban Development

Växjö was paired with the City of Burlington, as both were considered to be facing related sustainable development challenges and climate change risks including flooding. Växjö and Burlington are sharing knowledge and best practices on sustainable urban solutions. This is being achieved through the development of local action plans which outline activities and pilot projects to achieve tangible results.

A knowledge-exchange platform has been established with resources and best practices on overcoming specific urban development barriers. Webinars and staff exchange visits have taken place to discuss district energy, bio-energy, actions on climate change, tall wood buildings, eco-systems services, urban park strategies, community engagement and stormwater management.

Regular monthly Skype meetings take place, some of which include information webinars by both municipalities.

13. Municipal Natural Assets Initiative (MNAI) – Watershed-level project in Ontario's Greenbelt

Mayor Meed-Ward was approached by an MNAI representative in the spring of 2019 regarding the possibility of participating in this project, along with Conservation Halton and the City of Hamilton as partners.

Capital Works staff have been coordinating with Conservation Halton, City of Hamilton and Royal Botanical Gardens (RBG) staff regarding a proposed project related to Grindstone Creek. A draft Memorandum of Understanding (MOU) has been prepared. Final details are being worked out with the MNAI. We anticipate this will lead to the signing of the MOU in the summer and commencement of the project in the fall.

The overall goals are to:

- (i) support and guide Conservation Halton, the cities of Burlington and Hamilton, and the Region of Halton in identifying, valuing and accounting for the natural assessment in their financial planning and asset management programs;
- (ii) develop leading-edge, sustainable, cost-effective and climate resilient flood management and storm water management infrastructure;
- (iii) reduce risk and potential liability due to flooding, erosion and sedimentation; and
- (iv) provide sustainable service delivery to communities.

The objectives in support of this goal include:

- (i) identifying and understanding the current and possible role and quantifying the role of natural assets as a component of flood mitigation, storm water management, and water quality control; and
- (ii) determining associated costs and benefits relative to engineered alternatives and/or long-term operations and maintenance for engineered assets (e.g., diversion channels, storm water management ponds, storm water management facilities and systems).

Depending on the number of partners that sign the MOU, it is anticipated that the City of Burlington will be required to fund a total of \$35,000 in 2019 and 2020.