



HAMILTON WATER
WATER IS LIFE



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Public Works

**Public Works
Hamilton Water**

Storm Event Response Group (SERG) & Flooding

Public Work Committee, August 31, 2015 (PW15059)

Providing services that bring our City to life !

Agenda



- History of SERG
- Minor & Major Stormwater Management Systems
 - Conveyance Issues
 - Inflow & Infiltration
- History of Flooding Claims and Grants
- Projects Resulting from Flooding
- Protective Plumbing Program
- Sewer Lateral Cross-Connection
- Ongoing Proactive Investigations
- Flooding and Drainage Master Servicing Study
- Communication Strategy
- SERG & Strategic Alliances (Independent Community Panel)
- Resourcing Constraints

History of SERG

- SERG Committee established 2006 in response to changing climate and intense and frequent rainfall events
- Cross-departmental initiative
- Purpose:
 - Committed to assessing, analysing and implementing storm water management improvements
 - Addresses cause and effect of inclement weather on the storm management/drainage systems

*Protect Public Health, Property
and the Environment*

History of Flooding Claims and Grants

Year	Total Liability Claims	Total Approved Grants	Total Grant Payments \$
2005	678	1395	916,188
2006	186	775	499,563
2007	90	45	30,199
2008	172	596	219,795
2009	1,643	4,279	3,180,609
2010	71	111	87,191
2011	45	73	58,515
2012	145	218	164,000
2013	0	0	0
2014	0	0	0
2015	0	0	0
Total	3030	7492	5,156,060

Stormwater Management System

- Minor System:
 - Underground pipes
 - Limited carrying capacity
- Major System:
 - Ditches, roadways
 - Ponds, swales
 - Outfall channels
 - Natural streams and valleys



Minor & Major Stormwater Management Systems

- Combined Sewer Service Area (minor system only)
- Separated Storm Sewer Area (major and minor system)



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Conveyance Issues

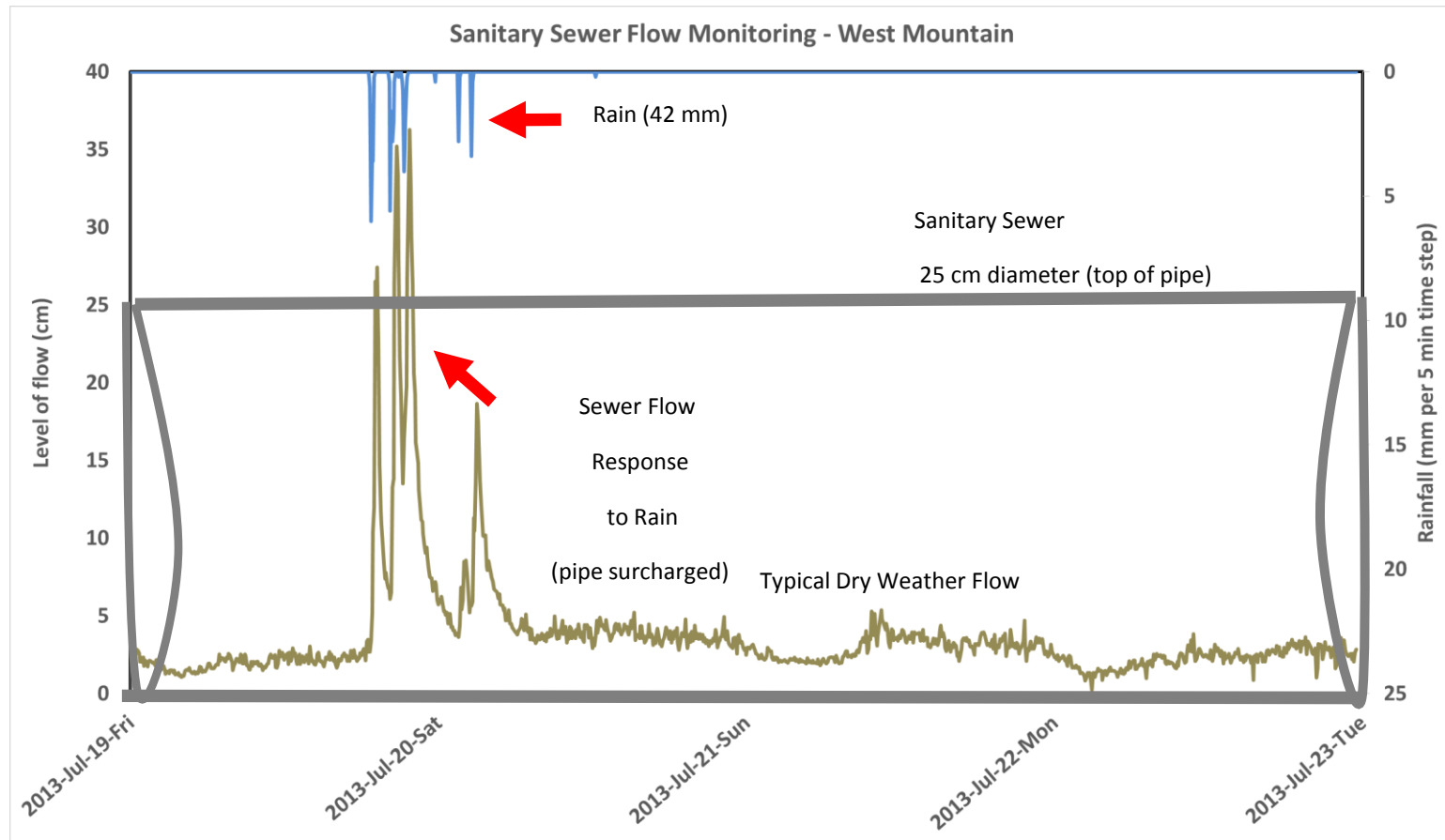
- Minor and Major systems have threshold servicing capacity
- When the volume of rainfall exceeds the design capacity of the infrastructure, diminished services are experienced including flooding



Inflow & Infiltration

Unintended entry of stormwater, snowmelt and groundwater into the sanitary sewer system.

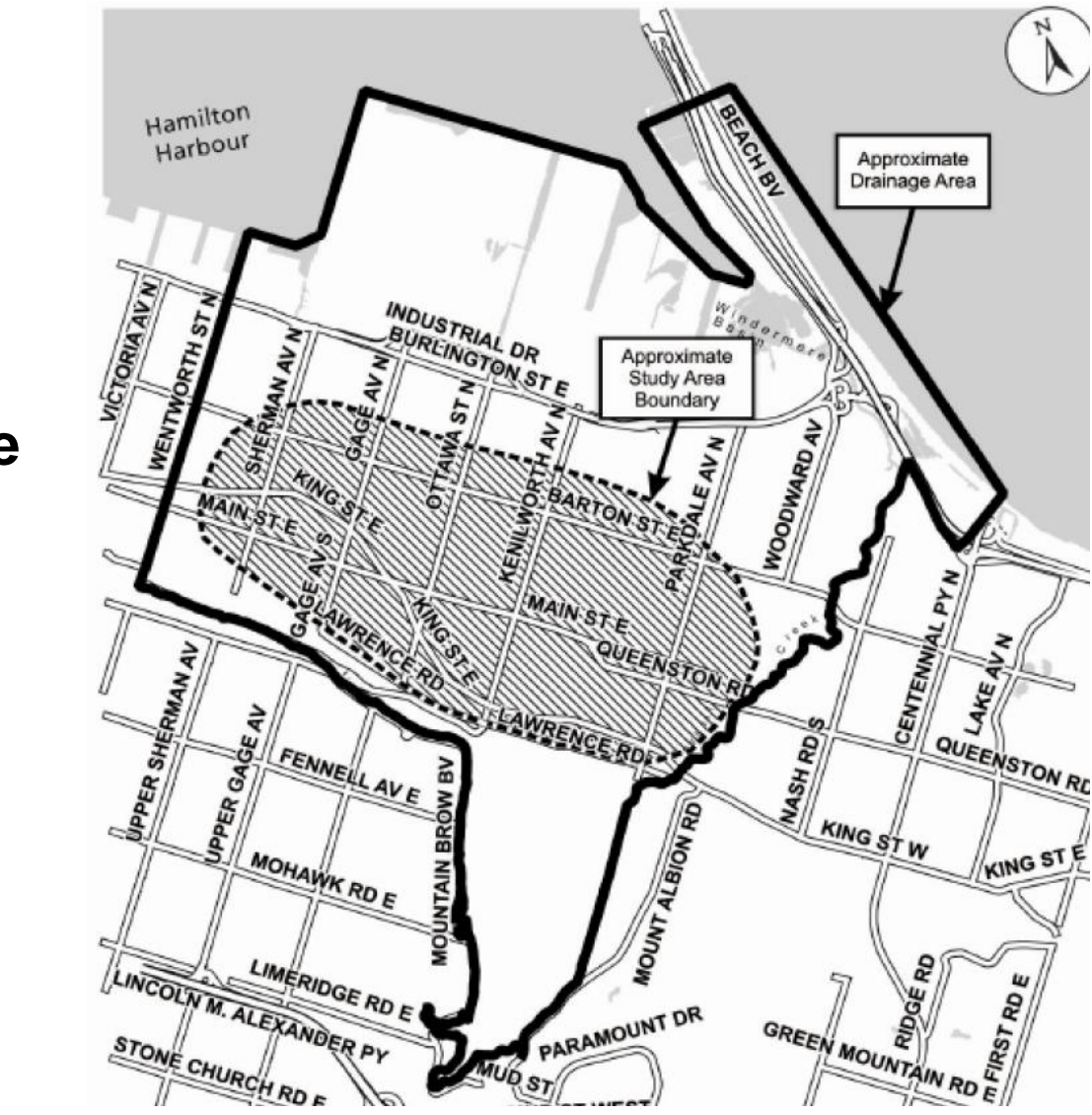
Ie. Binbrook, Riverdale East and Old Dundas Road in Ancaster



Lower East End Drainage Study (LEEDS)

Initiated to
address severe
wide-spread
basement
flooding

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LEEDS

- \$16 million from 2007 – present
- Implemented Measures:
 - Upgrade or redirect combined/storm relief sewers
 - Redirect sewers away from problematic/over-utilized sewers
 - Extend storm relief sewers
 - Modify or provide sewer connections
 - Modify weirs, orifices, gate settings (to increase local CSOs, to block or adjust problematic connections)
- Benefit:
 - Approximately 3,410 properties & Kenilworth underpass
 - Reductions in hydraulic grade line reducing the risk of basement flooding
 - Improved overall network performance both upstream and downstream



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LEEDS

- Upcoming Capital Projects:
 - Gage Park Storm Water Management Facility-
 - Rosslyn – King to Roxborough
 - Britannia/Oriole/Adair
 - Edgemont – Maple to Main



Kenilworth Underpass



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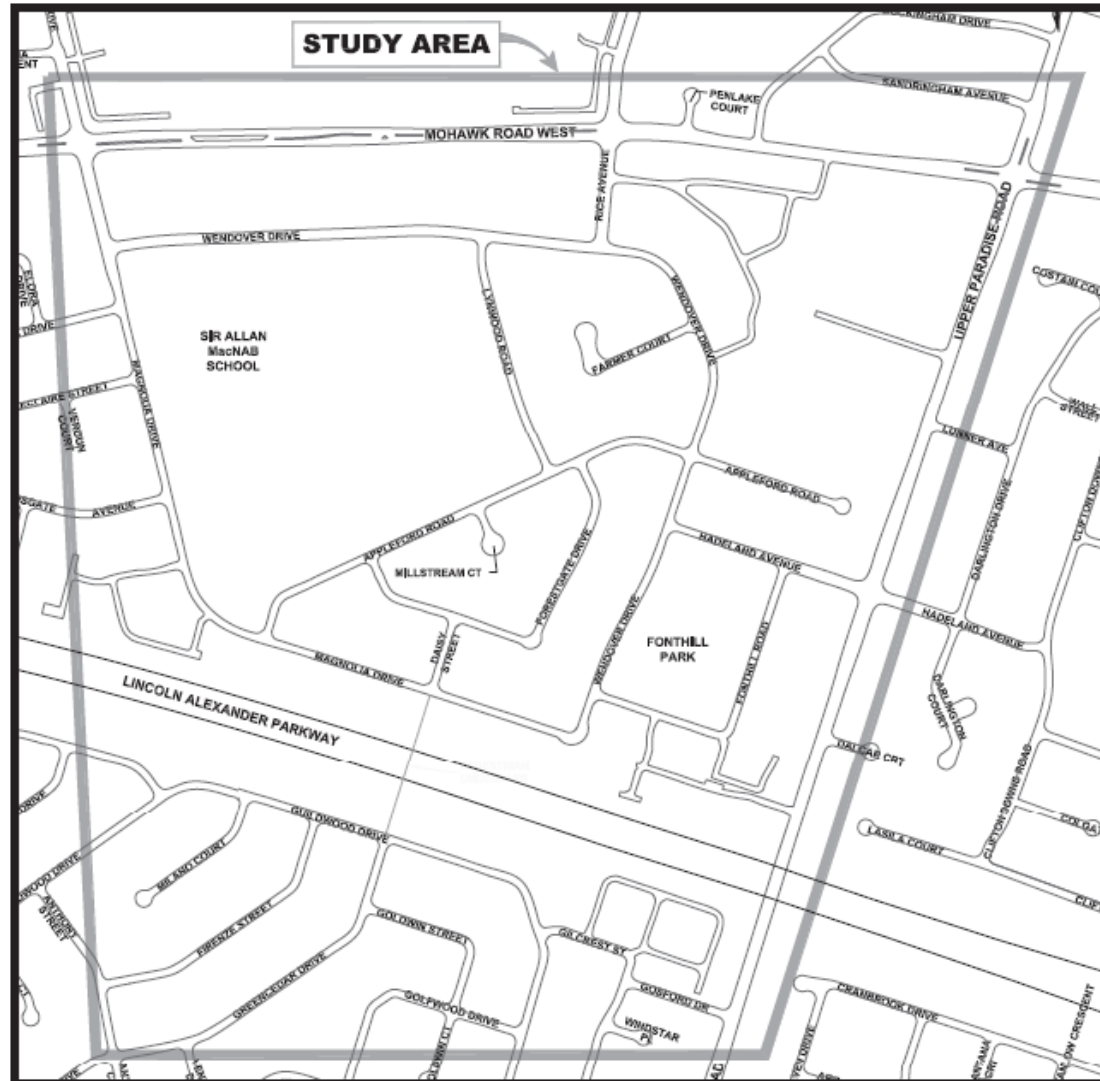


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Fessenden Neighbourhood Upgrades

**Initiated to
address
flooding
during major
storm events**

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Fessenden Neighbourhood Upgrades

- \$8.3 million from 2009 - 2014
- Implemented Measures:
 - Phase 1: Underground stormwater detention tanks on Greencedar Drive
 - Phase 2: A stormwater management facility on the Sir Allan MacNab School property, complete with storm sewer connection to a new control chamber at the intersection of Appleford Road and Forestgate Drive
 - Phase 3: Increased storm sewer capacity from the depression area on Magnolia Drive to the new control chamber previously constructed in Phase 2
- Benefit:
 - Reduced surface flooding during the major storm events
 - Majority of surface runoff contained within the curbs
 - Residents may approach the insurance industry for a lower risk rating



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Old Dundas Road Sewage Pumping Station Flooding Study

- Flooding of basements in 2005, 2006, and 2013
- Investigations revealed that stormwater and groundwater are infiltrating significantly into the sanitary sewer system.
- Upcoming Works:
 - Private Property Works: disconnecting roof downspouts and private catch basins. Work will commence in 2016.
 - Public Property Works: sealing maintenance hole and rehabilitating underground sewer infrastructure. Work will commence in 2016.
 - Inline/Offline Storage: currently in the design stage. Construction will commence in the spring of 2016.
 - Emergency Overflow: Schedule “C” Environmental Study. Work will commence in the summer of 2015.
- Substantial completion of all projects by Q4 2017



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Binbrook Flooding Study

- Extreme storm event of July 26, 2012
 - 1,000 year storm = approx. 140 mm of rain in 3 hours
- Issues identified:
 - Extraneous inflow and infiltration in the sanitary system
- Work completed to date:
 - Replacement of traditional manholes with solid lids
 - Rehabilitation of the sanitary sewer system by developers

Upcoming work:

 - Modification to pumping station and collection system upgrades to accommodate wet weather and operational issues
- Ongoing & Upcoming Work:
 - Currently under construction is Upper Centennial trunk sewer tunnel and will provide a new outlet for sanitary flows (scheduled for completion in 2017)
 - Trenchless rehabilitation to seal the sanitary system from excessive infiltration and inflow



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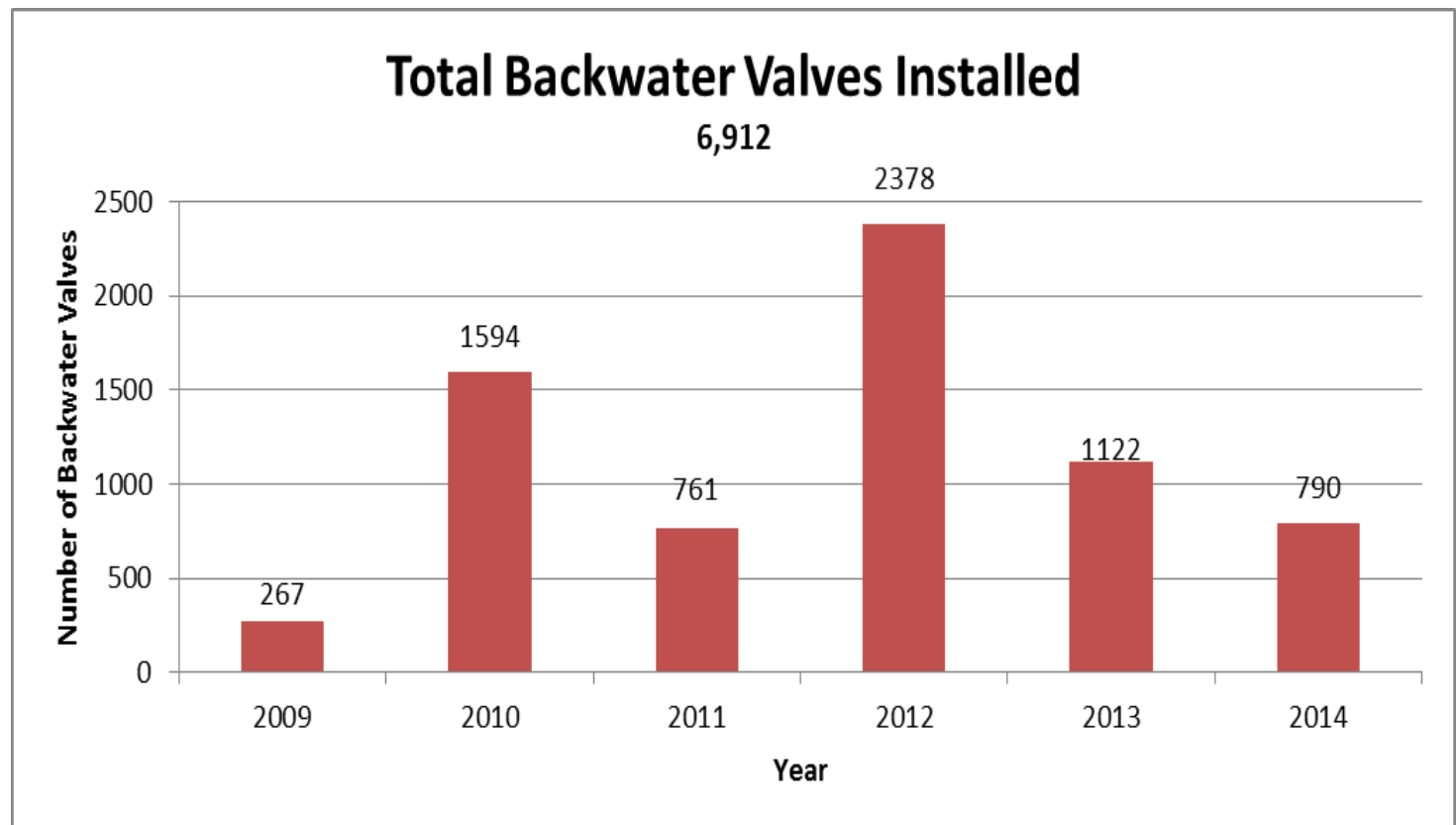
Ongoing Proactive Investigations

- Inflow & Infiltration:
 - Flow monitoring and Rain Gauges
 - Smoke testing and dye testing
 - Rehabilitation plans
 - Infrastructure upgrades
 - Sewer Inflow Vulnerability Assessment



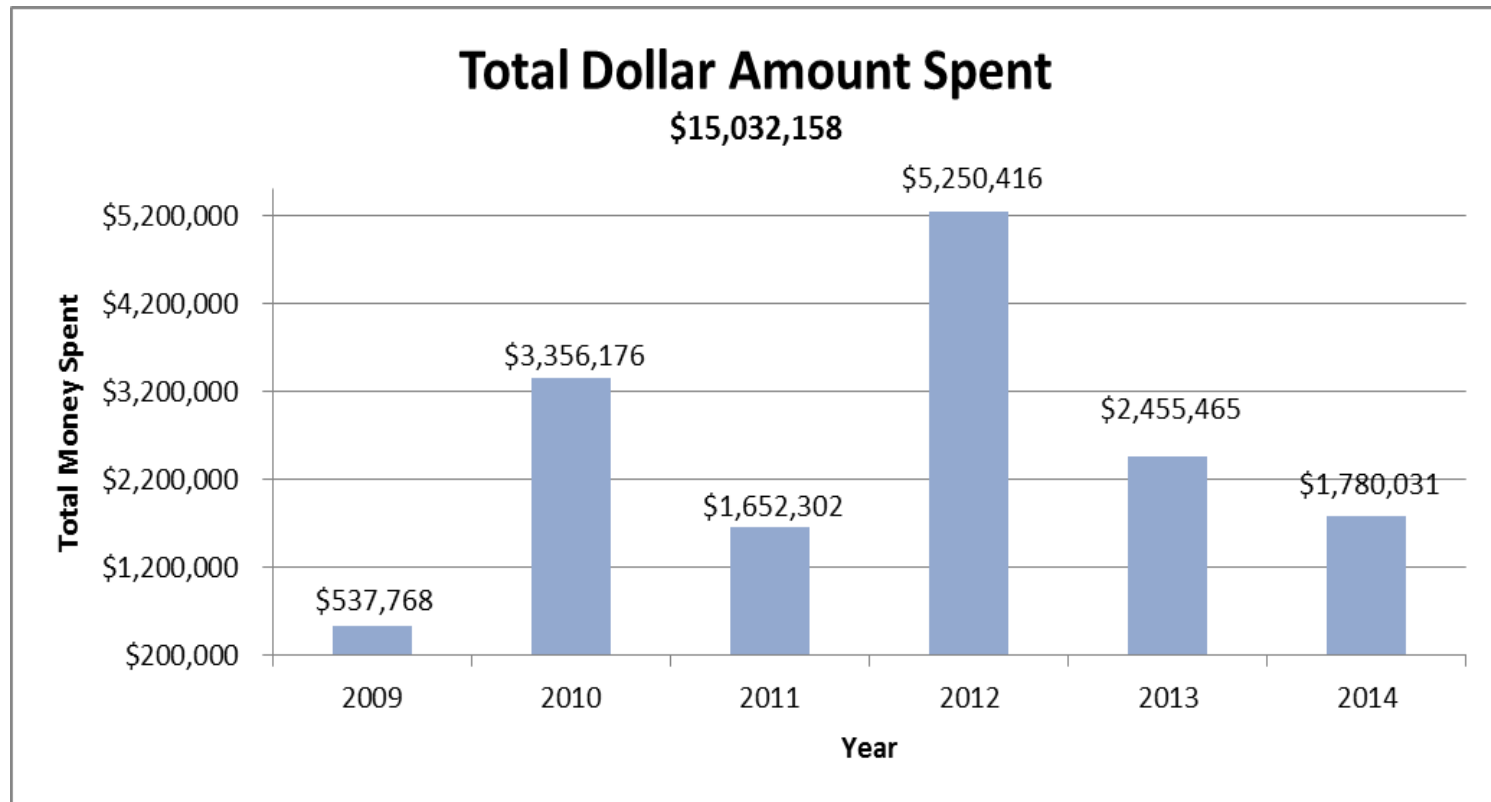
Protective Plumbing Program

Since 2009, nearly 7,000 backwater valves have been installed.



Protective Plumbing Program

Since 2009, over \$15 million in grants has been provided.



Sewer Lateral Cross Connection Program

- Purpose:
 - Environmental protection
 - Reduced flow to the Woodward Wastewater Treatment Plant
 - Reduction in basement flooding
- Main Study Area:
 - Chedoke Creek, Red Hill Creek and Davis Creek watersheds
- Progress:
 - Since 2010 ;
 - 136 complete cross connections identified
 - 125 have been corrected
- Investigations and corrective actions are ongoing
- Staff resources provided by Council in 2013 recently filled and enhanced program execution is forthcoming

Flooding and Drainage Master Servicing Study

- Purpose:
 - To identify the root causes of flooding in the core combined area of the city
- Considerations:
 - Level of Service (LOS)
 - Growth and intensification
 - Climate change
- Outcome:
 - Determine an appropriate LOS for the City's urban drainage systems
 - Recommend opportunities for flooding and drainage system improvement and scope projects, programs and a resource strategy (staff and finances)
 - Develop conceptual designs for capital works for the preferred alternatives



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Communication Strategy

- Flood Aware Program:

- Discontinued
- No dedicated resources



- Current Outreach:

- Flood Preparedness information on website
- Proactive outreach when severe storms anticipated:
 - Social Media
 - Emergency Operations Centre (EOC)

SERG & Strategic Alliances

(Independent Community Panel)

- 2006
 - 26 recommended initiatives
- 2009
 - all original recommendations from 2006 achieved
 - additional 23 recommendations (focused on climate change adaptation approaches)
- Current Status of Recommendations:
 - In various states of progress
 - Recommendations spread throughout multiple Divisions
 - No program lead to monitor progress of recommendations

Resourcing Constraints

- Delivery of these projects and programs is progressing slowly due to:
 - ***limited staffing resources***
 - ***competing financial resources***



Stormwater Funding Structure

The City's stormwater program budget for 2015 is \$22.9M funded through the following sources:

- Wastewater Charges \$17.4M 76%
 - Based on metered water usage
- Property Taxes \$ 3.9M 17%
 - Based on property values, allocation supports operating storm costs such as basin cleaning
- Development Charges \$ 1.6M 7%
 - DCs limited to funding capital projects related to new development and cannot support maintenance costs of new infrastructure

Stormwater Funding Inequity

- Intent that consumers contribute equitably in proportion to the cost of stormwater program
- Current funding structure based largely on water usage and to lesser degree on property values results in lack of linkage between customer use/benefit of service and the user fee being charged
 - Properties without a wastewater connection are not charged wastewater/storm user fee based on water usage eg. paved parking lots
 - Properties with large hard surface areas and low water usage may not be paying their fair share eg. big box stores

Sustainable Stormwater Funding

- Sustainability is achieved through full cost pricing and user pay approach as exists with City's water and wastewater program
- Majority of current funding based on water consumption which has declined significantly over the last decade coupled with increased capital funding of storm works results in challenges to maintain level of service expected and demanded by the public
- Many Ontario municipalities have changed or are reviewing funding options for their stormwater programs

Key Messages



- City has made a ***significant investment*** in stormwater over the past decade in response to Climate Change
- Stormwater management is very ***complex*** and managed through a number of different divisions
- There continues to be a ***lack of resources*** to manage the stormwater portfolio sustainably
- Activity of ***SERG has declined*** due to lack of staffing resources
- Challenges with ***inequitable and unsustainable funding*** of the stormwater mandate



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