



Report to: General Committee

Date Report Authored: February 9, 2015

SUBJECT: Citywide Multi-phase Sanitary System Downspout Disconnection Program – Annual Progress Update and Phase 3 Details

PREPARED BY: Gord Miokovic, Manager-System Engineering (Waterworks)
John Lau, System Engineer (Waterworks)

RECOMMENDATION:

- 1) That the report entitled “Citywide Multi-phase Sanitary System Downspout Disconnection Program – Annual Progress Update and Phase 3 Details” be received; and
- 2) That Council approve the Phase 3 program area, covering 3,690 properties pending 2015 Capital Budget Approval, as follows:
 - a. Thornhill Area - bounded by John Street to the north, Highway 404 to the east, Chumleigh Crescent to the south, and Don Mills Road to the west;
 - b. Milliken Area - bounded by Denison Street to the north, McCowan Road to the east, Steeles Avenue to the south, and Brimley Road to the west;
 - c. Unionville Area - bounded by Highway 7 to the north, McCowan Road to the east, Highway 407 to the south, and Kennedy Road to the west;
- 3) That the project be funded in the amount of \$361,700 from the 2015 capital project request # 15294 Sanitary System Downspout Disconnection Program – Phase 3 of 5; and
- 4) That Staff be authorized and directed to do all things necessary to give effect to this resolution.

PURPOSE:

The purpose of this report is to:

- i. Provide a status update on Phase 1 & 2 of the Citywide Multi-phase Sanitary System Downspout Disconnection Program (DDP);
- ii. Provide Council proposed Phase 3 area details;
- iii. Obtain authorization from Council to proceed with the areas chosen for Phase 3 of the program;
- iv. Identify other areas for future phases; and
- v. Provide information on some other inflow and infiltration (I-I) reduction initiatives in Markham.

EXECUTIVE SUMMARY:

Phase 1 of the program covered part of Thornhill Area (see **Attachment A**). All testing was completed by April 2014. Through the testing of 2,256 properties, the following results are obtained:

- 21 properties were identified as having downspouts directly connected to the sanitary sewers

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- 48 other locations were identified as being inflow/infiltration (I-I) sources. *(These other sources include: uncapped lateral cleanouts; damaged sanitary manholes; street catch basins, or driveway and stairwell drains connected to the sanitary sewer; etc.)and*
 - 65 properties were identified as having lateral interactions between the storm and sanitary systems, which indicated there maybe cracks or cross-connections at the service lateral.

Phase 1 is still currently in the disconnection stage. "Notice of Disconnection" had been given out to the 21 affected homeowners by registered mail in June 2014 along with the City subsidiary package. A twelve month period was provided for the homeowners to carry out the disconnection works. Post flow monitoring will commence in Fall 2015 after the completion of the downspouts disconnections.

For the 48 other I-I sources, the public side I-I sources had been checked and resolved by City Operation and Maintenance (O&M) staff while the list of private side I-I sources had been provided to City By-law Department to carry out necessary actions.

For the 65 properties with lateral interaction, they will be inspected under the Sanitary Lateral Inspection Program in order to evaluate the condition of the service lateral and any identified defects will be fixed accordingly. 40 properties had already been inspected in 2014 and the remaining 25 properties will be inspected in 2015.

The approved budget for Phase 1 was \$807,646. The total amount spent was \$267,347 and the remaining funds of \$540,299 were returned to source (see **Attachment F**).

Phase 2 of the program also covered part of Thornhill Area (see **Attachment B**). The testing work commenced in May 2014 and was completed by November 2014. The disconnection stage is expected to start in June 2015. Through the testing of 2,827 properties, the following preliminary results were obtained:

- 65 properties were identified as having downspouts directly connected to the sanitary sewers.
[Notice of Disconnection will be send out to the affected homeowners in June 2015.]
- 44 other locations were identified as being inflow/infiltration (I/I) sources. *(These other sources include: uncapped lateral cleanouts; damaged sanitary manholes; street catch basins, or driveway and stairwell drains connected to the sanitary sewer; etc.)*
[City O&M staff will investigate and fix the identified public side I-I sources in 2015. List of identified private I-I sources will be provided to City By-law Department for them to carry out necessary actions.]
- 213 properties were identified to have lateral interactions which indicate there may be cracks or cross-connections at the service lateral.
[The sanitary service lateral of the identified properties with lateral interaction will be inspected under the annual Sanitary Lateral Inspection Program.]

The approved budget for Phase 2 was \$357,550. The amount spent to date is \$127,397 and the remaining funds of \$230,153 are committed for the Financial Assistant Plan and the Flow Monitoring work which will be carried out in 2015-2016 (see **Attachment F**).

Phase 3 of the program is being proposed to cover the remainder of the Thornhill Area, the Milliken Area, and the Unionville Area (see **Attachment C**). Phase 3 would run from 2015 – 2018 at a total estimated cost of \$361,700 (see **Attachment F**).

Phase 4 of the program is expected to run from 2016-2019 with a total estimated cost of \$248,218. Phase 5 of the program is expected to run from 2017-2020 with a total estimated cost of \$244,065 (see **Attachment F**).

At this time the program has a total of 5 phases proposed with funding for future phases to be considered as part of the annual budget process. Funding for 2016 and 2017 is subject to Council approval.

The DDP is just one of the programs/initiatives to mitigate sanitary system inflow/infiltration (I-I) issues. The other initiatives include sewer and lateral inspection & lining, plugging and sealing manholes, design standard changes, etc.

BACKGROUND:

The DDP is an extension of the Pilot DDP completed in 2012. The goal of the program is to:

- Reduce the risk of wastewater based basement flooding;
- Reduce the flow in the sanitary sewer system by reducing extraneous inflow;
- Enforce the City of Markham Sewer By-Law #2014-71 which does not permit storm water entering the wastewater collection system.

The identification of higher risk areas within the City and the phasing of the program were determined by taking into account wastewater flow modeling, wastewater flow monitoring, past flooding incidents reported to the City and all other on-going programs/initiatives within Markham. These identified higher risk areas are shown on **Attachment D**.

Under the pilot program, smoke testing and water testing had been used to identify the direct connections of downspouts into the sanitary sewer system. Based on the Phase 1 test results, it was noticed that smoke testing proved to be a more efficient and cost effective process in finding sources of I-I contribution than water testing. In order to improve the cost effectiveness of future phases of the DDP, Council has approved the elimination of water testing in the program under report “Citywide Multi-phase Sanitary System Downspout Disconnection Program – Phase 1 Progress Update and Phase 2 Details” dated March 14, 2014. With this change, a larger area could be covered under each phase of the program while reducing overall program cost.

Each phase of the DDP now involves the following elements:

- i. Modeling and evaluation of the existing flow monitoring data to assess the extent of extraneous flows in an area;
- ii. Public Communication and Education Plan;

- iii. Multi-step Site Investigation Approach:
 - 1. Lot survey identifying all downspouts connected to the underground system;
 - 2. Sanitary and storm sewer smoke testing of all downspouts connected to the underground system;
- iv. Resident notification for follow-up action required along with Financial Assistant Plan (FAP) information;
- v. A 12 months timeframe given to the homeowners to carry out the downspout disconnection works;
- vi. Follow-up corrective action inspection;
- vii. Progressive By-law Enforcement for non-compliance with required corrections;
- viii. Flow Monitoring of area after identified corrective action completed.

DISCUSSION:

1. Phase 1 Progress

Phase 1 covered the Thornhill area (see **Attachment A**) and commenced in May 2013. All testing had been completed by April 2014 and is currently in the disconnection stage. The test results are summarized in **Table 1**:

Table 1: Phase 1 –Test Results

	Total no. of Properties	No. of properties identified with Downspout directly connected to sanitary system	No. of other I-I contribution items identified	No. of lateral interaction identified
Phase 1	2,256	21	48	65

1.1 Direct connection of downspouts to the sanitary sewer system

Under Phase 1, a total of 21 properties had been identified as having downspouts directly connected to the sanitary sewer system. “Notice of Disconnection” had been mailed to the property owners by registered mail in June 2014. A 12 month period was provided to the homeowners to complete the disconnection works with a deadline of June 2015. The up-to-date disconnection status is summarized in **Table 2**.

Table 2: Downspouts Disconnection Status

	No. of properties identified with Downspout connect to Sanitary System	No. of properties completed disconnection	No. of properties outstanding (Due by June 2015)
Phase 1	21	3	18

1.2 Other public/private side I-I contribution sources

During smoke testing, apart from downspouts connections to sanitary sewer, other I-I sources were also identified. These sources were located within both public and private properties. **Table 3** summarized the different I-I sources and the action taken.

Table 3: Other I-I Sources Status

Public/Private Side	Other I-I Sources	No. Identified	Actions Taken
Public	Potential catchbasin connected to sanitary sewer	4	City O&M staff performed investigation and resolved the issue
Public	Sanitary Manholes Defects (cracks, hole, wrong cover lid)	5	City O&M staff repaired all the defects
Private	Uncapped Lateral clean out	17	City O&M staff capped all the lateral cleanouts
Private	Driveway drains, private CB, side drain, stairwell drain, and rear drain connections	13	List has been send to the City By-law Department for follow-up actions
Private	Potential sump pump connection	2	List has been send to the City By-law Department for follow-up actions
Private	Weeping tile connection	2	List has been send to the City By-law Department for follow-up actions
Private	Disconnected downspouts not properly capped	2	Letter send to property owners and the issues have been fixed with follow-up inspection
Private	Sanitary Manhole in parking lot with open grid cover	1	City O&M staff replaced the manhole lid
Private	Old oil sump connection	1	List has been send to the City By-law Department for follow-up actions
Private	Unknow cement structure connection	1	List has been send to the City By-law Department for follow-up actions
	Total	48	

1.3 Lateral interaction between sanitary and storm sewer

Lateral interaction occurs when smoke comes out from the downspouts under both storm and sanitary sewer smoke testing when the two systems are intended to be fully separate. This indicated that there may be cracks at the lateral pipe or some cross-connection which allows the migration of smoke during the testing. The properties identified to have lateral interaction have been added to the Sanitary Lateral Inspection program. This Program will inspect and evaluate the condition of the sanitary service laterals, with any defects identified to be fixed accordingly. The current status of the sanitary service lateral inspection is summarized in **Table 4**.

Table 4: Sanitary Service Lateral Inspection Status

	No. of properties with Lateral Interaction	No. of properties inspected	No. of properties to be inspected in 2015
Phase 1	65	40	25

For the 40 inspected properties, the CCTV results from the consultant indicated that there is no major structural defect that warrant any repair works at this time. One of the laterals was identified to have blockage caused by grease and the inspection could not be completed up to the property line. This issue will be resolved by City O&M staff in 2015.

1.4 Phase 1 Flow Monitoring

Flow monitoring will be undertaken after the required repair works have been completed in the Fall of 2015. The Phase 1 Flow Monitoring works will have a duration of one year. After this monitoring, staff will be able to assess how successful the work was in reducing the I-I level.

2. Phase 2 Progress

Phase 2 covered the Thornhill area (see **Attachment B**) and commenced in May 2014. All field testing was completed by November 2014. The preliminary test results are summarized in **Table 5**:

Table 5: Phase 2 –Test Results

	Total no. of Properties	No. of properties identified with Downspout directly connected to sanitary system	No. of other I-I contribution items identified	No. of lateral interaction identified
Phase 2	2,827	65	44	213

Note: These numbers will be confirmed upon receive of the Final Smoke Testing Report expected late March 2015.

2.1 Direct connection of downspouts to the sanitary sewer system

A “Notice of Disconnection” will be sent out to the affected homeowners in June 2015 along with the Financial Assistant Plan (FAP) information. The homeowners will be given a 12 month timeframe to secure contractors or undertake the work themselves. Along with it being available on the City web site, literature on how to properly and effectively disconnect the downspout will also be provided to the affected homeowners. Following the disconnection of downspouts and the FAP forms being submitted, the work will be inspected by City staff and rebates will be provided. Post disconnection flow monitoring is expected to commence in late 2016 for a one year period.

2.2 Other public/private side I-I contribution sources

The other I-I sources identified will be addressed by:

- City crews on public property in 2015;
- Inform By-law department regarding the private side I-I sources to carry out the necessary actions.

2.3 Lateral interaction between sanitary and storm sewer

The identified lateral interactions will be inspected in 2015 as part of our annual Sanitary Lateral Inspection Program. Depending on the extent of the works required, repairs will be undertaken in 2016.

2.4 Phase 2 Flow Monitoring

After completion of the necessary repair work, the one year post flow monitoring is expected to be carried out starting Fall 2016.

3. Phase 3 Sanitary System Downspout Disconnection Program

The following areas are being recommended for Phase 3 of the DDP (see **Attachment C**):

- a. Thornhill Area - bounded by John Street to the north, Highway 404 to the east, Chumleigh Crescent to the south, and Don Mills Road to the west;
- b. Milliken Area - bounded by Denison Street to the north, McCowan Road to the east, Steeles Avenue to the south, and Brimley Road to the west;
- c. Unionville Area - bounded by Highway 7 to the north, McCowan Road to the east, Highway 407 to the south, and Kennedy Road to the west; and

These areas cover a total of 3,690 properties. The proposed schedule for Phase 3 is summarized in **Table 6**:

Table 6: Phase 3 Schedule

i. Public Communication and Education Plan – (Overview of the Public Communication and Education Plan is enclosed in Attachment E)	Started in August 2014
ii. Lot Survey	August 2014 & May 2015 to September 2015
iii. Smoke Testing & Report	May 2015 to May 2016
iv. Resident notification for follow-up action required along with FAP information	June 2016 to May 2017
v. Follow-up corrective action inspection	June 2016 to June 2017
vi. Progressive By-law Enforcement for Non-compliance with required corrections	June 2017 to January 2018
vii. Flow Monitoring of area after identified corrective action completed	Oct 2017 to Oct 2018

Annual reports will be presented to Council regarding the progress of the program and to confirm future phase areas.

4. Other Future Program Areas

The DDP currently has a total of 5 phases in order to cover the identified higher risk areas (see **Attachment D**). The potential Phase 4 & 5 program areas are Markham Village Area A and Area B respectively.

In order to enhance the efficiency of the program, lot survey within part of the Phase 4 area (Markham Village Area A) will be performed during the Summer of 2015. By having the lot survey started in 2015, it will increase the flexibility of the smoke testing schedule and ensure the progress of the program in 2016.

5. Other Inflow-Infiltration (I-I) Reduction Initiatives and Programs

The DDP is just one of the many initiatives in Markham that deal with the issue of extraneous flow into the sanitary sewer system. Staffs have or are implementing the following in 2014 and 2015 to mitigate both public and private side I-I issues:

Public side:

- Sanitary sewer lateral inspection (On-going);
- Sanitary sewer relining (On-going);
- Sanitary manhole plugging for manhole covers at low-lying and ponding area (Completed in 2014. Follow-up inspection in 2015);
- Easement based Sanitary Manhole Condition Survey (On-going);
- Sanitary manhole sealing for the low-lying manholes during road re-construction and rehabilitation works (2015 Capital Budget Item);
- Resolve public side I/I sources identified during smoke testing of the Sanitary Sewer Downspout Disconnection Program (On-going).

Private side:

- Sustainable Neighborhood Retrofit Action Plan (SNAP) in Bayview Glen area by the Toronto and Region Conservation Authority (TRCA);
- Working with Insurance Bureau to implement additional private side measure to reduce extraneous flow and the risk of basement flooding.

Markham has been working closely with Region of York and TRCA by supporting them on their I-I and SNAP programs. The Region of York, due to their re-organization and re-examining priorities, looked at their private side Inflow-Infiltration (I-I) Program and decided it is now not going forward.

FINANCIAL CONSIDERATIONS:

The Phase 3 Program budget is \$361,700. The following funding allocation breakdown is proposed for the program covering 3,690 properties:

Table 4: Phase 3 Budget Breakdown

Item	Total Budget
<i>Activities:</i>	
<i>Public Communication & Education</i>	\$28,571
<i>Site Investigation</i>	\$123,360
<i>Financial Assistance Plan: Downspout Disconnection & Rain Barrel</i>	\$96,200
<i>Flow Monitoring</i>	\$75,000
<i>Total</i>	\$323,131
<i>Contingency (10%)</i>	\$32,131
Overall Total	\$355,444
Overall Total + Tax	\$361,700

Note: The above budget assumes 4% of the total properties will require downspout disconnection and take advantage of the Financial Assistance Plan.

The Financial Assistance Package (FAP), was approved by Council on March 19, 2013 under the report, "Citywide Multi-phase Sanitary System Downspout Disconnection Program – Financial Assistance Plan", and covers:

- 80% of the cost of completing the downspout disconnection, to a maximum of \$500, and
- 100% of the cost of a rain barrel purchased by the home owner, to a maximum of \$150.

The overall program estimate for the remaining areas (Phases 3, 4 & 5) is \$853,983 (see **Attachment F**). The annual cost breakdown for each of the remaining phases is:

Phase 3 (2015)	\$361,700
Phase 4 (2016)	\$244,065
Phase 5 (2017)	\$248,218
Total	\$853,983

Funding for future Phase 4 and Phase 5 will be subject to Council approval.

HUMAN RESOURCES CONSIDERATIONS

Resources are available within the Department.

ALIGNMENT WITH STRATEGIC PRIORITIES:

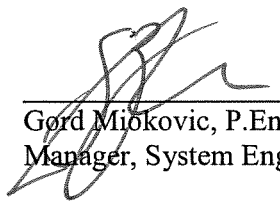
This project aligns with the Building Markham's Future Together Strategic Plan, improving the areas of Managing our Growth, Protecting our Environment and Excellence in Municipal Services. Disconnecting roof downspouts from the sanitary sewer system in accordance with City's By-law, has extensive and long-lasting environmental benefits which include reduced inflow/infiltration into the sanitary sewer system, reduced energy costs for sanitary sewer pumping and treatment, ground water recharge, water conservation, reduced probability of sanitary sewer backups into basements, and reduced sanitary sewer overflows to receiving waters.

BUSINESS UNITS CONSULTED AND AFFECTED:


The Business units which will be affected most by the Sanitary System Downspout Disconnection Program include Environmental Service – Waterworks, Asset Management, and By-law Enforcement.

RECOMMENDED

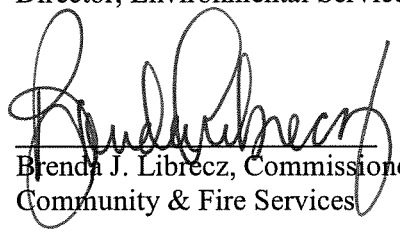
BY:



Gord Miokovic, P.Eng.
Manager, System Engineering



Peter Loukes, P.Eng.
Director, Environmental Services



Brenda J. Librecz, Commissioner
Community & Fire Services

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ATTACHMENTS:

Attachment "A" – Phase 1 Area

Attachment "B" – Phase 2 Area

Attachment "C" – Phase 3 Area

Attachment "D" – Citywide Multi-phase Sanitary System Downspout Disconnection Program

Attachment "E" – Downspout Disconnection Program Phase 3 Communication Strategy

Attachment "F" – Cost Breakdown for the Future Identified Program Areas