



Report to: General Committee

Date Report Authored: 15 Jan, 2013

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**SUBJECT:** Citywide Multi-phase Sanitary System Downspout  
Disconnection Program – Financial Assistance Plan

**PREPARED BY:** Gord Miokovic, Manager, System Engineering (Waterworks)  
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**RECOMMENDATION:**

- 1) That the report entitled “Citywide Multi-phase Sanitary System Downspout Disconnection Program – Financial Assistance Plan” be received; and
- 2) That Council, acknowledge the commencement of the Citywide Multi-phase Sanitary System Downspout Disconnection Program, which is an extension of the Pilot Sanitary System Downspout Disconnection Program completed in 2010; and
- 3) That Council, approve the financial assistance plan for the Citywide Multi-phases Sanitary System Downspout Disconnection Program; and further,
- 4) That the cost for Phase 1 of the Program totaling \$518,510 of which \$251,931 be funded in 2013 from capital project #11382 Downspout Disconnection Program and the remaining amount of \$266,579 be requested as part of the 2014 capital budget process;

That Staff be authorized and directed to do all things necessary to give effect to this resolution.

**EXECUTIVE SUMMARY:**

This report summarizes the details of the Citywide Multi-phase Sanitary System Downspout Disconnection Program and its associated proposed Financial Assistance Plan. The program is estimated to have seven phases implemented over eight years. The program is anticipated to incorporate approximately 11,126 properties within the City’s high risk waste water based basement flooding areas. The total cost of the entire program is estimated to be \$2.56 million.

A Financial Assistance Plan is proposed for the program in order to offset the residents’ cost in disconnecting the downspouts, which are directly connected to the sanitary sewer system. The plan will cover 80% of the cost for completing the downspout disconnection, to a maximum of \$500, and 100% of the cost up to \$150 for a rain barrel purchase by the home owner.

The works involved in the Program includes the following:

- i. Public Communication and Education Plan;
- ii. Site Investigation to identify direct downspouts connection to the sanitary sewer system;
- iii. Disconnection of identified downspouts and implementation of the Financial Assistance Plan;
- iv. Progressive By-law enforcement;

- v. Flow monitoring after the disconnection of downspouts to assess sanitary sewer capacity.

Based on the risk analysis, which takes into account the flow monitoring data, past flooding records and all the on-going programs/initiatives within Markham, Phase 1 of the 7 phases program will be implemented within the Thornhill Area and will run from 2013 – 2015 (including a minimum of one-year flow monitoring after the disconnection of downspouts) with an estimated cost of \$519K. Annual reports will be prepared to update Council on the progress of the program and the identification of future phase areas. Funding for future phases will be considered as part of the annual budget process.

**PURPOSE:**

The purpose of this report is to present details of the Citywide Multi-phase Sanitary System Downspout Disconnection Program and to obtain authorization from Council for the proposed Financial Assistance Plan to support the program.

**BACKGROUND:**

The City of Markham has separate sewer systems for storm water and sanitary flow. Sanitary sewers are designed to convey household and commercial wastewater to Regional wastewater trunk sewers and eventually to wastewater treatment plants. Sanitary sewers are not sized to convey any storm/snowmelt runoff and only have capacity to allow a small amount of infiltration of groundwater into the system before becoming surcharged (beyond capacity).

Over time in some older areas within the City, home owners and builders have on occasion incorrectly connected the roof downspouts directly to the sanitary sewers. These direct connections of downspouts to the sanitary sewer system, which are now illegal, create elevated sewer flow and increase the risk of sanitary sewer backups and basement flooding during extreme wet weather conditions.

In order to mitigate this primary contributor to extraneous sanitary inflows, City of Markham Council through the report dated April 3, 2008, approved a Pilot Downspout Disconnection Program in the Grandview area of Thornhill in April 29, 2008. This pilot program was successfully completed in February 2010. A staff report to Council was made in September 2010, presenting results and effectiveness of the pilot program and recommending the consideration of implementing the Citywide Multi-phase Sanitary System Downspout Disconnection Program in selected high priority areas, including provision of a financial assistance package. As highlighted in the report at that time, under the pilot program, 45 homes were identified as having their downspouts connected to the sanitary system. This accounts for 6% of the total 766 homes in the pilot study area. The City spent \$9,800 on the financial assistance plan in disconnecting all the identified downspouts. The effectiveness of disconnecting the downspouts from the sanitary sewer was evaluated through the pre and post downspout disconnection flow monitoring data. The results indicated that there was a 40-50% reduction in the peak inflow and infiltration (I/I) rates within the pilot area local sanitary sewers.

It should be noted that the Downspout Disconnection Programs also acts as a means to enforce the existing City of Markham Sewer By-Law # 436-86 and Region of York Sewage and Land Drainage By-Law # S-0064-2005-009, which prohibit the discharge of roof drainage water to the sanitary sewer system.

Further to the Pilot Program, continuous flow monitoring has been performed to evaluate the condition and risk of different areas within the City. The flow monitoring results, along with the past flooding records, were used to determine and prioritize the different areas and phases of the program being recommended.

#### **OPTIONS/ DISCUSSION:**

##### **1. Citywide Multi-phase Sanitary System Downspout Disconnection Program**

The Citywide Multi-phase Sanitary System Downspout Disconnection Program is an extension of the Pilot Downspout Disconnection Program which was successfully completed in 2010, achieving 100% disconnection compliance within the enforcement period. The Program will focus on the areas within the City that have elevated risk of waste water based basement flooding, namely the three specific older areas within City of Markham (built before 1980's): the Thornhill Area, Unionville Area and Markham Village.

The Citywide Multi-phase Sanitary System Downspout Disconnection Program has direct connections/tie-in with other programs/initiatives. Waterworks has been actively involved in the following programs/initiatives in order to ensure the success of the Citywide Multi-phase Sanitary System Downspout Disconnection Program and the consistency of the program direction:

- Flood Control Implementation Strategy being undertaken by Asset Management
- Sanitary Sewer Relining by Environmental Service – Waterworks
- Inflow/Infiltration (I/I) Reduction Program by York Region
- Sustainable Neighbourhood Retrofit Action Plan (SNAP) by Toronto and Region Conservation Authority (TRCA)

Based on the current available information, which includes flow monitoring data, past flooding records and all the on-going programs/initiatives within Markham, it is estimated that the Program will have a total of seven phases implemented over an eight year period with an estimated total cost for the entire Program of \$2.56 million. Information regarding the program cost estimate is provided in the “Financial Considerations” section below. The areas within the City that have been identified for the Citywide Multi-phase Sanitary System Downspout Disconnection Program along with number of properties in each area are summarized in Table 1 and the figure enclosed in **Attachment A**.

**Table 1: Identified Areas Statistic of the Citywide Multi-Phases Sanitary Sewer Downspout Disconnection Program.**

Locations	Identified Areas	No. of Properties in Area
Thornhill Area	Area A	2,256
	Area B	1,274
	Area C	1,400
Unionville Area	Area A	1,517
	Area B	1,808
Markham Village	Area A	1,351
	Area B	1,520
Total		11,126

Please note that the number of phases, identified program areas, priority of the areas, and the overall program implementation time are subject to change based on the annual risk evaluation of different areas within the City taking into consideration the most up-to-date flow monitoring results, flooding records and the improvement to the system due to other initiatives/programs.

The Citywide Multi-phase Sanitary System Downspout Disconnection Program will use the Pilot Program approach and will involve the following components:

*i. Public Communication and Education*

Corporate Communication and Community Engagement will establish a Public Communication and Education Plan, covering the entire run of each phase of the Multi-phase Program. The plan will connect the residents and the City to ensure a smooth and efficient roll out of the Program. The plan will include public meetings, website content, newsletters, notices, and site visits. Details of the Public Communication and Education Plan are included in **Attachment B**.

*ii. Site Investigation*

The following multi-step site investigation approach will be undertaken in order to locate the downspouts that are connected directly to the sanitary sewers system:

1. Lot survey undertaken each summer for the specific phase;
2. Sanitary and storm sewer smoke testing on all downspout connected to the underground system; and
3. Water/dye testing on the downspouts that do not response to or that are not conclusive as a result of the smoke testing

*iii. Downspout Disconnection and Financial Assistance Plan*

Notice of Disconnect will be sent out to home owners with downspouts identified to be directly connected to the sanitary sewer system. After proper disconnection of the downspouts, the home owners can apply for the Financial Assistance Plan in order to offset the majority of the cost associated with the disconnection work. Details of the proposed Financial Assistance Plan are provided in the next section.

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iv. *By-law Enforcement*

For cases where the residents do not disconnect the identified downspouts within the disconnection period indicated in the Notice of Disconnection, City of Markham Sewer By-Law # 436-86 will be enforced in order to ensure compliance.

v. *Flow Monitoring After Program's Phase Completion*

After the completion of each program phase, flow monitoring will be undertaken for a minimum one-year period in order to evaluate the effectiveness and benefit of the downspout disconnection. Should the reduction in risk not be sufficient, further tools may need to be used in the area to address the issue. This would be conveyed to Council through this program's annual updates.

## **2. Financial Assistance Plan**

The Financial Assistance Plan will follow the provision approved by Council to offset residents' costs and facilitate the compliance process under the Pilot Program. The financial assistance package will include the following:

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

The Financial Assistance Plan will be implemented for all future phases of the program. If there is a need to revise or modify the Financial Assistance Plan, approval from Council will be obtained accordingly.

## **3. Phase 1 of the Citywide Multi-phase Sanitary System Downspout Disconnection Program and Future Phases**

Based on detailed risk analysis, the Phase 1 area for the Citywide Multi-phase Sanitary System Downspout Disconnection Program is identified as Area A within the Thornhill Area (see **Attachment A**). The Phase 1 area covers a total of 2,256 properties and 68 m of sanitary and storm sewers. The proposed schedule for Phase 1 of the Program is as follow:

- i. Public Communication and Education Plan – **April 2013 to January 2015** (Overview of the Public Communication and Education Plan is enclosed in **Attachment B**);
- ii. Site Investigation which includes lot survey, sanitary and storm sewer smoke testing, and water/dye testing – **May 2013 to April 2014**;
- iii. Disconnection of identified roof downspouts and implementation of Financial Assistant Plan – **May 2014 to November 2014**;
- iv. Progressive By-law enforcement – **December 2014 to January 2015**;

v. Flow monitoring after the disconnection of downspouts – **December 2014 to November 2015.**

According to the current available information and analysis, it is anticipated that apart from Phase 1, there will be six more phases of the Program in order to cover all the identified high risk areas within the City. It is anticipated that a new Phase of the program will roll out on an annual basis. The actual program area for each phase will be confirmed in an annual council report. The program areas for future phases will be determined based on past flooding history, flow characterization observed during flow monitoring, and sewer capacity modeling, while taking into consideration the impacts from all the on-going programs/initiatives within Markham. An annual report will be presented to Council regarding the progress of the program and the identified/confirmed future phase areas.

The approach implemented under Phase 1 of the Program will serve as a basis for all future phases.

**FINANCIAL CONSIDERATIONS AND TEMPLATE: (external link)**

Taking into consideration the future phase areas, the overall program cost is approximately \$2.56 million (refer to attachment C for cost breakdown). The cost estimate and work breakdown for Phase 1 of the Program are summarized in the following table. It is estimated that the cost for Phase 1 of the Program is \$518,510 of which \$251,931 will be funded by the 2011 capital project #11382 Downspout Disconnection Program in 2013 and the remaining amount of \$266,579 will be requested as part of the 2014 budget process.

**Table 2: Phase 1 Cost Breakdown**

Year	Item	Total Cost
<b>2013</b>	<b><i>2013 Requirements (to be funded from project 11382)</i></b>	
	<i>Activities:</i>	
	<i>Public Communication &amp; Education</i>	\$12,640
	<i>Site Investigation</i>	\$239,291
	<b><i>2013 Total</i></b>	<b>\$251,931</b>
<b>2014</b>	<b><i>2014 Budget Required</i></b>	
	<i>Activities:</i>	
	<i>Site Investigation</i>	\$103,179
	<i>Financial Assistance Plan: Downspout Disconnection &amp; Rain Barrel</i>	\$88,400
	<i>Flow Monitoring</i>	\$75,000
	<b><i>2014 Total</i></b>	<b>\$266,579</b>
<b>2013-2014</b>	<b>Overall Total</b>	<b>\$518,510</b>

Note: 2014 budget will be subject to Council approval through the 2014 Budget Process

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The above cost assumes 6% of the total properties identified in table 1 will require downspout disconnection and take advantage of the Financial Assistance Plan, estimated based on the results of the Pilot Program.

Please note that the cost estimate is based on the current industry standard. All future funding requests will be made during the annual budget process

### **HUMAN RESOURCES CONSIDERATIONS**

Resources are available within the Department.

### **ALIGNMENT WITH STRATEGIC PRIORITIES:**

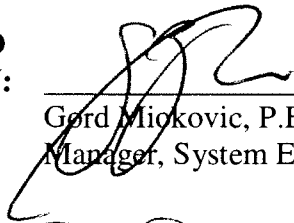
This project aligns with the Building Markham's Future Together Strategic Plan, improving the areas of Managing our Growth, Protecting our Environment and Excellence in Municipal Services. Disconnecting roof downspouts from the sanitary sewer system in accordance with City's By-law, has extensive and 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.

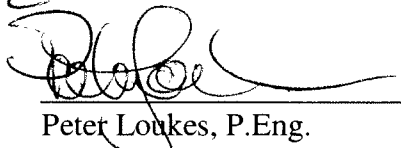
### **BUSINESS UNITS CONSULTED AND AFFECTED:**

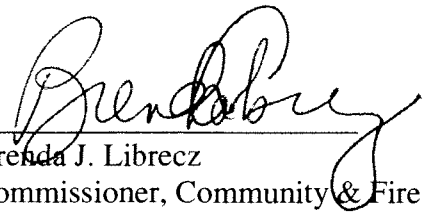
The Business units which will be affected most by the Roof Downspout Disconnection Program include Environmental Service – Waterworks and By-law Enforcement.

### **RECOMMENDED**

**BY:**

  
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Peter Loukes, P.Eng.  
Director – Environmental Services

  
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Brenda J. Librecz  
Commissioner, Community & Fire Services

**ATTACHMENTS:**

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

Attachment "B" – Public Communication & Education Plan

Attachment "C" – Cost Breakdown for the Identified Program Areas