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INFLOW AND INFILTRATION REDUCTION PILOT PROJECTS TRI-PARTY AGREEMENTS UPDATE CITY OF MARKHAM, CITY OF VAUGHAN, TOWN OF AURORA, AND TOWN OF RICHMOND HILL

The Environmental Services Committee recommends the adoption of the recommendation contained in the following report dated October 19, 2012, from the Commissioner of Environmental Services.

1. RECOMMENDATION

It is recommended that this report be received for information.

2. PURPOSE

The purpose of this report is to provide an update on the inflow and infiltration reduction pilot projects and local municipal tri-party agreements as requested at the March 2012 Environmental Services Committee meeting. These projects complement the Regional and local Inflow and Infiltration Reduction Strategy and help address conditions of approval on the Southeast Collector Individual Environmental Assessment.

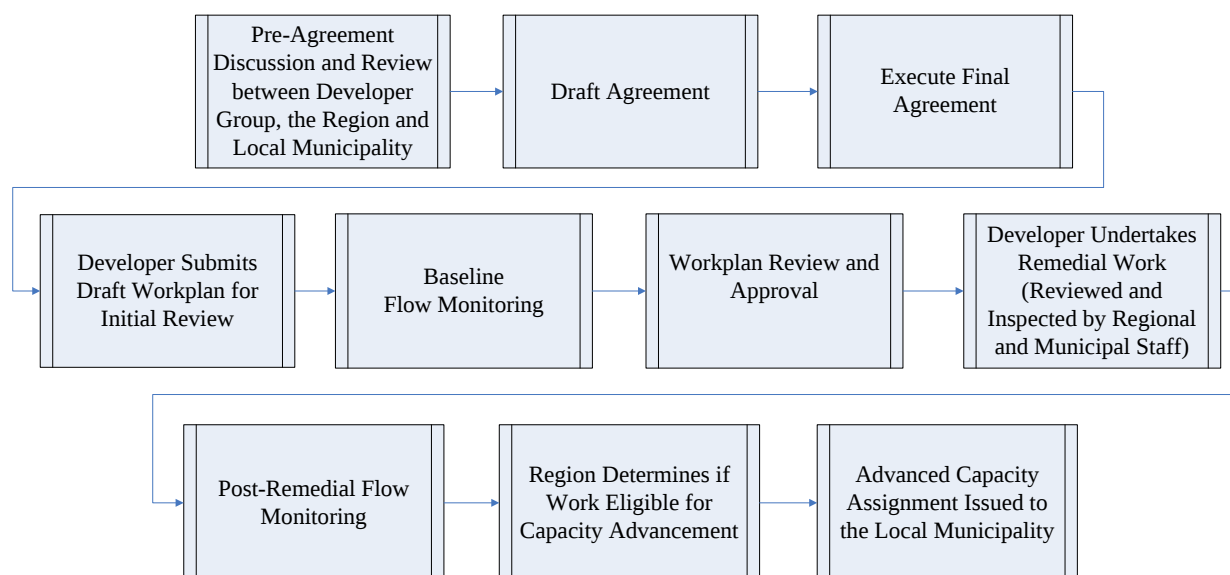
3. BACKGROUND

Four inflow and infiltration reduction tri-party agreements approved to date

On September 23, 2010, Council authorized staff to enter into an agreement with the City of Markham and Upper Unionville Inc. to permit Upper Unionville Inc. to undertake an inflow and infiltration reduction pilot project funded solely by the developer in exchange for allocation of advanced servicing capacity. Council also authorized staff to consider similar developer initiated projects in other local municipalities. Council has authorized three more agreements since that time.

The following figure outlines the development and approval process for the pilot projects.

Figure 1
Development and Approval Process Flow Chart



A summary of the status and details of the four pilot projects is provided in Table 1.

Table 1
Pilot Projects Summary

Municipality	Landowners Group	Status of Agreement	Potential Capacity assignments (units)	Capacity assigned to date (units)
Markham	Upper Unionville Inc.	Executed (June 2011)	2500	480
Vaughan	Huntington Landowners Trustee Inc.	Executed (Sept. 2012)	4600	667
Aurora	Aurora 2C Landowners Group Inc.	Executed (Sept. 2012)	3300	0
Richmond Hill	North-East Leslie Landowners Group Inc.	Execution anticipated late 2012	2232	0

480 units of capacity assigned to Markham and 667 units of capacity assigned to Vaughan with further remedial works underway

The Phase I work plan for remedial construction activities submitted by Upper Unionville Inc. was reviewed, analysed and audited by Region and Markham staff. The final plan was approved for implementation in February 2012. Work was completed and the first phase of capacity assignment from inflow and infiltration reduction, totalling 480 units, has been granted to Markham for the Upper Unionville Inc. development. A Phase I work plan for Vaughan has also been implemented by the Huntington Landowners Trustee Inc. resulting in 667 units of capacity.

Allocation granted through this program uses a ratio of two units of reduction to one unit of capacity assignment for all inflow and infiltration reductions to help support the 40 megalitres per day inflow and infiltration reduction goal in 2031 from the Southeast Collector Individual Environmental Assessment conditions of approval. The above reductions achieve approximately 3% of the Region's target. The following implementation plans have also been submitted and are under review by Regional and local municipal staff, with remedial repair works expected to begin before year end:

- Phase II work plan submitted by Upper Unionville Inc. in Markham
- Phase II work plan submitted by Huntington Landowners Trustee Inc. in Vaughan

The majority of works targeted by developers include: roof leader disconnections, downspout disconnections and basement drain disconnections from the local sanitary sewer system. Various catch basins and manholes have also been rehabilitated or disconnected from the sanitary system to alleviate additional storm flows from gaining access to the sanitary sewer system. The second phase submission in the City of Markham focuses mainly on manhole lid repairs and sealing. It is imperative for local municipalities to understand the work the developers are completing, as over time, these specific improvements will need to be funded and maintained by local municipalities on a regular basis to ensure removed flows do not recur once the advanced capacity has been assigned and allocated.

Inflow and infiltration reduction pilot projects complement the Region's overall inflow and infiltration reduction program

Key benefits of the inflow and infiltration reduction pilot projects are summarized below:

- Developer funding of required local system capacity and maintenance improvements at no cost to the Region or local municipalities
- Reduction in inflow and infiltration complements Regional and local Inflow and Infiltration Reduction Strategy and conditions of the Southeast Collector Individual Environmental Assessment
- Generation of development charges from the advanced capacity assignment allocated
- Acquiring project experience that can be used for other inflow and infiltration reduction projects in Regional and local municipal systems

- Provision of flow data used for hydraulic model calibration and capacity monitoring

It is critical that existing pilot projects continue to be carried out in a manner that complements the Region's overall Inflow and Infiltration Reduction Strategy and address Southeast Collector Individual Environmental Assessment conditions of approval. Work plans will continue to be developed in partnership with the development community to achieve local municipal and Regional objectives.

4. ANALYSIS AND OPTIONS

Success of the pilot projects hinge on the Region's ability to align developer interests with the regional Inflow and Infiltration Reduction Strategy. It is imperative that works continue to be carried out with rigorous implementation plans, including detailed proposals for remedial works, flow monitoring and public communication materials that are deemed acceptable to Regional and local municipal staff.

Acceptance of additional allocation-seeking proposals beyond one pilot per municipality is not recommended

In February and March 2011, Regional and local councils approved the Inflow and Infiltration Reduction Strategy. To ensure the developer funded pilots are actually achieving targeted results, remediated works will need to show sustained long-term (one year flow measurement) enduring reductions of inflow and infiltration that form a significant contribution towards the overall strategy objectives to meet the Ministry of the Environment's conditions of approval. Until developer funded pilot projects successfully demonstrate sustained long term benefits to the Region's overall inflow and infiltration reduction strategy, acceptance of additional allocation-seeking proposals beyond one pilot project per municipality is not recommended.

Early results of pilot projects show reduced inflow and infiltration, but further monitoring is required to assess long-term benefits

Although early advances in reducing inflow and infiltration have been promising, a considerable amount of additional work continues. Final reconciliation of capacity assignment to pilot projects will be made as verified by post remediation flow monitoring currently underway.

Inflow and infiltration reduction works carried out in Markham and Vaughan in accordance with respective implementation plans submitted by the developers are summarized in Table 2.

Table 2
Completed Inflow and Infiltration Works to End of September 2012

MARKHAM	VAUGHAN
• 16 downspouts removed in residential properties • Cross-connections rectified in four reversed sloped driveways through construction of new storm sewer connections • Sealing and restoration of three maintenance access lids • Cross-connections rectified at two commercial sites • Diversions of storm runoff away from basement drains that connect to sanitary sewer system at two houses	• The Brooke Street sanitary sewer was constructed inside a storm sewer, with steel plate maintenance access covers to separate the two systems. Closed circuit television inspection was carried out to identify sources of inflow and identified a missing access cover plate which allowed stormwater inflow into the sanitary sewer. The missing plate was installed and all plates are being properly sealed and secured in addition to further ongoing inspection and remedial works to ensure repairs provide long-term reductions.

For the Markham pilot project, post construction flows are currently being monitored with seven flow meters. Six months of post construction flow monitoring confirmed that there is now less inflow and infiltration originating from the areas where remediation works have been performed.

Repair work to the Brooke Street sewer in Vaughan was completed in August 2012. Prior to repair, flow meters recorded spikes in sanitary sewer system flows during rain events. Spikes in flows have not been recorded during rain events that occurred after the work was completed.

While early works indicate reductions in inflow and infiltration and have provided innovative ways to advance capacity assignment to local municipalities, full evaluation of the benefits of the program requires longer-term assessment. This will include evaluation of the long-term performance of the works being done. For instance, the next phase of works proposed by the developer in Markham focuses mainly on maintenance access lid repairs and sealing. The reliability and durability of lid sealing requires evaluation long after the work has been completed. To date, developer led works have helped reduce inflow to the sewer system. Consideration will also be given to encourage future work plans to focus on infiltration reduction.

Detailed work plans and inflow and infiltration reduction verification must be in accordance with Regional and local requirements

Detailed work plans approved by the Region are required from developers to ensure that works carried out are in alignment with the Region's overall plan and conducted to the Region's standards. A resident communication protocol acceptable to local municipalities and the Region is required to ensure the public is notified of all projects.

To ensure consistency and proven benefits, quantification, flow monitoring and verification must be in accordance with the method adopted for the Region's overall Inflow and Infiltration Reduction Strategy. All monitoring works conducted by the developer for the purposes of determining actual inflow and infiltration reduction associated with capacity allocation will be reviewed by the Region and where required, the Region will carry out independent monitoring to support the verification process.

Developers must comply with the Region's *Sanitary Sewer System Inspection, Testing and Acceptance Guidelines* in all local municipalities

Equally important to project success is that any new sewer pipe constructed by developers, comply with the Region's *Sanitary Sewer System Inspection, Testing and Acceptance Guidelines* developed in October 2011. This will ensure that future inflow and infiltration is minimized and will not counteract gains in reduction of inflow and infiltration in existing areas. Acceptance guidelines are now implemented in all local municipalities and are a pre-condition for all future capacity assignment to local municipalities. These guidelines will ensure acceptable quality of installed infrastructure and will help ensure new developments are not the future source of excess inflow and infiltration by confirming proper performance before municipal assumption takes place.

Principles of agreement, delineated in the tri-party agreements, guide the pilot projects and are in place to ensure the requirements of the Region and local municipalities are met. These Council approved principles must be adhered to.

Future flow monitoring and audit programs will recognize municipalities that sustain acceptable or better inflow and infiltration thresholds

During the execution and implementation stages of the pilot projects, the Region has received requests from local municipalities for a mechanism to provide capacity assignment in exchange for local inflow and infiltration reduction and system maintenance in a similar fashion to the developer funded pilot projects.

In specific areas of many local municipalities, current inflow and infiltration rates and volumes surpass design limits and acceptable industry thresholds. As a result, wastewater flow generated per capita is not sustainable, not now or in the future. Improving inflow and infiltration performance is a necessity for sustainable system management and to

accommodate future growth. Improving unacceptable levels of inflow and infiltration does not warrant advanced capacity assignment and is a requirement for responsible management of the existing and future capacity assignment process. All local municipalities have committed to inflow and infiltration reduction actions both as a condition of 2013 and post 2013 capacity assignment, as well as to meet conditions of approval on the Southeast Collector Individual Environmental Assessment. The Inflow and Infiltration Reduction Strategy aims to address this mutual challenge in both local and Regional systems. Regional and local focus on inflow and infiltration reduction and capacity assignment will continue to be based on proven results of developer pilots.

York Region will consult with local municipalities to establish base allowances for inflow and infiltration

On May 17, 2012, Council received Clause 5 of Report No. 5 of Environmental Services Committee awarding the flow monitoring and audit program. This program will improve the Regional and local municipalities' current understanding of system performance in relation to investments made on system maintenance and recognize municipalities that are managing, operating and sustaining flows below acceptable (design) inflow and infiltration thresholds. With this understanding of system flows, the Region will consult with local municipalities to establish base allowances for inflow and infiltration and a flow based capacity assignment framework will be agreed to instead of the current population based approach. The joint Regional and local municipal expectation will be that inflow and infiltration flow rates be managed at allowable limits (as committed). Where flows are impacted by increased inflow and infiltration beyond an acceptable range, the capacity assignment will be adjusted to account for additional inflow and infiltration flow rates. Conversely, if flows are managed at levels better than acceptable design limits and adequate conveyance capacity is thereby available for use, the potential exists for municipalities to gain additional capacity assignment in recognition of improved system performance.

Regional/Local Water and Wastewater Steering Committee has started discussions toward developing a revised performance based framework for capacity assignment

Regional staff received requests from local municipal staff for consideration of additional wastewater capacity assignment if the local municipality can demonstrate sustained local sanitary system performance better than design allowances for inflow and infiltration. To be responsive to these requests, Regional staff initiated discussions with local municipal staff with the aim of developing a revised performance based framework for wastewater capacity assignment as part of the Regional/Local Water and Wastewater Steering Committee. The key to moving forward will be to establish comprehensive baseline flows and supporting program to understand performance and how in-progress remediation work impacts the baseline.

With development of this program and the addition of planned improvements to the Regional trunk flow monitoring system, wastewater flow data will be readily available and consistent. Billing actual wastewater flows (as currently implemented in King Township) will also proceed to more accurately assess system usage. Currently, the flow monitoring and audit program is under development and flow monitors will begin to be installed in mid-2013.

Link to key Council-approved plans

Implementation of the pilot projects supports the following two 2011 to 2015 Corporate Strategic Plan objectives by recovering existing wastewater system capacity through the approval of developer funded inflow and infiltration reduction projects in partnership with local municipalities:

- identify and leverage capacity available in existing infrastructure to complete the build-out of developing communities
- continue to partner with all levels of government to facilitate delivery of environmentally-sustainable infrastructure

5. FINANCIAL IMPLICATIONS

Developer funded Inflow and Infiltration reduction pilot projects provide a unique opportunity for local municipalities to complete required inflow and infiltration reduction at no cost

There are no direct financial implications as a result of this report. Developers are undertaking projects at their own cost and are fully responsible for Regional and local municipal costs for retaining consultants to assist with review and inspection of remediation works and to conduct independent flow monitoring to verify inflow and infiltration reduction results.

In addition, developer groups are fully responsible for all Regional and local municipal staff costs to prepare and administer the agreement, as well as all legal fees incurred by the Region for the agreement.

Inflow and infiltration pilot projects provide local municipalities with an opportunity to generate alternative means of funding sewer remediation projects that would otherwise be funded by user rates. The program complements the Inflow and Infiltration Reduction Strategy and Southeast Collector Individual Environmental Assessment. The program also provides an alternative temporary funding mechanism to achieve Inflow and Infiltration Reduction Strategy objectives.

6. LOCAL MUNICIPAL IMPACT

All local municipalities will benefit from the pilot projects

There are currently four developer initiated inflow and infiltration reduction pilot projects in the Region. Local municipalities benefit from the removal of a portion of existing inflow and infiltration generated in the system, at no cost to these municipalities. York Region and the nine local municipalities are actively involved in the Inflow and Infiltration Reduction Strategy program and experience gained in these pilot projects will be shared across all municipalities.

7. CONCLUSION

In February and March 2011, Regional and local Councils approved the Inflow and Infiltration Reduction Strategy that focused on the following commitments:

- Develop and maintain the Strategy including the programs, goals and interagency and regulatory reporting requirements for staged reduction of inflow and infiltration over the next 20 years
- Recommend to future Councils that they commit funds for inflow and infiltration reduction that is economically justified by the avoidance of future treatment and conveyance costs
- Measure wastewater flows before and after carrying out construction/rehabilitation works on sewers and document inflow and infiltration reduction expenditures and flow reduction measures
- Continue to work together in a collaborative manner over the life of the Strategy and commit appropriate staffing and financial resources toward implementation of the Strategy based on a business case analysis

The developer funded pilot projects help to meet the above commitments and main benefits continue to be:

- Developer funding of required local system improvements derive benefits in existing infrastructure at no cost to the Region or local municipalities
- A reduction in inflow and infiltration in line with the Regional and local Inflow and Infiltration Reduction Strategy and Southeast Collector Individual Environmental Assessment
- Generation of development charges from the capacity assignment allocated
- Acquiring project experience that can be used for other inflow and infiltration flow reduction projects in the Region

York Region and the local municipalities have a joint responsibility to implement the Strategy and further define activities to ensure the Strategy is continually maintained and enhanced. The Strategy will be updated as data is collected, new information is learned and new technology becomes available through this and other initiatives.

For more information on this report, please contact Daniel Kostopoulos, Director, Capital Planning and Delivery at Ext. 5070.

The Senior Management Group has reviewed this report.