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**16TH AVENUE TRUNK SEWER, PHASE 2 UPDATE
AND WELL MITIGATION, CACHET ESTATES
TOWN OF MARKHAM, PROJECT 74030**

The Transportation and Works Committee recommends the adoption of the recommendations contained in the following report, November 25, 2004, from the Commissioner of Transportation and Works:

1. RECOMMENDATIONS

It is recommended that:

1. The independent monitoring of the Environmental Management Plan (EMP) as being carried out by Gartner Lee Ltd. for the 16th Avenue Trunk Sewer, Phase 2 Project, be amended from \$200,000 to \$750,000 excluding GST to cover the three year construction period.
2. Regional Council approve the financial contribution to the Town of Markham, an amount up to \$1,650,000 for the Cachet Estates Municipal Water System Project, subject to the Town of Markham securing releases from the residents of Cachet Estates on behalf of the Region.

2. PURPOSE

On October 5, 2004, the Region received the Permit to Take Water (PTTW) for the construction of the 16th Avenue Trunk Sewer, Phase 2. This project includes a significant EMP component. The regulatory agencies have conditioned the full compliance to the EMP under the PTTW. Accordingly, the Region is utilizing the services of Gartner Lee Ltd. to conduct an independent monitoring of the EMP implementation. This report outlines the compliance program and the associated cost. As well, this report briefly discusses the well mitigation program and outlines the finalization of the financial contribution to the proposed servicing of Cachet Estates.

3. BACKGROUND

On October 19, 2004 the Region executed a contract with McNally International Inc./Aecon Civil (Joint Venture), for the construction of the 16th Avenue Trunk Sewer, Phase 2 project, following receipt of key environmental approvals from the Ministry of the Environment (MOE) and the Toronto Regional Conservation Authority (TRCA).

A significant component of the construction contract is the EMP. This plan, adopted by the regulatory agencies, is designed to protect the natural functions of the eco-system;

fish and fish habitat, wetlands, streams and environmentally sensitive areas. The EMP operates on the principle of proactive management of stress to the natural environment. The EMP includes implementation of the mitigation plan, which incorporates comprehensive monitoring and adaptive management concepts.

3.1 Environmental Management Plan

Following extensive review by the regulatory agencies over the past eight months, the plan, as outlined in the following documents, was included as a condition to be complied with under the PTTW received on October 5, 2004:

- 16th Avenue Trunk Sewer Phase 2 EMP Report, MacViro Consultants Inc., May 2004.
- Addendum to the 16th Avenue Phase 2 EMP Report, MacViro Consultants Inc. June 25, 2004.
- 16th Avenue Trunk Sewer Phase 2 Addendum 2 to EMP Report, MacViro Consultants Inc. July 15, 2004.
- 16th Avenue Trunk Sewer Phase 2 Addendum 3 to EMP report MacViro Consultants Inc. July 19, 2004.

The EMP outlines proactive mitigation measures, with significant capital costs, for the safeguarding of the groundwater resource, wetlands, woodlots and watercourses. It particularly addresses concerns associated with the reduction in stream base flows, the discharge of groundwater into the receiving streams, as well as dewatering effects on wetlands and woodlots. The plan identifies all temporary effects of dewatering on; groundwater recharge of streams and wetlands, erosion of streams from discharge, and temperature impacts of the discharge on cool or warm water fisheries as well as the potential affects of dewatering on the trees and vegetation. It also outlines the necessary steps to mitigate these temporary adverse affects from an environmental standpoint.

3.2 Well Mitigation Program

As part of the well mitigation program, the Region's proactive mitigation program has identified potential impacts to private wells prior to the commencement of the dewatering operation. This proactive mitigation program based on an analysis undertaken using information obtained from Ministry of the Environment (MOE) well records and from well surveys conducted throughout the area has predicted impacts at the locations noted in Table 1.

Table 1
Predicted Well Impacts

Location	Number of Wells Impacted
Cachet Estates	43
Jennings Gate	3
Victoria Square	0
Rural Areas	38
Heavy Water Users	4
Total	88

Implementation of the planned proactive measures of the enhanced mitigation program was initiated following receipt of the PTTW from the MOE on October 5, 2004. These measures will include one of the following:

- Lowering of the pumps in the existing wells.
- Providing a new deeper drilled well.
- Connection to a local watermain where feasible.

The proactive mitigation option chosen for the anticipated well interference in the Cachet Estates and Jennings Gate areas is the connection of the potential affected residents to an extension of a local watermain service into this area by the Town of Markham.

4. ANALYSIS AND OPTIONS

On October 5, 2004 the MOE issued the dewatering permit for the project. The permit references stringent obligations that must and will be met under the terms of the EMP. Integral to the compliance to the PTTW is a satisfactory EMP that manages the dewatering activity in an environmentally responsible manner. The mitigation measures in the EMP, as required for compliance by the regulatory agencies, includes a comprehensive monitoring program that provides the agencies with a measure of satisfaction that the EMP is carried out successfully. Therefore, the Region must ensure that the design builder McNally International Inc./Aecon Civil (Joint Venture) complies fully with the EMP conditions in the PTTW. Accordingly, the Region will conduct independent monitoring of the EMP implementation, through its own consultant, Gartner Lee Ltd., to ensure the integrity of the program.

4.1 Environmental Management Plan (EMP)

It is the responsibility of McNally International Inc./Aecon Civil (Joint Venture) to construct all temporary infrastructure necessary to affect the dispersions and, through their consultant MacViro Consultants Inc., to manage the plan and monitor and report to the regulatory agencies on a monthly basis. In order to provide overall quality assurance on the EMP, the firm of Gartner Lee Ltd., was retained by the Region on May 20, 2004. Their role will be dedicated to independent monitoring of the EMP.

The EMP as conditioned for compliance in the PTTW is made up of three major components:

- Dispersing the dewatering discharge east of Robinson Creek into the Cornell Development Storm Drainage, completed Ninth Line Trunk Sewer South of 16th Avenue and Exhibition Creek.
- Dispersing the dewatering discharge north of 16th Avenue to augment base flow in Little Rouge Creek, Robinson Creek, Bruce Creek, Berczy Creek, Beaver Creek, Rouge River, Apple Creek and Carlton Creek as well as dispersing the dewatering discharge west into Bruce Creek. In addition, dispersing dewatering discharge into the Angus Glen and York Downs golf courses for irrigation purposes.
- An extensive monitoring, adaptive management and reporting program.

The dewatering discharge east of Robinson Creek was approved earlier by the regulatory agencies and the diversion has been underway since May 2004. The balance of the EMP components will be implemented as part of Phase 2 construction activities.

The stringent requirements imposed on the management of temporary environmental impacts during construction by the regulatory agencies are reflected in the EMP. These conditions must be met without exception for the successful delivery of the 16th Avenue Phase 2 project.

An elaborate network of monitoring locations (see Table 2) will be set up to monitor flows, temperature and quality of water in the receiving watercourses and will be supplemented with groundwater monitoring stations and surveys of woodlots and wetlands. This rigorous monitoring program as conducted by McNally International Inc./Aecon (Joint Venture) will be implemented through the three year construction time frame and continue for three years after construction for a total of six years.

Table 2
Monitors Implemented Under the EMP

Monitoring Feature	Number of Monitoring Sites	Parameter
Fisheries	40	Stream Gauge
	40	Piezometer
	40	Dissolved Oxygen
	40	Temperature
	31	Fish
	21	Benthos
	12	Water Quality
	30	Piezometer
	30	Temperature
	30	Soil Moisture
Total	314	

Wetlands	30	Amphibian Activity
	30	Vegetation Composition
	30	Photographic
	30	Wildlife
Total	120	
Woodlots	8	Tree Assessment
	8	Soil Moisture
Total	16	
Geomorphology	24	Site Erosion
Total	24	

4.2 Independent Monitoring of the Environmental Monitoring Plan

Regional Council approved the retention of Gartner Lee Ltd., to provide the independent inspection function throughout the duration of the project at its meeting on May 20, 2004, Clause 7 of Report No. 5. Gartner Lee Limited will report directly to the Region. Based on the approved EMP as it currently stands, their function has increased in scope and magnitude. The regulatory agencies have stressed the importance of an independent due diligence review to the successful delivery of the EMP and thus the project. To this end, the independent EMP monitoring program will be rigorous and will adapt to suit the needs of the project as it progresses. Gartner Lee Ltd., will employ the protocols prescribed by the Canadian Standards Association's Z-768 and CAN/CSA – ISO 14010-96 in undertaking this independent EMP monitoring program.

This program will include a comprehensive review of the daily, weekly and monthly monitoring carried out by McNally International Inc./Aecon Civil (Joint Venture) as outlined in the EMP. Gartner Lee Limited will review the practices and record keeping as mandated by the EMP. Any and all corrective action taken to mitigate adverse impacts to the environment will be reviewed for compliance to the EMP. Recommendations on improvements to the EMP during the course of the construction will be provided as part of the adaptive management approach. Accordingly, it is proposed that \$750,000 (excluding GST) be allocated for this independent monitoring of the EMP for the 16th Avenue Trunk Sewer Phase 2 project.

The monthly report produced by Gartner Lee Limited will be made available to the public and regulatory agencies. Gartner Lee Limited will submit all their reports to the Regional Project Manager and will place the report on the project website.

The Gartner Lee independent EMP monitoring budget for the period September 2004 to August 2007 can be categorized as follows:

Table 3
Independent EMP Monitoring Budget

Items	Sub-total
Setting up the compliance program and review protocols with Agencies	\$50,000
General inspection of monitoring and dewatering operations over the life of the project	290,000
Report and review of all reports produced for regulatory agencies for compliance	339,800
Disbursements for independent testing equipment	70,200
Total	\$750,000

The \$750,000 estimate to undertake the independent EMP monitoring over a three year period has been reviewed and found to be a reasonable estimate.

4.3 Financial Contribution for well mitigation in Cachet Estates

On June 24, 2004, Regional Council approved the financial contribution of \$320,000 to the Town of Markham's watermain project in the Jennings Gate area under the auspices of the proactive well mitigation program. As part of the approval, Regional Council also approved in principle a financial contribution in the amount of \$1,650,000 to the Town of Markham for the Cachet Estates area.

Regional staff have since been working with the Town of Markham staff towards finalizing the protocols of securing the releases from the residents. These details have now been resolved and over the period of December 2004, the Town will provide the Region with the releases from the residents of Cachet Estates.

The Town of Markham will be hosting a drop in centre during the month of December 2004 in order to facilitate the securing of releases from the residents of Cachet Estates. Through the drop in centre, the residents will be given the opportunity to obtain information on the watermain project from Town of Markham staff. As well, the Region's participation in this drop in centre will afford the residents an opportunity to obtain information on the well mitigation program proposed for Cachet Estates. This collaborative approach will afford the Region an opportunity to continue its public outreach/communication in a proactive manner.

Once the releases for Cachet Estates are obtained from the Town of Markham, the Region will then provide the proportionate amount of funds up to a maximum of \$1,650,000 in trust to the Town of Markham, who in turn, will apply the funds under the fee by-law to the residents of Cachet that signed the releases. It is duly noted that all residents who do not sign the releases will not be eligible for the financial contribution.

The residents of Cachet who do not sign the releases will be handled as part of the normal well mitigation program.

4.4 Project Schedule

Based on the project commencement date of October 2004, the following major milestones are established for the completion of the 16th Avenue Trunk Sewer Phase 2 construction.

Table 4
Major Milestones

Milestone	Date
Commencement of proactive well mitigation	October 2004
Completion of EMP infrastructure	January 2005
Commencement of dewatering	February/March 2005
Commencement of tunnelling	May/June 2005
Completion of sewer construction	August 2007

5. FINANCIAL IMPLICATIONS

The independent EMP monitoring cost of \$750,000 (GST exclusive) and the financial contribution for the total amount of \$1,650,000 for the well mitigation program for Cachet Estates will be funded from development charges (80%) and wastewater user rates (20%).

6. LOCAL MUNICIPAL IMPACT

The 16th Avenue Trunk Sewer and associated integrated components form an integral link to the continued development of The Regional Municipality of York in both the short and long term.

7. CONCLUSION

The 16th Avenue Trunk Sewer Phase 2 Construction project is now underway. Gartner Lee Ltd., have begun their independent monitoring of the EMP program. While this program is in the formative stages, significant effort is being expended towards the finalization of protocols and inspection methodology in consultation with the review agencies and the 16th Avenue trunk sewer, phase 2 project team. Concurrently, the proactive well mitigation program is well underway and the protocol employed for the Town of Markham to secure the releases has been initiated. Once the releases are in place, the appropriate funds will be transferred to the Town of Markham for the watermain projects in Cachet Estates.