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**16TH AVENUE TRUNK SEWER TRANSITION TO PHASE 2 PROGRESS REPORT
TOWN OF MARKHAM, PROJECT 74030**

The Transportation and Works Committee recommends:

- 1. The presentation by Nitti Subramaniam, Contract Project Manager, Infrastructure, Design and Construction, be received; and**
- 2. The recommendations contained in the following report, April 21, 2004, from the Commissioner of Transportation and Works be adopted:**

1. RECOMMENDATIONS

It is recommended that:

1. The following report be received for information by Committee and Regional Council.
2. The current contract P-02-132 with the firm, Inspec-Sol Inc. be increased by \$2,100,000 (plus GST where applicable) to accommodate the scope changes necessary to enhance the Phase 2 proactive mitigation plan, as outlined in this report.
3. The Commissioner of Transportation and Works be authorized to engage the firm of Gartner Lee Ltd. at an upset limit of \$200,000, plus GST where applicable to provide environmental auditing services for the construction of the 16th Avenue Trunk Sewer, Phase 2.
4. The Commissioner of Transportation and Works be authorized to engage the firm of Ogilvie, Ogilvie & Company at an upset limit of \$100,000, plus GST where applicable to provide facilitation services for public and Community Liaison Committee (CLC) meetings associated with the construction of the 16th Avenue Trunk Sewer, Phase 2.
5. The provisions of the Purchasing By-law be waived to allow the direct appointment of Gartner Lee Ltd. for the auditing of the Environmental Management Plan (EMP) and Ogilvie, Ogilvie & Company to facilitate all public and CLC meetings associated with this project.
6. The Commissioner of Transportation and Works be authorized to issue the design builder, McNally International Inc./Aecon Civil (Joint Venture) a purchase order during the transition period between total performance of Phase 1 (April 30, 2004) and the execution of the contract document for Phase 2, a daily maintenance fee of \$8,333.33 plus GST where applicable or \$250,000 plus GST where applicable a month covering the period May 1, 2004 to July 31, 2004.

2. PURPOSE

This report is intended to provide an update on the current status of the 16th Avenue Trunk Sewer, outline the upcoming events that will transition the project into Phase 2 of the works and to seek approval to extend the services of Inspec-Sol Inc. Inc., and retain the services of Ogilvie, Ogilvie & Company, Gartner Lee Ltd. and the McNally International Inc./Aecon Civil (Joint Venture) design-build team to implement the transition measures, the proactive mitigation, the EMP and the communication strategy necessary for the successful delivery of the project.

3. BACKGROUND

3.1 Construction Status

There are two phases to the 16th Avenue Trunk Sewer. Phase 1 begins at Ninth Line and ends approximately 150 metres west of Stone Mason Boulevard, while, Phase 2 continues westerly from this point to Woodbine Avenue (*see Attachment 1*).

Phase 1 was completed, inspected and placed into full service on March 19, 2004. Phase 2 is currently awaiting the receipt of approvals from the Ministry of Environment (MOE) and the Toronto Region Conservation Authority (TRCA) to proceed towards construction.

Upon completion of Phase 1, the contractor has removed the construction compound at Ninth Line and 16th Avenue, cleaned the site and has turned it over to the landowner. Similar removal and clean up of the site has taken place at the Brother Andre School location.

The construction compounds at Stone Mason Boulevard and Kennedy Road remain in preparation for the Phase 2 works. During the transition period to the initiation of Phase 2, McNally International Inc./Aecon Civil (Joint Venture) is to provide the maintenance and security of these compounds.

3.2 Approvals from the Regulatory Agencies

Dewatering activity continues at the Stone Mason Boulevard compound. Currently, the water generated by the dewatering activity is being discharged into Robinson Creek. This will continue until the MOE and the TRCA issues the permits for the construction of Phase 2.

Since June 2003, Regional staff have been working closely with the regulatory agencies towards finalizing the EMP for any temporary impacts to the environment during the construction of Phase 2. On March 25, 2004, the Region secured approval from the MOE and the TRCA to begin the diversion of the flow from the dewatering activity at Robinson Creek. The diversion will convey the water easterly to the Ninth Line location where it will be dispersed into Exhibition Creek, the Ninth Line Sewer south of 16th Avenue and the Cornell storm drainage system (*see Attachment 2*). This diversion

constitutes one of three key phases of a comprehensive EMP that is currently being reviewed by the regulatory agencies for the construction of Phase 2.

Subsequently, on April 5, 2004, Regional staff received the written comments from the MOE on fisheries issues from the Department of Fisheries and Oceans (DFO). Then, on April 10, 2004, verbal comments were received from all regulatory agencies through the MOE, on the consolidated EMP submitted on January 12, 2004. These comments were reviewed with the MOE at a meeting held at MOE offices on April 14, 2004. The successful resolution of the agency comments will lead to a permit from the MOE and the TRCA.

In the interim, well mitigation activities continue by Inpec-Sol Inc., monthly monitoring of the environmental impacts due to the dewatering at Stone Mason Boulevard continue by McNally International Inc./Aecon Civil (Joint Venture), finalization of the contract document for ratification by both McNally International Inc./Aecon Civil (Joint Venture) and the Region continues and scheduling activities for the Phase 2 construction is being finalized.

4. ANALYSIS AND OPTIONS

As we transition towards the implementation of construction for the Phase 2 portion of the 16th Avenue Trunk Sewer, we need to finalize the following outstanding issues:

- Resolving the EMP by working collaboratively with the regulatory agencies towards a timely resolution.
- Finalizing the McNally International Inc./Aecon Civil (Joint Venture) contract negotiations to include the cost of an approved EMP.
- Implementing the transition activities to ensure that the construction activity for Phase 2 implemented under Phase 1 remains on stand-by mode to seamlessly begin the next phase once the permits are obtained from the regulatory agencies.
- Positioning the proactive mitigation plan to ensure that the Region can embark on this program as soon as the permits are obtained.
- Continuing with the proactive communication strategy that will keep all stakeholders informed.

4.1 Securing of Approvals from the Regulatory Agencies

The agencies have provided the Region with their comments on the EMP for the construction of Phase 2. The comments relate to the monitoring program proposed for the woodlots, wetlands and wells. In addition, the agencies are continuing to refine the mitigation plans associated with the dewatering program specifically with respect to the quality, quantity, velocity and temperature of the water proposed to be discharged to the receiving streams.

One integral aspect of the EMP is the quality control and assurance of such a plan. While it is accepted that McNally International Inc./Aecon Civil (Joint Venture) will be

responsible for the implementation and management of the plan, Regional staff in discussions with the agencies have concurred that due to the significance of the plan to the success of the project, a comprehensive auditing program must be put in place to ensure the success of this plan. Furthermore, a firm that has done similar assignments for the regulatory agencies and has worked extensively in the areas of fish habitat management and watercourse rehabilitation programs must do the audit. Accordingly, the Region is intending to hire Gartner Lee Ltd. as an environmental specialist firm to provide this audit function throughout the duration of the project, as this firm meets the stringent requirements necessary for the undertaking of such an audit function and has credibility with the regulatory agencies.

In the interim, the MOE and the TRCA have granted approval to divert the flow from Robinson Creek easterly to the Ninth Line location. This plan will thus reduce the amount of flow significantly to Robinson Creek and will in turn divert the flow into Exhibition Creek, the Ninth Line Trunk Sewer south of 16th Avenue and the Cornell Storm Drainage system. The works for this diversion is being carried out by McNally International Inc./Aecon Civil (Joint Venture) and will be completed in early May. Once complete, 90% of the flows from Robinson Creek will be diverted.

4.2 Finalizing the Contract Documents with McNally International Inc./Aecon Civil (Joint Venture)

Regional staff have concluded the negotiations with McNally International Inc./Aecon Civil (Joint Venture) to retain the tunnel-boring machine (TBM) and have the equipment available to commence Phase 2 of the sewer when the permits are obtained.

A supplementary report outlining the details of the revised price for the construction of the Phase 2 works will be presented to the Transportation and Works Committee once the EMP is finalized with the MOE and TRCA.

4.3 Implementing and Managing the Transition Activities

The construction compounds at Stone Mason Boulevard and Kennedy Road will be secured to ensure public safety and prevent vandalism to the construction equipment. Site security will be provided continuously, seven days a week. Dewatering will continue to maintain the tunnel 150 metres west of Stone Mason Boulevard with the TBM parked in it. As well, inspected and maintained on a daily basis will be the following:

- TBM.
- Excavated tunnel up to 150 metres west of Stone Mason Boulevard.
- Stand-by generator to ensure the availability of power to the site at all times.

In addition, McNally International Inc./Aecon Civil (Joint Venture) will provide bonding and insurance. As a result, the daily cost payable to McNally International Inc./Aecon Civil (Joint Venture) to provide all of the above will be \$8,333.33. This daily cost includes the additional pumping costs once the Robinson Creek diversion is implemented, and this is expected to take place in early May, 2004. This will continue until the permit is received for the construction of the Phase 2 portion of the 16th Avenue Trunk Sewer.

The dewatering activity at the Stone Mason Boulevard construction compound must continue during the transition period in order to ensure the following does not occur:

- Submergence of and damage to the TBM.
- Contamination of the Groundwater (oil and grease in the TBM) due to submergence of the TBM.
- Uncontrolled flow to the Duffin Creek Water Pollution Control Plant due to rising groundwater.
- Recovery of water pressure due to the discontinuation of the dewatering activity. This will result in significant dewatering to re-initiate the depressurization to construct Phase 2.

During the course of the transition, daily monitoring activities continue on the wetlands, woodlots and receiving streams by McNally International Inc./Aecon Civil (Joint Venture). This monitoring is formally reported to the regulatory agencies on a monthly basis and will continue into the Phase 2 portion of the works. The scope of monitoring for Phase 2 will be more comprehensive due to the extension of the dewatering activity and this is to be ratified with the regulatory agencies as part of the current review of the EMP.

In the interim, the Region has secured the approval from the MOE and the TRCA to divert the flows from the dewatering activity at Robinson Creek (Stone Mason Compound). Accordingly, McNally International Inc./Aecon Civil (Joint Venture) has initiated the implementation of the temporary infrastructure necessary to affect this diversion. This work is being done under Phase 1 as a scope change under the provisions of the Region's Purchasing By-law. Once this work is completed, total performance or contract completion for Phase 1, will be granted to McNally International Inc./Aecon Civil (Joint Venture), the maintenance holdback released and a purchase order will be issued to McNally International Inc./Aecon Civil (Joint Venture) for the daily maintenance costs for the duration of the transition period between total performance and the start up of Phase 2.

4.4 Preparing for the Proactive Mitigation Plan for Phase 2

Regional Council committed on November 21, 2002 through the adoption of Clause No. 1, Report No. 9 of the Transportation and Works Committee meeting to establish an enhanced mitigation program with proactive mitigation for potential well impacts of the 16th Avenue project. This mitigation program is intended to anticipate problems before they occur and provide well mitigation prior to the wells being affected by the dewatering program.

The foundation for the program has been put into place through the retention of Inspec-Sol Inc., a hydrogeological consulting firm. To date all exploratory investigations have been completed and all private wells currently being impacted by the current dewatering at the Stone Mason Boulevard site are being remediated through lowering of the pump levels, provision of new deeper drilled wells or connections to the local municipal water system where necessary.

In addition, the following components have been added to enhance the program:

- Installation of an expanded and exhaustive monitoring network.
- A comprehensive monthly monitoring and reporting mechanism in accordance with the current Permit To Take Water (PTTW) for Phase 1, which will lead into Phase 2 once the permit is issued for the next portion of 16th Avenue.
- Continued management of the reactive mitigation of the Phase 1 related well interference issues, including but not limited to investigation of well interference issues, supply of temporary tanks and provision of permanent solutions where applicable.
- Development and documentation of a “Standardized Protocols and Specifications” document for well mitigation and monitoring.
- Continued provision of the 24 hour call centre management to handle concerns and queries by citizens.
- On-going technical support from a hydrogeological perspective in dealings with the regulatory agencies.
- Presentation at public and CLC meetings.

In preparation for the proactive mitigation program necessary for constructing Phase 2, a protocol has been developed for the implementation of the program. As part of this program, it is anticipated that 13 well replacements, 24 well modifications and 40 well investigations will need to be carried out. In addition, a reactive mitigation program is anticipated to capture any unforeseen well rehabilitation necessary and it is estimated that approximately 56 wells may need either replacement or modification.

Inspec-Sol Inc. is currently managing the proactive well mitigation program and is extensively involved in providing the on-going quality assurance and audit functions to ensure that the mitigation activities are in compliance with the protocols established for the Region. In addition, some treatment challenges have been encountered associated with high iron and some methane content in certain locations. These issues are being treated successfully through the technical expertise demonstrated by Inspec-Sol Inc.

The cost for the proactive mitigation program has escalated due to the more comprehensive approach as the program develops in preparation for Phase 2. The delay in start up of Phase 2 has resulted in some additional reactive mitigation work being encountered during this transition period.

The escalation can be attributable to the following major scope additions:

- Installation of an expanded monitoring well network that has increased the coverage by 50%.
- A more comprehensive monthly groundwater reporting program in accordance with the requirements of the regulatory agencies.
- On-going supplementary Phase 2 well preconstruction surveys including but not limited to well water levels and quality issues.
- On-going reactive mitigation of Phase 1 resident concerns including investigations resulting from the Regional 24 hour call centre and installation of new private wells complete with treatment systems as deemed appropriate.

- The refinement of the “Standardized Protocols and Specifications for well mitigation and monitoring” document in consultation with the MOE.
- Continuation of the supply of water tanks and bottles to all homes experiencing difficulties while the cause of the disruption is investigated. This is continuing during the transition period.
- Continuation of the management of the Regional 24 hour call centre and the corresponding database of all calls received, investigated and addressed. To date, the delay in start up of Phase 2 has added approximately four months of additional coverage by this call centre.
- The provision of well drillers to drill the necessary wells due to the shortage of this trade during the winter months.
- A scaled up stakeholder consultation program that includes, bi-monthly CLC meetings, bi-weekly project updates, project website and regular public meetings at critical milestones. The involvement in this program includes presentations where necessary and preparation of the presentation material.

Inspec-Sol Inc. was selected through a competitive process and their retention to carry out the hydrogeological and public communication services necessary for the proactive mitigation program was approved by Council on January 23, 2003. Accordingly, their services are being provided at very competitive prices. Since then, they have been working collaboratively towards the successful adoption of the proactive well mitigation program by the MOE. Their long standing involvement with the project enables them to use the knowledge gained in resolving well interference in an effective manner. As well, the hydrogeological knowledge gained by their involvement to date, proves to be an invaluable resource in anticipating as well as resolving private well issues in a timely manner. The additional scope that Inspec-Sol Inc. plans to undertake towards implementation of the proactive and reactive mitigation program is deemed to be a reasonable response to public, Regional and regulatory agency concerns.

Accordingly, the budget for the mitigation program needs to be revised to accommodate the enhancements to the program, the impacts due to the delays with the start-up of Phase 2 and the on-going treatment challenges for high iron and methane. These costs are outlined below in Table 1:

Table 1
Proactive Mitigation Activities and Costs

Activity	Cost
Project management duties for mitigation of 133 wells	\$233,000
Replacement of 13 wells	136,000
Well modification of 24 wells	196,000
On-going well investigation work for 40 wells	233,000
Anticipated reactive mitigation work for 56 wells	1,080,000
On-going call centre management	160,000
Iron and Methane treatment systems	62,000
Total	\$2,100,000

Therefore, it is proposed that the current contract with Inspec-Sol Inc. be amended by an additional \$2,100,000 to deliver the mitigation program for the 16th Avenue Trunk Sewer. This amount is reasonable in light of the order of magnitude of work that will be required to successfully deliver the proactive mitigation program once the permit is issued. It is also emphasized that these costs are based on the estimated well mitigation required and will only be used to the extent deemed necessary for the duration of the project.

4.5 Continuing with an Effective Communication Strategy

The Region continues its comprehensive communication strategy with a view towards engaging the public in a constructive manner. Since January 2004, the Region has conducted the following information sessions:

- Presentation to the Markham Development Services Committee regarding the EMP on February 17, 2004.
- CLC meeting on February 26, 2004 updating the members on the status of the project.
- An information evening for the Federation of Agriculture on the topic of “A Farmer’s guide to Hydrogeology – Understanding Aquifers,” on March 3, 2004.

In addition, the communication strategy includes an upcoming public meeting after the permit is issued for Phase 2. The CLC endorsed this approach.

As well, key stakeholders are kept informed on a regular basis through the issuance of bi-weekly status updates on the project. The public at large can continue to voice any concerns through the project call centre managed by Inspec-Sol Inc. and can retrieve information from the project web site that is updated on a regular basis.

In order to continue to maintain the proactive communication strategy, the Region proposes on utilizing the firm of Ogilvie, Ogilvie & Company to provide effective and impartial facilitation of all public and CLC meetings. Ogilvie, Ogilvie & Company has been providing this service on an adhoc basis thus far on this project and has a thorough understanding of the sensitivities and key issues surrounding this project. The firm has provided excellent facilitation thus far at all public and CLC meetings. As this project moves into Phase 2, the Region anticipates holding regular public and CLC meetings to keep the public informed on the progress of the project. Therefore, the Region is proposing to continue to use Ogilvie, Ogilvie & Company in this capacity for the duration of this project.

4.6 Schedule

The delay in acquiring the PTTW has resulted in a delay to the commencement of Phase 2 of the project. Once the PTTW is obtained, the following sequence of major activities will result:

- The construction contract with McNally International Inc./Aecon Civil (Joint Venture) will be executed.
- The Proactive mitigation of all identified wells will be remediated. This is expected to take about four months. Concurrently, McNally International Inc./Aecon Civil (Joint

- Venture) will begin the installation of the necessary infrastructure to accommodate the dewatering activity inclusive of all monitoring stations to manage the EMP.
- Once the proactive mitigation works is completed by Inspec-Sol Inc., dewatering will commence.
 - Then, the mining of the tunnel westerly towards Woodbine Avenue and the construction of the new shafts will be initiated. This will mark the beginning of construction of the Phase 2 portion of the 16th Avenue Trunk Sewer. Overall, two tunnel machines will be utilized. One will traverse from Stone Mason Boulevard to Kennedy Road while the other will move westerly from Kennedy Road to Woodbine Avenue. It is anticipated that both these machines will work concurrently and the construction of the sewer is anticipated to take thirty-two months.

Hence, the overall construction of the 16th Avenue Trunk Sewer is expected to take approximately three years from the point of obtaining the permits from the MOE and the TRCA.

5. FINANCIAL IMPLICATIONS

The breakdown of the costs associated with the completion of Phase 1, transition costs in preparation for Phase 2, positioning proactive mitigation for Phase 2, retaining an environmental auditor, securing the services of a facilitator for stakeholder meetings, implementing the Robinson Creek Diversion and monthly maintenance cost for McNally International Inc./Aecon Civil (Joint Venture) is summarized in Table 2.

Table 2
Phase 1 Project Costs for 16th Avenue Trunk Sewer

Components	Cost
Ninth Line to Stone Mason Boulevard	
• Projected final costs prior to Robinson Creek Diversion	\$24,662,700
• Robinson Creek Diversion	143,300
Projected final costs after Robinson Creek Diversion	24,806,000
Monthly Dewatering and Construction Compound/TBM/Tunnel maintenance costs (After implementation of Robinson Creek Diversion)*	750,000
Original Proactive Mitigation Cost	1,962,784
Proactive Mitigation Cost increase	2,100,000
Projected final cost for Proactive mitigation	4,062,784

EMP audit function by Gartner Lee Ltd.	200,000
Facilitation services by Ogilvie, Ogilvie & Company	100,000
Total (GST extra)**	\$29,918,784

*\$250,000 per month from May 1, 2004 to July 31, 2004.

**Phase 2 construction cost for McNally International Inc./Aecon Civil (Joint Venture) is not included. As this cost is dependent on the finalization of the EMP, it will be included once the the EMP is ratified with the MOE and TRCA.

All of the above costs are included in the 2004 Budget and Business Plan and will be funded from development charges (80%) and wastewater user rates (20%).

6. LOCAL MUNICIPAL IMPACT

The construction of the 16th Avenue Trunk Sewer is needed to service development within the Towns of Markham and Richmond Hill. This sewer in combination with proposed expansion of the York Durham Sewer System in the south east quadrant of the Region will eventually provide servicing for the Towns of Aurora, Newmarket and the City of Vaughan.

Extensive mitigation measures are currently being put in place to ensure that the residents on private wells are provided with safe adequate water supply during the construction of Phase 2 of the 16th Avenue Trunk Sewer. In addition, a comprehensive EMP will be deployed to ensure the protection of the natural resources and mitigate any temporary impacts to the environment during construction.

7. CONCLUSION

As Regional staff continue to work with the regulatory agencies towards the obtaining of the necessary permits for the construction of the Phase 2 of the 16th Avenue Sewer, it is important to establish the framework for the transition into Phase 2. An integral component to this transition is a sound proactive well mitigation program, an effective EMP and a communication strategy that manages key stakeholders.

In order to achieve these objectives in an effective and efficient manner, Regional staff propose on working with; Inspec-Sol Inc. on the proactive well mitigation program, Gartner Lee Ltd. towards ensuring the integrity of the EMP throughout the Phase 2 construction, Ogilvie, Ogilvie & Company in providing effective and impartial facilitation of all public and CLC meetings and McNally International Inc./Aecon Civil (Joint Venture) in successfully constructing the Phase 2 portion of the works.

Accordingly, it is proposed that the Region adopt the recommendations outlined in this report to prepare for the implementation of Phase 2 of the 16th Avenue Trunk Sewer project in a timely manner once the permits are received from the MOE and the TRCA. The Senior Management Group has reviewed this report.

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(A copy of the attachments referred to in the foregoing is included with this report and is also on file in the Office of the Regional Clerk.)