TORONTO

STAFF REPORT
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Update on the Emergency Repair to the Coxwell Sanitary Trunk Sewer

Date:	May 20, 2009
To:	Public Works and Infrastructure Committee
From:	General Manager, Toronto Water
Wards:	Ward 29
Reference Number:	P:\2009\Cluster B\TW\pw09018

SUMMARY

This report provides an update on the progress made in contingency planning and in advancing the work required to address the damaged section of the Coxwell Sanitary Trunk Sewer (the "CSTS").

Preliminary work indicates a permanent by-pass is the preferred option, though this remains dependant on the results of the geotechnical studies that are expected to be completed in late June 2009. The permanent by-pass, if that is the chosen option, will be implemented as expeditiously as possible. As work considering by-pass options progresses, emergency measures to control discharge of sewage and mitigate environmental impacts in the event the CSTS was to fail, are being implemented; and the technical feasibility and limitations of implementing temporary by-pass/treatment options in advance of the construction of the permanent by-pass are also being assessed.

Financial Impact

There are no financial implications resulting from receipt of this report.

DECISION HISTORY

City Council at its meeting of September 25, 26 and 27, 2006, approved the undertaking of the Don and Waterfront Trunk Sewers and Combined Sewer Overflow Control Strategy Class Environmental Assessment Study (the "Don EA Study"), which among other issues, includes the condition assessment of the Trunk sewers tributary to the Ashbridges Bay Treatment Plant including the CSTS. A copy of the Council Decision Document can be found at:
http://www.toronto.ca/legdocs/2006/agendas/council/cc060925/wks6rpt/cl039.pdf

City Council at its meeting of January 27 and 28, 2009, authorized the General Manager, Toronto Water, to retain the various professional and engineering consultants and to procure the various goods and/or services to undertake the engineering design and the construction of physical works to support the implementation of emergency works necessary to by-pass the damaged section of the CSTS, if required. The General Manager was also authorized, subject to certain conditions, to negotiate, and execute on behalf of the City the terms of these agreements with such consultants. A copy of the Council Decision Document can be found at:
http://www.toronto.ca/legdocs/mmis/2009/cc/decisions/2009-01-27-cc30-dd.pdf

This report serves to respond to the request for the General Manager, Toronto Water, to report to the Public Works and Infrastructure Committee on the results of the geotechnical studies and other pertinent matters related to the CSTS.

ISSUE BACKGROUND

During a recent inspection of the CSTS significant damage was found to about 60 metres of pipe located beneath Barbara Crescent, north of the intersection of Coxwell Avenue and O'Connor Drive. While the inspection of the sewer showed that it was still working as it should, given the nature and extent of the damage discovered, failure of the CSTS cannot be ruled out. Work has proceeded on an emergency basis to: control the discharge of sewage and mitigate environmental impacts in the event the CSTS was to fail; undertake geotechnical studies to support the design and construction of any permanent by-pass; implement monitoring programs to detect changes in the condition of the CSTS that could possibly impact sewage flow and properties directly above the affected sewer; and assess the feasibility and limitations of implementing temporary by-pass/treatment options in advance of the construction of a permanent by-pass.

COMMENTS

The following presents an update of the noted activities and various options being considered.

Permanent By-Pass
While a number of routing options have been developed for consideration, the preferred option, with the shortest implementation schedule and lowest cost, is a short soft ground tunnel from the confluence of the Don River and Taylor-Massey Creek and connecting the CSTS north of the intersection of Coxwell Avenue and O'Connor Drive, downstream of the damaged section of the CSTS. However, a final decision will not be made until the results of the geotechnical studies are obtained and the availability of space for construction of a connection shaft to the CSTS determined.

MMM Group Limited and Golder Associates have been retained to undertake comprehensive constructability and geotechnical studies. The borehole work along the preferred route has been completed. A draft Geotechnical Data Report and a Pre-Design Geotechnical Report are being prepared. Should the geotechnical studies determine that

the soil conditions along the preferred route presents high construction risks further geotechnical work will be required to examine other routing options.

A report is expected by June 2009 regarding the feasibility of constructing a shaft on City-owned property located at the north-west corner of the intersection of Coxwell Avenue and O'Connor Drive.

Toronto Water is in the process of engaging a consulting engineering firm, through a competitive bid process, to act as the "Owner's Engineer" to develop the preliminary design and provide oversight on the detailed design and construction of a permanent tunnelled by-pass sewer. The Owner's Engineer is expected to be engaged by June 2009, coinciding with the expected receipt of the geotechnical studies. Further, to expedite the construction of the permanent by-pass, a design-build procurement process will be used, where the design-build request for proposal is expected to be released by August 2009. Once awarded, construction is expected to be completed within eight to 10 months.

Temporary By-Pass Assessment

R.V. Anderson Associates Limited was retained and has completed the preliminary design of a pump by-pass from MH #11 to a location immediately downstream near O'Connor Drive and Coxwell Avenue. The alignment of this option generally follows the preferred route of the above-noted permanent by-pass; where the by-pass forcemain (pipe) would be laid on the ground or partially buried and would not interfere with tunnel construction. The forcemain would connect to the CSTS via a deep shaft. However, the feasibility of constructing a shaft at the noted location, again, depends of the results of the geotechnical studies.

Should the City proceed with this option, it is expected that a design-build procurement process will be used to expedite the construction. It is estimated that construction could be completed within four to six months at a cost estimated at $13,000,000. Should the CSTS collapse and emergency measures including a pumped by-pass be put into service, the operating costs are estimated to be $600,000 per month.

CH2M Hill Canada Limited has also been retained to undertake a detailed assessment and preliminary design of the most feasible option, should the CSTS collapse, for directing as much flow as possible to the North Toronto Treatment Plant (NTTP) and with the rest of the flow being temporarily by-passed to the Mid-Toronto Interceptor (MTI) sewer, near Gerrard Street. The results of the detailed assessment determined that a nominal amount of flow could be directed to the NTTP, while the remaining flow would have to be piped a distance of approximately six kilometres along the Don River valley to the MTI. In comparison to the pumped by-pass option, this option is not recommended as it results in a much longer implementation schedule (estimated at 12 months) and is much more costly (estimated at $23,000,000).

Internal Repair Options Assessment

M.E. Andrews & Associates Limited has been retained to undertake a technical evaluation of various internal repair options to assess the degree to which the options can provide the necessary structural support and the feasibility of implementation, given the

extenuating circumstances at this site in terms of large pipe diameter, long distance to the damaged area from the nearest access point; and the extremely high flow conditions. A draft report is expected by the end of June 2009.

Emergency Contingency Measures

To mitigate the impacts in the event of a partial or full collapse of the CSTS before the permanent and/or temporary by-passes can be implemented, Toronto Water has undertaken the following activities:

- Consulted with the Ontario Ministry of the Environment, and was advised that amendments to Certificates of Approval are not required for the construction of emergency modifications to the sewer system to control the release of sewage.

- To prevent wide spread flooding and sewer backup, upstream of the damaged area, three existing overflow chambers within the Don STS are being retrofitted and a new by-pass for Taylor/Massey Creek STS is being created to control the discharge of the flow from the CSTS into the Don River. Flap gates are also being installed, where required, to prevent backup of river flows into the sewer.

- To contain the sewage within the North Toronto STS, and direct the flow to the noted by-pass locations, maintenance hole covers are being sealed and/or maintenance hole stack extensions (1 to 2 metres high) are being installed for eight maintenance holes, near the pedestrian trail.

- Spill containment booms have been purchased and ready for installation downstream of the overflow locations during a by-pass condition and provisions have been made for collection and disposal of captured floating debris.

- Provisions have been made for hauling sludge from the North Toronto Treatment Plant, which is currently being conveyed through the CSTS for final treatment and disposal at the Ashbridges Bay Treatment Plant.

- CH2M Hill Canada Limited has been retained to assess the water quality impacts in the Don River and waterfront, in the event of a collapse of the CSTS; and assessing the technical feasibility and requirements of using the Keating Channel (at the mouth of the Don River) as a primary treatment facility with disinfection. A final report containing the preliminary design of this option is expected by the end of May 2009.

Monitoring Program

Toronto Water has implemented a comprehensive monitoring program to track any changes associated with the damaged CSTS; and to help provide early warning should conditions deteriorate, summarized in the following:

- Three flow level monitors have been installed to monitor the flow in the CSTS on a continuous basis. An alarm will be triggered should there be an unexpected change in the sewer's flow pattern and an emergency response team dispatched. To date, the monitoring data indicates that the sewer is operating normally.

- City crews are surveying, once a week, several points along the roadside/curb in the area above the damaged section of the CSTS to determine if any ground settlement is occurring. To date, everything is normal.

- MMM Group Limited and Golder Associates have been retained to undertake subsurface monitoring and residential building condition assessments and monitoring. Ten shallow subsurface monitoring points in the affected area and two deep (~30 metres) ground monitoring probes directly above the damaged area have been installed and are being monitored on a weekly basis to detect if any ground settlement is occurring. To date, everything is normal.

- On February 4, 2009, a "Consent and Authorization to Proceed with Monitoring" letter was hand delivered to 11 homes on Coxwell Blvd. and Barbara Crescent whereby the City sought the participation of these residents in additional monitoring of the ground conditions over and adjacent to the CSTS. This additional monitoring involves establishing a baseline condition assessment of these properties and structures and installing settlement monitoring points on the exterior of these homes, which will be surveyed on a weekly basis. As of May 20, 2009, five of eleven homes have participated in all or part of this additional monitoring program. Further attempts have been made to contact residents in the remaining six homes in an effort to obtain their participation.

- M.E. Andrews & Associates Limited has been retained to undertake a re-inspection of the damaged section of the CSTS and to identify if any changes have occurred to its structural condition since their last inspection in October 2008. This work is expected to be completed by end of May 2009.

Priority Inspection of Other Critical Sanitary Trunk Sewer Sections

M.E. Andrews & Associated Limited has been retained to undertake the inspection and condition assessments for four other critical sewer sections which also have high flow rates and limited by-pass opportunities similar to the CSTS. These sections are the: Mid-Toronto Interceptor at the Don River; Humber STS (lower section); Black Creek STS (lower section) and the Highland Creek STS (lower section). The assessments are 70% complete; and the inspections, to date, have not identified any damaged sections.

Communications with Local Residents and Councillors

A commitment has been made to keep residents informed as the process moves forward. Two public meetings have been held with the residents in the area of the damaged section of the CSTS, with the local councillors, to explain the condition of the CSTS and how they may be affected. As well, regular contact has been provided through the office of the General Manager, Toronto Water to keep local residents informed of the situation and ongoing activities. The following summarizes the contact to date:

- January 14, 2009: Public meeting held at East York Civic Centre attended by 50 residents along with Councillor Ootes and Councillor Davis.

- January 21, 2009: Toronto Water creates a special webpage containing presentations, decision document and a map of the affected area. Updates to the webpage are posted as required.
- February 10, 2009: Public meeting held at East York Civic Centre and presentation to affected local residents, attended by 18 people, to address specific list of questions sent to the City regarding the CSTS situation.
- February 2009: E-mail address "coxwellsewer@toronto.ca" was set up to answer public enquiries.
- February 26, 2009: Hand delivered construction notice to 62 residents on Barbara Crescent and Coxwell Boulevard informing them of the start of construction associated with the geotechnical investigations and settlement monitoring activities. Councillor Davis and Councillor Ootes also informed.
- March 6, 2009: Email was sent to the residents association, Councillor Davis and Councillor Ootes, with detailed information on upcoming construction activities.
- March 13, 2009: Email was sent to the residents association, Councillor Davis and Councillor Ootes, responding to questions about construction noise and vibration, as well as building permit authorities. The importance of residents participating in the monitoring program was again reiterated in this email.
- As plans are finalized, residents will be kept informed by a variety of means including email, notices, public meetings and web information, as appropriate.

CSTS Update at Toronto Emergency Management Program Committee

An update on activities undertaken in regards to the CSTS emergency was provided, by Toronto Water staff, to the Toronto Emergency Management Program Committee at its meeting of February 27, 2009.

Coordination with Regulatory Agencies

There has been ongoing dialogue and regular interaction with the regulatory agencies (Ontario Ministry of the Environment, Toronto and Region Conservation Authority; and the Federal Department of Fisheries and Oceans) where they have provided input into the development of the emergency contingency plans and other activities.

City of Toronto Office of Emergency Management (OEM) Working Group

The OEM Working Group meets regularly and has included the CSTS issue on its agenda. The CSTS Collapse Contingency Plan - March 2009, was prepared and includes City Division specific contingency plans. Divisional contingency plans have been reviewed and are being further refined.

A Summary of Procurement Taken to Date

The following emergency Purchase Orders in the total amount of $2,683,820 (net of GST) have been issued to obtain professional engineering and legal services to secure the immediate performance of necessary emergency work required as a direct result of the damaged CSTS:

a) additional inspection to assess extent of damage - $157,680 (M.E. Andrews & Associates Limited and D.M. Robichaud Associates Ltd.);
b) screening analysis of available options - $400,000 (MMM Group Ltd.);

c) property condition assessments and settlement monitoring in area of damaged Coxwell STS - $400,000 (MMM Group Ltd. and Golder Associates);
d) geotechnical investigation and assessment of permanent relief sewer constructability - $500,000 (MMM Group Ltd. and Golder Associates);
e) preliminary design of temporary sewage bypass pumping system - $138,440 (R.V. Anderson Associates Ltd.);
f) inspection of other priority/critical trunk sewers in the City's system and screening of unsolicited repair offers - $290,000 (Andrews Infrastructure);
g) review of alternative by-pass/treatment options - $497,700 (CH2M Hill Canada Limited);
h) external legal services - $300,000 (Borden Ladner Gervais LLP)

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