



STAFF REPORT INFORMATION ONLY

Emergency Repair to the Coxwell Sanitary Trunk Sewer – September 2009 Update

Date:	September 21, 2009
To:	Public Works and Infrastructure Committee
From:	General Manager, Toronto Water
Wards:	Ward 29
Reference Number:	P:\2009\Cluster B\TW\pw09021

SUMMARY

This report provides an update on the progress made in contingency planning and advancing the remedial work required to address the damaged section of the Coxwell Sanitary Trunk Sewer (the “CSTS”). Additional condition assessment monitoring has revealed no further deterioration of the damaged section of the CSTS.

Work undertaken to-date has determined that a permanent by-pass tunnel around the damaged section of the CSTS is the preferred option; and a preliminary design of the permanent by-pass has been completed. A design-build team is being selected through a two phase competitive procurement process.

Options for implementing a temporary by-pass, as well as options for in-situ repairs, have been assessed and determined not to be feasible due to technical limitations and implementation schedules similar to the construction of the permanent bypass.

Emergency measures to ensure public safety and to prevent wide spread flooding and sewer backup in the event the CSTS were to fail prior to the construction of the permanent by-pass have been implemented.

An estimated \$4.7 million has been spent to date for professional engineering and legal services associated with this emergency.

Financial Impact

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

DECISION HISTORY

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 address the damaged section of the CSTS. 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>

At the May 20, 2009, Public Works and Infrastructure Committee the General Manager, Toronto Water, presented an information report providing an update on the progress made in contingency planning, activities and various options being considered in advancing the work required to address the damaged section of the CSTS. A copy of the May 20th report can be found at:

<http://www.toronto.ca/legdocs/mmis/2009/pw/bgrd/backgroundfile-21457.pdf>

This report serves to provide an update on the contingency planning, various activities and costs associated with the remediation of the CSTS.

ISSUE BACKGROUND

During an 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 with the implementation of emergency measures to control the discharge of sewage and mitigate environmental impacts in the event the CSTS was to fail. These measures include: implementation of 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 engineering studies to evaluate alternatives and identify a solution to resolve the problem(s) and to 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 considered in the information report to the May 20, 2009, Public Works and Infrastructure Committee.

Permanent By-Pass

The permanent by-pass will be implemented as a design-build assignment. Hatch Mott MacDonald (HMM) have been retained through a competitive process as the City's "Owner's Engineer" for the design-build assignment. HMM's assessment of the various routing options, and from geotechnical studies undertaken to date, have determined the preferred option to be a short soft ground tunnel. The recommendation is to tunnel around the damaged section of the CSTS, starting from the confluence of the Don River and Taylor-Massey Creek and connecting to the CSTS north of the intersection of Coxwell Avenue and O'Connor Drive, downstream of the damaged section of the CSTS as shown in Figure 1. A preliminary design for the construction of this permanent by-pass has been completed.

The proposed alignment is located under property owned by the Toronto and Region Conservation Authority (TRCA), Hydro One, and two private property owners. Staff are proceeding with negotiations to secure these easements.

A design-build team (contractors and engineers) will be selected to complete the permanent by-pass through a two phase competitive procurement process, wherein requests for proposals from the pre-qualified (short listed) teams is expected by late October 2009. The permanent by-pass is anticipated to take 8 to 10 months to construct at a cost estimated between \$15 million to \$25 million.

Temporary By-Pass Assessment

R.V. Anderson Associates Limited was retained and has completed the preliminary design of a pump by-pass around the distressed area (i.e. from the upstream MH #11, to a location immediately downstream near O'Connor Drive and Coxwell Avenue). It is estimated that construction of a system to convey only dry weather flows could be completed within four to six months at a cost estimated at \$13,000,000. Due to the lengthy implementation schedule and the disruption to the community, implementation of a temporary flow by-pass system was determined to be not feasible.

Internal Repair Options Assessment

M.E. Andrews & Associates Limited was retained to assess proposals submitted from various firms to undertake an internal repair of the CSTS. However, none of the submissions could provide the necessary structural support and the necessary flow conveyance capacity in less time or cost than the proposed permanent by-pass. Therefore, the option to undertake an internal repair of the CSTS was determined to be not feasible.

Emergency Contingency and Treatment Measures

All the emergency measures to mitigate the impacts in the event of a partial or full collapse of the CSTS have been implemented. These include: rehabilitating the three existing overflow chambers within the Don STS plus the Thorncliffe sewer; adding a new by-pass for Taylor/Massey Creek STS; sealing the maintenance hole covers with stack extensions within the North Toronto STS; and purchasing spill containment booms and site preparation for installation of the booms downstream of the overflow locations.

CH2M Hill Canada Limited was retained to assess the water quality impacts in the Don River and waterfront, in the event of a collapse of the CSTS. Recommended contingency treatment measures include: installing trash nets to capture floatables at the outlets of the overflow chambers; divert as much flow as possible through the North Toronto Treatment Plant (NTTP); and use the Keating Channel (at the mouth of the Don River) as a primary treatment facility with disinfection.

Final decisions on implementing these options will depend on the success of field tests being undertaken and further discussion with the Ontario Ministry of the Environment. For example, the trash netting option noted above, has not been used for this type of application and will be field tested at the Ashbridges Bay Treatment Plant to assess its performance and operational requirements. Further, while the additional flow that could be routed and treated at the NTTP represents only about 10% of the average dry weather flow in CSTS, field tests are being undertaken to identify operational issues and impacts on the plant's treated effluent quality.

CH2M Hill have completed preliminary engineering for emergency treatment works within Keating channel consisting of: disinfection equipment, spill containment booms to capture floatables, a submerged curtain wall to contain settled sludge, dredging to remove settled sludge, and skimmers to remove floating debris. Implementation of these works will require approximately 4 to 5 months at an estimated cost of \$10 million for construction. System operation (in the event of a CSTS failure) was estimated to be \$1 million per month. Further work is underway to assess and modify the proposed designs for more expeditious implementation; and to refine the cost estimates.

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. The monitoring consists of: three continuous recording flow level monitors within the CSTS; monitoring, on a weekly basis, ten shallow subsurface monitoring points and two deep (~30 metres) ground monitoring probes in the affected area; surveying of several points along the roadside/curb in the area above the damaged section of the CSTS; and settlement monitoring points on homes on Barbara Crescent. To date, the monitoring program has not detected any ongoing or progressive deterioration in conditions.

M.E. Andrews & Associates Limited undertook a re-inspection of the damaged section of the CSTS on June 16, 2009. No change in the condition of the CSTS was detected. As the water level was lower during this re-inspection, (initial inspection was in October 2008) and because sonar equipment was employed to permit inspection below the water surface, more damage to the pipe was visible than in the initial inspection. On July 20, 2009, another inspection of the CSTS was undertaken, using laser technology which permitted measuring the size of cracks and deformations. Again, no further deterioration was detected.

Priority Inspection of Other Critical Sanitary Trunk Sewer Sections

Staff have completed approximately 95% of the inspection and condition assessments for four other critical sewer sections within the City's trunk sewer system and no critical issues have been found. These trunk sewer sections include: Mid-Toronto Interceptor at the Don River; Humber STS (lower section); Black Creek STS (lower section); and the Highland Creek STS (lower section).

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.
- July 23, 2009: Home inspections of the 11 properties that participated have been completed. Of the 11 properties requested to participate, a total of 3 homes consented to the full inspection, 7 homes consented to modified inspections and one home did not consent to any monitoring.
- August 31, 2009: Sent out letter to local residents informing them that a Request for Qualifications was going out asking contractors to pre-qualify to receive a RFP to bid on the construction of a bypass.
- September 9, 2009: responded to resident inquiry regarding increased ground settlement monitoring following the August 18, 2009 detection of several magnetic targets showing weekly readings on the margin of, or outside, of what is called the "typical instrument accuracy". Residents were informed of the fact that

- some movement was detected at the deep magnetic targets is not an indication of instability of the Coxwell Sanitary Trunk Sewer.
- As plans are finalized, residents will be kept informed by a variety of means including email, notices, public meetings and web information, as appropriate.

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

Emergency Management Working Group Meetings continue to include the CSTS as an agenda item. In addition, Toronto Water is in continuous communications with other impacted City Divisions of any changes in planning assumptions so division specific contingency plans can be reviewed and revised as necessary.

A Summary of Procurement Taken to Date

The following Purchase Orders, including pending amendments, in the total amount of \$4,728,058 (net of GST) have been issued to obtain professional engineering and legal services to secure the 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) - to be amended for an additional \$300,000 for additional inspections of the CSTS (Andrews Infrastructure);
- g) Review of alternative by-pass/treatment options - \$497,700 (CH2M Hill Canada Limited) to be amended for an additional \$40,000 for pilot testing of trash nets (CH2M Hill Canada Limited);
- h) External legal services - \$300,000 (Borden Ladner Gervais LLP);
- i) Flow level monitoring upstream and downstream of damaged section of CSTS - \$70,550.00 (Clarifica Inc.);
- j) Construction of Massey Creek Sanitary Trunk Sewer Emergency Overflow - \$309,120.00 (Utility Force Inc.); and
- k) Competitively-bid consultant assignment for preliminary design of the CSTS Bypass Tunnel, and contract administration services during detailed design and construction

of the Bypass Tunnel in the amount of \$1,324,568.00 (net of G.S.T.) was awarded to Hatch Mott MacDonald.

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SIGNATURE

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Figure 1, Permanent Bypass Preliminary Design Alignment,

