Lead in Drinking Water Mitigation Strategy – Response to Request for Information and Contract Award/Reallocation of Funding for Corrosion Control

Date: February 25, 2013

To: Public Works and Infrastructure Committee

From: General Manager, Toronto Water
Director, Purchasing and Materials Management Division

Wards: All

Reference Number: P:\2013\Cluster B\TW\pw13004

SUMMARY

This report responds to a request from the Public Works and Infrastructure Committee for additional information on several specific items relating to the City’s lead in drinking water mitigation strategy.

It also advises on the results of Tender Call 247-2012 for the Implementation of Corrosion Control Systems at the Island, R. C. Harris, F. J. Horgan, and R. L. Clark Water Treatment Plants and seeks authority to award a contract to the recommended bidder by reallocating funds within the approved Toronto Water 2013 Capital Budget in order to increase funds dedicated to the Corrosion Control project.

RECOMMENDATIONS

The General Manager, Toronto Water and the Director of Purchasing and Materials Management Division recommend that:

1. City Council amend the 2013 Approved Capital Budget for Toronto Water by reallocating the approved funding in a total amount of $1,470,000.00 from CPW545-03 Linear Infrastructure Salaries ($150,000.00), CPW545-04 Major Works Facilities Salaries ($130,000.00), CPW545-05 Survey and Mapping Salaries ($260,000.00) and CPW545-06 TS Admin Salaries ($930,000.00) to the...
Corrosion Control Project (CPW020-25) to fund the cost of awarding the Corrosion Control contract MCP12-05WS.

2. Subject to the approval of Recommendation 1 above, City Council award Contract MCP12-05WS, Tender Call 247-2012, for the Implementation of Corrosion Control Systems at the Island, R. C. Harris, F. J. Horgan, and R. L. Clark Water Treatment Plants to W. A. Stephenson Mechanical Contractors Limited, in the amount of $8,536,132.51, net of HST recoveries, having submitted the lowest bid meeting specifications in conformance with the Tender requirements.

3. This report be forwarded to Budget Committee for its meeting on March 28, 2013 for its consideration of Recommendations 1 and 2 above.

Financial Impact

An increase in funding is required for the award of the construction contract for corrosion control estimated at $9,479,000.00 including all applicable taxes, charges and contingency allowances. The total potential cost to the City is $8,536,132.51 net of HST recoveries. This is approximately $1,470,000.00 higher than the estimated cost of the project included in the Toronto Water 2013 Approved Capital Budget and 2014-2022 Capital Plan (Corrosion Control Project, CPW020-25).

Sufficient funds are available in the 2013 Approved Capital Budget for Toronto Water in CPW545-03, CPW545-04, CPW545-05, and CPW545-06. These funds will not be required in 2013, as originally anticipated, due to a re-organization approved by Council in Technical Services in 2013 resulting in a reduced operating budget to be recovered from Toronto Water capital projects; therefore these funds are available for reallocation. Accordingly, a total amount of $1,470,000.00 will be reallocated to the Corrosion Control Project to provide additional funding required in 2013 for the award of construction contract.

The following table summarizes the cash flow requirements net of HST Recoveries, for the Corrosion Control Project, by year:

<table>
<thead>
<tr>
<th>Account No.</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>Total</th>
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<tr>
<td>CPW020-25</td>
<td>$4,588,000.00</td>
<td>$4,765,000.00</td>
<td>$110,000.00</td>
<td>$9,463,000.00</td>
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Funding for the contract award of $8,536,132.51, net of HST recoveries, is available in the 2013 Capital Budget and 2014-2022 Capital Plan for Toronto Water, subject to the Council approval of the funding reallocation outlined in Recommendation 1, which will increase available funding in 2013 from the originally estimated $3,118,000.00 to the required amount of $4,588,000.00.
A report is required in accordance with the Financial Control Bylaw Municipal Code Chapter 71-9E for approval to reallocate funds within the approved Toronto Water 2013 Capital Budget.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

**DECISION HISTORY**

The Public Works and Infrastructure Committee on September 12, 2012 adopted Item PW17.15, "2011 Drinking Water Systems Annual and Summary Reports" as amended, and in so doing, requested the General Manager, Toronto Water:

1. in cooperation with the Medical Officer of Health, to report to the Public Works and Infrastructure Committee on:
   a. possible methodologies for collecting information on the rates of replacements of the private portion of lead water service;
   b. the education program for the Corrosion Control Program implementation; and
   c. research on public health impacts on partial lead service replacements.

2. to report to the Public Works and Infrastructure Committee on any methods the city can use to improve the reporting of the upgrade of the private portion of water service replacements including but not restricted to the city’s contractor being required to report to the city all upgrades that they carry out.

A copy of the Committee decision related to this request is available at http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.PW17.15

**BACKGROUND**

Toronto’s drinking water is safe and is continuously tested to ensure it meets or exceeds all provincial regulations for drinking water quality standards. Lake Ontario (the drinking water source) and the treated water supply do not contain significant concentrations of lead.

The water service is the pipe delivering water to individual buildings and may be made of lead depending on when it was installed. The water service is divided into two portions: the section of the pipe running from the watermain to the property line is owned and maintained by the City; and the section of the pipe running from the property line into the house is the responsibility of the homeowner.

Single-family houses built before the mid-1950s may be connected to the water system with lead service pipes. Apartment buildings and other multi-residential buildings with
more than six units or three storeys typically do not have lead water service connections. When replacing a lead water service, it is best to replace both portions of the pipe in order to reduce lead in the drinking water.

In 2011 Toronto City Council approved the Lead in Drinking Water Mitigation Strategy to help reduce lead in drinking water. The strategy is comprised of the following components:

(i) **Corrosion Control.** The corrosion control plan is required under MOE regulations and when implemented will reduce the acidity of drinking water with the addition of phosphoric acid. Its reaction with lead will allow for the formation of an insoluble coating on the internal surfaces of the distribution system and household plumbing. By changing the water at the treatment plants, the City will be able to mitigate corrosion and therefore lower the lead concentration at the tap. Subject to the contract award for the implementation of the corrosion control systems included in this report, the City is on schedule to implement the corrosion control plan in 2013-2014.

(ii) **Planned Water Service Replacement.** The City-owned portion of lead pipes that supply water to residential homes are replaced in coordination with other planned construction projects.

(iii) **Priority Lead Water Service Replacement.** A program for residents who want to replace the entire lead pipe that supplies water to their home. When the property owner replaces the privately-owned section of the lead pipe at the same time or before the City-owned portion, the City commits to replacing the City-owned pipes.

(iv) **Emergency Water Service Replacement.** Emergency replacement takes place when a pipe that supplies water to a home is broken or has low flow.

(v) **Faucet Filter Program.** The faucet filter program has two parts:
- Part 1. A one-time free NSF-053 certified faucet filter for lead removal, to all homes immediately following the replacement of the City-owned section of the lead pipe that supplies water to the home; and
- Part 2. The Faucet Filter Rebate Program also offers an annual $100 rebate for the purchase of a NSF-053 certified faucet-mounted filter to applicants who meet the eligibility requirements.

At its meeting on September 12, 2012, the Public Works and Infrastructure Committee requested additional information on several specific items relating to the City's lead in drinking water mitigation strategy.

At its public opening held on January 9, 2013 the Purchasing and Materials Management Division opened bids for the implementation of corrosion control systems at the City's water treatment plants. The lowest bid meeting the mandatory requirements of the tender call was approximately $1.4 million higher than the approved budget for this project.
Therefore, Council authority is required to reallocate funds within the approved Toronto Water 2013 Capital Budget and to award the contact.

This report was prepared in consultation with the Medical Officer of Health and the Deputy City Manager and Chief Financial Officer.

COMMENTS

1. Education Program for the Corrosion Control Program Implementation

Toronto Water was required by Ontario Ministry of the Environment (MOE) Regulation 170/03, made under the Safe Drinking Water Act, 2002, to prepare a Corrosion Control Plan (CCP) for its drinking water system. The purpose of the CCP was to identify the preferred method to reduce the lead leaching from lead water services, internal plumbing and brass fixtures, thereby reducing lead levels in household tap water and reducing the potential health risk from exposure to this source of lead.

The CCP was submitted to the MOE in October 2010 and they concurred with Toronto Water's identified approach for corrosion control through the addition of phosphoric acid. Phosphoric acid addition creates a barrier preventing lead release to water. Key factors for selecting phosphoric acid for corrosion control are as follows:

(i) Phosphoric acid will achieve regulatory compliance in the shortest time, or within 1 to 2 years after dosing is initiated;
(ii) Phosphoric acid has a long history of successful use for corrosion control in drinking water, being the preferred method for many American and British water utilities;
(iii) As previously mentioned, phosphoric acid addition to our drinking water is supported by Toronto Public Health. The addition of food-grade phosphoric acid to drinking water would add about 0.1 to 0.2 % to a person's daily phosphorus intake (phosphorus is found in many foods including dairy and meat products and soft drinks in greater quantities); and
(iv) Phosphoric acid provides protection from "hidden" lead sources such as leaded-brass fixtures, lead solder and small lengths of lead service line which are very hard to identify.

Corrosion control is the most effective strategy available to water utilities to address lead concerns in drinking water. It is not only required by the MOE but is also endorsed as a significant lead reduction measure by authorities such as Health Canada and the United States Environmental Protection Agency. A key benefit of corrosion control is that the health benefits are experienced by all residents regardless of their socioeconomic status. Toronto Public Health has participated in the development of the Corrosion Control Plan and supports it as a key component to reduce lead exposure to all City residents.

The corrosion control project is proceeding on schedule and is anticipated to be initiated in 2013 with full implementation by the end of 2014.
Toronto Water has developed a comprehensive communications plan to support the implementation of corrosion control. The communications plan will create awareness and understanding of corrosion control as well as Toronto Water’s chosen methodology (the addition of phosphoric acid).

Specifically the communications plan will develop methodologies to target/communicate with Toronto Water’s overall customer base and City of Toronto’s general population who will be affected by this issue; reassure residents of the continuing high quality of Toronto’s tap water; meet Ministry of the Environment’s expectations for public education and promotion regarding corrosion control; continue to enhance understanding of (and therefore preparation for) the responsibility, importance and costs of replacing the private side of a lead water service connection; and foster ongoing awareness and adoption of the numerous mitigation practices that residents have available to them in addressing the issue of lead pipes and drinking water.

Beginning in late spring to early summer (pending actual corrosion control active dates at the plants), Toronto Water will release clear and concise information about corrosion control on its website (www.toronto.ca/leadpipes), in all related public education materials such as any applicable factsheets, postcards, brochures, etc. as well as in articles in the householder newsletter, Our Toronto, and the Utility Bill insert (including eBill customers if feasible).

This launch of information will be prefaced by the development of a comprehensive 311 Knowledge Base entries (which will be supported with 311 staff training if needed) and notification to all councillors.

Additionally, Toronto Water has notified York Region of the corrosion control implementation (Toronto Water provides water supply to portions of York Region) and will conduct meetings with any industrial, commercial and institutional customers with sewer surcharge agreements that may be impacted.

2. **Contract Award for the Implementation of Corrosion Control at the City's Water Treatment Plants**

Tender Call 247-2012 was issued by Purchasing and Materials Management Division on November 15, 2012 and advertised on the City’s Internet Website.

The Purchasing and Materials Management Division at its Public Opening held on January 9, 2013 opened the following bids for Contract MCP12-05WS, Tender Call 247-2012, for the Implementation of Corrosion Control Systems at the Island, R. C. Harris, F. J. Horgan, and R. L. Clark Water Treatment Plants.
The information provided in the tender submitted by W. A. Stephenson Mechanical Contractors Limited was verified in accordance with the terms of the tender call document and found to meet the mandatory requirements of the call.

The Tender documentation submitted by the recommended bidder has been reviewed by the General Manager of Toronto Water and was found to be in conformance with the Tender requirements. Toronto Water staff have compared the bid to the estimated cost and found the price of the recommended bidder to be reasonable given the tender prices of all bidders. The Fair Wage Office has reported that the recommended firm has indicated that it reviewed and understands the Fair Wage Policy and Labour Trades requirements and has agreed to comply fully.

The tender price is approximately $1,400,000.00, net of HST Recoveries, higher than the initial estimate that was included in the Toronto Water 2013 Capital Budget and 2014-2022 Capital Plan. This is mainly due to the addition of necessary project elements identified during the detailed design phase after the initial budget estimate was already established. The tender price is higher than the initial pre-tender estimate because it did not include the following:

(i) the provision of additional scope at the Island Water Treatment Plant which includes an additional coagulant dosage point, replacing existing aged dechlorination and coagulant chemical storage tanks which have reached the end of their service life and are adjacent to where the new corrosion control systems will be installed, and the addition of chemical lines to be used for future treated water dechlorination;

(ii) the provision of additional chemical deliveries beyond the base scope requirement to each of the four water treatment plants;

(iii) the provision of miscellaneous concrete repairs, firestopping, radar/x-ray inspections, and hydro vacuuming excavation which were added to the tender's schedule of prices in order to secure units rates in advance to be used when required during construction; and

(iv) the addition of process controls and instrumentation to enable all four water treatment plants to simultaneously dose the corrosion control chemical prior to and post filtration. A decision was made to implement simultaneous dosage of corrosion control chemical during the detailed design phase after discussions with several municipalities and the review of preliminary pilot plant results. This decision was based on the findings that future chemical consumption and operating costs will be reduced by this mode of operation.
3. Methods for Collecting Information on Replacement of Private Lead Water Service

A water service connection to a property is comprised of two components: (i) the City-owned portion within the public road allowance extending from the watermain to the water shut-off valve located at property line; and (ii) a privately-owned portion extending from the shut-off valve to the interior of the building. The City is responsible for the repair or replacement of the City-owned portion of the lead water service connection. The individual property owner is responsible for the repair or replacement of the privately-owned portion of the water service connection.

In January 2011, as part of the Lead in Drinking Water Mitigation Strategy, Council adopted a modified Water Service Replacement Program, estimated at 5,000 replacements per year, consisting of the following elements:

(i) Planned replacement of water services on the City-owned portion, on a street-by-street basis, to be coordinated with other City infrastructure renewal programs (estimated at 3,000 replacements per year of which two-thirds are estimated to be lead services) including: watermain replacement; watermain structural lining; road reconstruction; or sewer reconstruction; where the existing water services are lead or galvanized pipes, smaller than 19 mm in diameter, or the original services have never been replaced, and deemed to be at the end of their service life;

(ii) Emergency water service replacement of the City-owned portion, on an address specific basis, where: the water service is broken; or if the water service cannot deliver the minimum flow of seven litres per minute measured at the first entry point to the house for single-family, duplex or triplex residential properties (estimated at 500 replacements per year of which two-thirds are estimated to be lead services). The seven litres per minute criteria does not apply to non-residential properties. Non residential properties (including mixed use of residential and non-residential properties) must apply and pay for an upgraded new service if the existing service does not meet the minimum flow requirements for that building type.; and

(iii) Priority lead water service replacement of the City-owned section, on an address specific basis (capped at 1,500 replacements per year) and only if the City side is lead and the property owner replaces the private side of the lead service, prior to or at the same time the City-owned section is replaced.
2011-2012 Program Overview

<table>
<thead>
<tr>
<th>Water Service Replacement Program Components</th>
<th>Targeted Number of Water Service Replacement</th>
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</thead>
<tbody>
<tr>
<td>Planned Water Service Replacement on a Street-by-Street Basis</td>
<td>Watermain Replacement; Watermain Structural Lining; Road Reconstruction Only; Arterial Road; Resurfacing Only; Sewer Reconstruction</td>
</tr>
<tr>
<td>Unplanned Water Replacement on an Address-by-Address Basis</td>
<td>Emergency</td>
</tr>
<tr>
<td></td>
<td>Priority Replacement Program</td>
</tr>
<tr>
<td>Total</td>
<td>5000</td>
</tr>
</tbody>
</table>

* In 2011, the previous lead replacement program completed 1274 lead service replacements and 203 replacements under the new program. As of December 31, 2012 there was a backlog of 513 work orders in the new Priority Replacement Program. This is due to weather (pipe replacement work decreases dramatically in winter) and pressures placed on the program as a result of the water meter replacement program in predominantly lead service areas in addition to contractor issues. This backlog has been carried over into 2013. Letters are being sent to these residents and will include a Toronto Public Health information sheet on flushing and filter use.

Water services replaced through the above programs are replaced with 19 mm copper services, in accordance with the City’s current standard, and at no cost to the property owner for the City-owned portion. If the existing water service is greater than 19 mm, it will be replaced with the same size at no cost to the property owner. In cases where the property owner wants to have a larger than 19 mm service installed, or one that is larger than the existing, the property owner must upsize the private portion of the service to the same size as the City side and pays a compensating fee for this upsizing request.

It is estimated there are 40,000 lead water service connections remaining in the City’s distribution system. Based on an annual replacement rate of 5,000 water services per
year, where approximately 3,800 are expected to be lead services, it is estimated that it will take another 10 to 11 years to replace the remaining City-owned lead water services.

Currently, there are two methods in place for the collection of information on the replacement of private lead water services: (i) the completion of the new water/sewer service card by City staff responsible for inspecting water and sewer service installations; and (ii) the documents submitted by applicants under the new Priority Lead Water Service Replacement Program.

In 2008, Toronto Water revised its water/sewer service card to be used by City staff responsible for inspecting water and sewer service installations. The card documents the material and diameter of the service for both the new and old service and both the City and private side. An example of a new water/sewer service card is found in Appendix A.

In 2009, both Toronto Water and Technical Services published their own Field Services Manuals. The purpose of these manuals is to provide inspectors and contract administrators a source of knowledge and set out the expectations as they carry out their duties during construction. Both manuals specifically instruct the City's contract inspector to complete the water/sewer service cards and forward them to the appropriate section in Toronto Water to assist the Division in the preparation of the as-built drawings and to update the asset inventory database and work management systems.

In 2010, Toronto Water issued operational guidelines instructing all program delivery groups responsible for overseeing water service replacement to complete the new water/sewer service card and forward them to the Manager of Watermain Asset Planning.

In 2011, the Priority Lead Water Service Replacement Program was launched. Under the program, property owners may have the City-owned portion of their lead water service replaced by meeting the requirements of the program and submitting an application with the supporting documentation to Toronto Water. To be considered under the program, applicants must include among other items either: (i) An invoice from a contractor indicating that the private side of the water service has been replaced, including date and cost of work (i.e. already replaced); or (ii) a signed agreement with the City-hired contractor indicating that the private side of the lead water service will be replaced at the same time as the City-owned portion.

Under the planned and emergency water service replacement programs, approximately 3,500 lead water services (City-owned portion) are replaced each year. The private side is also replaced on a subset of these 3,500 water services. If the water/sewer service cards are accurately completed for all water service replacements, the City should have accurate information for the material type of the City-owned portion. The private-side portion of the water/sewer service card may or may not be filled out. If it is filled out, the City will have the material type of the private side. If it is not filled out, the City must assume that the service was not replaced.
Under the Priority Lead Water Service Replacement Program, private side replacement of lead services is a condition of the program and accurate information currently exists for the approximately 1,500 lead water services replaced each year under this program.

Starting in 2013, Toronto Water through its Watermain Asset Planning Unit will begin to analyze the information collected through the water/sewer service cards and the Priority Lead Water Service Replacement Program to report on the material type of the water services replaced on an annual basis. At this time it is anticipated that the 2013 data would be available by mid-2014. As a follow-up to the 2010 operational guidelines, Toronto Water will remind program delivery groups responsible for overseeing water service replacement to complete the new water/sewer service cards. Unfortunately, there is little that can be done to report on the material type of the water services that were replaced prior to 2013 as there was no program in place to analyze this data.

Although it is feasible to change contract specifications to require contractors who perform the water service replacement work to collect and report to the City the material type of the upgrades that they carry out on the private-side, there would be additional costs to the City. Given that the City already has a process in place that requires City inspection staff to report on this information, it is not recommended that the City require its contractors to collect and report on it as well.

Although it will take another 10 to 11 years to replace the remaining City-owned lead water service connections, the City’s Corrosion Control Plan addresses regulatory requirements and is the most cost-effective strategy available to water utilities to address lead concerns in drinking water.

4. Research on Public Health Impacts on Partial Lead Service Replacements

There is limited research available on the public health impacts of partial lead service line replacement. The available research indicates that partial lead service line replacement is not an effective risk management measure to reduce lead in drinking water. Partial lead service line replacements are frequently associated with short-term elevated drinking water lead levels, suggesting potential for harm. The longer-term impacts are unknown.

Toronto Water is currently limiting partial lead service line replacement to necessary upgrades and emergency replacements to the system and the Priority Lead Water Service Replacement Program encourages full service line replacements. Whenever Toronto Water completes a partial lead service line replacement, the homeowner is provided with a one-time free NSF-053 Certified faucet filter for lead removal.

Toronto Water, in collaboration with Toronto Public Health, will continue to reach out to the public to raise the awareness of the health risks and to encourage the public to take action to reduce their risks. Toronto Public Health has summarized the research on potential health impacts of partial lead service line replacements. This summary is attached in Appendix B.
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SIGNATURE

__________________________________________  _______________________________
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General Manager  Director
Toronto Water  Purchasing and Materials Management

ATTACHMENTS

Appendix A:  City of Toronto Water/Sewer Service Card