



**STAFF REPORT
ACTION REQUIRED**

Lead in Drinking Water Mitigation Strategy – Update

Date:	July 28, 2014
To:	Public Works and Infrastructure Committee
From:	General Manager, Toronto Water
Wards:	All
Reference Number:	P:\2014\Cluster B\TW\pw14013)

SUMMARY

At its meeting on June 10, 11, 12 & 13, 2014, City Council requested an update on several items relating to the City's Lead in Drinking Water Mitigation Strategy. This report responds to those requests and provides an update on several specific items related to the City's Lead in Drinking Water Mitigation Strategy.

RECOMMENDATIONS

The General Manager, Toronto Water, recommends that:

1. The Public Works and Infrastructure Committee receive this report for information.

Financial Impact

There is no financial impact from the receipt of this report.

DECISION HISTORY

At its meeting of June 10, 2014, City Council adopted item MM52.4 *Lead in Drinking Water Mitigation Strategy* directing the General Manager, in consultation with the Medical Officer of Health, to submit a report to the August 13, 2014 meeting of the Public Works and Infrastructure Committee on the implementation of the Lead in Drinking Water Mitigation Strategy, including updates on the Corrosion Control Program, Water Service Replacement Program, and Faucet Filter Program. In addition there was a request to report on the feasibility and estimated cost of:

- a) restoring the 5,000 "planned" lead service replacements on streets scheduled for resurfacing and "stand-alone" service replacement in conjunction with the Water Meter Replacement program that were cut in 2011; and
- b) reducing the service standard of "up to 12 weeks" and increasing the number of Priority "High-Lead" service replacements.

This Council directive can be viewed at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.MM52.4>

A copy of the Lead in Drinking Water Mitigation Strategy adopted by City Council at its meeting on February 23 and 24th, 2011 can be viewed at:

<http://www.toronto.ca/legdocs/mmis/2011/bu/bgrd/backgroundfile-34876.pdf>

ISSUE BACKGROUND

In 2011, Toronto City Council approved the Lead in Drinking Water Mitigation Strategy a comprehensive strategy comprised of corrosion control, lead service replacement, a faucet filter program, and public education to reduce lead in drinking water. Please find below a summary of the strategy.

Corrosion Control

This is a city-wide long-term solution that enhances the water treatment process through the addition of phosphate to lower the lead concentration at the tap. Phosphate works by forming a protective coating inside water pipes which reduces corrosion and the leaching of lead from surfaces in contact with drinking water. Corrosion control has been implemented at two of the four water treatment plants – R.C. Harris and R.L. Clark began adding phosphate in the spring of 2014 and the F.J. Horgan and Island Water Treatment Plant will begin adding phosphate in the fall 2014.

Lead Service Replacement

- a) Planned Water Service Replacement: The City-owned portion of the lead pipe that supplies water to residential homes is replaced in coordination with other planned construction projects.
- b) Emergency Water Service Replacement: Replacement when a pipe that supplies water to a home is broken or has low flow.
- c) Priority Lead Water Service Replacement: Replacement of the entire lead pipe that supplies water to a home – 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.

Faucet Filter Program

- 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

- b) An annual \$100 rebate for the purchase of a NSF-053 certified faucet-mounted filter to low income residents; and
- c) A faucet filter is provided when Water Meter Program staff have to cut into a lead water service on private property to install a new automated water meter.

Public Education and Communications

Toronto Water and Toronto Public Health work closely together to prepare and disseminate public education materials on lead in drinking water to residents through a wide range of communications tactics.

Non-Regulated Testing

Non-regulated drinking water quality testing for lead continues to be provided at no cost to the property owner.

COMMENTS

Corrosion Control

Implementation

Corrosion control treatment, or the addition of chemicals to create a barrier between the pipes and the drinking water, is the most cost-effective strategy available to water utilities to address lead concerns in drinking water. It is endorsed as a lead reduction measure by authorities such as Health Canada and the United States Environmental Protection Agency. One of the key advantages of corrosion control is that the health benefits are experienced by all Toronto residents regardless of their socioeconomic status or their knowledge of the effects of lead.

In 2011, City Council adopted the Lead in Drinking Water Mitigation Strategy and Toronto Public Health has been actively involved in the development of the strategy, including input on the implementation of corrosion control. Toronto Public Health supports corrosion control as a critical component to reduce lead exposure to the residents of the city.

The City's Corrosion Control Plan (CCP) was submitted to the Ministry of the Environment (MOE) in October, 2010 to comply with the regulatory deadlines. In February, 2011, City Council approved the Lead in Drinking Water Mitigation Strategy, which includes the CCP. The MOE acknowledged receipt and accepted the CCP in April, 2011. Following acceptance of the CCP by the MOE, Toronto Water proceeded with engaging the services of a consulting engineering firm in May 2011.

Corrosion control at the City involves adding phosphate at the water treatment plants in the form of phosphoric acid to lower lead levels at the tap. Phosphate works by forming a protective coating inside water pipes which reduces corrosion and the leaching of lead from surfaces in contact with drinking water. Detailed information is provided in Appendix A.

The corrosion control project is proceeding on schedule with full implementation by the end of 2014, as previously reported in Toronto Water's Public Works and Infrastructure Committee staff report dated February 25, 2013. The estimated capital cost to install the new infrastructure at all four water treatment plants is \$8 million. Progress on delivery of key activities is provided in Table 1 below:

Table 1: Corrosion Control Timelines

Activity	Date	Status
Corrosion Control Plan:		
<i>Submission to MOE</i>	October, 2010	Completed
<i>Approved by Council via Lead in Drinking Water Mitigation Strategy</i>	February, 2011	
<i>Received and accepted by MOE</i>	April, 2011	
Engineering Consultant engaged for design and contract administration	May, 2011	Completed
Construction Tender:		
<i>Issued</i>	December, 2012	Completed
<i>Awarded</i>	June, 2013	
Construction:		
<i>R. L. Clark WTP</i>	March, 2014	Commissioned
<i>R.C. Harris WTP</i>	May, 2014	Commissioned
<i>F.J. Horgan WTP</i>	Fall, 2014	On-going
<i>Island WTP</i>	Fall, 2014	On-going
Resume regulatory lead sampling and monitoring	June, 2015	On Time

Testing Phase during Implementation

Since 2011, Toronto Water has undertaken various tests and studies which confirm that the addition of phosphates during drinking water treatment can effectively reduce lead concentrations at the tap to meet regulations and improve public health. The results from these studies also indicated a rapid reduction in lead levels a few months following the addition of phosphate. Based on the results from Toronto Water's tests and the experience from other municipalities that have implemented phosphoric acid systems for corrosion control, Toronto Water anticipates a significant reduction in the leaching of lead into drinking water, full compliance with MOE's Regulation 170/03, and a reduction of the public's exposure to lead in drinking water.

Ongoing Monitoring

Regulatory lead sampling and monitoring will begin in June, 2015. Due to the complexity of the distribution system, it is anticipated that the phosphate conditioning period can take between 1 to 2 years before full compliance (less than 10% of samples exceeding the 10 µg/L lead regulatory limit) is achieved. Results from lead sampling will

be reviewed and the performance of the corrosion control system will be assessed and optimized over time in consultation with Toronto Public Health.

Impacts and Benefits of Corrosion Control Implementation

Corrosion control will mitigate the potential health risk from the lead that continues to leach from lead water services (if they have not been replaced), internal plumbing containing lead solder joints and even brass plumbing fixtures.

Corrosion control is an effective long-term solution to mitigating the potential health risk of lead in drinking water while the removal of lead services (both public and private) throughout the distribution system continues over several years. Corrosion control provides health benefits to all Toronto residents regardless of their socioeconomic status or knowledge about lead and protects against all sources of lead in the water, not just lead service lines.

Lead Service Replacements

Toronto Public Health advises that it is desirable to remove as much lead from the water infrastructure as possible and that both the public and private sides should be replaced at the same time wherever possible. Replacing both services causes the least disruption to the service line, minimizes any potential lead precipitation into the water, and eliminates the need for a filter which would still be recommended if a portion of the lead service remained. It should be noted that lead may also exist in fixtures and solder used pre-1980s.

The City removes lead from the water infrastructure in three ways. Firstly, there is planned replacement of water services on the City-owned portion, on a street-by-street basis, coordinated with other City infrastructure renewal programs, including water main replacement; water main structural lining; sewer reconstruction and major road reconstruction (planned replacements are 3,000 substandard). Factors impacting the number of replacements done include: location of the work where areas with newer housing will have fewer lead services; homeowners opting not to have the private side replaced at the same time as the public side; and as services are replaced, identifying the locations of the remaining lead services is becoming more challenging.

Secondly, there is 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. The program continues to meet demands within the annual target of 500 replacements per year.

Thirdly, there is priority lead water service replacement of the City-owned section, on an address specific demand basis 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. This is considered by Toronto Public Health to be the most desirable option, however the program is demand-driven and demand to date has not exceeded the annual target for 1,500 replacements.

Toronto has 475,000 residential water service connections. In 2007, approximately 65,000 city-owned services were estimated to be lead. In 2014, there are approximately 35,000 remaining. An update on service replacement carried out under the program is outlined in Table 2.

Table 2: Lead Service Replacements

		Target*	2014 (to June 30th)	2013	2012
Planned Water Service Replacement (substandard and lead)	Capital Program (watermain replacement, structural relining, sewer and road reconstruction)	3000	44 ⁺	1206 ⁺	1313**
Un-planned Water Service Replacement	Priority Lead Program	1500	630	1390	1019
	Emergency Replacement (substandard and lead)	500	465	321	344
Total		5000	1139	2917	2676

**The capital and emergency replacements are based on financial targets set for planning purposes.*

*** Replacements are coordinated with capital projects which may or may not be in areas where there are a high number of lead services.*

⁺ Service cards are received in batches. The numbers reflect service cards incorporated to date.

Faucet Filter Program

The faucet filter program provides a one-time free NSF-053 certified faucet mounted lead removal filter to the property owner along with a lead and public health information kit immediately following the replacement of the City-owned section of the water service. If there are more than one unit at a property where a water service is being replaced, then staff will leave enough kits for each apartment. The program also provides an annual rebate, up to \$100 for a NSF-053 certified faucet mounted lead removal filter, until the CCP takes effect, and where: (i) there is a child under six years old and /or a pregnant woman living in the home; (ii) the home is a single family, duplex or triplex building; and (iii) the annual household income is less than \$50,000. Since 2011, 9 applications have been received of which 4 were approved.

In response to Council motion PW26.3

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.PW26.3> adopted by Council at its meeting of November 13, 14, 15 & 16, 2013, filters are now also given out when Water Meter Program staff have to cut into a lead water service on private property to install a new automated water meter. Thirty-nine filters have been distributed to date.

Feasibility of Restoring Replacements with Local Road Resurfacing and Stand-Alone Replacement

Local Road Resurfacing

An estimated 1,500 substandard services could be identified and coordinated for replacement annually from the local road resurfacing program. Based on the number of cuts required, the estimated cost per service would be \$5,000 per connection as Toronto Water would be required to reconstruct a portion of the road.

Stand-Alone Replacement

A stand-alone replacement program targeting the remaining substandard services where there are no other capital works planned would cost an estimated at \$6,000 per connection. This is due to the need for full road restoration caused by the number of road cuts and the dedicated staff required to coordinate and deliver a stand-alone program. A breakdown of costs is provided in Table 3.

Table 3: Cost Estimates

Item	Estimated Water Service Replacements	Cost
Local Road Resurfacing	1,500	\$7,500,000
Stand-Alone Replacement	4,000	\$24,000,000
Total	5,500	\$31,500,000

With the implementation of Toronto Water's Corrosion Control Program in 2014, which will reduce lead levels across the City, an investment of approximately \$31 million in substandard water service replacement annually is not recommended.

In addition, there are concerns that partial lead service replacement may increase lead exposure over the long term. Consequently, the desired goal of regulatory compliance and a significant reduction of the public's exposure to lead in drinking water is unlikely to be achieved.

In reference to the Water Meter Program, since the work has been substantially completed in areas with substandard water services, coordination with this program is no longer a feasible option.

Increasing the Number of Priority Lead Replacements

The priority lead replacement program as described previously is entirely demand driven as the City has limited ability to force private property owners to replace the private portion of the service connection. Toronto Water forecasts an annual demand of 1,500

replacements as a guide for planning the financial and contractor resources required to carry out the work. The City is able to accommodate current replacement demand levels.

Reducing the 12 Week Service Standard

Once an application is approved under the program, a work order is created to initiate the construction work to complete the replacement. The process is included as Appendix B. There is a 12 week service standard during which timing the work is coordinated between the contractor, utility locates and the resident; 48% of work orders are completed within 8 weeks and 5% within 8 to 12 weeks for a total of 53% of work orders being completed within the service standard.

For the 47% that exceed the 12 weeks service standard, the timelines can be impacted by a number the following external factors:

- i) Scheduling utility locates which can take up to 4 weeks during the construction high season or initial appointments for locates maybe rescheduled by the locates company.
- ii) Seasonal variations and unexpected adverse weather conditions including severe rain storms or severe cold spells may cause delays or postponement of work and completion of replacements may take longer;
- iii) Contractors may have delays within their own schedules. Contractors may adjust timings to enable them to deploy crews more cost effectively and efficiently to complete multiple jobs in one area; and
- iv) Occasionally, homeowners may not be available for a period of time.

Public Education and Communications

Since 2007, information on lead in drinking water continues to be provided to residents through a wide range of communications resources and methods including: detailed information on the City of Toronto website, WaterSource updates to the Mayor and all Councillors for use in Ward newsletters, media releases, information in utility bills, information in various City of Toronto newsletters, information for 311 customer service agents, fact sheets with construction notices where capital work is underway, information in lead testing kits, direct mail (200,000 cards) to older homes where lead pipes are suspected, information and/or staff presentations at public meetings and City events, and information included in the faucet filter distribution package.

Toronto Water and Toronto Public Health through their public education efforts continue to advise the public that replacing both sides at the same time is still important as it causes the least disruption to the service line, minimizes any potential lead precipitation into the water and eliminates the need for ongoing filtering of water for lead.

In 2010, research was completed on a wide range of issues related to lead in drinking water which resulted in Toronto Public Health and Toronto Water improving

communication materials (fact sheets, website, construction notices, etc.) to ensure the health risks associated with lead in drinking water were clearly communicated. In 2014 further research is planned to investigate issues related to the priority lead program. This report has been prepared in consultation with the Medical Officer of Health.

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ATTACHMENTS

Appendix A - Corrosion Control Implementation Plan - Backgrounder
Appendix B - Priority Lead Service Replacement Program - Work Order Process Flow