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| TO: | CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON MARCH 5, 2012 |
| FROM: | JOHN BRAAM, P.ENG. ACTING EXECUTIVE DIRECTOR, PLANNING, ENVIRONMENTAL & ENGINEERING SERVICES & CITY ENGINEER |
| SUBJECT: | LEAD MITIGATION PROGRAM UPDATE |

RECOMMENDATION

That, on the recommendation of the Acting Executive Director, Planning, Environmental and Engineering Services and City Engineer, the following report **BE RECEIVED** for information with respect to the City of London's lead mitigation program for Londoners with lead water service pipes.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

The reports noted below can be found at <http://www.london.ca/d.aspx?s=/Meetings/ccminutes.htm> :

- Lead Mitigation Program and Community Lead Testing, April 7, 2008, ETC Agenda Item #2
- Lead Mitigation Program and Community Lead Testing, Sept 22, 2008, ETC Agenda Item #2
- [Lead Mitigation Program and Community Lead Testing, June 1, 2009, ETC Agenda Item #22](#)
- [Concerns Regarding Partial Lead Service Replacement, March 1, 2010, ETC Agenda Item #3](#)

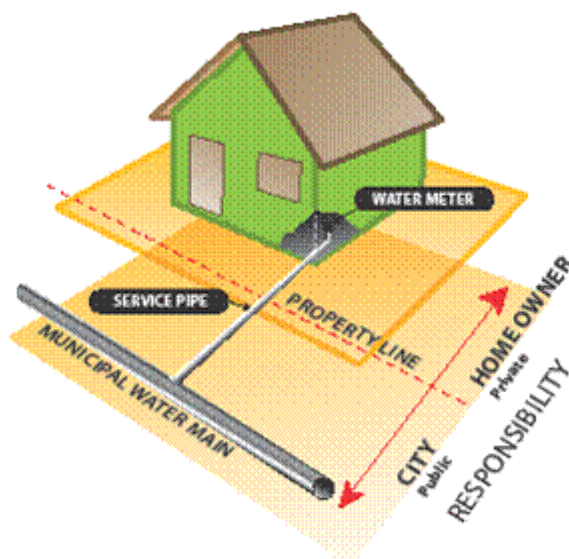
BACKGROUND

Purpose

The purpose of this report is to update Committee and Council with respect to the City's ongoing efforts to mitigate lead levels in the drinking water of consumers with lead service pipes.

Background

The water in London's distribution system has very low or undetectable levels of lead, but many homes built before 1953 are connected to the distribution system by lead water services. The water service is the pipe that conveys water from the water main under the street, to the water meter in the customer's house. Water services run across both public and private property. The public portion runs from the water main to the property line, and the private portion runs from the property line to the water meter.



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As water travels through lead service pipes, it has the ability to uptake lead. In the summer of 2006, the City of London began offering Londoners free water testing for lead, and noted elevated lead levels in samples taken from the taps of customers with lead service pipes. A three-pronged approach to minimize lead levels at the consumers' taps was developed, consisting of *education and awareness, water chemistry changes and lead service replacements*. In 2006, it was estimated that approximately 9,000 London homes had lead water services.

Education and Awareness

In 2006, the City of London embarked upon a campaign of education and awareness regarding lead in drinking water. Information was posted on the City website, and several "Enviroworks" flyers have been dedicated to the topic of lead exposure and lead water services. In 2007, an information brochure was prepared and delivered to the over 28,000 London homes connected to water mains that were installed before 1953. In each of these communications, customers were informed of the City's free lead testing program and were encouraged to call and arrange a home visit for a water sample to be taken. The laboratory results of all samples taken are mailed to homeowners with an explanatory letter. If the lead level in the water sample is elevated, an information package is provided to the homeowner. These packages were prepared by the Middlesex-London Health Unit and contain important information regarding potential health effects related to lead exposure, and steps that can be taken to reduce exposure to all sources of lead.

City staff replace about 10,000 older water meters in London homes and businesses each year. If the building is 1950's era or older, water meter staff explain that a lead water service may be present, and offer to take a water sample while they are on-site. If a lead water service is visible when the water meter is replaced, the homeowner is made aware at that time.

Each winter, City staff focus their efforts on particular streets that have been identified for "targeted lead service replacement" (more on this below). Through these efforts, the owners of all houses on the targeted streets are contacted, and water samples are taken in order to identify whether lead water services exist.

Since the City of London began offering free lead testing in 2006, more than 9,200 water samples have been taken for analysis from London households and businesses, including 462 samples in 2011.

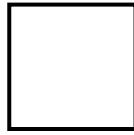
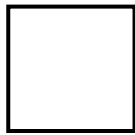
Water Chemistry Changes

In 2007, the pH of London's drinking water was approximately 7.1. The pH of the raw lake water in Lakes Huron and Erie is approximately 8.2, but that pH is reduced by the water treatment processes in order to achieve optimal treatment. Research and experimentation in London in 2007 indicated that raising the pH of the water following treatment would significantly reduce lead uptake. In late 2007, pH adjustment equipment was installed at the water treatment plant near Grand Bend, which is part of the Lake Huron Primary Water Supply System. Gradual pH adjustment commenced in January, 2008.

The water supplied by the Lake Huron Primary Water Supply System and delivered through the Arva Pumping Station has maintained a pH of approximately 8.1 since 2008. The vast majority of older London homes are supplied with water from the Lake Huron system, and testing has demonstrated that the pH adjustment has reduced lead levels by 40 to 50% at the taps of customers with lead water services.

In 2011, pH adjustment equipment was installed at the water treatment plant near Port Stanley, which is part of the Elgin Area Primary Water Supply System. Testing of this new equipment began in late February, 2012, and a target pH value of 8.1 has been set. When this pH target is achieved, all water in London's distribution system will have a stable pH of approximately 8.1.

These changes to the water treatment processes form the basis of London's "Corrosion Control Plan" (CCP). London is one of 19 Ontario municipalities that were required to submit formal CCPs to the provincial government based upon the results of mandated "Community Lead Testing". Enhanced monitoring of lead levels is another important element of London's CCP. In 2007, the City of London constructed a "Pipe Loop Assembly" using 4 lead service pipes excavated from London properties. An automated control system adjusts water flow through the pipes to simulate typical household water consumption, and weekly water samples are taken from each of the 4 pipes.



In addition to the pipe-loop sampling, 10 London homeowners have volunteered to participate as “Sentinel Homes” where extensive sampling is performed 3 times per year. The Pipe Loop and Sentinel sampling provide accurate, ongoing monitoring of the effectiveness of the pH adjustment strategy.

Lead Service Replacements

In 2008, Council approved an 18-year program to expedite lead service replacements. The City of London is endeavouring to replace an average of 500 lead services each year. By adhering to this target, the public portion of all lead services can be replaced by 2025. Lead water services are replaced in London under 3 different programs:

1. The Lead Service Replacement Program – Under this program, customers with lead services initiate the process by hiring a contractor to replace the private portion of the service. The City of London is then notified and the public portion of the service is replaced by the City at no charge to the customer. In 2011, 59 lead services were replaced under this program.
2. The Capital Water Main Replacement Program – Under this program, the City of London replaces the public portions of all water services on a given street as part of a larger infrastructure renewal process that also replaces the water main. If lead services exist on a street where the water main is scheduled for replacement, homeowners are provided with literature that informs them of the upcoming project, offers free testing to determine whether a lead service is present at their home, and explains the benefits of replacing the private portion of the lead service in conjunction with the public portion replacement. In 2011, the public portions of 110 lead services were replaced under this program.
3. The Targeted Lead Service Replacement Program – Under this program, the City of London identifies and replaces the public portions of all lead services on targeted streets where the water main is not being replaced. As with capital water main replacement, homeowners receive literature explaining the benefits of replacing the private portion of the lead service in conjunction with the public portion replacement. In 2011, the public portions of 99 lead services were replaced under this program.

In addition to the programs listed above, lead services are replaced if they develop leaks, or if they are exposed due to other excavation work (e.g. sewer replacements). An additional 28 lead services were replaced in this manner in 2011.

Under the Lead Service Replacement Program, both the public and private portions of the lead service are replaced, resulting in a full service replacement. Under both the Capital Water Main Replacement Program and the Targeted Lead Service Replacement Program, the public portions of the services are replaced, but the homeowners may or may not choose to replace the private portions. The benefits of a full replacement are explained to homeowners, and the City has established a loan program to assist homeowners with the costs of private-side service replacement. Where the homeowner chooses to replace the private portion, a full replacement is the result. But in cases where the homeowner chooses not to replace the private portion, the new public portion of the service is connected to the existing private lead service, resulting in a “partial lead service replacement”.

Full lead service replacements reduce lead at customer’s taps to the same low level that exists in the water mains. Testing in London has confirmed that partial lead service replacements reduce customer lead levels by an average of 35 to 40%.

Listed below are the numbers of public-portion lead service replacements performed in London in each year since 2007:

- 2007 – 476 replacements
- 2008 – 651 replacements
- 2009 – 628 replacements
- 2010 – 620 replacements
- 2011 – 296 replacements

In total, the public portions of 2,761 lead services have been replaced since 2007, for an average of 534 replacements per year. It is estimated that between 6,000 and 6,500 full lead services remain in London.

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The number of lead services replaced in 2011 was significantly lower than in previous years. This is partly due to the fact that the number of customer-initiated replacements has been declining since 2007, as the total number of customers wishing to have this work performed decreases. However, the most significant factor leading to the 2011 decrease was the number of services replaced under the Capital Water Main Replacement Program. The number of lead services replaced under this program is dependent upon the extent of capital replacement work performed in a given year. As well, not all capital projects involve streets with lead water services. Although the presence of lead services is a consideration when selecting streets for capital replacement work, other factors also play a significant role. In 2011, several capital water main replacement projects did not involve streets with lead water services.

In 2012, it is estimated that 444 lead services will be replaced.

Research Initiatives

Since 2007, the City of London has partnered with the Department of Chemical and Biochemical Engineering at Western University to conduct lead corrosion studies and work toward the development of a mathematical model to forecast lead levels in municipal drinking water.

The City of London has recently partnered with both Western and the University of Toronto (in conjunction with École Polytechnique de Montréal) in submitting funding applications to the Canadian Water Network for future lead mitigation research projects.

Summary

The proactive approach taken by the City of London with respect to mitigating lead levels in drinking water has included *public education and awareness, changes to the water treatment processes, and lead service replacement programs*. Londoners continue to take advantage of London’s free lead testing program and elevation of the water’s pH has had a significant impact in reducing lead levels for customers with lead service pipes. In addition, an average of 534 lead services have been replaced each year since the beginning of 2007. The City of London’s lead mitigation strategy is an important element of our continuing commitment to provide safe, clean drinking water to all London residents.

Acknowledgements

This report has been prepared with input from Roland Welker, Division Manager, Water Engineering and Dan Huggins, Water Quality Manager.

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| PREPARED BY: | RECOMMENDED BY: |
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| JOHN SIMON, P.ENG. DIVISION MANAGER, WATER OPERATIONS DIVISION | JOHN BRAAM, P.ENG. ACTING EXECUTIVE DIRECTOR, PLANNING, ENVIRONMENTAL & ENGINEERING SERVICES & CITY ENGINEER |

Cc: Dr. Graham Pollett, Middlesex-London Health Unit
Wally Adams, Middlesex-London Health Unit
Fatih Sekercioglu, Middlesex-London Health Unit
Roland Welker, Division Manager, Water Engineering