



INFORMATION REPORT

TO:	Chair and Members Public Works Committee
COMMITTEE DATE:	September 17, 2018
SUBJECT/REPORT NO:	Corrosion Control Program for the Woodward Drinking Water System (PW18080) (City Wide)
WARD(S) AFFECTED:	City Wide
PREPARED BY:	Susan Girt 905-546-2424, Extension 2671
SUBMITTED BY:	Andrew Grice Director, Hamilton Water Public Works
SIGNATURE:	

Council Direction:

The Public Works Committee, at its meeting dated November 16, 2015 approved the following:

- (a) That the General Manager of Public Works be authorized and directed to implement corrosion control within the Woodward Drinking Water System (DWS) using a phosphate-based treatment approach with orthophosphate as the method for corrosion control (phosphoric acid as the treatment additive);
- (b) That Capital Project ID 5141666110 in the amount of \$4.95 Million be approved for the design and construction of a chemical addition, storage and metering facility at the Woodward Water Treatment Plant, including \$2 Million WIP funding from Project 5141166110 (planned process upgrades at the Woodward facility);
- (c) That the Water Operating Budget Forecast be increased by \$310,000 in 2018 to support the annual ongoing cost of the Corrosion Control Program (substantially for purchase of the chemical);
- (d) That the General Manager of Public Works be directed to develop and implement an Outreach Plan for the users of the Woodward DWS respecting the Corrosion Control Program;
- (e) That one temporary Full-time Equivalent (FTE) is added to the Hamilton Water complement for a two-year period to support the implementation and monitoring associated with the Corrosion Control Program, anticipated to occur between 2016 – 2019;

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OUR Mission: To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner.

OUR Culture: Collective Ownership, Steadfast Integrity, Courageous Change, Sensational Service, Engaged Empowered Employees.

- (f) That a one-time increase of \$250,000 be added to the Water Operating Budget Forecast in 2018 to support preparation of the Woodward DWS for chemical addition.

Information:

In 2007, changes to the Safe Drinking Water Act and Ontario Regulation 170/03 sought to improve the safety of drinking water as it relates to the presence of lead. The City of Hamilton obtained approval by both Council and the Ministry of Environment and Climate Change (MOECC now the Ministry of Environment, Conservation and Parks (MECP)), to implement a Corrosion Control Program (CCP). The objective of the program is to improve the quality of water by reducing the lead concentration at the tap to below the allowable limit of 10 µg/L, as defined in the Ontario Drinking Water Quality Standards (ODWQS).

Hamilton's Corrosion Control program is a system-wide approach that provides the ultimate level of protection to Hamilton residents from lead in drinking water.

This report, serves to highlight the progress of the Corrosion Control Program.

❖ Corrosion Control Plan, 2010

The Corrosion Control Plan for the Woodward Sub-System within the City of Hamilton's Drinking Water System (CH2M Hill, 2010) was submitted for review and approval to the MOECC in 2010 for compliance with Schedule 15.1 of O. Reg 170/03. The Corrosion Control Plan addressed the following:

- a) Assessment of Corrosion in the City of Hamilton's Drinking Water System
- b) Development of Alternative Corrosion Control Measures and Their Evaluation
- c) Identification of the Preferred Measure for Corrosion Control
- d) Implementation Plan and Post-Implementation Monitoring Plan

Based on a comprehensive review of the occurrence of lead measured at the tap, the number of lead services remaining in the system, the cost associated with Lead Service Line replacement and the experience of other municipalities with similar water quality conditions, a phosphate-based treatment approach was recommended for corrosion control in the City of Hamilton.

Orthophosphate is an effective corrosion inhibitor as it forms a thin protective coating on lead surfaces. This coating helps reduce corrosion and the leaching of lead from surfaces in contact with drinking water. Phosphate-based inhibition for Corrosion Control is also used in various communities including Toronto, ON (2014), Winnipeg, MB (2000), Halifax, NS (2002) Washington, DC (2004) and others.

❖ Health Related Concerns of Lead and Benefits of Orthophosphate

Consumption of even very small amounts of lead is harmful to human health, especially in infants, young children and pregnant women (impacts to foetus). There is no recommended level of lead ingestion that is considered safe.

Phosphorus is an essential mineral primarily used for growth and repair of body cells and tissues. Structurally it is found in bones and teeth and functionally, it is required for a variety of biochemical processes including energy production and pH regulation. It is found in many foods in the form of phosphate and as a food additive in the form of various phosphate salts used for non-nutrient functions during food processing.

As part of Hamilton's Corrosion Control Program, orthophosphate will be introduced into the Woodward DWS in small doses in the form of food-grade phosphoric acid, which is a clear, odourless liquid. The addition of orthophosphate into the Woodward DWS represents only a small fraction of phosphate that is consumed as part of a natural diet. To put this into perspective, an average person would need to drink more than 330 glasses of tap water to get the same amount of phosphate that is present in one glass of milk. See Table 1 in Appendix A for other dietary sources of phosphorus.

❖ Financial Implications

The Capital cost for the full-scale corrosion control chemical addition, storage and metering facility at the Woodward Water Treatment Plant (WTP) is estimated at \$4.95M.

A breakdown of the estimated pre-and post-implementation annual operating costs are illustrated in Table 2 in Appendix A.

❖ Outreach Plan

Hamilton Water developed a comprehensive outreach plan that highlights, the health risks of lead exposure and the benefits of corrosion control. Stakeholders included residential, commercial, industrial and institutional customers as well as other water systems supplied by Hamilton Water (Haldimand County and Halton Region).

❖ Design & Construction (Capital Program)

The corrosion control chemical building at the Woodward Water Treatment Plant consists of storage tanks and pumps that will add phosphate to treated water prior to entering the distribution system. Phosphoric acid will initially be added at a concentration of between 1.8 and 3 mg/L as PO₄ (phosphate). Preliminary design of the Capital Works program began in 2016 and Commissioning is on track to begin in October 2018

❖ Implementation and Contingency Planning

Baseline monitoring to understand the impact of orthophosphate on the distribution system has been completed and a post implementation monitoring program has been developed. Monitoring of lead concentrations at the tap will be incorporated into the monitoring plan once the system has stabilized.

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The Woodward DWS Licence was amended August 17, 2017 to include Corrosion Control. Hamilton Water is on target to begin Corrosion Control Chemical addition in November 2018.

❖ Distribution Plan

Hamilton Water staff are actively flushing the water distribution network to prepare the system for phosphate addition. Upon implementation of the Corrosion Control Program it is possible to have some localized water quality issues such as cloudy water or taste and odour complaints. Hamilton Water will ensure staff are available to respond to any water quality complaints.

Appendices and Schedules Attached

Appendix A – Summary Tables