

TO: Council Committee
FROM: Andrew Schell, Manager, Environmental Services
Peter Dance, Director of Public Works
REPORT NO.: PW-06-057
DATE: September 14, 2006
SUBJECT: **CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION BY-LAW**

Recommendation

THAT the attached Cross-Connection Control and Backflow Prevention By-Law be adopted.

Background

A cross-connection is defined as “any actual or potential connection between a potable water system and any source of pollution or contamination” (CAN/CSA B64.10). Cross-connections are present in every water supply system. Any cross-connections that are not protected against backflow are potentially a dangerous source of contamination. When backflow (a flowing back or reversal of the normal direction of flow) occurs through an unprotected cross-connection, pollutants or contaminants can enter the municipal water system. Due to the resulting health hazards, it is important for the municipality to have an effective cross-connection control program (CCCP) in place.

In the 2005 Orillia Water Supply Municipal Inspection Report, the Ministry of Environment noted in the “Distribution” analysis section:

- No by-law in place to prohibit cross-connections.
- Backflow preventers are not installed at each lateral connection to major industries.
- A by-law was not in place limiting access to hydrants.

In the “Summary of Best Practices Issues” section of the report, the above three comments were again noted.

In the “Recommended Actions” section of the report, it was noted:

- The owner should adopt a by-law to prohibit potential cross-connections within the drinking water system.
- The owner should adopt a by-law that limits the access to the City of Orillia hydrants.

The attached by-law, upon Council approval, will address all of the Ministry of Environment concerns listed above.

On January 3, 2006, Council approved the initial phase of Cross-Connection Control and Backflow Prevention by adopting standards for minor health hazard control, which requires the installation of a water meter in each new domestic service connection that includes a backflow prevention device to protect the distribution system from contamination. The package also includes a thermal expansion tank, which is designed to absorb the increased volume of water created when water is heated, eliminating problems associated with the hot water system.

While it is not documented in a readily accessible form, we believe that most major industrial/commercial services are protected with backflow prevention consistent with Plumbing Code requirements.

Analysis and Options

In April 2005, the National Guide to Sustainable Municipal Infrastructure Innovations and Best Practices (Infraguide) published "Methodology for Setting a Cross-Connection Control Program". This document outlines the best practice for setting up a new program.

The National Plumbing Code of Canada requires connections to potable water systems be designed and installed so non-potable water or substances that may make the water non-potable cannot enter the potable water system. CAN/CSA B64.10-01 Manual for the Selection and Installation of Backflow Prevention Devices provides detailed information about backflow, back siphonage and cross-connections and the potentially dangerous sources of contamination.

The CSA 2003 standard defines the health hazard levels as:

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| a) | minor hazard | - a nuisance, with no possibility of health hazard |
| b) | moderate hazard | - minor hazard with low probability of becoming a severe hazard |
| c) | high or severe hazard | - any potential cross-connection involving any substance that could be a danger to health. |

The CCCP policy and by-law that is being presented to Council will follow the methodology set out by Infraguide. This best practice addresses cross-connection control programs for all Canadian municipalities. This is a 15-step program starting with establishing authority and administrative responsibility, establishing budgets, public relations, training and completing the program with performing quality control and program assurance, just to name a few.

The program will be phased in over time allowing compliance with the by-law and its requirements. The second phase will address the implementation of a detailed registry of all Commercial accounts and the health hazard rating associated with each. The high or severe risk categories need to be addressed as a priority since they involve substances that could be an immediate danger to public health. City facilities will be addressed as well to "lead by example" and gain information to improve the program as it progresses through its initial phases. CAN/CSA

B64.10-01 provides a guide to the Assessment of Hazards, which will be used to assess all service connections to the City potable water supply to assign the degree of hazard potential as minor, moderate or severe. Moderate hazards will be phased in after the severe potential hazards have been addressed. While the minor hazard is the lowest of concern, it is best to implement as soon as possible on new construction and renovations as it provides the most cost effective approach at the start of a new project rather than retrofitting after the fact. This was presented to and accepted by Council in January 2006.

The recommendation to Council at this time is to approve the Cross-Connection Control and Backflow Prevention Program By-law. The overall water distribution system operations including monitoring quality through sampling, maintaining chlorine residuals, maintaining positive pressures, and performing appropriate levels of distribution system maintenance and upgrades, are currently being addressed ensuring a total water quality management program. A Cross-Connection Control Program complements the other barriers of this multi-barrier approach to providing safe drinking water to the City. With the National Plumbing Code of Canada requiring the installation of backflow preventers where applicable, it is anticipated that most issues will be maintenance requirements and inspection infractions.

As an additional barrier against contamination the by-law will provide standards for the use of all fire hydrants, and the maintenance of private fire hydrants connected to the system. Private hydrants pose a major threat to the system if maintenance and usage practices are not correctly performed. Presently there is nothing in place to provide security against contamination from private systems and fire hydrants.

At present the Fire Department has requested that all private hydrants be painted yellow. Due to a lack of confidence related to these hydrants the Fire Department will not connect to these hydrants when responding to an emergency unless it is absolutely necessary. Connections to the hydrants are not controlled and water usage to-date is not recorded and invoiced. The by-law will prevent unauthorized connection and usage of hydrants without protection measures, notification, and a use permit in place first. This also addresses the ongoing life safety issue of fire hydrant availability in the event of a fire.

As well the by-law will provide quality control and assurance checks that all hydrants are being maintained and operable, and that backflow systems are being maintained by the manufacturers specifications as prescribed by the National Plumbing Code and the Ontario Building Code.

Financial Impact

In addition to some initial staff time to answer questions and concerns regarding implementation of the by-law requirements, staff time will be required for initial review of inspection reports, follow-up if required, and every 5 years for re-inspection reports. It is expected that current staffing levels can absorb this time requirement. As well, approximately \$8000 will be required to purchase Backflow

Metering Assemblies required for hydrant use. These units will be required when the bulk filling station at West Orillia Well is not feasible for water taking due to pool filling, road maintenance requirements and geographic feasibility.

Comments from Other Departments

There has been extensive dialogue with the Fire Department, Chief Building Official and the Manager of Legislative Services in preparation of this report.

Summary

With this program in place, the City of Orillia will provide increased potable water protection and fire safety, which will reduce risks to public health, demonstrate due diligence and regulatory compliance, reduce liability, and increase consumer confidence as well as heighten cross-connection awareness.

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