



Subject: Backflow Prevention Program
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Department: Operational Services
Date: April 16, 2019

Recommendation

- 1. That Report No. OPS19-007 be received; and**
- 2. That this Program be approved on all Industrial, Commercial, Institutional (ICI) and Multi Residential facilities.**

Executive Summary

Staff is seeking to provide Council with updated information on the status of the Backflow Prevention Program (BFPP). By implementing the BFPP the Town will be taking measures to ensure that its drinking water system is protected from possible contamination due to cross connections.

The BFPP is a critical component of the drinking water operations to ensuring the safety of the drinking water supply and public health. This report will speak to the following:

- Water can backflow from the private side into the Municipal Drinking Water System;
- This program is focused on Industrial, Commercial and Institutional (ICI) at this time;
- The current Building Code requires the installation of backflow devices for new properties;
- Annual inspections are required to ensure the devices are operational;
- A Consultant has been engaged to develop a Program;
- Multi-departmental Initiative;
- Approximately 600 ICI properties will be affected;
- Several steps are proposed to implement the BFPP;
- To attain compliance, the property owners will be required to complete several steps;

- The Town of Aurora shall be responsible for a number of steps;
- The Town of Aurora shall communicate to and educate the property owners through different means including a Public Open House;
- The Owners of ICI and Multi-Residential properties have several responsibilities.

Background

The American Water Works Association (AWWA) defines a cross connection as ‘a connection or potential connection between any part of a potable drinking water system, and any other environment containing other substances in a manner that, under any circumstances, would allow such substances to enter the potable water system’.

Cross connections that are not protected against backflow are potentially dangerous sources of contamination. When backflow occurs through an unprotected cross connection, pollutants and contaminants can enter from the private plumbing system into the municipal water distribution system and be delivered to other consumers or locations.

In 2002, the *Safe Drinking Water Act 2002* was enacted to protect the health of Ontarians and to safeguard Ontario's drinking water. Section 19 requires individuals with the authority to make decisions about municipal drinking water systems ‘to exercise the level of care, diligence and skill in respect of a municipal drinking water system that a reasonably prudent person would be expected to exercise in a similar situation’, regarding the protection and safety of the users of the municipal drinking water system.

The Town's Water Distribution System is regulated by the *Safe Drinking Water Act, 2002* and applicable regulations and adheres to the Town's Quality Management System Policy. The Policy states that The Town of Aurora is committed to:

1. Ensuring a consistent supply of safe, high quality drinking water, through a commitment to system maintenance;
2. Maintaining and continually improving its quality management system, through a commitment to Aurora's consumers to provide safe drinking water; and
3. Complying with applicable regulations and legislation.

It is important to note that implementation of a Municipal Back Flow Prevention Program is not a provincial legislative requirement at this time. The Ontario Ministry of Environment, Conservation and Parks (MECP) recommends that municipalities give due consideration to the *Safe Drinking Water Act 2002* and continual improvement of

the Towns water quality management system Council can elect to defer the BFPP , however staff recommend that the BFPP be implemented as outlined herein.

As part of the Town's Drinking Water Quality Management System (DWQMS), staff, acting on the Ontario Ministry of Environment, Conservation and Parks (MECP) recommendations, tabled Report No. IES14-045 Water Connection Backflow Prevention Program. Council approved the recommendation in that report to enact Bylaw Number 5645-14 being a Bylaw to regulate cross connections and backflow prevention in private plumbing systems, as required to protect the Town's drinking water system from contamination. The Bylaw was enacted on December 16, 2014.

Analysis

Water can backflow into the Municipal Drinking Water System.

Backflow is a circumstance that can occur in a drinking water system whereby potable water that has been delivered from the municipal system into the plumbing of a private building or system, flows backwards into the municipal drinking water system from the private side. In the event this should occur there is potential for contaminants to enter the municipal water system.

There are a number of operational conditions, both on the municipal and the private side that have the potential to induce backflow:

- The use of a fire hydrant or a watermain break can reduce the pressure in a pipe sufficiently to cause water to be siphoned from neighboring buildings into the distribution system.
- Industrial processes that operate at high pressure by means of pumps, boilers, etc. such that higher pressure in the private system can be greater than the pressure in the distribution system, causing backflow conditions.

The installation of backflow preventer devices will minimize the probability of the water to flow in the reverse direction and contaminate the municipal drinking water system.

In 2005 the City of Stratford experienced contamination in their municipal drinking water system with detergent chemicals from a carwash. A drinking water advisory was issued and residents were advised not to drink, shower or wash their hands with tap water.

To avoid a similar occurrence and to protect the municipal water distribution system thereby minimizing the health hazards, many municipalities in Ontario have

implemented a Backflow Prevention Bylaw through an effective BFPP, making backflow prevention devices mandatory for premise isolation.

The current Building Code requires the installation of backflow devices.

Currently, under the Ontario Building Code O.Reg 332/12 (“Building Code”), section 7.6.2.6 , new buildings where a moderate or severe hazard may be caused by backflow shall be provided with premise isolation by installing the appropriate backflow preventer device for the intended use of the building. The ongoing monitoring of the devices is not addressed under the Building code. The Building Code also applies when a building goes through a renovation or change of use ensuring that the device is functioning properly at all times.

Annual inspections are required to ensure the devices are operational.

Other than the initial inspection performed by the Building Department , the Town does not yet have a program to ensure these devices are tested and maintained on an annual basis, hence the program described in this Report is being proposed.

This Program is focused on Industrial, Commercial and Institutional (ICI) at this time.

The Bylaw applies to existing and future Industrial, Commercial, and Institutional properties as well as multi-residential properties in excess of three stories. Residential Buildings covered under Part 9 of the Building Code, are not required to be isolated unless the property is connected to an auxiliary water supply.

A Consultant was engaged to develop a Program.

To date, the program has not been implemented; however, Operational Services staff is working on developing a Back Flow Prevention Program (BFPP) program. A consulting firm, DFA Infrastructure International Inc., was retained to assist staff in a review of the current BFPP Bylaw and to develop internal procedures, forms, and communication materials including conducting Public Open Houses for the BFPP development and implementation.

Staff believe that a robust BFPP education element is a critical step that must be conducted preceding the full implementation of the BFPP as this program can have a significant financial impact on our stakeholders.

Multi-Departmental Initiative.

Collaboration with internal departments is also necessary to ensure a comprehensive development and smooth implementation of the backflow prevention program. It is anticipated that following internal departments will be involved during the design and implementation phases of the backflow prevention program: Operational Services, Finance and Accounting, Legal, Bylaw, Communication, Building, Engineering Services, Information and Technology, Executive Leadership Team and Town Council.

Approximately 600 ICI properties will be affected.

There are approximately 600 properties that will be required to comply with this Bylaw. Some of these properties cover multiple businesses. Of these 600 properties, approximately 164 have one (1) or multiple businesses that are considered high-risk hazards for the water distribution system.

The implementation of this program is based on risk priority. Those properties with high risk operations, where processes require potable water supply interaction with chemicals or other substances, will be addressed first followed by moderate risk properties.

Staff also need to include several municipal facilities in the BFPP. We recommend that these facilities be first on the list for backflow device survey and retrofit, as the Town should take the lead in this initiative.

Several steps are proposed to implement the BFPP.

The implementation of the program will consist of the following steps:

- Communication and education engagement with property owners through Public Open Houses, inserts in the water bill and a BFPP page on Town's website;
- Collection of information, identification of properties and development of a database for the program;
- Develop and maintain a roster of contractors to conduct facilities surveys and backflow prevention devices installation and testing;
- Notify property owners to survey the property, install backflow prevention devices for premise isolation or test existing backflow prevention devices;
- Survey of each property to identify potential cross-contamination sources and hazard classification, for both municipal and private properties;

- Installation of backflow preventers for premise isolation and/or testing of existing devices;
- Collection and administration of surveys and test reports showing that the devices are functioning;
- Follow-up and reporting of actions taken to comply;
- Record keeping and follow-up notifications for subsequent re-testing requirements;
- Implementation will be over a multi-year period and will be managed as part of day to day operations; and
- Update and approval of an amended Bylaw.

To attain compliance, the property owners will be required to complete several steps:

- A Building Permit is required for the installation of all premise isolation backflow preventers, regardless of the size of the water service connection;
- The installations of the premise isolation devices and all related items should be done in accordance with the Building Code, Canadian Standards Association (CSA) –B64 series standard, Municipal Code Chapter 851 and manufactures specifications;
- A “Cross Connection Control Survey” shall be conducted for each facility initially and every five (5) years thereafter, or when there is a change of property usage;
- Testing and inspection of each backflow preventer shall be done at installation and each year thereafter;
- All backflow device deficiencies identified through the survey or testing reports shall be fixed; and
- All backflow prevention work shall be done by the Qualified Persons registered with the Town.

The Town of Aurora shall be responsible for a number of steps:

- Administer and manage a BFPP to ensure compliance with the Town’s Bylaw;
- Inform property owners about the Bylaw and their responsibilities;
- Send notifications for site survey and testing requirements;
- Ensure that all Industrial, Commercial and Institutional (ICI) properties and multi-residential properties install appropriate backflow prevention devices for premise isolation (downstream of the water meter);
- Ensure that owners applying for new water service connections implement any backflow prevention requirements specified in the Bylaw;

- That all ICI, and multi-residential properties submit Backflow Prevention Device Test Report annually and Cross Connection Surveys every five (5) years to Town's Operational Services Department, in accordance with Bylaw's requirements and
- Ensure all municipal facilities are in the BFPP and compliant with the Bylaw.

The Owners of ICI and Multi-residential properties have several responsibilities.

All ICI properties and multi-residential properties (three (3) units or more) require a premise isolation backflow prevention device to be installed. All property owners shall:

- At the owner's expense, retain a Qualified Person to conduct a backflow prevention survey of the property to identify potential cross connections and evaluate risks that may cause a backflow situation;
- At the owner's expense, install appropriate backflow prevention device(s), replace or and/or repair the malfunctioning devices to protect the municipal water distribution system against contamination;
- The device(s) shall be installed at the incoming water service connection, downstream of the water meter, in an accessible location;
- Retain a Qualified Person to conduct a test after installation of the backflow prevention device and annually thereafter;
- Maintain records of backflow surveys and backflow prevention device tests and ensure tags are placed on all backflow prevention devices to identify information required under the Bylaw;
- Submit backflow prevention device test reports and property surveys to Town's Operational Services Department to meet requirements of the Bylaw;
- Ensure all piping between the water meter and the premise isolation backflow prevention device is clearly labelled "No Connections Permitted";
- Notify the Town of any change in hazard level. This could be due to a change in building operations or activities, or any changes in the service connection to the building or property; and
- Pay administration and professional fees for ongoing annual BFPP compliance testing.

Advisory Committee Review

Not applicable.

Legal Considerations

Section 19 of the *Safe Drinking Water Act, 2002* places a statutory standard of care on those having oversight of the municipal drinking water systems. The establishment and implementation of the BFPP is a strategy aimed at reducing the risk of contamination of the water supply and meeting the MECP recommendations, as part of adhering to the statutory standards of care.

The Legal Services Division is assisting the Operational Services Department with the necessary revisions of the Backflow Prevention Bylaw to implement the BFPP.

Financial Implications

There are several financial implications in implementing the BFPP, both for the property owners as well as the Town, as follows:

Private property owners

To fund all aspects of property surveys, backflow prevention device installation and the ongoing annual testing and monitoring, which include:

- Building permits for installation of a backflow prevention device;
- Property survey and risk assessment once every five (5) years or as plumbing or business use changes (the average price is approximately \$500 for large industries);
- Purchase and installation of recommended backflow prevention device(s);
- Annual backflow prevention device(s) testing; and

The average costs encountered by the property owners varies based on the size of the water service line, property size and contractor's fees for work:

- Survey \$500/property (this price varies based on the size of the property and complexity of the processes)
- Testing of a backflow preventer device \$250/device
- Building permit for new installments \$565
- Backflow preventer installation \$1,200 (for a two (2) inch device)
- Backflow preventer device \$5,500 (two (2) inches) / \$6,400 three (3) inches) / \$9,000 (four (4) inches) / \$13,000 (six (6) inches)
- Administration fees (charged by the Town)

- Survey report \$60
- Test report \$35

Town of Aurora

- Council approved \$50,000 for Capital Project No.43039 in the 2014 Capital Budget. These funds will be used for program development, education, public information sessions and provision of literature to affected property owners;
- It is estimated that initially one full-time staff would be required to administer the program with the potential to supplement with additional staff resources in the future;
- Purchase and development of BFPP software required to streamline the ongoing program administration requirements; and
- The Town of Aurora has thirteen facilities (Town Hall, Aurora Family Leisure Complex, Stronach Aurora Recreation, Aurora Community Centre, Aurora Joint Operations Centre, Department of National Defense, Former Aurora Armoury, Aurora Cultural Centre, Victoria Hall, Factory Theatre, Aurora Public Library, Aurora Senior Centre, Fire Hall and sport fields with irrigation system in place) that need to be surveyed. To be compliant with the Bylaw 5645-14, all but two of these facilities need to have backflow devices installed for premise isolation.

Upon completion of the BFPP Bylaw, and administrative policies including the surveying Town's facilities , Operational Services staff will have a better understanding of all costs associated with installation of backflow prevention devices on each of the Town Facilities.

All financial aspects of the Municipal administrative process associated with the BFPP are intended to be cost neutral to the Municipality as the program is rate based. Funds required to implement the Town wide BFPP and to install Back Flow prevention devices at the Towns existing facilities will be outlined in detail in a future Council report.

Communications Considerations

The BFPP and Bylaw will require significant public consultation and communications in order for the program to be understood, accepted and successfully implemented by all of the Town's affected Stakeholders. The initial education and consultative period will

commence in Summer 2019, by sending notices and inserts with the water bill about the program and the Public Open House, along with information posted on Town's website.

Also, due to the fact that this program may be ongoing for a considerable period of time, staff will continue to publicly promote and educate the Stakeholders on the Bylaw and Backflow Prevention until full compliance has been achieved.

Link to Strategic Plan

The Town of Aurora supports the DWQMS Policy through its corporate Strategic Plan Goal: "Supporting an exceptional quality of life for all."

Alternative(s) to the Recommendation

1. Council may direct that the Bylaw and the BFPP not be implemented; however, under Section 19 of the Safe Drinking Water Act, the owner of a water system and staff with decision-making responsibilities and those with operating authorities are required to demonstrate a 'standard duty of care'. It is recommended that staff be empowered to mitigate risks of water supply contamination caused by backflow of non-potable water from a private system. The implementation of the BFPP will reduce the risks of contamination of the water supply, as well as fulfill the Ministry of Environment, Conservation and Parks recommendations to implement such a program for the protection of the drinking water system.

Conclusions

This Backflow Prevention Bylaw and BFPP are intended to prevent drinking water contamination through cross connections and potential backflow incidents. They will complement other barriers Aurora has implemented to provide safe drinking water to Town's residents.

The BFPP is a maintenance program. The Program requires the initial installation of backflow devices and/or, annual testing of existing devices to ensure they continue to function properly. Testing reports will be submitted to the Operational Services Department. Site surveys must be conducted once every five (5) years to ensure that no new connections have been created and confirm the property use and hazard.

Attachments

Attachment #1 – Public Engagement and Communications Plan

Previous Reports

IES14-045 Water Connection Backflow Prevention Program, September 2, 2014

Pre-submission Review

Agenda Management Team review on March 28, 2019

Departmental Approval

Approved for Agenda

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