

NO: R142

COUNCIL DATE: June 27, 2016

REGULAR COUNCIL

TO: **Mayor & Council**

DATE: **June 22, 2016**

FROM: **General Manager, Engineering**

FILE: **5600-43**

SUBJECT: **City of Surrey Water System Annual Report for 2015**

RECOMMENDATION

The Engineering Department recommends that Council:

1. Receive this report as information; and
2. Authorize staff to forward to the Medical Health Officer in accordance with the requirements of the *Drinking Water Protection Act* a copy of this report and the related report titled "City of Surrey Water System Annual Report for 2015", a summary of which is attached to this report as Appendix "I".

INTENT

This report represents the 2015 Annual Report of the City of Surrey Water System, which has been prepared in accordance with the requirements of the *British Columbia Drinking Water Protection Act*.

DISCUSSION

As a water system operator, the City monitors on an on-going regular basis the quality of the water it delivers to its customers. Section 15(b) of the *British Columbia Drinking Water Protection Act* (provincial regulation) requires a water supplier to report the results of water quality monitoring in accordance with the requirements described in Section 11 of the *Act*. The City satisfies this requirement through the preparation of an annual written report that is made available to water consumers and is forwarded to the Medical Health Officer as information. The City, in cooperation with the Fraser Health Authority (FHA) and Metro Vancouver, has developed a water quality monitoring and reporting plan for the City's water distribution system. A protocol document sets out monitoring parameters, the reporting structure and response plans to emergency situations such as incidents of high bacteria counts or other types of contamination, should they occur.

A Summary of the City of Surrey Water System Annual Report for 2015 is attached to this report as Appendix "I". The full report will be available for viewing on the City's website and forwarded to the Medical Health Officer subject to consideration of and approval by Council of the recommendations contained in this report.

The City of Surrey purchased all of its water in 2015 from Metro Vancouver (i.e., the Greater Vancouver Water District). Metro Vancouver (MV) monitored all of the parameters of the City's source water within the Metro Vancouver system from the alpine reservoirs of the North Shore Mountains through the MV distribution system to the delivery points in Surrey.

Within the City distribution system, samples are taken on a regular basis and tests are conducted on those samples which include bacteria, turbidity (cloudiness) as well as chemical and physical parameters unique to distribution systems. Weekly samples are obtained at 51 water sampling sites located strategically across the City's water distribution system. These samples are collected by both City and Metro Vancouver staff and are forwarded to the Metro Vancouver testing laboratory in Burnaby.

In 2015, two thousand nine hundred and seventy one (2,971) water samples were analyzed with none of the samples indicating the presence of E-coli bacteria as per the B.C. Drinking Water Protection Regulation (BCDWPR) and the Guidelines for Canadian Drinking Water Quality (GCDWQ). In November 2015, the Metro Vancouver Sunnyside Reservoir #1, located in the South Surrey Athletic Park, was being prepared for maintenance and inspection by Metro Vancouver staff. During that period, some stagnated water from the base of the reservoir entered Surrey's distribution network (instead of being discharged into the reservoir outfall as required). As a result, samples obtained from this reservoir exceeded the Total Coliform count as set by the BCDWPR. Engineering staff immediately notified Fraser Health and carried out extensive flushing of mains in the immediate area. Subsequent tests revealed no further Total Coliform. To ensure that a similar incident is not repeated in the future, Metro Vancouver has agreed to notify the City when it will be emptying any of its reservoirs for maintenance purposes ensuring to discharge into the reservoir outfall as required.

Lead Levels

The Engineering Department carries out water quality testing three times per year to determine lead levels within our water distribution system. As per the Guidelines for Canadian Drinking Water Quality (GCDWQ), lead presence in drinking water must not be greater than 10 parts per billion (10 ppb). The results from our 2015 water quality testing program reflect that lead presence within Surrey's water distribution system is less than 0.5 ppb, which falls well below GCDWQ requirements.

Chlorine Levels

As in previous years, portions of the City's distribution system have experienced, from time to time, lower than desirable chlorine residual values. The lower than desirable chlorine residual values may be attributed to mainline segments which are "dead-ended"; that is, they are not looped or interconnected with other segments of mainlines. The City, where possible, is requiring looping of existing dead-ended mains either as new development occurs or through Capital Projects. Where it is not possible to loop, blow-offs are installed at main ends. Further, the City institutes a flushing and maintenance program to improve water quality in affected areas.

Cross Connection Control Program

As part of the City's effort to provide high quality water, the City has established a Cross Connection Control (CCC) program. This program is a joint effort between the City and water customers to protect the City's water system from contamination originating on private property. Contaminants may enter the City's water system through cross connections during a backflow event when the pressure in the City's water system is low or negative. Such low or negative pressure conditions exist when there is a water main breakage or extraordinary demand such as during a major firefighting event. The risk that private plumbing systems pose to the City's water distribution system can be reduced by the installation, testing and regular maintenance of backflow preventers. In addition, all new construction that introduces a potential cross connection hazard requires the installation of a backflow preventer, as regulated by the British Columbia Building Code and the Surrey Waterworks Cross Connection Control By-law.

In 2015, the number of backflow preventers registered with the City increased by 6% for a total of 10,265 devices. The City's CCC program requires that the owner test the backflow preventer annually to confirm that it is working properly. In 2015, the City achieved over 95% compliance with this requirement. A relatively small number of owners were found to be in non-compliance and were advised to ensure proper operation within a specified deadline or face By-law infractions. In all cases, these owners subsequently complied with the City's requirements.

CONCLUSION

The City remains diligent and proactive in monitoring, operating and maintaining the City's water distribution system to ensure that the City's water customers continue to receive safe and clean drinking water.

Based on the above discussion, it is recommended that Council authorize staff to forward to the Medical Health Officer in accordance with the requirements of the *Drinking Water Protection Act* a copy of this report and the related report titled "City of Surrey Water System Annual Report for 2015", a summary of which is attached to this report as Appendix "I".

Fraser Smith, P.Eng., MBA
General Manager, Engineering

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Appendix "I" - Summary of the City of Surrey Water System Annual Report for 2015

Summary of the City of Surrey Water System Annual Report for 2015

In 2015, the City of Surrey purchased all the water that it supplied to City of Surrey residents from Metro Vancouver (i.e., the Greater Vancouver Water District). The City of Surrey’s water distribution system is connected to the Metro Vancouver distribution system at the discharge points for six (6) Metro Vancouver water reservoirs and at eleven (11) Metro Vancouver connection chambers located throughout the City.

The City’s piped water distribution system is approximately 1,846 km in length (1% increase from 2014) and includes ten (10) pump stations.

Surrey’s geography and development pattern is serviced with eight (8) different water pressure zones.

The City’s maintenance program for its water system components includes a regular program of unidirectional water main flushing of all mains in the system at least once every five (5) years. This unidirectional approach to flushing ensures that water from non-flushed mains does not flow into recently flushed mains. The City’s maintenance program combined with an ongoing program of pipe size upgrades and water supply controls by Metro Vancouver has minimized the need for any abrasive, mechanical cleaning of the City’s water mains.

Monitoring of the quality of the water within the City’s water system is undertaken at fifty-one (51) water-sampling sites located strategically across the City. Weekly samples are collected by both City and Metro Vancouver staff. These samples are tested at the Metro Vancouver Water Laboratory in Burnaby for bacteria, turbidity, and chlorine residual. Water temperature is taken at the time of the sample collection.

In 2015, 15% of the City’s water operating and maintenance budget was spent on water quality-related work. Two thousand nine hundred and seventy one (2,971) water samples were analyzed with none of the samples indicating the presence of E-coli bacteria as per the B.C. Drinking Water Protection Regulation (BCDWPR) and the Guidelines for Canadian Drinking Water Quality (GCDWQ). In November 2015, the Metro Vancouver Sunnyside Reservoir #1, located in the South Surrey Athletic Park, was being prepared for maintenance and inspection by Metro Vancouver staff. During that period, some stagnated water from the base of the reservoir entered Surrey’s distribution network (instead of being discharged into the reservoir outfall as required). As a result, samples obtained from this reservoir exceeded the Total Coliform count as set by the BCDWPR. Engineering staff immediately notified Fraser Health and carried out extensive flushing of mains in the immediate area. Subsequent tests revealed no further Total Coliform. To ensure that a similar incident is not repeated in the future, Metro Vancouver has agreed to notify the City when it will be emptying any of its reservoirs for maintenance purposes ensuring to discharge into the reservoir outfall as required.

The City has established response procedures to deal with water quality issues and infrastructure failure such as water main breaks. The procedures incorporate both agency notification and steps for physical repair. Integral to the response procedures are well-defined communication links between City, Metro Vancouver, and Fraser Health Authority (FHA) staff.

Chlorine residuals are monitored throughout the distribution system. In 2015, 67% of the 2,971 samples taken were greater than 0.2 mg/L (decrease of 5% from 2014). The remaining 33% of the samples were less than 0.2 mg/L. Low chlorine residuals are attributed to low water demand and/or stagnation. Where there are increased HPC (heterotrophic plate counts), as the result of low chlorine residual and circulation issues, staff flush the affected section to replace water in the mains thus increasing chlorine residuals. HPC is not mandatory under the 2014 Guidelines for Canadian Drinking Water Quality; however, the City of Surrey continues to use this methodology to ensure the quality of the water is maintained. The City continues to improve these low flow areas by looping of mains and increased water usage through service connections to new residences and businesses.

Metro Vancouver Water Laboratory technicians perform quarterly tests on water within the City's system for disinfection by-products (Haloacetic Acids and Trihalomethanes), and semi-annual tests for pH and select metal concentrations. Sampling sites for these tests were selected in accordance with a monitoring and reporting plan established between the City and Metro Vancouver staff. The results of these tests demonstrated that water quality remained within acceptable levels, as recommended in the 2014 Guidelines for Canadian Drinking Water Quality.

Except for a few circumstances where fire hydrants were opened without authorization or were damaged in accidents, there were no incidences of tampering or vandalism with the City's water system in 2015. System security includes lighting, locks, and alarms at pump stations as well as back flow prevention check valves on service connections. The City also has a Cross Connection program to guard against contaminants entering the system due to faulty connections.

The City monitors water service connections to commercial/industrial businesses on an on-going basis through a Cross Connection Control (CCC) program that includes a database of backflow prevention devices. In 2015, the number of backflow preventers registered with the City increased by 6% for a total of 10,265 devices. The City's CCC program requires that the owner test the backflow preventer annually to confirm that it is working properly. In 2015, the City achieved over 95% compliance with this requirement. The relatively lower number of owners that were found to be in non-compliance were notified to comply or face By-law enforcement.

In 2015, the Engineering Department initiated a phased program, on a hazard priority basis, of Cross Connection Survey (CC Survey) on ICI facilities. The Program is to identify any potential cross connections in order to minimize the risk of contaminants originating from private properties entering into the City's water system and private plumbing works. In 2015, 207 ICI properties have been surveyed.

The City of Surrey remains diligent in maintaining its water distribution system to high quality standards and in ensuring the delivery of high quality water to the City's residents and businesses.