



TO: GENERAL COMMITTEE

SUBJECT: 2012 WATER OPERATIONS BRANCH ANNUAL REPORT, SUMMARY REPORT AND MANAGEMENT REVIEWS

PREPARED BY AND KEY CONTACT: S. BRUNET, B.SC., MANAGER OF WATER OPERATIONS EXTENSION 6140

SUBMITTED BY: J. THOMPSON, P.ENG., DIRECTOR OF ENVIRONMENTAL SERVICES  13-02-07
J. THOMPSON

GENERAL MANAGER APPROVAL: RICHARD FORWARD, GENERAL MANAGER OF COMMUNITY OPERATIONS 

CHIEF ADMINISTRATIVE OFFICER APPROVAL: CARLA LADD, CHIEF ADMINISTRATIVE OFFICER 

RECOMMENDED MOTION

1. That Staff Report ENV001-13 concerning the 2012 Municipal Summary Report and Annual Drinking Water System Report regarding the City of Barrie's Drinking Water system be received for information purposes.
2. That the City of Barrie, Environmental Services Department, Water Operations Branch, Annual Report for 2012 be received for information purposes.
3. That the Water Operations Branch Management Reviews, dated December 4th, 2012 and January 11th, 2013 be received for information purposes.

PURPOSE & BACKGROUND

4. The purpose of this Staff Report is to apprise Council of the operational and compliance status for the 2012 reporting year of the City of Barrie Drinking Water System and to solicit from Council an acknowledgement of their receipt and understanding of this Report.
5. There are 2 specific reporting requirements related to the Drinking Water Systems Regulation (O.Reg. 170/03) under the Safe Drinking Water Act (SDWA).
 - a) Section 11 requires an Annual Drinking Water System Report be prepared not later than February 28th of each year. This Report provides a brief description of: the drinking water system; chemicals used; a breakdown of monetary expenses related to required equipment; a summary of all test results; and a summary of adverse reports and corrective actions taken. In addition, this Report entitled '2012 Drinking Water System Report' must be available to the public upon request and be posted on the City of Barrie website.
 - b) Schedule 22 requires a Municipal Summary Report be prepared not later than March 31st of each year and a copy forwarded to members of Municipal Council. This Report lists the non-compliances in respect to the SDWA, the Drinking Water System Regulation, the Municipal Drinking Water License, Drinking Water Works Permit and orders applicable to the drinking water system received, and the corrective measures that were taken in respect to the non-compliances. In addition, it summarizes the quantities and flow rates of the water supplied during the reporting year, including monthly average and maximum daily flows along with a comparison to rated capacities.

6. In addition, under the Drinking Water Quality Management Standard, there is an obligation for the Operating Authority to communicate the results of Management Reviews, the adequacy of the infrastructure necessary to operate and maintain the drinking water system, and infrastructure maintenance programs to the Owner.
7. The Municipal Summary Report and Annual Drinking Water System Report, and details regarding Management Review, infrastructure adequacy and maintenance programs are components of a larger more comprehensive report entitled the Water Operations Branch Annual Report, a copy of which can be found in the Councillors' Lounge for review. A copy of the Executive Summary found in the Water Operations Branch Annual Report is attached as Appendix A of this staff report.

ANALYSIS

8. The City of Barrie drinking water system consists of a new Surface Water Treatment Plant (SWTP) and associated Low Lift Pumping Station (LLPS), 12 ground water wells, 2 in-ground storage facilities, 3 elevated storage reservoirs and 6 booster stations, distribution water mains and associated hydrants and valves in 5 pressure zones throughout the City.
9. Source water from the SWTP is drawn from a depth of approximately 22m from Kempenfelt Bay. The intake is situated on the south west side of Lake Simcoe, where lake water is conveyed through the LLPS and pumped up to the plant for treatment. Water supplied from the ground water system relies on wells drilled into a deep aquifer that is not under the direct influence of surface water.
10. The new Surface Water Treatment Plant provides water to Barrie's south-end. Its regulatory approved treatment process employs primary screening, flocculation, ultra-membrane filtration and granular activated carbon contactors (for taste and odour control) followed by disinfection using chlorine gas. Treatment at each of the well stations consists of iron sequestration by addition of sodium silicate and disinfection with chlorine gas (and in one case, ultraviolet disinfection). The two systems effectively operated as separate entities with provision for emergency backup augmentation. Key processes within the water supply, treatment and storage facilities are continually monitored, recorded and alarmed through the SCADA (Supervisory Control and Data Acquisition) system.
11. The distribution grid consists of 3674 hydrants and approximately 620 km of water main and transmission main ranging from 150mm to 1200mm in size serving approximately 43,000 services providing water to approximately 140,000 customers.
12. The total annual production volume for 2012 was 14,075,987 m³ (3% decrease from 2011) with an average day flow of 38,564 m³ (3% decrease from 2011) and a maximum day flow of 60,160 m³ in the month of July (7.7% decrease from 2011).
13. The Ministry of the Environment (MOE) inspection, conducted yearly, has partially been conducted in November 2012 for the 2012 operational year in the form of document requests. The remainder of the inspection is scheduled to occur in the first quarter of 2013. The primary focus of this inspection is to confirm compliance with the MOE legislation and control documents as well as conformance with the MOE drinking water related policies for the inspection period.
14. The 2011 MOE inspection identified 4 non-compliances; UV transmittance samples, heterotrophic plate count testing and weekly static level measurements at production wells were missed, and a failure to report the changes to the drinking water system profile in the required notification time. Corrective actions included modifications to associated work orders in CityWorks (the computerized maintenance management system), to laboratory documents and the existing Communications Strategy under the QMS Program.

15. Under the Water Operations Branch Quality Management System (QMS) Top Management (Water Operations Branch Management Team) is responsible for ensuring that a Management Review is conducted at least once every twelve months. This continual improvement process is a requirement under the Drinking Water Quality Management Standard (DWQMS) with the objective of identifying deficiencies and establishing action plans to address those deficiencies.
16. Management Reviews were conducted December 4th, 2012 and January 11th, 2013. The following results are based on data up to and including December 31st, 2012.
 - i. The alterations made as a result of the 2011 MOE Inspection Report has demonstrated no missed sampling, measuring and testing in the identified areas as well as a broader communication strategy that prevents staffing absences from allowing this to happen again.
 - ii. There were thirteen (13) reported Adverse Water Quality Incidents, up by 1 from 2011. These incidents were the result of mechanical, programming and communications failures and sampling techniques (operator and/or lab).
 - iii. Approximately 40 km of water main were swabbed in 2012 under the Swabbing Program representing approximately 6% of the water mains in Barrie. The addition of a liaison person (Green Vest) in the field for customer service in this year's program assisted in less customer complaints and water quality issues demonstrating a 51% reduction in complaints from 2011.
 - iv. Raw water and drinking water quality trending revealed no major changes from 2011. As expected, turbidity's are greater in the north end due to the hardness of the ground water source. The surface water to the south service area has reduced concentrations of a number of parameters that allows for decreased demands for chlorine while still maintaining regulatory compliance and customer satisfaction. The source water quality monitoring program will continue in 2013 as recommended by the third party consultant.
 - v. There were no Permit to Take Water exceedences. The Surface Water Treatment Plant pumped an average of 26.6% of its daily permitted capacity while the ground water system pumped an average of 22.8% of its daily permitted capacity.
 - vi. With the addition of the surface water source, Centennial Wells 12 and 15, and Heritage Wells 11 and 14 have been demonstrating noticeable increases in artesian condition over the year.
 - vii. Of the 26,959 total work activities performed in 2012, approximately 70% were scheduled leaving approximately 30% of the activities occurring under unscheduled and emergency conditions.
 - viii. The 9% increase in main breaks from 2011 could be explained by the impact of the weather patterns experienced and ongoing infrastructure aging. There is an expectation of increased main break occurrences into 2013 as weather patterns continue to be unpredictable and the infrastructure continues to age.
 - ix. Curb box and valve repairs achieved only 48% of the 2012 target as a result of staff resource shortfalls.
 - x. A number of backflow alarms were identified through the Automated Meter Reading Program (AMI), however through an individual review of each occurrence it was determined that the alarms were false and related to low daily consumption.
 - xi. In 2012, an average of 15 customer complaints were received per month (compared to 31 in 2011). This significant decrease from 2011 can be attributed to the increased public communications and the use of a field liaison person during swabbing activities and the reduced mineral content and hardness of the surface water source. There were a total of 182 complaints with the majority being associated with pressure and coloured water issues.
 - xii. The July 6th, 2012 Risk Assessment annual review resulted in ground water system changes to the Risk Assessment Outcomes Table and surface water system changes to the summary of Critical Control Points.

- xiii. Two emergency mock scenarios were conducted; May 4th, 2012 and November 30th, 2012. These mock scenarios tested responses to a major backflow event and raw water contamination. In both situations, staff were well prepared to respond, being aware of notification procedures and contingency plans and responses. Two (2) recommendations resulted from the mock scenarios, both of which will be acted upon in 2013.
 - xiv. Two (2) Internal Audits were conducted yielding seven (7) Non-Conformance Reports (NCR's) and one (1) Corrective Action Reports (CAR's). These numbers are relatively the same as the outcomes from the 2011 audit year with the majority of the NCR's related to documentation and training requirements.
 - xv. The 2012 reaccreditation audit was achieved through a desk top surveillance audit of the City of Barrie Operational Plan in November 2012 and an on-site audit December 11th-12th, 2012. Five (5) Minor Non-Conformances were identified addressing documentation, training, communications and the verification of quality requirements upon receipt of essential supplies. All non-conformances will be addressed within the first quarter of 2013.
 - xvi. Through the staff suggestion box, crew meetings and General Staff Meetings, staff suggested ways to improve communications within and between the Sections of the Branch; provided ideas for training opportunities; and wanted better exposure with the public.
17. Copies of the Ontario Drinking Water Systems Regulation 170/03; the City of Barrie Municipal Drinking Water License, Drinking Water Works Permit and Permit to Take Water; the 2012 Drinking Water System Report and the 2012 Municipal Summary Report; the Water Operations Branch Management Review meeting minutes, and a copy of this Staff Report have been attached as Appendices to the Water Operations Branch Annual Report to be presented to Council.

ENVIRONMENTAL MATTERS

18. There are no environmental matters related to the recommendation other than regulatory compliance.

ALTERNATIVES

19. As this Report is being presented, as required legislatively, for information purposes only, no alternatives are presented.

FINANCIAL

20. There are no direct financial implications associated with the recommended motions.

LINKAGE TO COUNCIL STRATEGIC PRIORITIES

21. The recommendations included in this Staff Report are not specifically related to any of City Council's Strategic Priorities but is a requirement of ongoing service delivery.

APPENDIX "A"

Executive Summary

In 2012, 14,075,987 m³ of drinking water was produced and distributed so the City of Barrie residents could turn on their faucets to drink, bathe, cook, wash their clothes and water their lawns. Using the average volume of a household swimming pool to be 20,000 gallons, this amounts to approximately 189,000 swimming pools full of water that the Water Operations Branch pumped, treated and distributed in 2012.

The City of Barrie Drinking Water System is comprised of the Surface Water Treatment Plant (SWTP) and associated Low Lift Pumping Station (LLPS), 12 ground water wells, 2 in-ground storage facilities, 3 elevated storage reservoirs and 6 booster stations that provide treatment, storage and pressures for firefighting purposes. Six hundred and twenty kilometers (620km) of water main deliver water through 5 pressure zones to 43,136 services that provide water to approximately 140,000 customers whose consumption is monitored by water meters.

The total annual production for 2012 was 14,075,987 m³, a negligible decrease from 2011 with the average daily flow being 38,564m³ and a peak day flow of 60,160 m³ in the month of July. It has been estimated that, of the total water produced, 2.95% was used for non-metered functions.

The total cost to operate the City of Barrie Municipal Drinking Water System was approximately \$1398.13/ML with 92.4% of the projected budget being spent and 96.9% of the projected water revenues being collected. This allowed for the transfer of approximately \$1,822,256.27 to the Water Rate Reserve Fund. ** This amount is down from 2011 because revenues are less and there was a full year of debenture costs.

The 2012 Operating Budget for the Surface Water Supply Section of Water Operations Branch, Environmental Services Department, was under spent. As the major expenses (hydro and chemical costs) associated with running a treatment plant of this size are directly related to the operation of the plant, conservative numbers were used for budgeting to ensure a surplus at year end. The 2013 Business Plan and Budget is expected to be considerably closer than the 55% spent in 2012. Ninety-five percent (95%) of the Ground Water Supply Sectional budget was spent with approximately \$400,000 spent on SCADA upgrades, \$82,000 on well and pump maintenance, \$43,500 on booster pump maintenance and \$21,000 spent on tower maintenance.

Distribution crews repaired 58 main breaks, representing a 9% increase from 2011, at an average cost of \$4700.00 per main break and to protect against subsurface infrastructure damage 5688 locates were performed representing a decrease of 30% from 2011. The Water Operations Branch's Water Distribution Services Sectional budget was approximately 102% of the forecasted budget for 2012. The main expenditures were due to the increase in main breaks, contractor work associated with commissioning linear infrastructure, aging infrastructure and the unexpected repair of two transmission mains. In addition, staff resourcing shortfalls required the need for more outside forces to complete tasks with the largest expense being Contracted Services at \$275,000.00.

The Water Operations Branch's Water Customer Services Sectional budget was approximately 80% spent of the forecasted budget for 2012. Funds budgeted for "Material Costs Recovered" and "Purchases for Resale" were approximately twenty-eight percent (28%) under spent in 2012 as the number of equipment failures anticipated did not come to fruition. Reduced spending of minor capital funds that were budgeted for the purchase of additional remote programming devices for the AMI system was due to reduced staffing resources resulting from ongoing salary gapping measures. Workload and resourcing challenges also meant that funds allocated to resuming community outreach programs in Promotional Giveaways and Pre-printed Forms and Tags were under spent by approximately sixty percent (60%).

The year 2012 saw a fifty-one percent (51%) reduction from 2011 in quality complaint investigations that is a result of a couple of factors including the use of a "Green Vest" program and increased public communications prior to, and during the swabbing program in 2012 as well as the reduced mineral content and hardness of the surface water source that normally would generate dirty/dicoloured water complaints.

Approximately 3018 samples were taken for analysis used to assess system performance, develop corrective actions, ensure safe water for consumption and to meet legislative requirements. Ninety-nine point nine percent (99.9%) of all samples met regulatory compliance.

There were thirteen (13) reported Adverse Water Quality Incidents. These incidents were the result of mechanical, programming and communications failures and sampling techniques (operator and/or lab).

The alterations made as a result of the 2011 MOE Inspection Report has demonstrated no missed sampling, measuring and testing in the identified areas as well as a broader communication strategy that prevents staffing absences from allowing this to occur again. At the time of the writing of this report, the annual Ministry of the Environment (MOE) inspection was being conducted and hence the final inspection report for 2012 is not available.

The 2012 reaccreditation audit was conducted through a desk top surveillance audit of the City of Barrie Operational Plan in November 2012 and an on-site audit December 11th-12th, 2012. Five (5) Minor Non-Conformances were identified addressing documentation, training, communications and the verification of quality requirements upon receipt of essential supplies.

Management Reviews are a requirement of the Quality Management System (QMS) and assist in identifying deficiencies and establishing action plans. Management Reviews were conducted in December of 2012 and January of 2013, the results of which can be reviewed in the *Year in Review* Section of this report.

The development, implementation and continual improvement of processes and projects within the Water Operations Branch are driven by the following 5 priorities:

- 1. To ensure the delivery of Safe Drinking Water that meets or exceeds regulatory requirements.**
- 2. To ensure the delivery of Safe Drinking Water that meets or exceeds expectations and promotes customer confidence.**
- 3. To employ and retain a respectful, competent, motivated and adaptive workforce that is dedicated to teamwork, continual learning and improvement for the long term.**
- 4. To continually improve operational performance in a timely, sustainable and cost effective manner.**
- 5. To maintain an effective balance between expenditures and revenues.**

A review of these priorities and associated programs and projects completed in 2012 can be found in the *Year in Review* Section of this Report.