

**TO:** GENERAL COMMITTEE

**SUBJECT:** FROZEN WATER SERVICES

**WARD:** ALL

**PREPARED BY AND KEY CONTACT:** C. MARCHANT, SUPERVISOR OF WATER CUSTOMER SERVICES  
EXTENSION 6145

**SUBMITTED BY:** J. THOMPSON, PMP, P.ENG.  
DIRECTOR OF ENVIRONMENTAL SERVICES *J. Thompson*

**GENERAL MANAGER APPROVAL:** RICHARD FORWARD, MBA, M.Sc., P.ENG.  
GENERAL MANAGER OF INFRASTRUCTURE AND GROWTH  
MANAGEMENT *R. Forward*

**CHIEF ADMINISTRATIVE OFFICER APPROVAL:** C. LADD, CHIEF ADMINISTRATIVE OFFICER *C. Ladd*

**RECOMMENDED MOTION**

1. That a new Capital Project for Water Freezing Remediation be approved totalling \$450,000 for 2015, and be funded from the Water Rate Stabilization Reserve.
2. That Staff from the Water Operations Branch of the Environmental Services Department, in conjunction with Staff from the Revenue Branch of the Finance Department, be directed to develop and implement an Extreme Cold Weather Procedure in order to mitigate potential frozen water services in the event of future extreme winter weather temperatures.

**PURPOSE & BACKGROUND**

Report Overview

3. The purpose of this Staff Report is to apprise General Committee of the Environmental Services Department, Water Operations Branch's experiences with frozen water services over the course of the 2014 and 2015 extremely cold winter weather conditions and provide recommendations for remediation and mitigation plans for the residential properties affected.
4. Over the course of the 2014 and 2015 winter months a total of 313 residential properties suffered from operational issues resulting from water services freezing within the City of Barrie. This is a significant increase over the normal annual average of less than 4 (3.8 per year prior to 2014) which impacted residential properties and the issues can be attributed to the extremely long, cold winters experienced in each of the last 2 years.
5. Due to the significant efforts of Water Operations' Staff and Contractors engaged to assist, no residential customers were left without access to potable water for more than 24 hours throughout these difficult winters. This is vastly different from the experiences of many other cities across the Province, where frozen water services (and in some cases watermains) resulted in residents being without water for days or weeks at a time.

6. The service response provided throughout these unexpectedly difficult winter months came with a cost that was not budgeted for in the 2014 or 2015 Business Plan and Budget. As a result, operating budget accounts for contracted services (used to thaw and excavate and repair frozen services), overtime and minor capital (used for the purchase of additional potable hoses, fittings and equipment), have all exceeded the spending forecasted to date with approximately \$272,000 in 2015 operating funds already dedicated to addressing frozen services. Additionally, approximately 2400 staff hours will end up being committed to frozen services in 2015 as crews continue completion of the remediation work associated with the 52 locations that were excavated over the course of the winter. These are staff hours that were not accounted for within the 2015 Work Plan; as a result other planned preventative maintenance tasks have been significantly delayed or will not be completed.
7. Water Operations' Staff have compiled a comprehensive list of each residential property within the City of Barrie that was impacted by a frozen water service in the 2014 and 2015 winters. From this list a group of high priority "Tier One" properties have been identified as requiring immediate remediation efforts to ensure that they do not re-freeze in the future. These properties were deemed "Tier One" based on several factors:
  - a) Known issues with proximity to buried storm infrastructure;
  - b) Limited/no access to alternate water sources (house to house connection is not available); and
  - c) Critical users which include residents with known medical conditions that require consistent access to potable water (Dialysis), as well as those located within close proximity to specific pressure zones within the water distribution system.
8. In addition to the funding required to attend to each "Tier One" property, the Water Operations Branch sees a need to develop and implement an Extreme Cold Weather Procedure in conjunction with Staff from the Revenue Branch of the Finance Department. This procedure would be used during periods of extended extreme cold (as identified by Water Operations Management) and allow the Water Operations Branch to advise specific residents (based on information gathered over the course of the 2014/2015 winters) to "run water" in order to avoid their water service freezing. The procedure will be developed in cooperation with the Revenue Branch of the Finance Department to ensure that any residents advised to "run water" have their water/wastewater billing adjusted appropriately. Through the use of these measures, residents may avoid the frustration of loss of running water, and significant costs associated with staff overtime and contracted services can be dramatically reduced or eliminated as they are typically incurred once a water service has frozen. This approach may lead to some recommended By-Law amendments.
9. Endorsing the continuous running of water fixtures during potential freezing conditions does increase water production operational costs without a corresponding increased revenue stream. Therefore, it is not recommended that this advice be extended to the many thousands of residential services which have not experienced impacts from freezing services. Further, our system's delivery capacity may be overtaxed if all Barrie homes were to continuously draw water for extended periods.

#### ANALYSIS

10. Not unlike many other Municipalities across the Province, the extreme temperatures experienced through the last two winters have highlighted previously unknown, pre-existing issues with water services that will require remediation measures to ensure freezing is avoided in future winters.

11. Early investigation and review of infrastructure plans have indicated that proximity to existing infrastructure (namely storm drains and catch basins) have led to the increased likelihood of a water service freezing. As a result, Water Operations' Staff has identified 50 "Tier One" high priority locations that require immediate excavation and remediation work in 2015 to ensure that these water services are properly protected from ground frost and freezing during future winter months. "Tier One" properties have been identified as requiring immediate remediation efforts to ensure that they do not re-freeze in the future. These properties were deemed "Tier One" based on several factors:
  - a) Known issues with proximity to storm infrastructure;
  - b) Limited/no access to alternate water sources (house to house connection is not available); and
  - c) Critical users which include residents with known medical conditions that require consistent access to potable water (dialysis), as well as those located within close proximity to specific pressure zones within the water distribution system.
12. The estimated average cost associated with the investigation and remediation of residential water services subject to potential freezing is approximately \$9,000 per service, including all excavation and site restoration works. To replace all 313 residential services which have been impacted over the past two winters would require an allocated budget of \$2,817,000 and would likely be beyond the staff and contractor resource availability if attempted to be complete in this calendar year.
13. Freezing avoidance for the bulk of these services (beyond those identified as "Tier One" priority, 313 - 50 = 263) could most effectively be accomplished by an Extreme Cold Weather Procedure combined with a measured multiyear replacement program.
14. Recent changes to the Ontario Building Code (January 2015) have required an increase in the standard water service size for residential properties from the previous 19mm (3/4") to 25mm (1"). The increase in service pipe diameter results (on average) in a reduction of flow velocities within a service by 49% and can increase the likelihood of a water service freezing during periods of extreme cold. For this reason, Water Operations' Staff, along with Staff from the Corporate Asset Management Branch, will be reviewing the existing Water Transmission and Distribution Policies and Design Guidelines to ensure that depth of cover, separation between existing infrastructure and insulation requirements are adequate. If deemed necessary, amendments to our standards will be implemented.

### **ENVIRONMENTAL MATTERS**

15. There are no environmental matters related to the recommendation.

### **ALTERNATIVES**

16. The following alternatives are available for consideration by General Committee:

#### **Alternative #1**

General Committee could choose not to allocate additional budgeted funds in 2015 to remediate the "Tier One" priority residential water services. This approach is not recommended as next winter's weather conditions may potentially be similar to the last two years, resulting in repeated yet avoidable residential water service impacts and considerable operational funds expended to address the issues.

**Alternative #2**

General Committee could choose to allocate funds to remediate, in 2015, all services which have experienced service freezing issues. This approach is not recommended as available resources would unlikely be successful in completing this volume in 2015, expectation would not be met and without an Extreme Cold Weather Procedure the issues of 2014 and 2015 could well be repeated for many services.

**FINANCIAL**

17. The costs associated with the investigation and remediation of properties identified as "Tier One" (high priority) are estimated at \$9,000 per service, including all excavation and site restoration works. To address the "Tier One" properties identified, a total of \$450,000 of additional funds is being requested for 2015 through the Capital plan. In addition, Water Operations' Staff will be including additional capital funding requests through the 2016, 2017 and 2018 Business Plan and Budget process to address the remaining 263 residential properties that have experienced frozen services in either 2014 or 2015.
18. It is suggested that the requested Capital Funding for 2015 be funded from the Water Rate Stabilization Reserve. At the end of December 2014, this reserve had a balance of \$2.3 million which is slightly less than the recommended target of \$2.7 million.

**LINKAGE TO 2014-2018 STRATEGIC PLAN**

19. The recommendations included in this Staff Report support the following goals identified in the 2014-2018 Strategic Plan:
  - Responsible Spending - a measured multiyear remediation approach with priority issues addressed in this calendar year.
  - Inclusive Community – working toward all residential water customers enjoying the same level of uninterrupted service.
20. Approval of the requested operating budget increases would allow for the proper investigation and remediation of properties known to have frozen services during periods of extended cold. This spending can certainly be deemed responsible as the increased costs of attending to a frozen service at each location would be avoided in the future. These costs include staff overtime, contracted services and minor capital.
21. Consistent access to potable water should be considered a pillar of an inclusive community. Approval of the requested operating budget increases should ensure that the residential properties identified as prone to freezing services are able to access the potable water supply year round.