March 20, 2018

Belgrave Drinking Water System – 2017 Compliance Summary

This is a summary of regulatory compliance for the Belgrave Drinking Water System in 2017. A complete summary of the flows, sampling results, chemical use, and significant activities, was submitted on February 27, 2018 in the Annual Report.

BACKGROUND:

Following the Walkerton tragedy in 2000, the Ontario Government developed a new, comprehensive legislative paradigm based on a source-to-tap, multi-barrier approach to the protection of drinking water. The Safe Drinking Water Act (SDWA), 2002, and its Regulations, contain requirements for Municipalities that provide potable water to their residents.

Under Section 19 (Standard of Care of the SDWA, owners of a Drinking Water System are required to:

(a) 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; and

(b) act honestly, competently and with integrity, with a view to ensuring the protection and safety of the users of the Municipal Drinking Water System.

2002, c. 32, s. 19(1).

The following chart outlines key aspects of the SDWA that relate to the Belgrave Drinking Water System:
Legislative Framework for the Belgrave Municipal Drinking Water System

Safe Drinking Water Act, 2002:
Protects human health by controlling and regulating Drinking Water Systems and testing.

Ontario Regulations

Section 19 - Standard of Care
(Drinking Water System Owners)

Municipal Drinking Water Licencing Program

Ontario Drinking Water Quality Standards
(O.Reg. 169/03):
Outlines Safety Standards for Drinking Water.

Compliance & Enforcement
(O.Reg. 242/05):
Regulates Inspections of Drinking Water Systems

Permit to Take Water
# 4002-8WJ6C
Expires: Oct. 31, 2022

Certification of Drinking Water System Operators & Water Quality Analysts
(O.Reg. 128/04):
Outlines Certification of Water Operators & Analysts

Municipal Drinking Water Licence
#247-101
5-year renewal cycle, next renewal in 2021

Drinking Water Systems
(O.Reg. 170/03):
Sets out treatment and testing requirements for Regulated Water Systems.

Operating Authority Accreditation
3-year audit cycle; re-accreditation in 2018

Drinking Water Testing Services
(O.Reg. 248/03):
Regulates Laboratories that test water.

Financial Plans
(O.Reg. 453/07):
Encourages financial sustainability through required planning.

Financial Plan
#247-401
Completed 2017 for the period 2017-2021

QMS Operational Plan
Top Management and Owner Endorsement
This report intends to provide relevant information to help Council, as owner of the Belgrave Drinking Water System, meet this Standard of Care. Its contents are organized as follows, according to specific reporting requirements under the SDWA:

1. **Summary Report:** Schedule 22 of Ontario’s *Drinking Water Systems Regulation* (O. Reg. 170/03) requires that a summary report be prepared for the preceding calendar year, and submitted to members of Council to disclose compliance status and provide pertinent water quality data.

2. **Annual Report:** Section 11 of O. Reg. 170/03 requires that an annual report be prepared for the preceding calendar year, and submitted to member of Council and the Municipality of Morris-Turnberry. This report summarizes water quality monitoring, corrective actions, and major expenses, and is made available to the public on the Municipality of Morris-Turnberry website and at the Municipal office.

3. **MOECC Inspection Report:** In 2006, the Ministry of the Environment and Climate Change (MOECC) introduced a comprehensive inspection program for municipal residential drinking water systems. The objectives of this program are to determine compliance with the *SDWA* and associated regulations; to encourage the continuous improvement of the drinking water system; and to establish a process to measure these improvements.

4. **Municipal Drinking Water Management Review:** The *SDWA*, through the Municipal Drinking Water Licensing program, requires that the Township maintain an accredited Quality Management System (QMS) for its drinking water system. This review communicates to Council key information related to the QMS and the Municipal Drinking Water Licensing program.

5. **QMS “Operational Plan”:** The *SDWA*, through the Municipal Drinking Water Licensing program, requires that a Municipal Drinking Water System Owner (Council) endorse the most current version of the QMS Operational Plan. This document, once endorsed, is posted on the Municipal website and is available at the Operations Centre.

1. **SUMMARY REPORT**

1.1 **Submission to the Municipality of Morris-Turnberry**

Schedule 22 of Ontario Regulation 170/03 requires, for Large Municipal Residential Systems, that a Summary Report be prepared and submitted to the Municipality of Morris-Turnberry, for distribution to Council by March 31, 2017 for the period from January 1 to December 31, 2017.

**Statement of Compliance**

Requirements for owning and operating the Belgrave Drinking Water System are contained within the SDWA, its applicable regulations, and its approval instruments.

- The MOECC “Drinking Water Ontario” web portal provides the most current version of the Act and its regulations: [www.ene.gov.on.ca/environment/dwo](http://www.ene.gov.on.ca/environment/dwo)
- Belgrave is approved by the MOECC to operate a Class 1 Treatment and a Class 1 Distribution System through its Municipal Drinking Water License (MDWL) #247-101, and to alter the system through its Drinking Water Works Permit (DWWP) #247-201.

Compliance with these requirements is evaluated through annual Ministry Inspections. The Belgrave 2017 Inspection Report contains **three incidents of non-compliance**. There have been no Orders issued by the MOECC under the SDWA or Ontario Regulation 170/03 for the period of January 1, 2017 to December 31, 2017.
1.2 Summary of Flow Rates

Under Schedule 22-2(3) of O. Reg. 170/03, the Summary Report must include a summary of flow rates for the purpose of enabling the system owner to assess the capability of the system to meet existing and planned uses.

Table 1 is a summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average.

Table 1: 2017 Summary of Flows for Belgrave

<table>
<thead>
<tr>
<th>Month</th>
<th>Treated Flow Daily Max (L/s)</th>
<th>Treated Flow Monthly Avg (L/s)</th>
<th>Treated Volume Monthly Total (m³)</th>
<th>Treated Volume Daily Max (m³)</th>
<th>Treated Volume Monthly Avg (m³)</th>
<th>Capacity Daily Max (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1.56</td>
<td>1.41</td>
<td>455.48</td>
<td>48.0</td>
<td>14.69</td>
<td>34.72</td>
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<tr>
<td>February</td>
<td>1.56</td>
<td>1.41</td>
<td>369.01</td>
<td>18.0</td>
<td>13.18</td>
<td>13.02</td>
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<tr>
<td>March</td>
<td>1.56</td>
<td>1.40</td>
<td>425.00</td>
<td>18.5</td>
<td>13.71</td>
<td>13.38</td>
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<tr>
<td>April</td>
<td>1.56</td>
<td>1.41</td>
<td>486.00</td>
<td>59.0</td>
<td>16.20</td>
<td>42.68</td>
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<tr>
<td>May</td>
<td>1.56</td>
<td>1.42</td>
<td>544.16</td>
<td>47.5</td>
<td>18.14</td>
<td>34.36</td>
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<td>June</td>
<td>1.56</td>
<td>1.42</td>
<td>641.51</td>
<td>45.0</td>
<td>21.38</td>
<td>32.55</td>
</tr>
<tr>
<td>July</td>
<td>1.55</td>
<td>1.41</td>
<td>508.98</td>
<td>24.5</td>
<td>16.42</td>
<td>17.72</td>
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<tr>
<td>August</td>
<td>1.54</td>
<td>1.39</td>
<td>520.98</td>
<td>25.5</td>
<td>16.81</td>
<td>18.45</td>
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<tr>
<td>September</td>
<td>1.53</td>
<td>1.38</td>
<td>493.98</td>
<td>41.0</td>
<td>16.47</td>
<td>29.66</td>
</tr>
<tr>
<td>October</td>
<td>1.53</td>
<td>1.39</td>
<td>727.01</td>
<td>86.0</td>
<td>23.45</td>
<td>62.21</td>
</tr>
<tr>
<td>November</td>
<td>1.56</td>
<td>1.41</td>
<td>663.00</td>
<td>65.0</td>
<td>22.10</td>
<td>47.02</td>
</tr>
<tr>
<td>December</td>
<td>1.56</td>
<td>1.40</td>
<td>450.99</td>
<td>32.0</td>
<td>14.55</td>
<td>23.15</td>
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<td>PTTW Max</td>
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<td>1.6</td>
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<td>138.24</td>
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<td>---</td>
</tr>
<tr>
<td>Annual Max</td>
<td>1.56</td>
<td>---</td>
<td>727.01</td>
<td>86.00</td>
<td>---</td>
<td>62.21</td>
</tr>
<tr>
<td>Annual Avg</td>
<td>---</td>
<td>1.40</td>
<td>523.84</td>
<td>---</td>
<td>17.27</td>
<td>---</td>
</tr>
<tr>
<td>Annual Total</td>
<td>---</td>
<td>---</td>
<td>6,286.10</td>
<td>---</td>
<td>---</td>
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</tr>
</tbody>
</table>

Belgrave McCrae

<table>
<thead>
<tr>
<th>Month</th>
<th>Treated Flow Daily Max (L/s)</th>
<th>Treated Flow Monthly Avg (L/s)</th>
<th>Treated Volume Monthly Total (m³)</th>
<th>Treated Volume Daily Max (m³)</th>
<th>Treated Volume Monthly Avg (m³)</th>
<th>Capacity Daily Max (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>4.18</td>
<td>3.97</td>
<td>1,499.01</td>
<td>69.0</td>
<td>48.36</td>
<td>19.01</td>
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<tr>
<td>February</td>
<td>4.13</td>
<td>3.66</td>
<td>1,397.01</td>
<td>77.0</td>
<td>49.89</td>
<td>21.22</td>
</tr>
<tr>
<td>March</td>
<td>4.14</td>
<td>3.67</td>
<td>1,500.00</td>
<td>64.0</td>
<td>48.39</td>
<td>17.64</td>
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<tr>
<td>April</td>
<td>4.13</td>
<td>3.64</td>
<td>1,733.67</td>
<td>173.0</td>
<td>57.79</td>
<td>47.67</td>
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<td>May</td>
<td>4.14</td>
<td>3.65</td>
<td>1,614.86</td>
<td>68.0</td>
<td>52.09</td>
<td>18.74</td>
</tr>
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<td>June</td>
<td>4.09</td>
<td>3.60</td>
<td>2,000.47</td>
<td>114.0</td>
<td>66.68</td>
<td>31.42</td>
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<td>July</td>
<td>4.09</td>
<td>3.61</td>
<td>1,784.01</td>
<td>86.0</td>
<td>57.55</td>
<td>23.70</td>
</tr>
<tr>
<td>August</td>
<td>4.01</td>
<td>3.54</td>
<td>1,782.52</td>
<td>82.0</td>
<td>57.50</td>
<td>22.60</td>
</tr>
<tr>
<td>September</td>
<td>4.02</td>
<td>3.51</td>
<td>1,670.66</td>
<td>119.50</td>
<td>55.69</td>
<td>32.93</td>
</tr>
<tr>
<td>October</td>
<td>4.15</td>
<td>3.59</td>
<td>1,359.34</td>
<td>120.0</td>
<td>46.87</td>
<td>33.07</td>
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<tr>
<td>November</td>
<td>4.19</td>
<td>3.69</td>
<td>1,163.99</td>
<td>61.0</td>
<td>38.80</td>
<td>16.81</td>
</tr>
<tr>
<td>December</td>
<td>4.03</td>
<td>3.59</td>
<td>1,595.02</td>
<td>86.0</td>
<td>51.45</td>
<td>23.70</td>
</tr>
<tr>
<td>PTTW Max</td>
<td>4.2</td>
<td>4.2</td>
<td>11,037.6</td>
<td>362.88</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Annual Max</td>
<td>4.19</td>
<td>---</td>
<td>2,000.47</td>
<td>173.0</td>
<td>---</td>
<td>47.67</td>
</tr>
<tr>
<td>Annual Avg</td>
<td>---</td>
<td>3.64</td>
<td>1,591.71</td>
<td>---</td>
<td>52.59</td>
<td>---</td>
</tr>
<tr>
<td>Annual Total</td>
<td>---</td>
<td>---</td>
<td>19,100.56</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
Table 2: 2017 Summary of Flow Exceedances for Belgrave

There were no flow exceedances for the Belgrave Drinking Water System in 2017.

1.3 Comparison of Flow Rates vs. Rated Capacity

Under Schedule 22-2(3) of O. Reg. 170/03, the Summary Report must include a comparison of the summary referred to in paragraph 1 to the rated capacity and flow rates approved in the system’s approval, drinking water works permit or municipal drinking water license.

Table 3 illustrates the monthly capacity in relation to 100% capacity.
1.4 **Responsibility for Water Supply, Treatment and Storage**

Provincial Legislation sets out the responsibility for water supply in the Village of Belgrave. Under the *Municipal Act, 2001*, the Municipality of Morris-Turnberry is responsible for the treatment and storage of water in the Village of Belgrave. Veolia Water has been retained by the Municipality of Morris-Turnberry as the Operating Authority for the Belgrave Drinking Water System.

1.5 **System Description**

The Belgrave water system is characterized as a “secure ground water” system and is classified as a large municipally owned water system. The well house and its equipment have a daily maximum capacity to deliver 501 cubic meters of potable water per day to the Belgrave community in Morris-Turnberry and the Humphrey subdivision in North Huron.

The current water sources are two secure deep bed rock wells. The Jane St. production well is located at 32 Hamilton St. and the McCrea well is located at 23 McCrea St. Both are connected to the treatment plant at 28 McCrea St. via dedicated raw water mains.

The treatment plant is equipped with high lift pumps, backup diesel generator set, chlorinators, a chlorine contact reservoir, green sand filtration for iron removal and online monitoring. The system is controlled and monitored by an on-site PLC.

The Belgrave well supply was put in service May 1, 2007 and replaces the former Jane St, McCrea St. and Humphrey subdivision water systems. The Jane St. and McCrea St. wells were upgraded and retained as sources. The Humphrey subdivision well was abandoned. The Humphrey well house was retained and acts as a sample station and houses an on-line chlorine analyzer for the distribution system.

The distribution system in the Morris-Turnberry side of Belgrave was constructed in 2008 and is constructed of PVC with polyethylene services.

There is a connection to the Humphrey subdivision on the North Huron side. This distribution system is polyethylene and was constructed in the 1980’s.

There is no elevated storage to maintain pressure and therefore, the system pressure is maintained using pressure tanks and the high lift pumps.

The system has no hydrants and lacks the capacity to provide fire flows.

1.6 **Licences and Permits**

The Belgrave Drinking Water System has the following licenses and permits:

- **PTTW**: # 4002-8Y5KVG  
  Issued: Nov. 1, 2012  
  Expires: Oct. 31, 2022
- **MDWL**: # 247-101  
  Issued: Jul. 20, 2016  
  Expires: Jul. 19, 2021
- **DWWP**: # 247-202  
  Issued: Jul. 20, 2016  
  No expiry

CT calculations for Belgrave are based on flow and maintaining at least the minimum free chlorine residual. The limiting factor regarding flow is chlorine contact time. In order to meet the regulatory CT requirements, the maximum allowed flow must correspond with a free chlorine residual capable of achieving **2-log removal or inactivation of viruses** as outlined in the *MOECC Procedure for Disinfection of Drinking Water in Ontario*.

1.7 **System Infrastructure**

The Village of Belgrave has a distribution network of 117 customer services. The distribution system in the Morris-Turnberry side of Belgrave was constructed in 2008 and is constructed of PVC with polyethylene services.

There is a connection to the Humphrey subdivision on the North Huron side. This distribution system is polyethylene and was constructed in the 1980’s.
Semi-annual flushing is performed in Spring and Fall, along with valve turning. Periodic flushing of dead-ends occurs as necessary.

1.8 Water Sampling and Testing
The purpose of sampling and testing is to confirm that water is safe for human consumption and to provide a comprehensive track record.

Requirement:
O. Reg. 170/03 stipulates the minimum number and frequency of sampling for the Belgrave distribution system. Based on the estimated 2017 population of 376 residents, and in accordance with the 2017 Belgrave Inspection Report, Belgrave must meet the following annual sampling requirements:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Required # of Samples</th>
<th>Requirement Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Coli Total Coliform</td>
<td>For testing presence of microbiological activity</td>
<td>96</td>
<td>O. Reg. 170/03, Sch. 10</td>
</tr>
<tr>
<td>Heterotrophic Plate Count (HPC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trihalomethanes (THMs) and Haloacetic Acids (HAAs)</td>
<td>For testing presence of disinfection by-products</td>
<td>8</td>
<td>O. Reg. 170/03, Sch. 13</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>For testing presence of lead in the distribution system only – not private side</td>
<td>* reduced sampling in effect for 2017</td>
<td>O. Reg. 170/03, Sch. 15; MDWL # 247-101, Sch. D</td>
</tr>
</tbody>
</table>

Sampling Frequency and Location:
Currently, operators collect water samples for microbiological analysis on a weekly basis, and perform grab chlorine residuals four days a week. The distribution system chlorine residual is monitored continuously. Operators may use Municipal buildings, businesses, and residential homes to collect samples, depending on access to sample taps.

In 2017, staff collected 104 microbiological samples. Microbiological samples are sent primarily to E3 Laboratories in Niagara-on-the-Lake, but on occasion they are sent to SGS Environmental in London. Staff also collected 2 pH and alkalinity samples, as well as 4 THMs and 4 HAAs through this reporting period.

1.9 Communications When Adverse Water Samples Are Identified

Requirement – Laboratory:
A water sample that does not meet Provincial water quality standards is considered “adverse”. When adverse water quality is detected, the accredited laboratory conducting the testing will immediately notify the Operating Authority, the Spills Action Centre (SAC), and the Huron County Medical Officer of Health. This notification is made by telephone through live communication to a person in authority. In addition to the phone calls, a fax is sent to the three agencies to verify the live communication made earlier.

Requirement – Drinking Water System Owner/Operating Authority:
The SDWA also requires the drinking water system Owner/Operating Authority to immediately notify the MOECC and the Huron County Medical Officer of Health that the laboratory notice has been received and that “corrective actions” are being initiated. The method of contact is by telephone to a person of authority. The Operating Authority also faxes both agencies first to verify the previous live communication, and to confirm that corrective actions have been completed and the issue resolved.

This reporting system provides assurance that the water works owner is complying with the applicable regulations and that appropriate corrective actions are being taken and are being reported.
2.0 ANNUAL REPORT

Section 11 of Ontario Regulation 170-03 requires that an Annual Report be prepared by February 28 each year for the preceding calendar year. As well, the Annual Report must be made available to the public, free of charge. To meet this requirement, the Belgrave 2017 Annual Report will be posted on the Municipal website and shall be available at the Municipal Office. The Annual Report must include:

- A brief description of the water system.
- A summary of chemical usage for treatment.
- A summary of expenses incurred to make improvements to the water system.
- A summary of water quality testing results for microbiological, inorganic chemical and organic chemical parameters.
- A summary of adverse water quality reports.
- A description of how the Annual Report has been distributed and where the Annual Report and Summary Report required under O. Reg. 170/03 Schedule 22, will be located in order to be accessible to the public.

3.0 MOECC INSPECTION REPORT

On November 28, 2017, MOECC staff conducted an inspection of the Belgrave Drinking Water System. The inspection included a review of operating manuals, logbooks, staff certification and training, and water quality monitoring. It also includes an audit of the SCADA alarm history, data collection, and the operator log-in history.

The entire process concludes with an Inspection Report that includes required actions, recommended actions, and a final inspection rating. A low inspection rating does not necessarily mean that the drinking water provided is unsafe; however, it does indicate the degree to which there is room for improvement in meeting the Provincial regulatory requirements. These findings are used as a tool to track progress towards the Chief Drinking Water Inspector’s goal of achieving 100% compliance with the regulatory framework on a Province wide basis.

The Operating Authority achieved a rating of 95.59% on the 2017 Belgrave Inspection Report.

Precautionary Boil Water Notices
There were no Precautionary Boil Water Notices issued by the Operating Authority in 2017 on the Belgrave Drinking Water System.

Boil Water Advisory
There were no Boil Water Advisories issued by the Huron County MOH on the Belgrave Drinking Water System in 2017.

Compliance
There was one adverse water quality incident report (AWQI) filed with the MOE and the Huron County Health Unit in 2017.

AWQI #132208 - a treated water sample taken on January 10, 2017 came back with a total coliform result of 3 cfu/100mL. The area was re-sampled and results came back clear.
Non-Compliances

1) The owner did not have evidence indicating that all chemicals and materials that come in contact with water within the drinking water system met the AWWA and ANSI standards in accordance with the Municipal Drinking Water License and Drinking Water Works Permit issued under Part V of the SDWA.
   - Each new shipment of chemicals from supplier will come with C of A

2) There were four occasions during the inspection period when analyzer data logging did not occur due to UPS failures. There were two instances during the inspection period when the analyzer data logging failed but the reason for the failures was not documented. There is no further required action at this time.

3) A review of the logbook entries for the inspection period revealed that the alarm on the free chlorine residual analyzer at the Humphrey Sample Station was disabled on April 25 and 26, 2017 during the spring flushing program to eliminate high chlorine alarms from occurring.
   - new procedure implemented and operators trained on its practice

Chemical Exceedances

There were no exceedances for chemical parameters sampled in 2017.

4.0  MUNICIPAL DRINKING WATER MANAGEMENT REVIEW:

Belgrave received its first Municipal Drinking Water License and Drinking Water Works Permit on August 4, 2011. According to the five-year renewal cycle, these documents were due for renewal prior to August 2, 2016. Renewal submissions were made early in 2016, and these documents were renewed. The MDWL will now expire in July 2021.

Under the Licensing program, Belgrave is required to maintain a drinking water Quality Management System (QMS). Note: For QMS Roles and Responsibilities, see Organizational Chart and Roles & Responsibilities Table in Appendix E – Operational Plan.

   a. QMS Management Review Outcomes – includes action items from the most recent Management Review meeting
   b. Infrastructure Review Outcomes and Infrastructure Programs Summary – includes a summary of the infrastructure review process and of infrastructure repair, rehabilitation, and renewal programming.

Infrastructure Assessment

Regular contact is maintained with the Morris-Turnberry representative and also a monthly summary report is submitted. The JobsPlus program is continually updated with preventative and corrective maintenance issues. A complete summary can be forwarded to the client upon their request. Through regular communication between the operating authority and the client, capital items are discussed. A list of capital items and concerns was forwarded to the Morris-Turnberry representative on December 4, 2017.

The annual Management Review was conducted by the operating authority on May 15, 2017, as per the DWQMS requirement in Element 14. These regular discussions between the client and the operating authority for this water system are continued throughout the year by emails, phone calls, monthly reports, and meetings as per the requirements of Element 15 of the DWQMS.

The Internal Audit was completed on December 5 & 6, 2017 and the Risk Assessment was completed December 5, 2017. The 12-month surveillance audit was completed by SAI and maintained accreditation June 12, 2017. The staff
was involved with an Emergency Response exercise on December 20, 2017, which involved a chemical spill near the well head.

5.0 QMS OPERATIONAL PLAN

Belgrave must document its QMS in an Operational Plan, which must be endorse by QMS Top Management and Morris-Turnberry Council, and made available to the public. The Operational Plan was reviewed in 2017 as part of the Risk Assessment.

John Graham, Project Manager

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