The Regional Municipality of Durham

Oshawa Drinking Water System 2017 Annual Report

Drinking Water System Number: 220000772
Municipal Drinking Water Licence Number: 003-111
Drinking Water System Owner: The Regional Municipality of Durham
Drinking Water System Category: Large Municipal Residential

This Annual Report for the calendar year 2017 is designed to inform you about your drinking water system. This report has been prepared to satisfy Section 11 of Ontario Regulation (O. Reg.) 170/03. O. Reg. 170/03 sets requirements for drinking water systems with regard to sampling and testing, levels of treatment, certification of staff, and notification of authorities and the public about water quality. Hard copies of this report and the Schedule 22 Summary Report are available at the Regional Municipality of Durham Headquarters building located at 605 Rossland Road East, Whitby. The annual report is also available on the Region of Durham's website at www.durham.ca. Further information on the Drinking Water Regulations can be found on the Ministry of the Environment and Climate Change's website at www.ontario.ca/ministry-environment-and-climate-change.

Drinking Water System Process Description

General
The Oshawa Drinking Water System provides potable water to consumers in the City of Oshawa, Municipality of Clarington (Courtice urban area), Town of Whitby, Town of Ajax, and City of Pickering. The water supply plant is a Class Four Water Treatment Plant with an approved capacity of 134,000 cubic metres per day (m³/d). The Oshawa Water Supply Plant feeds a Class Two Distribution System and Class Three Trunk Distribution System. The treatment and distribution systems are owned and operated by the Regional Municipality of Durham. Oshawa Water Supply Plant No. 1 was offline during the reporting period.

The source water for the treatment process is drawn from Lake Ontario. The water supply system includes the following processes:

- Zebra mussel control (chlorine),
- Screening,
- Low lift pumping,
- Coagulation (aluminum sulphate),
- Flocculation,
- Filtration,
- Residual management
- Disinfection (chlorine),
- Fluoridation (hydrofluosilicic acid),
- High lift pumping,
- Water storage and distribution.
Raw Water Supply
Raw water is drawn from Lake Ontario through two intake pipes. The first is a 750 millimetre (mm) diameter intake pipe extending 831 metres (m) into the lake at a depth of approximately 7.6 m, and the second is a 900 mm intake pipe extending 924 m into the lake at a depth of approximately 10.7 m. Chlorine is added at the raw water intake for zebra mussel control and to provide initial disinfection. There is also a line for raw water sampling at the east intake crib. The pre-chlorine residual and turbidity are continuously measured as the raw water enters the water supply plant.

Coagulation/Flocculation/Sedimentation
The water from the east intake flows through a traveling screen, while the west intake utilizes a manual screen to remove large solids and continues towards the low lift pumps. Aluminum sulphate (alum) is added into a mechanical mixer upstream of the flocculation tanks. Gentle mixing of the alum occurs as the water passes through the flocculation tanks. Plant #1 has three sets of three stage, four cell hydraulic spiral upflow flocculation tanks with three trains of horizontal cross flow settling tanks. Plant #2 has three sets of two stage, three cell hydraulic spiral upflow flocculation tanks with three trains of horizontal cross flow settling tanks.

Filtration
Most of the particulate matter that was present in the raw water is deposited in the sedimentation tanks. The water supply plant has a total of ten filters to remove flocculated particles. All ten filters are dual media filters, composed of anthracite and sand. Filter effluent turbidity and head loss are continually monitored to indicate filter effectiveness.

Residual Management
The filter backwash treatment includes isolation of the filter cell, reversal of flow through the media, air scouring or surface water agitation. The backwash water is treated in two plate settling tanks before being dechlorinated. The settled solids are pumped to the sanitary sewer and the dechlorinated clear supernatant is discharged back to Lake Ontario.

Disinfection and Fluoridation
Filtered water passes through the filter under-drain into the treated water clearwell and reservoir, and eventually to the high lift pump suction well. The high lift pumps deliver treated water to the distribution system. Disinfection is achieved by the addition of chlorine at multiple application points throughout the plant. Consistent disinfection is ensured by continuous online monitoring of the free chlorine residual throughout the water supply plant. Fluoride (hydrofluosilicic acid) is added to the treated water for the prevention of tooth decay.
Distribution System
The Oshawa/Whitby/Ajax distribution system delivers treated water through approximately 2,028 kilometres of watermains in multiple pressure zones and includes nine reservoirs, and 12 booster stations and one elevated tank.

The Oshawa distribution system is interconnected with the distribution systems of Whitby and Ajax, therefore the entire system is licensed by the Ministry of the Environment and Climate Change as one distribution system. For the purposes of clarity in this report, distribution information will be recorded under its corresponding system.

Major Monetary expenses (above $10,000)
Under Section 11 of O. Reg. 170/03, a description of any major expenses incurred during this reporting period to install, repair or replace required equipment must be included in the annual report. The details of the major expenses for this drinking water system are as follows:

- Cathodic protection of watermains - $656,000
- Replacement of polybutylene service connections - $3,777,960
- Rehabilitation of watermains (cement lining) - $596,623
- Repair of pump at Hortop Pumping Station - $26,925
- Replace valve at Hortop Pumping Station - $34,100
- Repair of cracks at Hortop Pumping Station – 60,650
- Rebuild of pump at Hortop Pumping Station - $26,925
- Insulation at Oshawa Water Supply Plant - $38,350
- Replacement of mobile generators at the Oshawa Water Supply Plant - $24,973
Tables
For a description of terms and abbreviations in all tables, refer to the glossary at the end of the report.

Oshawa Drinking Water System (DWS) Table 1
Summary of all Adverse Water Quality Incidents (AWQI) in 2017 Reported to Spills Action Centre in Accordance with Schedule 16-3 and 16-4 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Incident Date</th>
<th>Parameter</th>
<th>Result</th>
<th>Corrective Action</th>
<th>Corrective Action Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 10</td>
<td>Low pressure (Distribution)</td>
<td>Not applicable</td>
<td>Flushed, resampled. Results met Ontario Drinking Water Quality Standards (ODWQS).</td>
<td>January 10</td>
</tr>
<tr>
<td>January 11</td>
<td>Sodium (Plant)</td>
<td>21.2 milligram per Litre (mg/L)</td>
<td>Resampled.</td>
<td>January 11</td>
</tr>
<tr>
<td>January 26</td>
<td>Low pressure (Distribution)</td>
<td>Not applicable</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>January 26</td>
</tr>
<tr>
<td>February 16</td>
<td>Low pressure (Distribution)</td>
<td>Not applicable</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>February 16</td>
</tr>
<tr>
<td>March 29</td>
<td>Fluoride Residual (Plant)</td>
<td>Greater than (&gt;1.5 mg/L)</td>
<td>Stopped feed until residual was within regulatory range.</td>
<td>March 29</td>
</tr>
<tr>
<td>May 5</td>
<td>Total Coliforms (Distribution)</td>
<td>1 Colony Forming Units (CFU) per 100 Millilitres</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>May 5</td>
</tr>
<tr>
<td>June 2</td>
<td>Total Coliforms (Distribution)</td>
<td>8 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>June 2</td>
</tr>
<tr>
<td>June 14</td>
<td>Total Coliforms (Distribution)</td>
<td>5 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>June 17</td>
</tr>
<tr>
<td>June 17</td>
<td>Total Coliforms (Distribution)</td>
<td>82 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>June 17</td>
</tr>
<tr>
<td>Incident Date</td>
<td>Parameter</td>
<td>Result</td>
<td>Corrective Action</td>
<td>Corrective Action Date</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------</td>
<td>---------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>June 21</td>
<td>Turbidity (Plant)</td>
<td>1.71 Nephelometric Turbidity Units (NTU)</td>
<td>Filter to waste until turbidity within regulatory compliance.</td>
<td>June 21</td>
</tr>
<tr>
<td>June 26</td>
<td>Chlorine (Distribution)</td>
<td>0.00 mg/L</td>
<td>Residual restored, flushed, resampled. Results met ODWQS.</td>
<td>June 26</td>
</tr>
<tr>
<td>July 17</td>
<td>Chlorine (Distribution)</td>
<td>0.00 mg/L</td>
<td>Residual restored, flushed, resampled. Results met ODWQS.</td>
<td>July 17</td>
</tr>
<tr>
<td>September 26</td>
<td>Total Coliforms (Distribution)</td>
<td>Presence</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>September 26</td>
</tr>
<tr>
<td>December 5</td>
<td>Total Coliforms (Distribution)</td>
<td>Presence</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>December 5</td>
</tr>
</tbody>
</table>
### Oshawa DWS Table 2

**Microbiological Membrane Filtration (MF) Testing Under Schedule 10 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Range of Escherichia Coli MF Colony Forming Units per 100 Millilitres</th>
<th>Range of Total Coliforms MF Colony Forming Units per 100 Millilitres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw</td>
<td>195</td>
<td>Non-Detect (ND) - 3</td>
<td>ND - 250</td>
</tr>
<tr>
<td>Treated</td>
<td>18</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Distribution</td>
<td>281</td>
<td>ND</td>
<td>ND - 82(4)*</td>
</tr>
</tbody>
</table>

*Number in parenthesis represents number of exceedance(s).

### Oshawa DWS Table 3

**Microbiological Presence Absence (P/A) Testing Under Schedule 10 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Escherichia Coli P/A per 100 Millilitres</th>
<th>Total Coliforms P/A per 100 Millilitres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated</td>
<td>197</td>
<td>Absence (A)</td>
<td>A</td>
</tr>
<tr>
<td>Distribution</td>
<td>819</td>
<td>A</td>
<td>A - Presence (2)*</td>
</tr>
</tbody>
</table>

*Number in parenthesis represents number of exceedance(s).

### Oshawa DWS Table 4

**Microbiological Heterotrophic Plate Count (HPC) Testing Under Schedule 10 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Range of HPC Samples Colony Forming Units per Millilitre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated</td>
<td>215</td>
<td>Non-Detect (ND) - 2</td>
</tr>
<tr>
<td>Distribution</td>
<td>699</td>
<td>ND - 270</td>
</tr>
</tbody>
</table>
Oshawa DWS Table 5
Operational Testing Done Under Schedule 7 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Test</th>
<th>Number of Samples</th>
<th>Range of Results</th>
<th>Unit of Measure</th>
<th>Parameter Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbidity - Filter Effluent</td>
<td>Continuous</td>
<td>0.001 - 2.003</td>
<td>Nephelometric Turbidity Units (NTU)</td>
<td>Turbidity is a measure of particles in water.</td>
</tr>
<tr>
<td>Fluoride - Plant</td>
<td>Continuous</td>
<td>0.15 - 1.67*</td>
<td>Milligram per Litre (mg/L)</td>
<td>Fluoride is added to water to prevent tooth decay.</td>
</tr>
<tr>
<td>Free Chlorine - Plant</td>
<td>Continuous</td>
<td>0.79 - 3.03*</td>
<td>mg/L</td>
<td>Must be sufficient to ensure disinfection has been achieved.</td>
</tr>
<tr>
<td>Free Chlorine - Distribution</td>
<td>Continuous</td>
<td>0.00 - 2.6*</td>
<td>mg/L</td>
<td>Recommended level of at least 0.20 mg/L in the distribution system to maintain secondary disinfection, 0.05 mg/L is the minimum required.</td>
</tr>
</tbody>
</table>

*Results include all analyzers and grab samples.

Oshawa DWS Table 6
Summary of Additional Testing and Sampling Carried Out in Accordance With the Requirement of an Approval, Order or Other Legal Instrument.

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Parameter</th>
<th>Date Sampled</th>
<th>Result</th>
<th>MAC</th>
<th>Unit of Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Water</td>
<td>Gross Beta</td>
<td>January - December</td>
<td>0.09 - 0.13</td>
<td>Not Applicable (N/A)</td>
<td>Becquerels per Litre (Bq/L)</td>
</tr>
<tr>
<td>Raw Water</td>
<td>Tritium</td>
<td>January - December</td>
<td>2.7 – 34.0</td>
<td>N/A</td>
<td>Bq/L</td>
</tr>
<tr>
<td>Treated Water</td>
<td>Tritium</td>
<td>January – June*</td>
<td>ND - 23.0</td>
<td>7000</td>
<td>Bq/L</td>
</tr>
<tr>
<td>Environmental Discharge (Backwash Supernatant)</td>
<td>Suspended Solids</td>
<td>January - December</td>
<td>8.0</td>
<td>25</td>
<td>Milligram per Litre (mg/L)</td>
</tr>
</tbody>
</table>

*Not all radionuclide results from the Ministry of Labour were available at the time of printing.
### Summary of Treated Water Chemical Parameters Tested Under Schedule 13 and 23 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony</td>
<td>14</td>
<td>Non-Detect (ND) - 0.0009</td>
<td>0.006</td>
<td>Milligram per Litre (mg/L)</td>
<td>No</td>
<td>Fire retardants, ceramics, electronics, solder.</td>
</tr>
<tr>
<td>Arsenic</td>
<td>14</td>
<td>ND - 0.0007</td>
<td>0.025</td>
<td>mg/L</td>
<td>No</td>
<td>Mining.</td>
</tr>
<tr>
<td>Barium</td>
<td>2</td>
<td>0.0224 - 0.0261</td>
<td>1.0</td>
<td>mg/L</td>
<td>No</td>
<td>Metal refineries, oil drilling.</td>
</tr>
<tr>
<td>Boron</td>
<td>2</td>
<td>0.0274 - 0.0314</td>
<td>5.0</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Cadmium</td>
<td>14</td>
<td>ND</td>
<td>0.005</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Chromium</td>
<td>14</td>
<td>ND - 0.0019</td>
<td>0.05</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Haloacetic acids</td>
<td>12</td>
<td>21.2</td>
<td>80</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>By-product of chlorination of drinking water.</td>
</tr>
<tr>
<td>Mercury</td>
<td>2</td>
<td>ND</td>
<td>0.001</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Selenium</td>
<td>14</td>
<td>ND - 0.001</td>
<td>0.01</td>
<td>mg/L</td>
<td>No</td>
<td>Refineries, mines, chemical manufacturing.</td>
</tr>
<tr>
<td>Sodium</td>
<td>12</td>
<td>13.8 - 21.2</td>
<td>20</td>
<td>mg/L</td>
<td>Yes (2)³</td>
<td>Runoff from road salt.</td>
</tr>
<tr>
<td>Trihalomethane</td>
<td>12</td>
<td>36.6</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>By-product of chlorination of drinking water.</td>
</tr>
<tr>
<td></td>
<td>Distribution (annual average)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uranium</td>
<td>2</td>
<td>ND</td>
<td>0.02</td>
<td>mg/L</td>
<td>No</td>
<td>Power generation.</td>
</tr>
<tr>
<td>Nitrite</td>
<td>12</td>
<td>ND</td>
<td>1.0</td>
<td>mg/L</td>
<td>No</td>
<td>Agriculture runoff, landfill leachate and animal waste.</td>
</tr>
<tr>
<td>Nitrate</td>
<td>12</td>
<td>ND - 0.465</td>
<td>10.0</td>
<td>mg/L</td>
<td>No</td>
<td>Fertilizer.</td>
</tr>
</tbody>
</table>

1 Parameters may occur naturally in the environment.
2 Sodium does not have a Maximum Acceptable Concentration (MAC); only an aesthetic objective of 200 mg/L. Sodium results exceeding 20 mg/L are to be reported to the Medical Officer of Health as per Schedule 16-3 (8) of O. Reg. 170/03.
3 Number in parenthesis represents number of exceedance(s). For Sodium, regulations require reporting when results exceed 20 mg/L if it has not been reported in the preceding 57 months.
### Oshawa DWS Table 8

**Summary of Lead Testing Under Schedule 15.1 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Number of Samples</th>
<th>Range of Lead Results Milligram per Litre</th>
<th>MAC</th>
<th>Number of Exceedances</th>
<th>pH</th>
<th>Alkalinity Milligram per Litre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plumbing</td>
<td>76</td>
<td>Non-Detect (ND) - 0.005</td>
<td>0.01</td>
<td>0</td>
<td>7.26 - 7.89</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Distribution</td>
<td>6</td>
<td>ND - 0.0095</td>
<td>0.01</td>
<td>0</td>
<td>7.54 - 7.64</td>
<td>87.5 - 91.2</td>
</tr>
</tbody>
</table>

### Oshawa DWS Table 9

**Summary of Treated Water Organic Parameters Tested Under Schedule 24 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alachlor</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Atrazine + N-dealkylated metabolites</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Azinphos-methyl</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Insecticide.</td>
</tr>
<tr>
<td>Benzene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Plastics manufacturing, leaking fuel tanks.</td>
</tr>
<tr>
<td>Benzo(a)pyrene</td>
<td>2</td>
<td>ND</td>
<td>0.01</td>
<td>ug/L</td>
<td>No</td>
<td>Formed from the incomplete burning of organic matter.</td>
</tr>
<tr>
<td>Bromoxynil</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>2</td>
<td>ND</td>
<td>90</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, forestry, household insecticide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----</td>
<td>-----------------</td>
<td>----------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Carbofuran</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>90</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Carbon Tetrachloride</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial activities.</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>2</td>
<td>ND</td>
<td>90</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, household insecticide.</td>
</tr>
<tr>
<td>Diazinon</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, livestock, operation, residential insecticide.</td>
</tr>
<tr>
<td>Dicamba</td>
<td>2</td>
<td>ND</td>
<td>120</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide</td>
</tr>
<tr>
<td>1,2-Dichlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>200</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial factories.</td>
</tr>
<tr>
<td>1,4-Dichlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial factories.</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial chemical factories.</td>
</tr>
<tr>
<td>1,1-Dichloroethylene (vinylidene chloride)</td>
<td>2</td>
<td>ND</td>
<td>14</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial chemical factories.</td>
</tr>
<tr>
<td>Dichloromethane</td>
<td>2</td>
<td>ND</td>
<td>50</td>
<td>ug/L</td>
<td>No</td>
<td>Pharmaceutical and chemical factories.</td>
</tr>
<tr>
<td>2,4-dichlorophenol</td>
<td>2</td>
<td>ND</td>
<td>900</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial contamination, reaction with chlorine.</td>
</tr>
<tr>
<td>2,4-Dichlorophenoxy acetic acid (2,4-D)</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, residential herbicide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----</td>
<td>--------------------------</td>
<td>----------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Diclofop-methyl</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>9</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Dimethoate</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, livestock, operation, residential insecticide.</td>
</tr>
<tr>
<td>Diquat</td>
<td>2</td>
<td>ND</td>
<td>70</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, aquatic herbicide.</td>
</tr>
<tr>
<td>Diuron</td>
<td>2</td>
<td>ND</td>
<td>150</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, industrial herbicide.</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>2</td>
<td>ND</td>
<td>280</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, forestry, household herbicide.</td>
</tr>
<tr>
<td>Malathion</td>
<td>2</td>
<td>ND</td>
<td>190</td>
<td>ug/L</td>
<td>No</td>
<td>Pest control insecticide.</td>
</tr>
<tr>
<td>2-Methyl-4-chlorophenoxyacetic acid (MCPA)</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Metolachlor</td>
<td>2</td>
<td>ND</td>
<td>50</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Metribuzin</td>
<td>2</td>
<td>ND</td>
<td>80</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Monochlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>80</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial and agricultural chemical factories and dry cleaning facilities.</td>
</tr>
<tr>
<td>Paraquat</td>
<td>2</td>
<td>ND</td>
<td>10</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, aquatic herbicide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----</td>
<td>----------------</td>
<td>----------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pentachlorophenol</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>60</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Pesticide, wood preservative residue.</td>
</tr>
<tr>
<td>Phorate</td>
<td>2</td>
<td>ND</td>
<td>2</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Picloram</td>
<td>2</td>
<td>ND</td>
<td>190</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial herbicide.</td>
</tr>
<tr>
<td>Polychlorinated Biphenyls (PCB)</td>
<td>2</td>
<td>ND</td>
<td>3</td>
<td>ug/L</td>
<td>No</td>
<td>Residue from various industrial uses.</td>
</tr>
<tr>
<td>Prometryne</td>
<td>2</td>
<td>ND</td>
<td>1</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Simazine</td>
<td>2</td>
<td>ND</td>
<td>10</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Terbufos</td>
<td>2</td>
<td>ND</td>
<td>1</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Tetrachloroethylene (perchloroethylene)</td>
<td>2</td>
<td>ND</td>
<td>30</td>
<td>ug/L</td>
<td>No</td>
<td>Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser).</td>
</tr>
<tr>
<td>2,3,4,6 - Tetrachlorophenol</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Wood preservative.</td>
</tr>
<tr>
<td>Triallate</td>
<td>2</td>
<td>ND</td>
<td>230</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Metal degreasing sites and other factories.</td>
</tr>
</tbody>
</table>
Oshawa DWS Table 9 continued

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,4,6-Trichlorophenol</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>5</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Pesticide manufacturing.</td>
</tr>
<tr>
<td>Trifluralin</td>
<td>2</td>
<td>ND</td>
<td>45</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>2</td>
<td>ND</td>
<td>2</td>
<td>ug/L</td>
<td>No</td>
<td>Leaching from PVC pipes; discharge from plastics factories.</td>
</tr>
</tbody>
</table>

Oshawa DWS Table 10

Inorganic or Organic Parameter(s) that Exceed Half the Standard Prescribed in Schedule 2 of the Ontario Drinking Water Quality Standards.

No inorganic or organic parameters exceeded half the maximum allowable concentration in 2017.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Unit of Measure</th>
<th>Date of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable (N/A)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
The Regional Municipality of Durham

Whitby Drinking Water System 2017 Annual Report

Drinking Water System Number: 220000754
Municipal Drinking Water Licence Number: 003-111
Drinking Water System Owner: The Regional Municipality of Durham
Drinking Water System Category: Large Municipal Residential

This Annual Report for the calendar year 2017 is designed to inform you about your drinking water system. This report has been prepared to satisfy Section 11 of Ontario Regulation (O. Reg.) 170/03. O. Reg. 170/03 sets requirements for drinking water systems with regard to sampling and testing, levels of treatment, certification of staff, and notification of authorities and the public about water quality. Hard copies of this report and the Schedule 22 Summary Report are available at the Regional Municipality of Durham Headquarters building located at 605 Rossland Road East, Whitby. The annual report is also available on the Region of Durham's website at www.durham.ca. Further information on the Drinking Water Regulations can be found on the Ministry of the Environment and Climate Change's website at www.ontario.ca/ministry-environment-and-climate-change.

Drinking Water System Process Description

General
The Whitby Drinking Water System provides potable water to consumers in the Town of Whitby, Brooklin urban area, City of Oshawa, Town of Ajax, City of Pickering and Municipality of Clarington (Courtice urban area). The water supply plant is a Class Three Water Treatment Plant with an approved capacity of 118,000 cubic metres per day (m³/d). The Whitby Water Supply Plant feeds a Class Two Distribution System and Class Three Trunk Distribution System. The treatment and distribution systems are owned and operated by the Regional Municipality of Durham.

The source water for the treatment process is drawn from Lake Ontario. The water supply system includes the following processes:

- Zebra mussel control (chlorine),
- Screening,
- Low lift pumping,
- Dechlorination (sodium bisulphite),
- Coagulation (aluminum sulphate),
- Flocculation,
- Filtration,
- Disinfection (chlorine)
- Fluoridation (hydrofluosilicic acid),
- High lift pumping,
- Water storage and distribution.
Raw Water Supply
Raw water is drawn from Lake Ontario through a 1,350 millimetre diameter intake pipe extending 1,710 metres (m) into the lake. The intake structure is located at a depth of approximately 16 m. Chlorine is added at the raw water intake for zebra mussel control and to provide initial disinfection. There is also a line for raw water sampling at the intake crib. The pre-chlorine residual and turbidity are continuously measured as the raw water enters the water supply plant.

Coagulation/Flocculation
The water flows through traveling screens to remove large solids and continues towards the low lift pumps. Aluminum sulphate (alum) is added into a mechanical mixer upstream of the flocculation tanks. Gentle mixing of the alum with the water occurs as the water passes through the flocculation tanks. There are six sets of hydraulic spiral upflow flocculation tanks, each with three cells arranged for parallel flow.

Filtration
Particulate matter that is present in the raw water is captured by the coagulation/flocculation process and deposited on the top of the filters. The water supply plant has four filters to remove flocculated particles. All filters are dual media filters, composed of anthracite and sand. Filter effluent turbidity and head loss are continuously monitored to indicate filter effectiveness. The filters are cleaned using a backwash treatment. The backwash water is discharged to a two-cell sedimentation tank to allow for settling of the suspended solids. The settled solids are pumped to the sanitary sewer and the supernatant dechlorinated and discharged back to Lake Ontario.

Disinfection and Fluoridation
Treated water passes through the filters and the filter under-drain into the treated clearwell which feeds into the high lift suction well. The high lift pumps deliver treated water to the distribution system. Disinfection is achieved by the addition of chlorine at multiple application points throughout the plant. Sodium bisulfite, a dechlorination chemical, is used to manage chlorine residuals. Consistent disinfection is ensured by continuous online monitoring of the free chlorine residual throughout the water supply plant. Fluoride (hydrofluosilicic acid) is added to the treated water for the prevention of tooth decay.

Distribution System
The Oshawa/Whitby/Ajax distribution system delivers treated water through approximately 2,028 kilometres of watermains in multiple pressure zones and includes nine reservoirs and 12 booster stations and one elevated tank.

The Whitby distribution system is interconnected with the distribution systems of Oshawa and Ajax, therefore the entire system is licensed by the Ministry of the Environment and Climate Change as one distribution system. For the purposes of clarity in this report, distribution information will be recorded under its corresponding system.
Major Monetary expenses (above $10,000)
Under Section 11 of O. Reg. 170/03, a description of any major expenses incurred during this reporting period to install, repair or replace required equipment must be included in the annual report. The details of the major expenses for this drinking water system are as follows:

- Rehabilitation of watermains (cement lining) - $973,437
- Replacement of polybutylene service connections - $1,337,549
- Cathodic protection of watermains - $219,000
- Rehabilitation of watermains (structural lining) - $1,692,884
- Addition of anthracite in filters at Whitby Water Supply Plant - $16,946
- Installation of mixing pump at Whitby Water Supply Plant - $15,029
- Serviced industrial water pump number (no.) 1 and no. 2 - $34,678
- Repair of pump no. 3 at Waverly Pumping Station - $10,970
- Installation of pump at Waverly Pumping Station - $12,954
Tables
For a description of terms and abbreviations in all tables, refer to the glossary at the end of the report.

Whitby Drinking Water System (DWS) Table 1
Summary of all Adverse Water Quality Incidents (AWQI) in 2017 Reported to Spills Action Centre in Accordance with Schedule 16-3 and 16-4 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Incident Date</th>
<th>Parameter</th>
<th>Result</th>
<th>Corrective Action</th>
<th>Corrective Action Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 11</td>
<td>Sodium (Plant)</td>
<td>21.1 milligram per Litre (mg/L)</td>
<td>Resampled</td>
<td>January 11</td>
</tr>
<tr>
<td>August 1</td>
<td>Low pressure (Distribution)</td>
<td>Not applicable</td>
<td>Flushed, resampled. Results met Ontario Drinking Water Quality Standards (ODWQS).</td>
<td>August 1</td>
</tr>
<tr>
<td>August 24</td>
<td>Total Coliforms (Distribution)</td>
<td>9 Colony Forming Units (CFU) per 100 Millilitres</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>August 24</td>
</tr>
<tr>
<td>August 25</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Watermain disinfected, flushed, resampled, Boil Water Advisory issued. Results met ODWQS, Boil Water Advisory lifted.</td>
<td>August 25</td>
</tr>
<tr>
<td>August 25</td>
<td>Chlorine (Distribution)</td>
<td>0.01 mg/L</td>
<td>Residual restored. Flushed, resampled. Results met ODWQS.</td>
<td>August 25</td>
</tr>
<tr>
<td>August 29</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>August 29</td>
</tr>
<tr>
<td>November 3</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>November 6 and 7</td>
</tr>
<tr>
<td>November 4</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Watermain disinfected, flushed, and resampled. Results met ODWQS.</td>
<td>November 6 and 7</td>
</tr>
<tr>
<td>November 4</td>
<td>Chlorine (Distribution)</td>
<td>0.03 mg/L</td>
<td>Residual restored. Flushed, resampled, Boil Water Advisory issued. Results met ODWQS, Boil Water Advisory lifted.</td>
<td>November 6 and 7</td>
</tr>
<tr>
<td>November 4</td>
<td>Chlorine (Distribution)</td>
<td>0.00 mg/L</td>
<td>Residual restored. Flushed, resampled. Results met ODWQS.</td>
<td>November 6 and 7</td>
</tr>
</tbody>
</table>
### Whitby DWS Table 1 continued

<table>
<thead>
<tr>
<th>Incident Date</th>
<th>Parameter</th>
<th>Result</th>
<th>Corrective Action</th>
<th>Corrective Action Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 10</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS.</td>
<td>December 10</td>
</tr>
</tbody>
</table>

### Whitby DWS Table 2

Microbiological Membrane Filtration (MF) Testing Under Schedule 10 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Range of Escherichia Coli MF Colony Forming Units per 100 Millilitres</th>
<th>Range of Total Coliforms MF Colony Forming Units per 100 Millilitres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw</td>
<td>197</td>
<td>Non-Detect (ND) - 2</td>
<td>ND - 110</td>
</tr>
<tr>
<td>Treated</td>
<td>4</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Distribution</td>
<td>168</td>
<td>ND</td>
<td>ND - 9(6)*</td>
</tr>
</tbody>
</table>

* Number in parenthesis represents number of exceedance(s).

### Whitby DWS Table 3

Microbiological Presence Absence (P/A) Testing Under Schedule 10 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Escherichia Coli P/A per 100 Millilitres</th>
<th>Total Coliforms P/A per 100 Millilitres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated</td>
<td>197</td>
<td>Absence (A)</td>
<td>A</td>
</tr>
<tr>
<td>Distribution</td>
<td>717</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

### Whitby DWS Table 4

Microbiological Heterotrophic Plate Count (HPC) Testing Under Schedule 10 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Range of HPC Samples Colony Forming Units per Millilitre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated</td>
<td>201</td>
<td>Non-Detect (ND) - 7</td>
</tr>
<tr>
<td>Distribution</td>
<td>532</td>
<td>ND - 430</td>
</tr>
</tbody>
</table>
Whitby DWS Table 5
Operational Testing Done Under Schedule 7 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Test</th>
<th>Number of Samples</th>
<th>Range of Results</th>
<th>Unit of Measure</th>
<th>Parameter Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbidity - Filter Effluent</td>
<td>Continuous</td>
<td>0.014 - 0.240</td>
<td>Nephelometric Turbidity Units (NTU)</td>
<td>Turbidity is a measure of particles in water.</td>
</tr>
<tr>
<td>Fluoride - Plant</td>
<td>Continuous</td>
<td>0.06 - 1.12</td>
<td>Milligram per Litre (mg/L)</td>
<td>Fluoride is added to water to prevent tooth decay.</td>
</tr>
<tr>
<td>Free Chlorine - Plant</td>
<td>Continuous</td>
<td>0.80 - 2.47*</td>
<td>mg/L</td>
<td>Must be sufficient to ensure disinfection has been achieved.</td>
</tr>
<tr>
<td>Free Chlorine - Distribution</td>
<td>Continuous</td>
<td>0.00 - 2.13*</td>
<td>mg/L</td>
<td>Recommended level of at least 0.20 mg/L in the distribution system to maintain secondary disinfection, 0.05 mg/L is the minimum required.</td>
</tr>
</tbody>
</table>

*Results include all analyzers and grab samples.

Whitby DWS Table 6
Summary of Additional Testing and Sampling Carried Out in Accordance With the Requirement of an Approval, Order or Other Legal Instrument.

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Parameter</th>
<th>Date Sampled</th>
<th>Result</th>
<th>MAC</th>
<th>Unit of Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Water</td>
<td>Gross Beta</td>
<td>January - December</td>
<td>0.09 - 0.14</td>
<td>Not Applicable (N/A)</td>
<td>Becquerels per Litre (Bq/L)</td>
</tr>
<tr>
<td>Raw Water</td>
<td>Tritium</td>
<td>January - December</td>
<td>3.1 - 28.9</td>
<td>N/A</td>
<td>Bq/L</td>
</tr>
<tr>
<td>Treated Water</td>
<td>Tritium</td>
<td>January – June*</td>
<td>ND - 26.0</td>
<td>7000</td>
<td>Bq/L</td>
</tr>
<tr>
<td>Environmental Discharge</td>
<td>Suspended Solids</td>
<td>January - December</td>
<td>13.2</td>
<td>25</td>
<td>Milligram per Litre (mg/L)</td>
</tr>
<tr>
<td>(Backwash Supernatant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Not all radionuclide results from the Ministry of Labour were available at the time of printing.
## Whitby DWS Table 7

Summary of Treated Water Chemical Parameters Tested Under Schedule 13 and 23 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony</td>
<td>14</td>
<td>Non-Detect (ND) - 0.0009</td>
<td>0.006</td>
<td>Milligram per Litre (mg/L)</td>
<td>No</td>
<td>Fire retardants, ceramics, electronics, solder.</td>
</tr>
<tr>
<td>Arsenic</td>
<td>14</td>
<td>ND - 0.0007</td>
<td>0.025</td>
<td>mg/L</td>
<td>No</td>
<td>Mining.</td>
</tr>
<tr>
<td>Barium</td>
<td>2</td>
<td>0.023 - 0.026</td>
<td>1.0</td>
<td>mg/L</td>
<td>No</td>
<td>Metal refineries, oil drilling.</td>
</tr>
<tr>
<td>Cadmium</td>
<td>14</td>
<td>ND</td>
<td>0.005</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Chromium</td>
<td>14</td>
<td>ND - 0.0021</td>
<td>0.05</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Haloacetic acids(6) - Distribution (annual average)</td>
<td>12</td>
<td>19.3</td>
<td>80</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>By-product of chlorination of drinking water.</td>
</tr>
<tr>
<td>Mercury</td>
<td>2</td>
<td>ND</td>
<td>0.001</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Selenium</td>
<td>14</td>
<td>ND - 0.0009</td>
<td>0.01</td>
<td>mg/L</td>
<td>No</td>
<td>Refineries, mines, chemical manufacturing.</td>
</tr>
<tr>
<td>Sodium(2)</td>
<td>12</td>
<td>10.1 - 21.1</td>
<td>20</td>
<td>mg/L</td>
<td>Yes (12)(^6)</td>
<td>Runoff from road salt.</td>
</tr>
<tr>
<td>Trihalomethane - Distribution (annual average)</td>
<td>12</td>
<td>38.5</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>By-product of chlorination of drinking water.</td>
</tr>
<tr>
<td>Uranium</td>
<td>2</td>
<td>ND - 0.0005</td>
<td>0.02</td>
<td>mg/L</td>
<td>No</td>
<td>Power generation.</td>
</tr>
<tr>
<td>Nitrite</td>
<td>12</td>
<td>ND</td>
<td>1.0</td>
<td>mg/L</td>
<td>No</td>
<td>Agriculture runoff, landfill leachate and animal waste.</td>
</tr>
<tr>
<td>Nitrate</td>
<td>12</td>
<td>ND - 1.63</td>
<td>10.0</td>
<td>mg/L</td>
<td>No</td>
<td>Fertilizer.</td>
</tr>
</tbody>
</table>

1 Parameters may occur naturally in the environment.
2 Sodium does not have a Maximum Acceptable Concentration (MAC); only an aesthetic objective of 200 mg/L. Sodium results exceeding 20 mg/L are to be reported to the Medical Officer of Health as per Schedule 16-3 (8) of O. Reg. 170/03.
3 Number in parenthesis represents number of exceedance(s). For Sodium, regulations require reporting when results exceed 20 mg/L if it has not been reported in the preceding 57 months.
### Whitby DWS Table 8
Summary of Lead Testing Under Schedule 15.1 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Number of Samples</th>
<th>Range of Lead Results Milligram per Litre</th>
<th>MAC</th>
<th>Number of Exceedances</th>
<th>pH</th>
<th>Alkalinity Milligram per Litre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plumbing</td>
<td>52</td>
<td>Non-Detect (ND) - 0.0017</td>
<td>0.01</td>
<td>0</td>
<td>7.36 - 8.01</td>
<td>Not Applicable (N/A)</td>
</tr>
<tr>
<td>Distribution</td>
<td>6</td>
<td>ND - 0.0009</td>
<td>0.01</td>
<td>0</td>
<td>7.64 - 7.98</td>
<td>88.7 - 92.3</td>
</tr>
</tbody>
</table>

### Whitby DWS Table 9
Summary of Treated Water Organic Parameters Tested Under Schedule 24 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alachlor</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Atrazine + N-dealkylated metabolites</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Azinphos-methyl</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Insecticide.</td>
</tr>
<tr>
<td>Benzene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Plastics manufacturing, leaking fuel tanks.</td>
</tr>
<tr>
<td>Benzo(a)pyrene</td>
<td>2</td>
<td>ND</td>
<td>0.01</td>
<td>ug/L</td>
<td>No</td>
<td>Formed from the incomplete burning of organic matter.</td>
</tr>
<tr>
<td>Bromoxynil</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>2</td>
<td>ND</td>
<td>90</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, forestry, household insecticide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----</td>
<td>-----------------</td>
<td>----------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Carbofuran</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>90</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Carbon Tetrachloride</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial activities.</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>2</td>
<td>ND</td>
<td>90</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, household insecticide.</td>
</tr>
<tr>
<td>Diazinon</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, livestock, operation, residential insecticide.</td>
</tr>
<tr>
<td>Dicamba</td>
<td>2</td>
<td>ND</td>
<td>120</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide</td>
</tr>
<tr>
<td>1,2-Dichlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>200</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial factories.</td>
</tr>
<tr>
<td>1,4-Dichlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial factories.</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial chemical factories.</td>
</tr>
<tr>
<td>1,1-Dichloroethylene (vinylidene chloride)</td>
<td>2</td>
<td>ND</td>
<td>14</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial chemical factories.</td>
</tr>
<tr>
<td>Dichloromethane</td>
<td>2</td>
<td>ND</td>
<td>50</td>
<td>ug/L</td>
<td>No</td>
<td>Pharmaceutical and chemical factories.</td>
</tr>
<tr>
<td>2,4-Dichlorophenol</td>
<td>2</td>
<td>ND</td>
<td>900</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial contamination, reaction with chlorine.</td>
</tr>
<tr>
<td>2,4-Dichlorophenoxy acetic acid (2,4-D)</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, residential herbicide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----</td>
<td>-----------------</td>
<td>----------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Diclofop-methyl</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>9</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Dimethoate</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, livestock, operation, residential insecticide.</td>
</tr>
<tr>
<td>Diquat</td>
<td>2</td>
<td>ND</td>
<td>70</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, aquatic herbicide.</td>
</tr>
<tr>
<td>Diuron</td>
<td>2</td>
<td>ND</td>
<td>150</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, industrial herbicide.</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>2</td>
<td>ND</td>
<td>280</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, forestry, household herbicide.</td>
</tr>
<tr>
<td>Malathion</td>
<td>2</td>
<td>ND</td>
<td>190</td>
<td>ug/L</td>
<td>No</td>
<td>Pest control insecticide.</td>
</tr>
<tr>
<td>2-Methyl-4-chlorophenoxyacetic acid (MCPA)</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Metolachlor</td>
<td>2</td>
<td>ND</td>
<td>50</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Metribuzin</td>
<td>2</td>
<td>ND</td>
<td>80</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Monochlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>80</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial and agricultural chemical factories and dry cleaning facilities.</td>
</tr>
<tr>
<td>Paraquat</td>
<td>2</td>
<td>ND</td>
<td>10</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, aquatic herbicide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------</td>
<td>------------------</td>
<td>-----</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pentachlorophenol</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>60</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Pesticide, wood preservative residue.</td>
</tr>
<tr>
<td>Phorate</td>
<td>2</td>
<td>ND</td>
<td>2</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Picloram</td>
<td>2</td>
<td>ND</td>
<td>190</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial herbicide.</td>
</tr>
<tr>
<td>Polychlorinated Biphenyls(PCB)</td>
<td>2</td>
<td>ND</td>
<td>3</td>
<td>ug/L</td>
<td>No</td>
<td>Residue from various industrial uses.</td>
</tr>
<tr>
<td>Prometryne</td>
<td>2</td>
<td>ND</td>
<td>1</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Simazine</td>
<td>2</td>
<td>ND</td>
<td>10</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Terbufos</td>
<td>2</td>
<td>ND</td>
<td>1</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Tetrachloroethylene (perchloroethylene)</td>
<td>2</td>
<td>ND</td>
<td>30</td>
<td>ug/L</td>
<td>No</td>
<td>Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser).</td>
</tr>
<tr>
<td>2,3,4,6 - Tetrachlorophenol</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Wood preservative.</td>
</tr>
<tr>
<td>Triallate</td>
<td>2</td>
<td>ND</td>
<td>230</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Metal degreasing sites and other factories.</td>
</tr>
</tbody>
</table>
### Whitby DWS Table 9 continued

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,4,6-Trichlorophenol</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>5</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Pesticide manufacturing.</td>
</tr>
<tr>
<td>Trifluralin</td>
<td>2</td>
<td>ND</td>
<td>45</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>2</td>
<td>ND</td>
<td>2</td>
<td>ug/L</td>
<td>No</td>
<td>Leaching from PVC pipes; discharge from plastics factories.</td>
</tr>
</tbody>
</table>

### Whitby DWS Table 10

Inorganic or Organic Parameter(s) that Exceed Half the Standard Prescribed in Schedule 2 of the Ontario Drinking Water Quality Standards.

No inorganic or organic parameters exceeded half the maximum allowable concentration in 2017.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Unit of Measure</th>
<th>Date of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable (N/A)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
The Regional Municipality of Durham

Ajax Drinking Water System 2017 Annual Report

Drinking Water System Number: 220008890

Municipal Drinking Water Licence Number: 003-111

Drinking Water System Owner: The Regional Municipality of Durham

Drinking Water System Category: Large Municipal Residential

This Annual Report for the calendar year 2017 is designed to inform you about your drinking water system. This report has been prepared to satisfy Section 11 of Ontario Regulation (O. Reg.) 170/03. O. Reg. 170/03 sets requirements for drinking water systems with regard to sampling and testing, levels of treatment, certification of staff, and notification of authorities and the public about water quality. Hard copies of this report and the Schedule 22 Summary Report are available at the Regional Municipality of Durham Headquarters building located at 605 Rossland Road East, Whitby. The annual report is also available on the Region of Durham's website at www.durham.ca. Further information on the Drinking Water Regulations can be found on the Ministry of the Environment and Climate Change's website at www.ontario.ca/ministry-environment-and-climate-change.

Drinking Water System Process Description

General
The Ajax Drinking Water System provides potable water to consumers in the Town of Ajax and City of Pickering. The plant also has the capability to supply a limited amount of water to the Town of Whitby, City of Oshawa, and Municipality of Clarington (Courtice). The water supply plant is a Class Four Water Treatment Plant with a rated capacity of 163,500 cubic metres per day ($m^3$/d). Ajax Water Supply Plant supplies a Class Two Distribution System, and a Class Three Trunk Distribution System. The treatment and distribution systems are owned and operated by the Regional Municipality of Durham.

The source water for the treatment process is drawn from Lake Ontario. The water supply system includes the following processes:

- Zebra mussel control (sodium hypochlorite),
- Screening,
- Low lift pumping,
- pH adjustment (sulphuric acid),
- Coagulation (aluminum sulphate),
- Flocculation,
- Filtration,
- Disinfection (sodium hypochlorite),
- Dechlorination (sodium bisulphite),
- Fluoridation (hydrofluosilicic acid),
- High lift pumping,
- Water storage and distribution.
Raw Water Supply
Raw water is drawn from Lake Ontario through a 2,100 millimetre (mm) diameter intake pipe extending 2,506 metres (m) into the lake. The intake structure is located at a depth of approximately 18 m. Five 100 mm diameter lines are located outside the intake pipe. Three lines are used for raw water sampling and two lines are dedicated to the delivery of chlorine solution to a zebra mussel chlorine diffuser that is used for initial disinfection and control of zebra mussels. The chlorine residual and turbidity are continuously measured as the raw water enters the water supply plant. Sulphuric acid can be added for pH adjustment to enhance disinfection, coagulation and flocculation.

Coagulation/Flocculation
The water flows through traveling screens to remove large solids and continues towards the low lift pumps. Aluminum sulphate (alum) is added to a mechanical mixer upstream of the flocculation tanks. Gentle mixing of the alum with the water occurs as the water passes through the six sets of mechanical mixing and hydraulic spiral up-flow flocculation tanks. Each tank contains three flocculation cells.

Filtration
Particulate matter that is present in the raw water is captured by the coagulation/flocculation process and deposited on the top of the filters. The water supply plant has six dual media filters to remove flocculated particles. Four of the filters use granulated activated carbon (GAC) and two use anthracite. GAC is used to assist in taste and odour control. Filter effluent turbidity and head loss are continuously monitored to indicate filter effectiveness. Three vertical centrifugal pumps are available for backwashing the filters. The backwashed water is discharged to two holding tanks and two sedimentation tanks to allow for settling of the suspended solids. The settled solids are pumped to the sanitary sewer and the dechlorinated clear supernatant is discharged back to Lake Ontario.

Disinfection, Fluoridation and High Lift Pumping
Filtered water passes through the filter under-drain into the reservoir. The water in the reservoir then enters the clear well and eventually the high lift pump suction well. The high lift pumps deliver treated water to the distribution system. Disinfection is achieved by the addition of chlorine at multiple application points throughout the plant. Sodium bisulphite, a dechlorination chemical, is used to manage chlorine residuals. Consistent disinfection is ensured by continuous online monitoring of the free chlorine residual throughout the water supply plant. Fluoride (hydrofluosilicic acid) is added to the treated water for the prevention of tooth decay.

Distribution System
The Oshawa/Whitby/Ajax distribution system delivers treated water through approximately 2,028 kilometres of watermains in multiple pressure zones and includes nine reservoirs, 12 booster stations and one elevated tank.

The Ajax distribution system is interconnected with the distribution systems of Whitby and Oshawa, therefore the entire system is licensed by the Ministry of the Environment and Climate Change as one distribution system. For the purposes of clarity in this report, distribution information will be recorded under its corresponding system.
Major Monetary expenses (above $10,000)
Under Section 11 of O. Reg. 170/03, a description of any major expenses incurred during this reporting period to install, repair or replace required equipment must be included in the annual report. The details of the major expenses for this drinking water system are as follows:

- Cathodic protection of watermains - $1,257,000
- Replacement of granular activated carbon in filters at Ajax Water Supply Plant - $104,575
- Replacement of polybutylene service connections - $7,383,230
- Repair of low lift pump at the Water Supply Plant - $23,495
- Replacement of dewatering pump at Cherrywood Pumping Station – $14,120
- Overhaul of motor at Ajax Water Supply Plant - $18,710
- Rebuild of mixer at the Ajax Water Supply Plant - $11,180
- Installation of motor at Ajax Water Supply Plant - $13,172
For a description of terms and abbreviations in all tables, refer to the glossary at the end of the report.

**Ajax Drinking Water System (DWS) Table 1**

Summary of all Adverse Water Quality Incidents (AWQI) in 2017 Reported to Spills Action Centre in Accordance with Schedule 16-3 and 16-4 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Incident Date</th>
<th>Parameter</th>
<th>Result</th>
<th>Corrective Action</th>
<th>Corrective Action Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 24</td>
<td>Total Coliforms (Distribution)</td>
<td>1 Colony Forming Units (CFU) per 100 Millilitres (mL)</td>
<td>Flushed, resampled. Results met Ontario Drinking Water Quality Standards (ODWQS).</td>
<td>May 24</td>
</tr>
<tr>
<td>June 25</td>
<td>Total Coliforms (Distribution)</td>
<td>9 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>June 25</td>
</tr>
<tr>
<td>August 5</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>August 5</td>
</tr>
<tr>
<td>August 12</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>August 12</td>
</tr>
<tr>
<td>August 18</td>
<td>Total Coliforms (Distribution)</td>
<td>2 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>August 18</td>
</tr>
<tr>
<td>August 24</td>
<td>Total Coliforms (Distribution)</td>
<td>Presence</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>August 24</td>
</tr>
<tr>
<td>September 30</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>September 30</td>
</tr>
<tr>
<td>October 6</td>
<td>Total Coliforms (Distribution)</td>
<td>2 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>October 6 and 7</td>
</tr>
<tr>
<td>November 16</td>
<td>Total Coliforms (Distribution)</td>
<td>1 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>November 16</td>
</tr>
<tr>
<td>November 30</td>
<td>Total Coliforms (Distribution)</td>
<td>2 CFU/100 mL</td>
<td>Flushed, resampled. Results met ODWQS</td>
<td>November 30</td>
</tr>
</tbody>
</table>
### Ajax DWS Table 2
**Microbiological Membrane Filtration (MF) Testing Under Schedule 10 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Range of Escherichia Coli MF Colony Forming Units per 100 Millilitres</th>
<th>Range of Total Coliforms MF Colony Forming Units per 100 Millilitres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw</td>
<td>197</td>
<td>Non-Detect (ND)</td>
<td>ND - 60</td>
</tr>
<tr>
<td>Treated</td>
<td>17</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Distribution</td>
<td>377</td>
<td>ND</td>
<td>ND - 9(9)*</td>
</tr>
</tbody>
</table>

* Number in parenthesis represents number of exceedance(s).

### Ajax DWS Table 3
**Microbiological Presence Absence (P/A) Testing Under Schedule 10 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Escherichia Coli P/A per 100 Millilitres</th>
<th>Total Coliforms P/A per 100 Millilitres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated</td>
<td>197</td>
<td>Absence (A)</td>
<td>A</td>
</tr>
<tr>
<td>Distribution</td>
<td>837</td>
<td>A</td>
<td>A - Presence (1)*</td>
</tr>
</tbody>
</table>

* Number in parenthesis represents number of exceedance(s).

### Ajax DWS Table 4
**Microbiological Heterotrophic Plate Count (HPC) Testing Under Schedule 10 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Number of Samples</th>
<th>Range of HPC Samples Colony Forming Units per Millilitre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated</td>
<td>214</td>
<td>Non-Detect (ND) - 2</td>
</tr>
<tr>
<td>Distribution</td>
<td>1026</td>
<td>ND - 370</td>
</tr>
</tbody>
</table>
### Ajax DWS Table 5

**Operational TestingDone Under Schedule 7 of O. Reg. 170/03.**

<table>
<thead>
<tr>
<th>Test</th>
<th>Number of Samples</th>
<th>Range of Results</th>
<th>Unit of Measure</th>
<th>Parameter Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbidity - Filter Effluent</td>
<td>Continuous</td>
<td>0.014 - 0.342</td>
<td>Nephelometric Turbidity Units (NTU)</td>
<td>Turbidity is a measure of particles in water.</td>
</tr>
<tr>
<td>Fluoride - Plant</td>
<td>Continuous</td>
<td>0.159 - 1.094*</td>
<td>Milligram per Litre (mg/L)</td>
<td>Fluoride is added to water to prevent tooth decay.</td>
</tr>
<tr>
<td>Free Chlorine - Plant</td>
<td>Continuous</td>
<td>0.55 - 2.07*</td>
<td>mg/L</td>
<td>Must be sufficient to ensure disinfection has been achieved.</td>
</tr>
<tr>
<td>Free Chlorine - Distribution</td>
<td>Continuous</td>
<td>0.20 - 3.72*</td>
<td>mg/L</td>
<td>Recommended level of at least 0.20 mg/L in the distribution system to maintain secondary disinfection, 0.05 mg/L is the minimum required.</td>
</tr>
</tbody>
</table>

*Results include all analyzers and grab samples.

### Ajax DWS Table 6

**Summary of Additional Testing and Sampling Carried Out in Accordance With the Requirement of an Approval, Order or Other Legal Instrument.**

<table>
<thead>
<tr>
<th>Type of Sample</th>
<th>Parameter</th>
<th>Date Sampled</th>
<th>Result</th>
<th>MAC</th>
<th>Unit of Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Water</td>
<td>Gross Beta</td>
<td>January - December</td>
<td>0.05 - 0.14</td>
<td>Not Applicable (N/A)</td>
<td>Becquerels per Litre (Bq/L)</td>
</tr>
<tr>
<td>Raw Water</td>
<td>Tritium</td>
<td>January - December</td>
<td>1.7 - 25.4</td>
<td>N/A</td>
<td>Bq/L</td>
</tr>
<tr>
<td>Treated Water</td>
<td>Tritium</td>
<td>January – June*</td>
<td>Non-Detect (ND) - 16.0</td>
<td>7000</td>
<td>Bq/L</td>
</tr>
<tr>
<td>Environmental Discharge (Backwash Supernatant)</td>
<td>Suspended Solids</td>
<td>January - December</td>
<td>11.6</td>
<td>25</td>
<td>Milligram per Litre (mg/L)</td>
</tr>
<tr>
<td>Environmental Discharge (Backwash Supernatant)</td>
<td>Chlorine Residual</td>
<td>January - December</td>
<td>0.00</td>
<td>N/A</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

*Not all radionuclide results from the Ministry of Labour were available at the time of printing.
### Ajax DWS Table 7

Summary of Treated Water Chemical Parameters Tested Under Schedule 13 and 23 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony</td>
<td>14</td>
<td>Non-Detect (ND) - 0.0011</td>
<td>0.006</td>
<td>Milligram per Litre (mg/L)</td>
<td>No</td>
<td>Fire retardants, ceramics, electronics, solder.</td>
</tr>
<tr>
<td>Arsenic</td>
<td>14</td>
<td>ND - 0.0007</td>
<td>0.025</td>
<td>mg/L</td>
<td>No</td>
<td>Mining.</td>
</tr>
<tr>
<td>Barium</td>
<td>2</td>
<td>0.0203 - 0.0229</td>
<td>1.0</td>
<td>mg/L</td>
<td>No</td>
<td>Metal refineries, oil drilling.</td>
</tr>
<tr>
<td>Boron</td>
<td>2</td>
<td>0.0264 - 0.0302</td>
<td>5.0</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Cadmium</td>
<td>14</td>
<td>ND</td>
<td>0.005</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Chromium</td>
<td>14</td>
<td>ND - 0.0026</td>
<td>0.05</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Haloacetic acids⁶ - Distribution (annual average)</td>
<td>12</td>
<td>13.2</td>
<td>80</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>By-product of chlorination of drinking water.</td>
</tr>
<tr>
<td>Mercury</td>
<td>2</td>
<td>ND</td>
<td>0.001</td>
<td>mg/L</td>
<td>No</td>
<td>Industrial.</td>
</tr>
<tr>
<td>Selenium</td>
<td>14</td>
<td>ND - 0.0014</td>
<td>0.01</td>
<td>mg/L</td>
<td>No</td>
<td>Refineries, mines, chemical manufacturing.</td>
</tr>
<tr>
<td>Sodium²</td>
<td>12</td>
<td>16.5 - 21.9</td>
<td>20</td>
<td>mg/L</td>
<td>Yes(3)³</td>
<td>Runoff from road salt.</td>
</tr>
<tr>
<td>Trihalomethane - Distribution (annual average)</td>
<td>12</td>
<td>32.7</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>By-product of chlorination of drinking water.</td>
</tr>
<tr>
<td>Uranium</td>
<td>2</td>
<td>ND</td>
<td>0.02</td>
<td>mg/L</td>
<td>No</td>
<td>Power generation.</td>
</tr>
<tr>
<td>Nitrite</td>
<td>12</td>
<td>ND</td>
<td>1.0</td>
<td>mg/L</td>
<td>No</td>
<td>Agriculture runoff, landfill leachate and animal waste.</td>
</tr>
<tr>
<td>Nitrate</td>
<td>12</td>
<td>ND - 0.51</td>
<td>10.0</td>
<td>mg/L</td>
<td>No</td>
<td>Fertilizer.</td>
</tr>
</tbody>
</table>

¹ Parameters may occur naturally in the environment.

² Sodium does not have a Maximum Acceptable Concentration (MAC); only an aesthetic objective of 200 mg/L. Sodium results exceeding 20 mg/L are to be reported to the Medical Officer of Health as per Schedule 16-3 (8) of O. Reg. 170/03.

³ Number in parenthesis represents number of exceedance(s). For Sodium, regulations require reporting when results exceed 20 mg/L if it has not been reported in the preceding 57 months.
Ajax DWS Table 8
Summary of Lead Testing Under Schedule 15.1 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Number of Samples</th>
<th>Range of Lead Results Milligram per Litre</th>
<th>MAC</th>
<th>Number of Exceedances</th>
<th>pH</th>
<th>Alkalinity Milligram per Litre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plumbing</td>
<td>92</td>
<td>Non-Detect (ND) - 0.0015</td>
<td>0.01</td>
<td>0</td>
<td>7.51 - 7.95</td>
<td>Not Applicable N/A</td>
</tr>
<tr>
<td>Distribution</td>
<td>8</td>
<td>ND - 0.0053</td>
<td>0.01</td>
<td>0</td>
<td>7.61 - 7.94</td>
<td>83.8 - 95.0</td>
</tr>
</tbody>
</table>

Ajax DWS Table 9
Summary of Treated Water Organic Parameters Tested Under Schedule 24 of O. Reg. 170/03.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alachlor</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>5</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Atrazine + N-dealkylated metabolites</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Azinphos-methyl</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Insecticide.</td>
</tr>
<tr>
<td>Benzene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Plastics manufacturing, leaking fuel tanks.</td>
</tr>
<tr>
<td>Benzo(a)pyrene</td>
<td>2</td>
<td>ND</td>
<td>0.01</td>
<td>ug/L</td>
<td>No</td>
<td>Formed from the incomplete burning of organic matter.</td>
</tr>
<tr>
<td>Bromoxynil</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Carbaryl</td>
<td>2</td>
<td>ND</td>
<td>90</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, forestry, household insecticide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----</td>
<td>-----------------</td>
<td>----------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Carbofuran</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>90</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Carbon Tetrachloride</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial activities.</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>2</td>
<td>ND</td>
<td>90</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, household insecticide.</td>
</tr>
<tr>
<td>Diazinon</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, livestock, operation, residential insecticide.</td>
</tr>
<tr>
<td>Dicamba</td>
<td>2</td>
<td>ND</td>
<td>120</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide</td>
</tr>
<tr>
<td>1,2-Dichlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>200</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial factories.</td>
</tr>
<tr>
<td>1,4-Dichlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Chemical and industrial factories.</td>
</tr>
<tr>
<td>1,2-Dichloroethane</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial chemical factories.</td>
</tr>
<tr>
<td>1,1-Dichloroethylene (vinylidene chloride)</td>
<td>2</td>
<td>ND</td>
<td>14</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial chemical factories.</td>
</tr>
<tr>
<td>Dichloromethane</td>
<td>2</td>
<td>ND</td>
<td>50</td>
<td>ug/L</td>
<td>No</td>
<td>Pharmaceutical and chemical factories.</td>
</tr>
<tr>
<td>2,4-dichlorophenol</td>
<td>2</td>
<td>ND</td>
<td>900</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial contamination, reaction with chlorine.</td>
</tr>
<tr>
<td>2,4-Dichlorophenoxy acetic acid (2,4-D)</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, residential herbicide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----</td>
<td>-----------------</td>
<td>----------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Diclofop-methyl</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>9</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Dimethoate</td>
<td>2</td>
<td>ND</td>
<td>20</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, livestock, operation, residential insecticide</td>
</tr>
<tr>
<td>Diquat</td>
<td>2</td>
<td>ND</td>
<td>70</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, aquatic herbicide.</td>
</tr>
<tr>
<td>Diuron</td>
<td>2</td>
<td>ND</td>
<td>150</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, industrial herbicide.</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>2</td>
<td>ND</td>
<td>280</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, forestry, household herbicide.</td>
</tr>
<tr>
<td>Malathion</td>
<td>2</td>
<td>ND</td>
<td>190</td>
<td>ug/L</td>
<td>No</td>
<td>Pest control insecticide.</td>
</tr>
<tr>
<td>2-Methyl-4-chlorophenoxyacetic acid (MCPA)</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Metolachlor</td>
<td>2</td>
<td>ND</td>
<td>50</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Metribuzin</td>
<td>2</td>
<td>ND</td>
<td>80</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Monochlorobenzene</td>
<td>2</td>
<td>ND</td>
<td>80</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial and agricultural chemical factories and dry cleaning facilities.</td>
</tr>
<tr>
<td>Paraquat</td>
<td>2</td>
<td>ND</td>
<td>10</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural, aquatic herbicide.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Number of Samples</td>
<td>Results Range</td>
<td>MAC</td>
<td>Unit of Measure</td>
<td>MAC Exceedance</td>
<td>Potential Sources</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pentachlorophenol</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>60</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Pesticide, wood preservative residue.</td>
</tr>
<tr>
<td>Phorate</td>
<td>2</td>
<td>ND</td>
<td>2</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Picloram</td>
<td>2</td>
<td>ND</td>
<td>190</td>
<td>ug/L</td>
<td>No</td>
<td>Industrial herbicide.</td>
</tr>
<tr>
<td>Polychlorinated Biphenyls (PCB)</td>
<td>2</td>
<td>ND</td>
<td>3</td>
<td>ug/L</td>
<td>No</td>
<td>Residue from various industrial uses.</td>
</tr>
<tr>
<td>Prometryne</td>
<td>2</td>
<td>ND</td>
<td>1</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Simazine</td>
<td>2</td>
<td>ND</td>
<td>10</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Terbufos</td>
<td>2</td>
<td>ND</td>
<td>1</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural insecticide.</td>
</tr>
<tr>
<td>Tetrachloroethylene (perchloroethylene)</td>
<td>2</td>
<td>ND</td>
<td>30</td>
<td>ug/L</td>
<td>No</td>
<td>Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser).</td>
</tr>
<tr>
<td>2,3,4,6 - Tetrachlorophenol</td>
<td>2</td>
<td>ND</td>
<td>100</td>
<td>ug/L</td>
<td>No</td>
<td>Wood preservative.</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>2</td>
<td>ND</td>
<td>230</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>2</td>
<td>ND</td>
<td>5</td>
<td>ug/L</td>
<td>No</td>
<td>Metal degreasing sites and other factories.</td>
</tr>
</tbody>
</table>
### Ajax DWS Table 9 continued

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number of Samples</th>
<th>Results Range</th>
<th>MAC</th>
<th>Unit of Measure</th>
<th>MAC Exceedance</th>
<th>Potential Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,4,6-Trichlorophenol</td>
<td>2</td>
<td>Non-Detect (ND)</td>
<td>5</td>
<td>Microgram per Litre (ug/L)</td>
<td>No</td>
<td>Pesticide manufacturing.</td>
</tr>
<tr>
<td>Trifluralin</td>
<td>2</td>
<td>ND</td>
<td>45</td>
<td>ug/L</td>
<td>No</td>
<td>Agricultural herbicide.</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>2</td>
<td>ND</td>
<td>2</td>
<td>ug/L</td>
<td>No</td>
<td>Leaching from PVC pipes; discharge from plastics factories.</td>
</tr>
</tbody>
</table>

### Ajax DWS Table 10

**Inorganic or Organic Parameter(s) that Exceed Half the Standard Prescribed in Schedule 2 of the Ontario Drinking Water Quality Standards.**

No inorganic or organic parameters exceeded half the maximum allowable concentration in 2017.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Unit of Measure</th>
<th>Date of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Applicable (N/A)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>