

## **The Regional Municipality of Durham**

### **Greenbank Drinking Water System 2016 Annual Report**

**Drinking Water System Number:** 220003760

**Municipal Drinking Water License Number:** 003-104

**Drinking Water System Owner:** The Regional Municipality of Durham

**Drinking Water System Category:** Large Municipal Residential

This Annual Report for the calendar year 2016 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 are available at the Regional Municipality of Durham Headquarters building located at 605 Rossland Road East, Whitby or on the [Region of Durham's website](http://www.durham.ca) at [www.durham.ca](http://www.durham.ca). Further information on the Drinking Water Regulations can be found on the [Ministry of the Environment and Climate Change's website](http://www.ontario.ca/ministry-environment-and-climate-change) at [www.ontario.ca/ministry-environment-and-climate-change](http://www.ontario.ca/ministry-environment-and-climate-change).

#### **Drinking Water System Process Description**

##### **General**

The Greenbank Drinking Water System provides potable water to consumers in the Community of Greenbank in the Township of Scugog. Greenbank has five municipal wells designated as Well No. 1, Well No. 3, Well No. 4, Well No. 5 and Well No. 6. Greenbank is a Class One Distribution and Supply System with an approved combined capacity of 553 cubic metres per day (m<sup>3</sup>/d). The Greenbank Well Supply System feeds a Class One Distribution System. The Greenbank treatment and distribution system are owned and operated by the Regional Municipality of Durham.

The water supply system includes the following three processes:

- Disinfection (sodium hypochlorite),
- Water storage and high lift pumping,
- Distribution.

##### **Raw Water Supply**

Water is pumped from five municipal wells within Greenbank to the reservoir for treatment. Wells No.1, 3, 4, 5 and 6 are drilled to a depth of 28.8 metres (m), 24.1 m, 34.1 m, 32.2 m and 29.1 m, respectively.

##### **Disinfection**

The raw water is disinfected with sodium hypochlorite as it enters the reservoir. The free chlorine residual and turbidity are monitored continuously by online analyzers on the treated water.

**Water Storage/Pressurization**

Treated water is stored in a 671 cubic metre three-cell below ground storage reservoir. From here the treated water flows to the high lift suction well. Pressure in the system is maintained by high lift pumps and five hydropneumatic tanks.

**Distribution System**

The distribution system delivers the treated water through approximately 7.1 kilometres of watermains. There is no water storage in the distribution 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 major expenses for this drinking water system are as follows:

- Foam swabbing of water mains - \$18,600
- Repaired Well No. 1 well screen - \$21,886

## Tables

For a description of terms and abbreviations in all tables, refer to the glossary at the end of the report.

### Greenbank Drinking Water System (DWS) Table 1

Summary of all Adverse Water Quality Incidents (AWQI) in 2016 Reported to Spills Action Centre in Accordance with Schedule 16-3 and 16-4 of O. Reg. 170/03.

No adverse water quality incidents occurred in 2016.

Incident Date	Parameter	Result	Corrective Action	Corrective Action Date
Not Available (N/A)	N/A	N/A	N/A	N/A

### Greenbank DWS Table 2

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

Type of Sample	Number of Samples	Range of Escherichia Coli MF Colony Forming Units per 100 Millilitres	Range of Total Coliforms MF Colony Forming Units per 100 Millilitres
Raw	260	Non-Detect (ND)	ND - 98
Treated	0	Not Applicable (N/A)	N/A
Distribution	5	ND	ND

### Greenbank DWS Table 3

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

Type of Sample	Number of Samples	Escherichia Coli P/A per 100 Millilitres	Total Coliforms P/A per 100 Millilitres
Treated	52	Absence (A)	A
Distribution	154	A	A

**Greenbank DWS Table 4**

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

Type of Sample	Number of Samples	Range of HPC Samples Colony Forming Units per Millilitre
Treated	52	Non-Detect (ND) - 3
Distribution	77	ND - 780

**Greenbank DWS Table 5**

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

Test	Number of Samples	Range of Results	Unit of Measure	Parameter Description
<b>Turbidity - Raw Water</b>	255	0.04 - 0.66	Nephelometric Turbidity Units (NTU)	Turbidity is a measure of particles in water.
<b>Free Chlorine - Plant</b>	Continuous	0.62 - 1.90*	Milligram per Litre (mg/L)	Must be sufficient to ensure disinfection has been achieved.
<b>Free Chlorine - Distribution</b>	Continuous	0.52 - 1.69*	mg/L	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.

\*Results include all analyzers and grab samples.

## Greenbank DWS Table 6

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

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources <sup>1</sup>
<b>Antimony</b>	5	Non-Detect (ND) - 0.0008	0.006	Milligram per Litre (mg/L)	No	Fire retardants, ceramics, electronics, solder.
<b>Arsenic</b>	5	ND - 0.0006	0.025	mg/L	No	Mining.
<b>Barium</b>	2	0.0883 - 0.0976	1.0	mg/L	No	Metal refineries, oil drilling.
<b>Boron</b>	2	0.0250 - 0.0295	5.0	mg/L	No	Industrial.
<b>Cadmium</b>	5	ND	0.005	mg/L	No	Industrial.
<b>Chromium</b>	5	ND	0.05	mg/L	No	Industrial.
<b>Mercury</b>	2	ND	0.001	mg/L	No	Industrial.
<b>Selenium</b>	5	ND	0.01	mg/L	No	Refineries, mines, chemical manufacturing.
<b>Sodium<sup>2</sup></b>	4	20.1 - 27.5	20	mg/L	Yes (4) <sup>3</sup>	Runoff from road salt.
<b>Uranium</b>	2	0.0009 - 0.0011	0.02	mg/L	No	Power generation.
<b>Fluoride</b>	4	0.09 - 0.12	1.5	mg/L	No	Mining.
<b>Nitrite</b>	4	ND	1.0	mg/L	No	Agriculture runoff, landfill leachate and animal waste.
<b>Nitrate</b>	4	0.273 - 0.579	10.0	mg/L	No	Fertilizer.

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).

### Greenbank DWS Table 7

Summary of Lead Testing Under Schedule 15.1 of O. Reg. 170/03. No lead samples from plumbing were required in 2016.

Location Type	Number of Samples	Range of Lead Results Milligram per Litre	MAC	Number of Exceedances	pH	Alkalinity Milligram per Litre
Plumbing	0	N/A	0.01	0	N/A	N/A
Distribution	4	Non-Detect (ND) - 0.0017	0.01	0	7.61 - 7.77	233 - 236

### Greenbank DWS Table 8

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

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Alachlor	1	Non-Detect (ND)	5	Microgram per Litre (ug/L)	No	Agricultural herbicide.
Atrazine + N-dealkylated metabolites	1	ND	5	ug/L	No	Agricultural herbicide.
Azinphos-methyl	1	ND	20	ug/L	No	Insecticide.
Benzene	1	ND	5	ug/L	No	Plastics manufacturing, leaking fuel tanks.
Benzo(a)pyrene	1	ND	0.01	ug/L	No	Formed from the incomplete burning of organic matter.
Bromoxynil	1	ND	5	ug/L	No	Agricultural herbicide.
Carbaryl	1	ND	90	ug/L	No	Agricultural, forestry, household insecticide.

**Greenbank DWS Table 8 continued**

<b>Parameter</b>	<b>Number of Samples</b>	<b>Results Range</b>	<b>MAC</b>	<b>Unit of Measure</b>	<b>MAC Exceedance</b>	<b>Potential Sources</b>
<b>Carbofuran</b>	1	Non-Detect (ND)	90	Microgram per Litre (ug/L)	No	Agricultural insecticide.
<b>Carbon Tetrachloride</b>	1	ND	5	ug/L	No	Chemical and industrial activities.
<b>Chlorpyrifos</b>	1	ND	90	ug/L	No	Agricultural, household insecticide.
<b>Diazinon</b>	1	ND	20	ug/L	No	Agricultural, livestock, operation, residential insecticide.
<b>Dicamba</b>	1	ND	120	ug/L	No	Agricultural herbicide
<b>1,2-Dichlorobenzene</b>	1	ND	200	ug/L	No	Chemical and industrial factories.
<b>1,4-Dichlorobenzene</b>	1	ND	5	ug/L	No	Chemical and industrial factories.
<b>1,2-Dichloroethane</b>	1	ND	5	ug/L	No	Industrial chemical factories.
<b>1,1-Dichloroethylene (vinylidene chloride)</b>	1	ND	14	ug/L	No	Industrial chemical factories.
<b>Dichloromethane</b>	1	ND	50	ug/L	No	Pharmaceutical and chemical factories.
<b>2,4-dichlorophenol</b>	1	ND	900	ug/L	No	Industrial contamination, reaction with chlorine.
<b>2,4-Dichlorophenoxy acetic acid (2,4-D)</b>	1	ND	100	ug/L	No	Agricultural, residential herbicide.

**Greenbank DWS Table 8 continued**

<b>Parameter</b>	<b>Number of Samples</b>	<b>Results Range</b>	<b>MAC</b>	<b>Unit of Measure</b>	<b>MAC Exceedance</b>	<b>Potential Sources</b>
<b>Diclofop-methyl</b>	1	Non-Detect (ND)	9	Microgram per Litre (ug/L)	No	Agricultural herbicide.
<b>Dimethoate</b>	1	ND	20	ug/L	No	Agricultural, livestock, operation, residential insecticide.
<b>Diquat</b>	1	ND	70	ug/L	No	Agricultural, aquatic herbicide.
<b>Diuron</b>	1	ND	150	ug/L	No	Agricultural, industrial herbicide.
<b>Glyphosate</b>	1	ND	280	ug/L	No	Agricultural, forestry, household herbicide.
<b>Malathion</b>	1	ND	190	ug/L	No	Pest control insecticide.
<b>2-Methyl-4-chlorophenoxyacetic acid (MCPA)</b>	1	ND	100	ug/L	No	Agricultural herbicide.
<b>Metolachlor</b>	1	ND	50	ug/L	No	Agricultural herbicide.
<b>Metribuzin</b>	1	ND	80	ug/L	No	Agricultural herbicide.
<b>Monochlorobenzene</b>	1	ND	80	ug/L	No	Industrial and agricultural chemical factories and dry cleaning facilities.
<b>Paraquat</b>	1	ND	10	ug/L	No	Agricultural, aquatic herbicide.
<b>Pentachlorophenol</b>	1	ND	60	ug/L	No	Pesticide, wood preservative residue.



**Greenbank DWS Table 8 continued**

<b>Parameter</b>	<b>Number of Samples</b>	<b>Results Range</b>	<b>MAC</b>	<b>Unit of Measure</b>	<b>MAC Exceedance</b>	<b>Potential Sources</b>
<b>Phorate</b>	1	Non-Detect (ND)	2	Microgram per Litre (ug/L)	No	Agricultural insecticide.
<b>Picloram</b>	1	ND	190	ug/L	No	Industrial herbicide.
<b>Polychlorinated Biphenyls(PCB)</b>	1	ND	3	ug/L	No	Residue from various industrial uses.
<b>Prometryne</b>	1	ND	1	ug/L	No	Agricultural herbicide.
<b>Simazine</b>	1	ND	10	ug/L	No	Agricultural herbicide.
<b>THM - Distribution (annual average)</b>	4	17.0	100	ug/L	No	By-product of chlorination of drinking water.
<b>Terbufos</b>	1	ND	1	ug/L	No	Agricultural insecticide.
<b>Tetrachloroethylene (perchloroethylene)</b>	1	ND	30	ug/L	No	Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser).
<b>2,3,4,6 - Tetrachlorophenol</b>	1	ND	100	ug/L	No	Wood preservative.
<b>Triallate</b>	1	ND	230	ug/L	No	Agricultural herbicide.
<b>Trichloroethylene</b>	1	ND	5	ug/L	No	Metal degreasing sites and other factories.
<b>2,4,6-Trichlorophenol</b>	1	ND	5	ug/L	No	Pesticide manufacturing.

**Greenbank DWS Table 8 continued**

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Trifluralin	1	Non-Detect (ND)	45	Microgram per Litre (ug/L)	No	Agricultural herbicide.
Vinyl Chloride	1	ND	2	ug/L	No	Leaching from PVC pipes; discharge from plastics factories.

**Greenbank DWS Table 9**

**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 2016.

Parameter	Result	Unit of Measure	Date of Sample
Not Applicable (N/A)	N/A	N/A	N/A