

The Regional Municipality of Durham

Greenbank Drinking Water System 2015 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 2015 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. 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.

Drinking Water System Process Description

Below is a description of the three drinking water system processes.

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 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 (m³/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),
- Distribution,
- Water storage and high lift pumping.

Raw Water Supply

Water is pumped from five (5) municipal wells within Greenbank to the reservoir for treatment. Well 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.

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.

Supervisory Control And Data Acquisition (SCADA) upgrades - \$78,192
Repaired Well No. 1 casing - \$27,824

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 2015 Reported to Spills Action Centre in Accordance with Schedule 16-3 and 16-4 of O. Reg. 170/03.

Incident Date	Parameter	Result	Corrective Action	Corrective Action Date
March 17	Lead (Distribution)	0.71 milligram per Litre (mg/L)	Flushed, resampled.	March 17
July 9	Sodium (Plant)	26.4 mg./L	Resampled.	July 9

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	266	Non-Detect (ND)	ND - 150
Treated	1	ND	ND
Distribution	3	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	152	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	53	Non-Detect (ND) - 7
Distribution	75	ND - 4,300

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
Turbidity - Raw Water	262	0.04 - 0.51	Nephelometric Turbidity Units (NTU)	Turbidity is a measure of particles in water.
Free Chlorine - Plant	Continuous	0.60 - 2.50*	mg/L	Must be sufficient to ensure disinfection has been achieved.
Free Chlorine - Distribution	Continuous	0.59 - 1.70*	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 ¹
Antimony	4	0.0004 - 0.0007	0.006	Milligram per Litre (mg/L)	No	Fire retardants, ceramics, electronics, solder.
Arsenic	4	Non-Detect (ND) - 0.0006	0.025	mg/L	No	Mining.
Barium	1	0.0976	1.0	mg/L	No	Metal refineries, oil drilling.
Boron	1	0.025	5.0	mg/L	No	Industrial.
Cadmium	4	ND	0.005	mg/L	No	Industrial.
Chromium	4	ND - 0.0028	0.05	mg/L	No	Industrial.
Mercury	1	ND	0.001	mg/L	No	Industrial.
Selenium	4	ND - 0.0006	0.01	mg/L	No	Refineries, mines, chemical manufacturing.
Sodium²	4	26.4 - 29.8	20	mg/L	Yes (4) ³	Runoff from road salt.
Uranium	1	0.0009	0.02	mg/L	No	Power generation.
Fluoride	4	0.04 – 0.08	1.5	mg/L	No	Mining.
Nitrite	4	ND	1.0	mg/L	No	Agriculture runoff, landfill leachate and animal waste.
Nitrate	4	0.336 - 0.411	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 as per the Medical Officer of Health 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 2015.

Location Type	Number of Samples	Range of Lead Results milligram per litre	MAC	Number of Exceedences	pH	Alkalinity milligrams per litre
Plumbing	0	N/A	0.01	0	N/A	N/A
Distribution	4	Non-Detect (ND) - 0.171	0.01	1	7.53 - 7.97	226 - 234

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	ND	5	microgram/litre (ug/L)	No	Agricultural herbicide.
Aldicarb	1	ND	9	ug/L	No	Agricultural insecticide.
Aldrin + Dieldrin	1	ND	0.7	ug/L	No	Residue from banned insecticide.
Atrazine + N-dealkylated metabolites	1	ND	5	ug/L	No	Agricultural herbicide.
Azinphos-methyl	1	ND	20	ug/L	No	Insecticide.
Bendiocarb	1	ND	40	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.

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Carbaryl	1	Non-Detect (ND)	90	ug/L	No	Agricultural, forestry, household insecticide.
Carbofuran	1	ND	90	ug/L	No	Agricultural insecticide.
Carbon Tetrachloride	1	ND	5	ug/L	No	Chemical and industrial activities.
Chlordane (Total)	1	ND	7	ug/L	No	Residue from banned insecticide.
Chlorpyrifos	1	ND	90	ug/L	No	Agricultural, household insecticide.
Cyanazine	1	ND	10	ug/L	No	Agricultural, residential herbicide.
Diazinon	1	ND	20	ug/L	No	Agricultural, livestock, operation, residential insecticide.
Dicamba	1	ND	120	ug/L	No	Agricultural herbicide.
1,2-Dichlorobenzene	1	ND	200	ug/L	No	Chemical and industrial factories.
1,4-Dichlorobenzene	1	ND	5	ug/L	No	Chemical and industrial factories.
Dichlorodiphenyltrichloroethane (DDT) + metabolites	1	ND	30	ug/L	No	Residue from banned insecticide.
1,2-Dichloroethane	1	ND	5	ug/L	No	Industrial chemical factories.
1,1-Dichloroethylene (vinylidene chloride)	1	ND	14	ug/L	No	Industrial chemical factories.

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Dichloromethane	1	Non-Detect (ND)	50	ug/L	No	Pharmaceutical and chemical factories.
2,4-dichlorophenol	1	ND	900	ug/L	No	Industrial contamination, reaction with chlorine.
2,4-Dichlorophenoxy acetic acid (2,4-D)	1	ND	100	ug/L	No	Agricultural, residential herbicide.
Diclofop-methy1	1	ND	9	ug/L	No	Agricultural herbicide.
Dimethoate	1	ND	20	ug/L	No	Agricultural, livestock, operation, residential insecticide.
Dinoseb	1	ND	10	ug/L	No	Herbicide residue.
Diquat	1	ND	70	ug/L	No	Agricultural, aquatic herbicide.
Diuron	1	ND	150	ug/L	No	Agricultural, industrial herbicide.
Glyphosate	1	ND	280	ug/L	No	Agricultural, forestry, household herbicide.
Heptachlor + Heptachlor Epoxide	1	ND	3	ug/L	No	Residue from banned insecticide.
Lindane (Total)	1	ND	4	ug/L	No	Agricultural, pharmaceutical insecticide.
Malathion	1	ND	190	ug/L	No	Pest control insecticide.
Methoxychlor	1	ND	900	ug/L	No	Agricultural, livestock, operation, residential insecticide.
Metolachlor	1	ND	50	ug/L	No	Agricultural herbicide.

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Metribuzin	1	Non-Detect (ND)	80	ug/L	No	Agricultural herbicide.
Monochlorobenzene	1	ND	80	ug/L	No	Industrial and agricultural chemical factories and dry cleaning facilities.
Paraquat	1	ND	10	ug/L	No	Agricultural, aquatic herbicide.
Parathion	1	ND	50	ug/L	No	Agricultural insecticide.
Pentachlorophenol	1	ND	60	ug/L	No	Pesticide, wood preservative residue.
Phorate	1	ND	2	ug/L	No	Agricultural insecticide.
Picloram	1	ND	190	ug/L	No	Industrial herbicide.
Polychlorinated Biphenyls (PCB)	1	ND	3	ug/L	No	Residue from various industrial uses.
Prometryne	1	ND	1	ug/L	No	Agricultural herbicide.
Simazine	1	ND	10	ug/L	No	Agricultural herbicide.
Trihalomethane (THM) - Distribution (annual average)	4	20.4	100	ug/L	No	By-product of chlorination of drinking water.
Temephos	1	ND	280	ug/L	No	Insecticide for mosquito, black fly control.
Terbufos	1	ND	1	ug/L	No	Agricultural insecticide.
Tetrachloroethylene	1	ND	30	ug/L	No	Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser).

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
2,3,4,6 - Tetrachlorophenol	1	Non-Detect (ND)	100	ug/L	No	Wood preservative.
Triallate	1	ND	230	ug/L	No	Agricultural herbicide.
Trichloroethylene	1	ND	5	ug/L	No	Metal degreasing sites and other factories.
2,4,6-Trichlorophenol	1	ND	5	ug/L	No	Pesticide manufacturing.
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	1	ND	280	ug/L	No	Industrial herbicide residue.
Trifluralin	1	ND	45	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 2015.

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