

The Regional Municipality of Durham

Sunderland Drinking Water System 2016 Annual Report

Drinking Water System Number: 220004910

Municipal Drinking Water License Number: 003-110

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. 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

General

The Sunderland Drinking Water System supplies potable water to consumers in the Town of Sunderland in the Township of Brock. Sunderland has two municipal wells designated as Well No. 1 and Well No. 2. The wells in Sunderland are classified as groundwater under direct influence of surface water (GUDI) with effective in-situ filtration. Well No. 1 and Well No. 2 are equipped with an ultraviolet (UV) system to provide the additional disinfection required for a GUDI well. Sunderland is a Class One Water Treatment System and a Class One Distribution and Supply. The approved combined capacity of the treatment system is 1,374 cubic metres per day (m³/d). The Sunderland treatment and distribution system is owned and operated by the Regional Municipality of Durham.

The water supply system includes the following four processes:

- Disinfection (sodium hypochlorite),
- Ultraviolet disinfection (UV),
- Distribution, and
- Storage.

Raw Water Supply

Water is pumped from two municipal wells in Sunderland. Well No. 1 is drilled to a depth of 8.9 metres (m), and Well No. 2 is drilled to a depth of 11.2 m. Water is delivered to the system by the well pumps.

Disinfection

The pumphouse contains the disinfection equipment for both Well No. 1 and Well No. 2. The water is treated with an UV disinfection system containing 12 UV reactors. The water is then chlorinated with sodium hypochlorite. The free chlorine residual, turbidity and UV transmittance are monitored continuously by online analyzers. The UV and chlorination systems will shut down the well pumps if an alarm occurs. This ensures the water is disinfected.

Distribution System

The distribution system delivers the treated water through approximately 8.5 kilometres of watermains and includes a 1,773 cubic metre standpipe for storage and pressure equalization.

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:

There were no major expenses incurred during this reporting period.

Tables

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

Sunderland 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

Sunderland 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	104	Non Detect (ND) - 1	ND - 19
Treated	0	Not Applicable (N/A)	N/A
Distribution	8	ND	ND

Sunderland 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	104	Absence (A)	A
Distribution	155	A	A

Sunderland 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	104	Non-Detect (ND) - 140
Distribution	81	ND - 7

Sunderland 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	104	0.07 - 0.44	Nephelometric Turbidity Units (NTU)	Turbidity is a measure of particles in water.
Free Chlorine - Plant	Continuous	0.78 - 1.92*	Milligram per Litre (mg/L)	Must be sufficient to ensure disinfection has been achieved.
Free Chlorine - Distribution	Continuous	0.45 - 2.20*	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.

Sunderland 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	10	Non-Detect (ND) - 0.0008	0.006	Milligram per Litre (mg/L)	No	Fire retardants, ceramics, electronics, solder.
Arsenic	10	ND	0.025	mg/L	No	Mining.
Barium	4	0.057 - 0.101	1.0	mg/L	No	Metal refineries, oil drilling.
Boron	4	0.0064 - 0.0158	5.0	mg/L	No	Industrial.
Cadmium	10	ND	0.005	mg/L	No	Industrial.
Chromium	10	ND	0.05	mg/L	No	Industrial.
Mercury	4	ND	0.001	mg/L	No	Industrial.
Selenium	10	ND	0.01	mg/L	No	Refineries, mines, chemical manufacturing.
Sodium²	8	9.2 - 26.0	20	mg/L	Yes (3) ³	Runoff from road salt.
Uranium	4	0.0010 - 0.0013	0.02	mg/L	No	Power generation.
Fluoride	8	0.04 - 0.06	1.5	mg/L	No	Mining.
Nitrite	8	ND	1.0	mg/L	No	Agriculture runoff, landfill leachate and animal waste.
Nitrate	8	0.66 - 4.53	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).

Sunderland 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)	0.01	0	7.34 - 7.48	288 - 305

Sunderland 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	4	Non-Detect (ND)	5	Microgram per Litre (ug/L)	No	Agricultural herbicide.
Atrazine + N-dealkylated metabolites	4	ND	5	ug/L	No	Agricultural herbicide.
Azinphos-methyl	4	ND	20	ug/L	No	Insecticide.
Benzene	4	ND	5	ug/L	No	Plastics manufacturing, leaking fuel tanks.
Benzo(a)pyrene	4	ND	0.01	ug/L	No	Formed from the incomplete burning of organic matter.
Bromoxynil	4	ND	5	ug/L	No	Agricultural herbicide.
Carbaryl	4	ND	90	ug/L	No	Agricultural, forestry, household insecticide.

Sunderland DWS Table 8 continued

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

Sunderland DWS Table 8 continued

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

Sunderland DWS Table 8 continued

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Phorate	4	Non-Detect (ND)	2	Microgram per Litre (ug/L)	No	Agricultural insecticide.
Picloram	4	ND	190	ug/L	No	Industrial herbicide.
Polychlorinated Biphenyls(PCB)	4	ND	3	ug/L	No	Residue from various industrial uses.
Prometryne	4	ND	1	ug/L	No	Agricultural herbicide.
Simazine	4	ND	10	ug/L	No	Agricultural herbicide.
THM - Distribution (annual average)	4	35.7	100	ug/L	No	By-product of chlorination of drinking water.
Terbufos	4	ND	1	ug/L	No	Agricultural insecticide.
Tetrachloroethylene (perchloroethylene)	4	ND	30	ug/L	No	Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser).
2,3,4,6 - Tetrachlorophenol	4	ND	100	ug/L	No	Wood preservative.
Triallate	4	ND	230	ug/L	No	Agricultural herbicide.
Trichloroethylene	4	ND - 0.2	5	ug/L	No	Metal degreasing sites and other factories.
2,4,6-Trichlorophenol	4	ND	5	ug/L	No	Pesticide manufacturing.

Sunderland DWS Table 8 continued

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Trifluralin	4	Non-Detect (ND)	45	Microgram per Litre (ug/L)	No	Agricultural herbicide.
Vinyl Chloride	4	ND	2	ug/L	No	Leaching from PVC pipes; discharge from plastics factories.

Sunderland 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