

The Regional Municipality of Durham

Orono Drinking Water System 2021 Annual Report

Drinking Water System Number: 220004769

Municipal Drinking Water Licence Number: 003-108

Drinking Water System Owner: The Regional Municipality of Durham

Drinking Water System Category: Large Municipal Residential

This Annual Report for the calendar year 2021 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 office that is located at 605 Rossland Road East, Whitby. The annual report is also available on the [Region of Durham's website](http://www.durham.ca) at www.durham.ca. Further information regarding the Drinking Water Regulations can be found on the [Ministry of the Environment, Conservation and Parks website](http://www.ontario.ca/ministry-environment-conservation-parks) at www.ontario.ca/ministry-environment-conservation-parks.

Drinking Water System Process Description

General

The Orono Drinking Water System provides potable water to consumers in the Village of Orono in the Municipality of Clarington. Orono has three municipal wells designated Well No. 3, Well No. 4 and Well No. 5. Well No. 5 is currently not in service. Orono is a Class Two Distribution and Supply Subsystem with an approved combined capacity of 1,745 cubic metres per day (m³/d). The Orono Well Supply System feeds a Class One Distribution Subsystem. The Orono treatment and distribution systems are owned and operated by the Regional Municipality of Durham.

The water supply system includes the following processes:

- Disinfection (sodium hypochlorite), and
- Distribution.

Raw Water Supply

Water is pumped from two municipal wells within the Village of Orono. Well No. 3 and Well No. 4 are each drilled to a depth of 13.7 metres (m). Water is delivered to the system by the well pumps.

Disinfection

The main pumphouse contains the disinfection equipment for both Well No. 3 and 4. The water is disinfected with sodium hypochlorite. The free chlorine residual and turbidity are monitored continuously by online analyzers.

Distribution System

The distribution system delivers the treated water through approximately 12 kilometres of watermains in two pressure zones and includes a booster station and a 680 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:

Cathodic protection of watermains - \$36,054.00

Standby generator replacement at Orono Wells 3 & 4 - \$108,177.46

Orono Well 4 pump replacement - \$29,809.00

Orono Well 4 rehabilitation - \$22,500.00

Supervisory Control and Data Acquisition (SCADA) upgrades - \$30,128.02

Tables

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

Orono Drinking Water System (DWS) Table 1

Summary of all Adverse Water Quality Incidents in 2021 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 2021.

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

Orono DWS Table 2

Microbiological 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	97	Non-Detect (ND)	ND
Treated	2	ND	ND
Distribution	5	ND	ND

Orono DWS Table 3

Microbiological 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	95	Absence (A)	A
Distribution	135	A	A

Orono DWS Table 4

Microbiological 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	97	Non-Detect (ND) - 21
Distribution	88	ND - 280

Orono DWS Table 5

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

Test	Number of Samples	Range of Results	Unit of Measure	Parameter Description
Turbidity - Raw Water	101	0.09 - 0.4	Nephelometric Turbidity Units (NTU)	Turbidity is a measure of particles in water.
Free Chlorine - Plant	Continuous	1.52 - 2.5*	Milligram per Litre (mg/L)	Must be sufficient to ensure disinfection has been achieved.
Free Chlorine - Distribution	Continuous	0.21 – 1.85*	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.

Orono DWS Table 6

Summary of Treated Water Chemical Parameter Testing Under Schedules 13 and 23 of O. Reg. 170/03.

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	M.A.C. Exceedance	Potential Source*
Antimony	8	Non-Detect (ND)	0.006	Milligram per Litre (mg/L)	No	Fire retardants, ceramics, electronics, solder.
Arsenic	8	ND	0.01	mg/L	No	Mining.
Barium	1	0.0652	1.0	mg/L	No	Metal refineries, oil drilling.
Boron	1	0.0183	5.0	mg/L	No	Industrial.
Cadmium	8	ND	0.005	mg/L	No	Industrial.
Chromium	8	ND	0.05	mg/L	No	Industrial.
Total Haloacetic acids -Distribution (annual average)	4	15.3	80	Microgram per Litre (ug/L)	No	By-product of chlorination of drinking water.
Mercury	1	ND	0.001	mg/L	No	Industrial.
Selenium	8	0.0006 - 0.0013	0.05	mg/L	No	Refineries, mines, chemical manufacturing.
Sodium	7	19.4 – 39	Not Applicable**	mg/L	Yes (8)***	Storm water runoff including road salt.
Total Trihalomethanes - Distribution (annual average)	4	36.7	100	ug/L	No	By-product of chlorination of drinking water.
Uranium	1	0.0016	0.02	mg/L	No	Power generation.
Fluoride	7	ND - 0.06	1.5	mg/L	No	Mining.
Nitrite	7	ND	1.0	mg/L	No	Agriculture runoff, landfill leachate and animal waste.
Nitrate	7	1 – 2.08	10.0	mg/L	No	Fertilizer.

* Parameters may occur naturally in the environment.

** 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.

*** 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.

Orono DWS Table 7

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

Location Type	Number of Samples	Range of Lead Results Milligram per Litre	MAC	Number of Exceedances	pH	Alkalinity Milligram per Litre
Plumbing	Not Required (N/R)	N/R	0.01	N/R	N/R	N/R
Distribution	4	Non-Detect (ND) – 0.0021	0.01	1	7.30 - 7.70	243 - 252

Orono DWS Table 8

Summary of Treated Water Organic Parameter Testing 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	1	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.
Carbofuran	1	ND	90	ug/L	No	Agricultural insecticide.

Orono DWS Table 8 continued

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Carbon Tetrachloride	1	Non-Detect (ND)	2	Microgram per Litre (ug/L)	No	Chemical and industrial activities.
Chlorpyrifos	1	ND	90	ug/L	No	Agricultural, household insecticide.
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.
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.
Dichloromethane	1	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-methyl	1	ND	9	ug/L	No	Agricultural herbicide.

Orono DWS Table 8 continued

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Dimethoate	1	Non-Detect (ND)	20	Microgram per Litre (ug/L)	No	Agricultural, livestock, operation, residential insecticide.
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.
Malathion	1	ND	190	ug/L	No	Pest control insecticide.
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	1	ND	100	ug/L	No	Agricultural herbicide.
Metolachlor	1	ND	50	ug/L	No	Agricultural herbicide.
Metribuzin	1	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.
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.

Orono DWS Table 8 continued

Parameter	Number of Samples	Results Range	MAC	Unit of Measure	MAC Exceedance	Potential Sources
Polychlorinated Biphenyls(PCB)	1	Non-Detect (ND)	3	Microgram per Litre (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.
Terbufos	1	ND	1	ug/L	No	Agricultural insecticide.
Tetrachloroethylene (perchloroethylene)	1	ND	10	ug/L	No	Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser).
2,3,4,6 - Tetrachlorophenol	1	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.
Trifluralin	1	ND	45	ug/L	No	Agricultural herbicide.
Vinyl Chloride	1	ND	1	ug/L	No	Leaching from PVC pipes; discharge from plastics factories.

Orono 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 2021.

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