

OPTIONAL ANNUAL REPORT TEMPLATE

Drinking-Water System Number:	220003582
Drinking-Water System Name:	Cardinal Water System
Drinking-Water System Owner:	Township of Edwardsburgh Cardinal
Drinking-Water System Category:	Large Municipal, Residential
Period being reported:	January 1, 2022 to December 31, 2022

<p style="text-align: center;"><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [] No [X]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection:</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Cardinal Water Control Pollution Plant 4000 John St Cardinal, Ontario K0E 1E0 </div>	<p style="text-align: center;"><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served: <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div></p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to: <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div></p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p>
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Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
N/A	N/A

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?
Yes [] No []



Ontario Drinking-Water Systems Regulation O. Reg. 170/03

Indicate how you notified system users that your annual report is available, and is free of charge.

- ☒ Public access/notice via the web
- ☐ Public access/notice via Government Office
- ☒ Public access/notice via a newspaper
- ☐ Public access/notice via Public Request
- ☐ Public access/notice via a Public Library
- ☐ Public access/notice via other method _____

Describe your Drinking-Water System

This is a surface water treatment plant that receives its source water supply from the St. Lawrence River. Treatment consists of pre-chlorination, basket screens, chemically assisted coagulation, and flocculation, 4 rapid dual media filters (anthracite coal and sand) for physical removal of turbidity, ultraviolet irradiation (primary disinfection) followed by post chlorination (secondary disinfection). Parameters such as UV intensity, chlorine residual, pH, filter and potable turbidity are continuously monitored. All process and security alarms are monitored 24/7 by Falcon Security. The distribution system includes an elevated storage tank, 6 sample stations, 82 hydrants and a mix of distribution material piping.

List all water treatment chemicals used over this reporting period:

Sodium Hypochlorite – ANSI/NSF 60
SternPAC (Aluminum chloride hydroxide sulphate) –ANSI/NSF 60

Were any significant expenses incurred to?

- ☒ Install required equipment
- ☒ Repair required equipment
- ☒ Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

Annual inspection of chlorine injection ring and raw intake structure. (\$1925)
Semi-annual servicing of Trojan UV Swift 12. (\$4147)
Semi-annual servicing of backup generator. (\$1642.50)
Annual backflow testing. (\$745.80)
Annual servicing and calibration of lab equipment/portable chlorine analyzers. (\$5250)
Semi-annual servicing of SCADA systems. (\$9634.03)
Annual servicing of fire alarm system. (\$335.81)
Installed a new Golden Anderson Pump Director. (\$19791.05)
Remote CCTV inspection of the Cardinal Water Tower. (\$5450)
Replaced Filter 1B turbidity analyzer (\$6576.60)
Replaced media, keystone valve positioners in filter 1A. (\$9861.15)
Purchased Honeywell water meter communication and programming system. (\$7961.29)
Replaced the Dundas Street sample station. (\$2040.67)



Installed a back up DCS Falcon Security alarm communicator. **(\$385)**
 Repaired backflow preventer at the Cardinal Water Plant. **(\$898.35)**
 Replaced Clearwell Greyline Level Transmitter and sensor. **(\$1715)**
 Replaced Siemens power supply unit in UV # 1. **(\$448)**
 Repaired water main break on Meadowlands Drive. **(\$3806.21)**
 Replaced pH probe on post chlorine analyzer. **(\$568.57)**
 Purchased and installed a new post chlorine analyzer. **(\$7792)**
 Replaced section of low lift stainless steel pipework. **(\$5627.49)**
 Replaced PAC injectors. **(\$375)**
 Replaced overload relays and switches in sump pump panel. **(\$1186.95)**
 Replaced post chlorine injector. **(\$766.41)**
 Replaced Flygt sump pump **(\$9,243.68)**
 Replaced Filter 2B ABB Sensor **(\$ 4961.83)**
 Repaired filter 1B pipework **(\$2172.65)**
 Replaced UPS Battery Backup for SCADA System. **(\$447.64)**
 WaterTrax License renewal **(\$3941.54)**
 County Road 2 Water main rehabilitation engineering services **(\$64,741.59)**
 Repaired water main on Meadowlands Drive and County Road 2 **(\$10,000)**
 Replaced pH probe in clearwell chlorine analyzer **(\$568.57)**

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre:

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
June 28, 2022	Lead (Walter St Sample Station)	0.257	ug/L	Reported to Leeds & Grenville Health Unit, SAC and MECP. Re-sampled.	June 30, 2022
July 13, 2022	Sodium (Cardinal Water Treatment Plant)	20.3	mg/l	Reported to Leeds & Grenville Health Unit, SAC and MECP. Re-sampled	July 14, 2022
Dec 22, 2022	Notice of Improper Disinfection (water main break)	N/A	N/A	Reported to Leeds & Grenville Health Unit, SAC and MECP. Collected microbiological sample.	December 24, 2022

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period:

	Number of Samples	Range of E.Coli Or Fecal Results (min)-(max)	Range of Total Coliform Results (min)-(max)	Number of HPC Samples	Range of HPC Results (min)-(max)
Raw	52	0 - 6	0 - 146	N/A	N/A
Treated	52	0 - 0	0 - 0	52	<1 - 16
Distribution	158	0 - 0	0 - 0	156	< 2 - 16

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report:

Parameter	Number of Grab Samples	Range of Results (min #)-(max #)
Potable Turbidity		
Continuous	8760	0.081-0.136
Grab	365	0.05-0.34
Filter 1A Turbidity		
Continuous	8760	0.010-0.130
Grab	729	0.02-0.20
Filter 1B Turbidity		
Continuous	8760	0.010-0.270
Grab	711	0.02-0.20
Filter 2A Turbidity		
Continuous	8760	0.020-0.420
Grab	728	0.04-0.19
Filter 2B Turbidity		
Continuous	8760	0.004-0.180
Grab	728	0.05-0.22
Chlorine (Primary)		
Continuous	8760	0.57-5.00
Grab	365	0.40-1.8
Chlorine(Point of Entry)		
Continuous	8760	1.46-4.90
Grab	730	1.7-3.2
Chlorine(Distribution)		
Grab: Free:	845	0.46-2.4
Total:	729	0.75 -2.6
UV Disinfection	8760	46.46 - 77.49
Fluoride	N/A	N/A

NOTE: For continuous monitors use 8760 as the number of samples.

NOTE: Units of measures include:
Chlorine – mg/L

Turbidity – NTU
UV – mJ/cm²

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
N/A	N/A	N/A	N/A	N/A

Summary of Inorganic parameters tested during this reporting period or the most recent sample results:

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	October 14, 2022	0.0001	mg/L	No
Arsenic	October 14, 2022	0.0006	mg/L	No
Barium	October 7, 2022	0.020	mg/L	No
Boron	October 7, 2022	0.020	mg/L	No
Cadmium	October 14, 2022	<0.000010	mg/L	No
Chromium	October 7, 2022	< 0.002	mg/L	No
*Lead	January 5, 2022	<0.00002	mg/L	No
Mercury	October 14, 2022	<0.00002	mg/L	No
Selenium	October 14, 2022	<0.001	mg/L	No
Sodium	Feb 7, 2022	18.6	mg/L	No
	June 6, 2022	17.9	mg/L	No
	July 4, 2022	20.3	mg/L	Yes
	July 13, 2022	19.6	mg/L	No
	Nov 7, 2022	17.2	mg/L	No
Uranium	October 14, 2022	0.00024	mg/L	No
Fluoride	Dec 5, 2022	<0.1	mg/L	No
Nitrite	Dec 5, 2022	0.1	mg/L	No
Nitrate	Dec 5, 2022	0.2	mg/L	No

*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential system

Summary of lead testing under Schedule 15.1 during this reporting period

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (mg/L) (min) – (max)	Number of Exceedances
Plumbing	N/A	N/A	N/A
Distribution	5	0.00007-0.257	1

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	Oct 12, 2022	< 0.3	ug/L	No
Atrazine + N-dealkylated metabolites	Oct 12, 2022	< 0.5	ug/L	No
Azinphos-methyl	Oct 12, 2022	< 1	ug/L	No
Benzene	Oct 7, 2022	< 0.5	ug/L	No
Benzo(a)pyrene	Oct 12, 2022	< 0.006	ug/L	No
Bromoxynil	Oct 12, 2022	< 0.5	ug/L	No
Carbaryl	Oct 12, 2022	< 3	ug/L	No
Carbofuran	Oct 12, 2022	< 1	ug/L	No
Carbon Tetrachloride	Oct 7, 2022	< 0.2	ug/L	No
Chlorpyrifos	Oct 12, 2022	< 0.5	ug/L	No
Diazinon	Oct 12, 2022	< 1	ug/L	No
Dicamba	Oct 20, 2022	< 1	ug/L	No
1,2-Dichlorobenzene	Oct 7, 2022	< 0.5	ug/L	No
1,4-Dichlorobenzene	Oct 7, 2022	< 0.5	ug/L	No
1,2-Dichloroethane	Oct 7, 2022	< 0.5	ug/L	No
1,1-Dichloroethylene (vinylidene chloride)	Oct 7, 2022	< 0.5	ug/L	No
Dichloromethane	Oct 7, 2022	< 5	ug/L	No
2,4-Dichlorophenol	Oct 12, 2022	< 0.2	ug/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	Oct 20, 2022	< 1	ug/L	No
Diclofop-methyl	Oct 12, 2022	< 0.9	ug/L	No
Dimethoate	Oct 12, 2022	< 1	ug/L	No
Diquat	Oct 7, 2022	< 5	ug/L	No
Diuron	Oct 12, 2022	< 5	ug/L	No
Glyphosate	Oct 7, 2022	< 25	ug/L	No
Malathion	Oct 12, 2022	< 5	ug/L	No
MCPA	Oct 17, 2022	< 10	Ug/L	No
Metolachlor	Oct 12, 2022	< 3	ug/L	No
Metribuzin	Oct 12, 2022	< 3	ug/L	No
Monochlorobenzene	Oct 7, 2022	< 0.5	ug/L	No
Paraquat	Oct 7, 2022	< 1	ug/L	No
Pentachlorophenol	Oct 12, 2022	< 0.2	ug/L	No
Phorate	Oct 12, 2022	< 0.3	ug/L	No
Picloram	Oct 20, 2022	< 5	ug/L	No
Polychlorinated Biphenyls(PCB)	Oct 11, 2022	< 0.05	ug/L	No
Prometryne	Oct 12, 2022	< 0.1	ug/L	No
Simazine	Oct 12, 2022	< 0.5	ug/L	No
THM (Running Annual average)	2022	59.5	ug/L	No



HAA (Running annual average)	2022	37.0	ug/L	No
Terbufos	Oct 12, 2022	< 0.5	ug/L	No
Tetrachloroethylene	Oct 7, 2022	< 0.5	ug/L	No
2,3,4,6-Tetrachlorophenol	Oct 12, 2022	< 0.2	ug/L	No
Triallate	Oct 12, 2022	< 10	ug/L	No
Trichloroethylene	Oct 7, 2022	< 0.5	ug/L	No
2,4,6-Trichlorophenol	Oct 12, 2022	< 0.2	ug/L	No
Trifluralin	Oct 12, 2022	< 0.5	ug/L	No
Vinyl Chloride	Oct 7, 2022	< 0.2	ug/L	No

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
THM	59.5	ug/L	Running Annual Ave.