Madoc Drinking Water System

Annual Water Report

Reporting period of January 1, 2020 – December 31, 2020

Prepared For: Corporation of the Municipality of Centre Hastings

Prepared By: Ontario Clean Water Agency
Agence Ontarienne Des Eaux

This report has been prepared to satisfy the annual reporting requirements of the Provincial Regulations and Guidelines established by the Ministry of the Environment in the Province of Ontario including the section 11 and Schedule 22 reports identified in O.Reg 170/03, Drinking Water Systems Regulation and the Permit to Take Water Reports identified in O.Reg 387/04, Water Taking and Transfer Regulation.

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Compliance Report Card

Drinking Water System Number:	220001575
System Owner:	Corporation of the Municipality of Centre Hastings
Operating Authority:	Ontario Clean Water Agency
Drinking Water System Category:	Large Municipal Residential
Reporting Period:	January 1, 2020 – December 31, 2020

Report Availability

Population Served:	**< 10,000**
Website where the annual report can be viewed by the public:	www.centrehastings.com
Alternate location were annual report will be available for inspection and is free of charge:	Municipal Office
How are system users notified that the annual report is available and is free of charge?	Public access/notice via Municipal Website
Number of Designated Facilities served:	None
Has a copy of this report been provided to all Designated Facilities?	N/A
Number of Interested Parties reported to:	N/A
Has a copy of this report been provided to all Interested Parties?	N/A
The following Drinking-Water Systems receive drinking water from this system:	N/A
Has a copy of this report been provided to connected owners?	N/A

Event Summary	# of Events	Date	Details
Ministry of Environment Inspections	2	Jan 8th, 2020 Nov 10th, 2020	Announced – Detailed Drinking Water Inspection – Final Inspection Rating of 99.22% Announced – Detailed Drinking Water Inspection – Final Inspection Rating of 100%
Ministry of Labour Inspections	0		
DWQMS Audits	1	Jul 20th, 2020	Surveillance Systems Audit performed by SAI Global
AWQI's	0		
Non-Compliance	1	Nov 18th-27th, 2020	UV Monitoring
Community Complaints	0		
Spills	1	Dec 9th, 2020	Water Tower overflow due to the loss of heat in the building causing the line that runs to the Pribusin to freeze.

Quality Control Measures

Corporation of the Municipality of Centre Hastings facilities are part of OCWA's operational Trent Valley Hub. The facilities are supported by hub, regional and corporate resources. Operational Services are delivered by OCWA staff that live and work in the surrounding area. OCWA operates facilities in compliance with applicable regulations. The facility has comprehensive manuals detailing operations, maintenance, instrumentation, and emergency procedures. All procedures are treated as active documents, with annual reviews.

OCWA has additional "Value Added" and operational support services that Corporation of the Municipality of Centre Hastings benefits from including:

- Access to a network of operational compliance and support experts at the regional and corporate level, as well as affiliated programs that include the following:
    - Quality & Environmental Management System, Occupational Health & Safety System and an internal compliance audit system.
    - Process Data Collection (PDC) and PDM (WISKI) facility operating information repository, which consolidates field data, online instrumentation, and electronic receipt of lab test results for reporting, tracking and analysis.
    - Work Management System (WMS) tracks and reports maintenance activities, and creates predictive and preventative reports.
    - Outpost 5 wide-area SCADA system allows for process optimization and data logging, process trending, remote alarming and optimization of staff time.
- Client reporting which includes operational data, equipment inventory, financial statements, maintenance work orders, and capital status reports
- Site-Specific Contingency Plans and Standard Operating Procedures
- Use of accredited laboratories
- Access to a network of operational compliance and support experts at the hub, region and corporate level
- Additional support in response to unusual circumstances, and extra support in an emergency.
- Use of sampling schedules for external laboratory sampling

System Process Description

Raw Source

Raw water source for the Madoc Drinking Water System are two groundwater wells. The Rollins Well (Well 3) is considered the main water supply well, while the Marmora Well (Well 4) is proposed as a secondary standby well.

Treatment

Madoc Drinking Water System is a two well supply system, Well # 3– Rollins Street and Well #4 – Marmora Street. Both wells are considered to be groundwater under the direct influence of surface water (GUDI).

Well #3 treatment system consists of a dual train cartridge filtration system and an ultraviolet light system for primary treatment and sodium hypochlorite as the secondary disinfectant. Well #3 is equipped with on-line alarmed continuous analyzers for treated water free chlorine residual and turbidity.

The Well #4 treatment system consists of a dual train cartridge filtration system and an ultraviolet light system along with an arsenic removal system. The primary disinfection process consists of the cartridge filtration system and ultraviolet system while sodium hypochlorite is the secondary disinfectant. Well #4 is equipped with on-line alarmed continuous analyzers for treated water free chlorine residual and turbidity.

Distribution free chlorine residual is continuously monitored with an on-line alarmed chlorine analyzer. Both facilities contain a well pump lock out system in the case disinfection failure.

Well #2 was decommissioned in August 2020 and is no longer operational.

Treatment Chemicals used during the reporting year:

Chemical Name	Use	Supplier
Sodium Hypochlorite	Disinfection	Brenntag

Summary of Non-Compliance

Non-Compliance Identified in a Ministry Inspection:

Ministry of Environment Inspection Rating: 99.22% & 100%

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
Municipal Drinking Water License	Schedule C, Section 1.6 of MDWL 153-101, Issue 3 requires that flow rate, UV intensity and UV lamp status be recorded once every four hours or less. UV intensity is continually monitored and will lock out the plant if the UV falls below 31.4 W/m^2	November 18th- 27th, 2019	Alarms have been set up that will trigger and page the on-call operator if we lose trending from either UV unit ensuring that recording will ensue as required per the MDWL.	Complete

Adverse Water Quality Incidents

Date	AWQI #	Cause			Corrective Action Taken
		Parameter	Result	Exceedance of	
N/A					

Non-Compliance

Legislation	requirement(s) system failed to meet	duration of the failure	Corrective Action	Status
N/A				

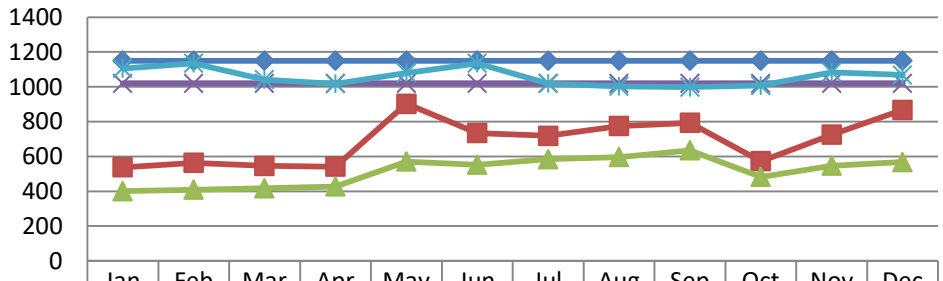
Flows

The Madoc Drinking Water System has a rated capacity for Rollins Street Pump house - 1,469m^3/day and Marmora Street Pump house - 1470m^3/day. Additional flow data can be found under the Water Taking and Transfer Data.

Raw Water Flows

The Raw Water flows are regulated under the Permit to Take Water.

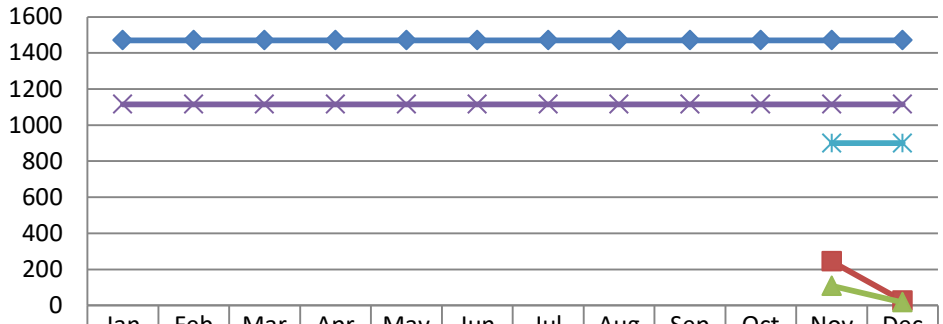
Raw Water Volume Taken: RW3



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PTTW Max Allowable (m3/d)	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150	1150
Max Flow (m3/d)	538.0	563.0	546.0	541.0	902.0	734.0	719.0	775.0	793.0	573.0	725.0	868.0
Avg (m3/d)	400.4	408.6	417.7	427.5	571.0	552.1	584.1	596.5	635.4	482.9	546.6	568.2
PTTW Max Allowable Peak Flow (L/min)	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020
Max Peak Flow (L/min)	1106	1135	1041	1017	1080	1135	1019	1003	998	1007	1083	1068

The above table shows there were spikes in instantaneous peak flow rate (L/min) and max flow rate these occurrences were caused during pump start-up/pump to waste. The Peak Flow rate was increased in May 2020 during scheduled flow meter calibrations.

Raw Water Daily Rate of Taking: RW4

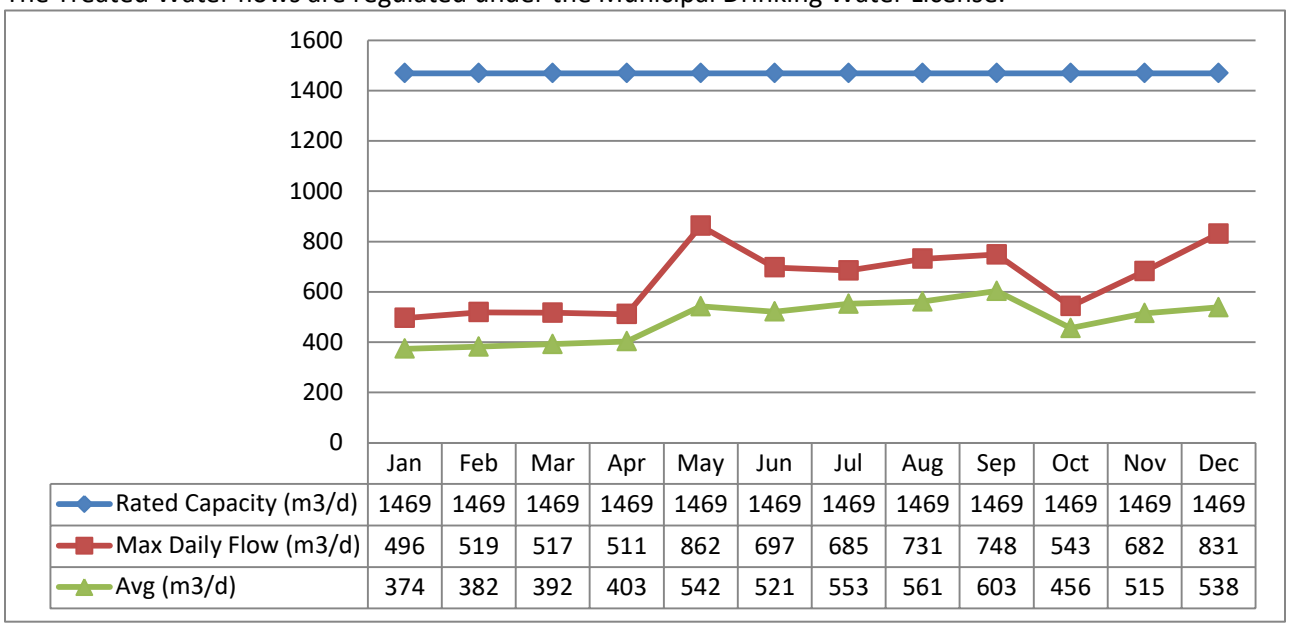


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PTTW Max Allowable (m3/d)	1470	1470	1470	1470	1470	1470	1470	1470	1470	1470	1470	1470
Max Flow (m3/d)											244	26
Avg (m3/d)											108	17
PTTW Max Allowable Peak Flow (L/min)	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115
Max Peak Flow (L/min)											900	900

The Marmora Well #4 did not run sufficiently in 2020 to gain reportable data.

Treated Water Flows - TW3

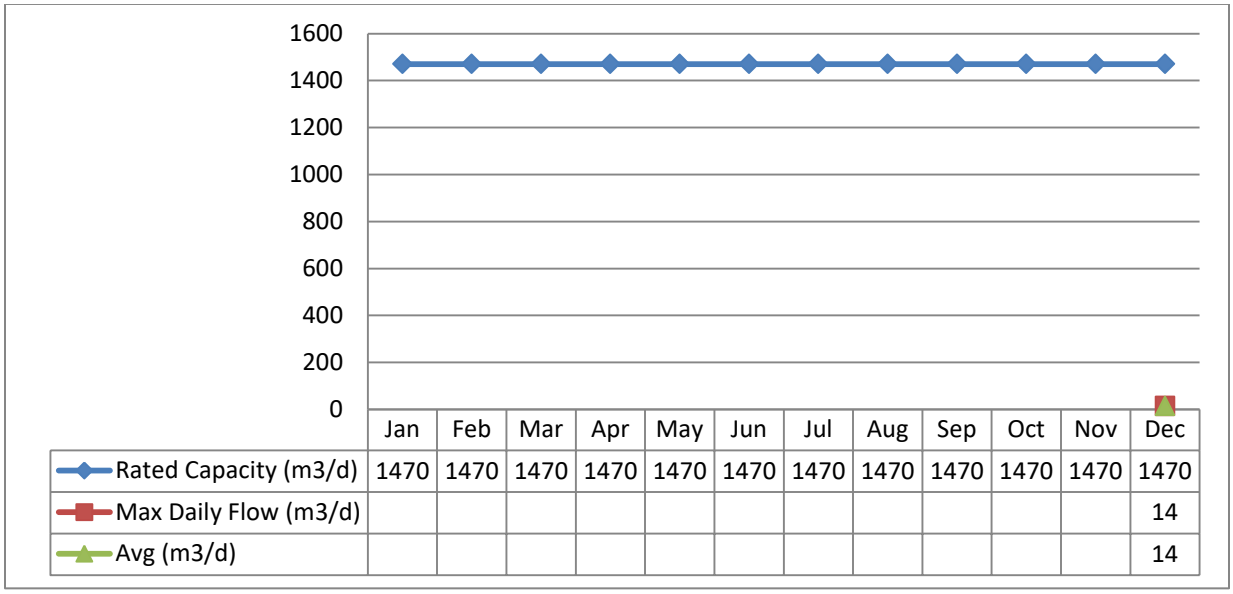
The Treated Water flows are regulated under the Municipal Drinking Water License.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rated Capacity (m3/d)	1469	1469	1469	1469	1469	1469	1469	1469	1469	1469	1469	1469
Max Daily Flow (m3/d)	496	519	517	511	862	697	685	731	748	543	682	831
Avg (m3/d)	374	382	392	403	542	521	553	561	603	456	515	538

Treated Water Flows – TW4

The Treated Water flows are regulated under the Municipal Drinking Water License.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rated Capacity (m3/d)	1470	1470	1470	1470	1470	1470	1470	1470	1470	1470	1470	1470
Max Daily Flow (m3/d)												14
Avg (m3/d)												14

The Marmora Well #4 did not run sufficiently in 2020 to gain reportable data.

Regulatory Sample Results Summary

- RW3 = Raw Water Well 3
- TW3 = Treated Water Well 3
- RW4 = Raw Water Well 4
- TW4 = Treated Water Well 4

- DW = Distribution Water

Microbiological Testing

Location	Number of Samples	E. Coli Results (min) - (max)	Total Coliform Results (min) – (max)	Number of HPC Samples	HPC Results (min) - (max)
Raw – RW3	52	0 – 7	0 – 72	~	~
Raw – RW4	7*	0 – 0	0 – 9	~	~
Treated - TW3	52	0 - 0	0 – 0	52	0 –1
Treated- TW4	2	0 - 0	0 - 0	2	0 - 1
Distribution - DW	130	0 - 0	0 - 0	130	0 - 12

* Well 4 ran to distribution for approximately 15 minutes in December 2020 and was not fully placed in operation until 2021. Sampling of the new well began in November 2020.

Operational Testing

On-Line

Parameter	Range of Results (min # - max #)
Turbidity, Well #3 Filter Effluent Train # 1 (NTU)	0.00 – 2.00 NTU*
Turbidity, Well #3 Filter Effluent Train # 2 (NTU)	0.00 – 2.00 NTU*
Chlorine, Well #3 Treated	0.00 – 3.32mg/L*
Total Chlorine, Distribution	0.00 – 5.00 mg/L*
Free Chlorine, Distribution	0.00 – 2.43 mg/L
Turbidity, Well #4 Filter Effluent Train # 1 (NTU)	0.00 – 5.00 NTU*
Turbidity, Well #4 Filter Effluent Train # 2 (NTU)	0.00 – 5.00 NTU*
Chlorine, Well #4 Treated	0.00 – 3.89 mg/L*

***** Instrument spikes and dips recorded by on-line instrumentation were a result of air bubbles and various maintenance and calibration activities. Power interruptions may also cause an instrument reading to drop to zero. All events are reviewed for compliance with O. Reg. 170/03 and if warranted, are reported to the Ministry of Environment as Adverse Water Quality Incidents.

In-House

Parameter	# of grab samples taken	Range of Results (min # - max #)
Raw Water Turbidity grabs - Well 3	12	0.11 – 0.22 NTU
Raw Water UVT grabs – Well 3	12	94.30 – 96.20 %
Raw Water Turbidity grabs - Well 4	1	0.22 – 0.22 NTU
Raw Water UVT grabs – Well 4	1	96.40 – 96.40 %
Well #3 Treated Water Free Chlorine	52	1.68 – 2.6 mg/L
Well #3 Treated Water Total Chlorine	52	1.94 – 3.10 mg/L
Well #4 Treated Water Free Chlorine	2	1.95 – 2.2 mg/L
Well #4 Treated Water Total Chlorine	2	2.20 – 2.40 mg/L
Distribution Free Chlorine	134	0.44 – 2.62 mg/L
Distribution Total Chlorine	132	1.07 – 2.96 mg/L

Additional Legislated Samples

Date of Legal Instrument issued	Parameter	Sample Location	# of grab samples taken	Range of Results (min # - max #)
MDWL : 153-101 Drinking Water Health Related Parameters	Antimony (ug/L)	RW 3	1	1.03
		RW 4	1	0.47
		TW 3	1	0.71
		TW 4	1	0.10
		DW	1	0.98
MDWL : 153-101 Drinking Water Non-Health Related Parameters	Organic Nitrogen (mg/L)	RW 3	4	0.05 - 0.08
		RW 4	n/a	
	Dissolved Organic Carbon (mg/L)	RW 3	4	2.0 – 2.0
		RW 4	n/a	
	Ammonia (mg/L)	RW 4	1	0.04
Additional Samples	Total Kjeldahl Nitrogen (N) (mg/L)	RW 3	4	0.05-0.09
	Total Ammonia Nitrogen (mg/L)	RW 3	4	0.4-0.04
	Fluoride	TW	Fluoride is not used at this facility	

Marmora St. Well 4 was placed into full operation in January of 2021, there were no quarterly samples taken during 2020.

Lead Sampling

The Lead Sampling Program is required under O.Reg 170/03. This system qualified for the plumbing exemption. This facility is on a reduced sampling schedule and lead is sampled every 36 months, the last samples were taken in 2019.

Location	Date	Lead (ug/L)	pH	Alkalinity (mg/L) as CACO3
	Limits/Ranges	***10.0***	***6.5-8.5***	***30-500***
Hydrant #82	16-Mar-20	--	7.80	253
Hydrant #74	16-Mar-20	--	7.90	270
Hydrant #74	14-Sept-20	--	7.80	299
Hydrant #82	14-Sept-20	--	7.80	323

Inorganic Parameters

- MAC = Maximum Allowable Concentration as per O.Reg 169/03
- BDL = Below the laboratory detection level
- Fluoride and Sodium are only required to be tested every 60 months.

Parameter	Sample Date	Result Value	MAC	Exceedance	
				MAC	½ MAC
Antimony: Sb (ug/L) - TW3	2020/03/23	0.71	6.0	No	No
Antimony: Sb (ug/L) - TW4	2020/11/23	<MDL 0.9	6.0	No	No
Arsenic: As (ug/L) - TW3	2020/03/23	2.0	10.0	No	No
Arsenic: As (ug/L) - TW4	2020/11/23	<MDL 0.2	10.0	No	No
Barium: Ba (ug/L) - TW3	2020/03/23	116.0	1000.0	No	No
Barium: Ba (ug/L) - TW4				No	No
Boron: B (ug/L) - TW3	2020/03/23	14.0	5000.0	No	No
Boron: B (ug/L) - TW4				No	No
Cadmium: Cd (ug/L) - TW3	2020/03/23	0.078	5.0	No	No
Cadmium: Cd (ug/L) - TW4				No	No
Chromium: Cr (ug/L) - TW3	2020/03/23	0.12	50.0	No	No
Chromium: Cr (ug/L) - TW4				No	No
Mercury: Hg (ug/L) - TW3	2020/03/23	<MDL 0.01	1.0	No	No
Mercury: Hg (ug/L) - TW4				No	No
Selenium: Se (ug/L) - TW3	2020/03/23	0.22	50.0	No	No
Selenium: Se (ug/L) - TW4				No	No
Uranium: U (ug/L) - TW3	2020/03/23	0.7	20.0	No	No
Uranium: U (ug/L) - TW4				No	No
Additional Inorganics					
Nitrite (mg/L) - TW3	2020/01/06	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW3	2020/04/06	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW3	2020/07/06	<MDL 0.003	1.0	No	No
Nitrite (mg/L) - TW3	2020/10/05	<MDL 0.003	1.0	No	No
Nitrate (mg/L) - TW3	2020/01/06	2.67	10.0	No	No
Nitrate (mg/L) - TW3	2020/04/06	1.14	10.0	No	No
Nitrate (mg/L) - TW3	2020/07/06	2.16	10.0	No	No
Nitrate (mg/L) - TW3	2020/10/05	1.64	10.0	No	No
Nitrite (mg/L) - TW4	2020/03/04	0.04	1.0	No	No
Nitrate (mg/L) - TW4	2020/03/04	0.006	10.0	No	No
60 Month Sampling					
Sodium(mg/L)-TW3	2018/07/25	63.7	20.0	Yes	Yes
Fluoride(mg/L)-TW3	2018/06/25	0.45	1.50	No	No

*There is no "MAC" for Sodium. The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted die~~ts.~~

Organic Parameters

- MAC = Maximum Allowable Concentration as per O.Reg 169/03
- BDL = Below the laboratory detection level

Parameter	Sample Date	Result Value	MAC	Exceedance	
				MAC	½ MAC
Alachlor (ug/L) - TW3	2020/03/23	<MDL 0.02	5.00	No	No
Atrazine + N-dealkylated metabolites (ug/L) - TW3	2020/03/23	<MDL 0.01	5.00	No	No
Azinphos-methyl (ug/L) - TW3	2020/03/23	<MDL 0.05	20.00	No	No
Benzene (ug/L) - TW3	2020/03/23	<MDL 0.32	1.00	No	No
Benzo(a)pyrene (ug/L) - TW3	2020/03/23	<MDL 0.004	0.01	No	No
Bromoxynil (ug/L) - TW3	2020/03/23	<MDL 0.33	5.00	No	No
Carbaryl (ug/L) - TW3	2020/03/23	<MDL 0.05	90.00	No	No
Carbofuran (ug/L) - TW3	2020/03/23	<MDL 0.01	90.00	No	No
Carbon Tetrachloride (ug/L) - TW3	2020/03/23	<MDL 0.17	2.00	No	No
Chlorpyrifos (ug/L) - TW3	2020/03/23	<MDL 0.02	90.00	No	No
Diazinon (ug/L) - TW3	2020/03/23	<MDL 0.02	20.00	No	No
Dicamba (ug/L) - TW3	2020/03/23	<MDL 0.2	120.00	No	No
1,2-Dichlorobenzene (ug/L) - TW3	2020/03/23	<MDL 0.41	200.00	No	No
1,4-Dichlorobenzene (ug/L) - TW3	2020/03/23	<MDL 0.36	5.00	No	No
1,2-Dichloroethane (ug/L) - TW3	2020/03/23	<MDL 0.35	5.00	No	No
1,1-Dichloroethylene (ug/L) - TW3	2020/03/23	<MDL 0.33	14.00	No	No
Dichloromethane (Methylene Chloride) (ug/L) - TW3	2020/03/23	<MDL 0.35	50.00	No	No
2,4-Dichlorophenol (ug/L) - TW3	2020/03/23	<MDL 0.15	900.00	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW3	2020/03/23	<MDL 0.19	100.00	No	No
Diclofop-methyl (ug/L) - TW3	2020/03/23	<MDL 0.4	9.00	No	No
Dimethoate (ug/L) - TW3	2020/03/23	<MDL 0.06	20.00	No	No
Diquat (ug/L) - TW3	2020/03/23	<MDL 1.0	70.00	No	No
Diuron (ug/L) - TW3	2020/03/23	<MDL 0.03	150.00	No	No
Glyphosate (ug/L) - TW3	2020/03/23	<MDL 1.0	280.00	No	No
Malathion (ug/L) - TW3	2020/03/23	<MDL 0.02	190.00	No	No
Metolachlor (ug/L) - TW3	2020/03/23	<MDL 0.01	50.00	No	No
Metribuzin (ug/L) - TW3	2020/03/23	<MDL 0.02	80.00	No	No
Monochlorobenzene (Chlorobenzene) (ug/L) - TW3	2020/03/23	<MDL 0.3	80.00	No	No
Paraquat (ug/L) - TW3	2020/03/23	<MDL 1.0	10.00	No	No
PCB (ug/L) - TW3	2020/03/23	<MDL 0.04	3.00	No	No
Pentachlorophenol (ug/L) - TW3	2020/03/23	<MDL 0.15	60.00	No	No
Phorate (ug/L) - TW3	2020/03/23	<MDL 0.01	2.00	No	No
Picloram (ug/L) - TW3	2020/03/23	<MDL 1.0	190.00	No	No

Prometryne (ug/L) - TW3	2020/03/23	<MDL 0.03	1.00	No	No
Simazine (ug/L) - TW3	2020/03/23	<MDL 0.01	10.00	No	No
Terbufos (ug/L) - TW3	2020/03/23	<MDL 0.01	1.00	No	No
Tetrachloroethylene (ug/L) - TW3	2020/03/23	<MDL 0.35	10.00	No	No
2,3,4,6-Tetrachlorophenol (ug/L) - TW3	2020/03/23	<MDL 0.2	100.00	No	No
Triallate (ug/L) - TW3	2020/03/23	<MDL 0.01	230.00	No	No
Trichloroethylene (ug/L) - TW3	2020/03/23	<MDL 0.44	5.00	No	No
2,4,6-Trichlorophenol (ug/L) - TW3	2020/03/23	<MDL 0.25	5.00	No	No
(MCPA) (ug/L) - TW3	2020/03/23	<MDL 0.12	45.00	No	No
Trifluralin (ug/L) - TW3	2020/03/23	<MDL 0.02	1.00	No	No
Vinyl Chloride (ug/L) - TW3	2020/03/23	<MDL 0.17	100.00	No	No
DISTRIBUTION WATER					
Trihalomethane: Total (ug/L) Annual Average - DW	2020/01/01	23.5	100.00	No	No
HAA Total (ug/L) Annual Average - DW	2020/01/01	11.85	80	No	No

*The Marmora Well #4 was put online but did not run sufficiently in 2020 to gain reportable data.

Maintenance Summary

OCWA uses a risk-based preventative maintenance framework that ensures assets are maintained to manufacturer's and/or industry standards. Maintenance is completed using various tools and operational supports.

OCWA uses a Work Tracking Database (Maximo). Maximo is a maintenance tracking system that can generate work orders as well as give summaries of completed and scheduled work. During the year, the operating authority at the facility generates scheduled work orders on a weekly, monthly and annual basis. The service work is recorded in the work order history. This ensures routine and preventive maintenance is carried out. Emergency and capital repair maintenance is completed and added to the system.

Capital projects are listed and provided to the Corporation of the Municipality of Centre Hastings in the form of a "Capital Forecast". This list is developed by facility staff and provides recommendations for facility components requiring upgrading or improvement.

Preventative/Weekly Maintenance Work Orders Completed	257
Operational Maintenance Work Orders Completed	14
Capital Maintenance Work Orders Completed	12

Maintenance Highlights: major expenses incurred to install, repair or replace required equipment

Filters - Well 3
Analog Input Isolators
Water Sampling New Well
UV Part and Maintenance
Emergency Water Line Repair - Well 3

QEMS

A Surveillance Systems audit was conducted by QMI-SAI Canada Limited on July 20th, 2020. The Corporation of the Municipality of Centre Hastings Quality Management System conforms to the Standard.

Water Taking and Transfer Data

Data for the reporting period of January 1, 2020 December 31, 2020 was submitted electronically to the Ministry of the Environment and Climate Change on Jan 29, 2021 under Permit to Take Water #2660-B5FQPP.