



Owen Sound Drinking Water System



Annual Report 2021

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Section 1 – Drinking Water System General Information

This report has been prepared in accordance with the reporting requirements set out in Ontario Regulation 170/03, Section 11 and as well as Schedule 22.

This report is to be presented to Council by the end of March each year. Copies of the report will be made available free of charge and can be found at the following locations;

- City Hall Clerk’s Office – located temporarily at 945 3rd Avenue East
- City’s website - <https://www.owensound.ca/en/city-hall/waterwastewater.aspx>
- Public Works office – 1900 20th Street East
- Water Treatment Plant – 2600 3rd Avenue East
- Owen Sound & North Grey Union Public Library – 824 1st Avenue West

Drinking Water System #	220001799
Drinking Water System Name	Owen Sound Drinking Water System
Drinking Water System Owner	Corporation of the City of Owen Sound
Drinking Water System Category	Large Municipal Residential
City of Owen Sound Population	22,000
Water Treatment Subsystem	Class 3, Certificate # 20 issued September 15th, 2005
Water Distribution Subsystem	Class 3, Certificate # 2094 issued September 15th, 2005
Drinking Water Works Permit #	092-202 Issue # 5 issued October 2nd, 2020
Municipal Drinking Water License	094-101 Issue # 5 issued October 2nd, 2020
Permit to Take Water #	3044-8SERHC issued March 23rd, 2012 expires March 15, 2022
Period of Report	January 1, 2021 to December 31st, 2021

Other Drinking Water Systems that receive drinking water from the Owen Sound Drinking Water System are;

<u>Drinking Water System Owner</u>	<u>Drinking Water System #</u>
Municipality of Meaford (Leith)	260065312

A copy of this report will be provided to Meaford by the end of February.

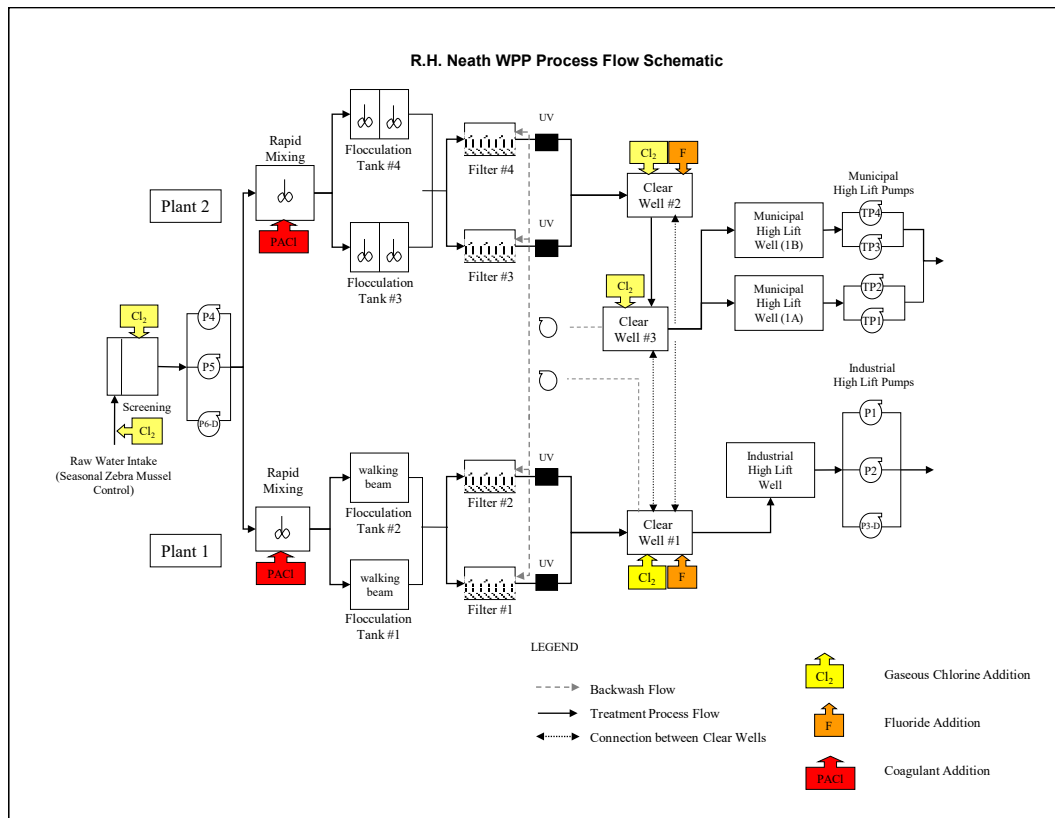
Section 1.1 – Drinking Water System Description

The Richard H. Neath Water Purification plant is a direct filtration surface water treatment plant that draws its water from Georgian Bay. This plant serves a population of approximately 22,000 people.

The Water plant comprises of the following processes;

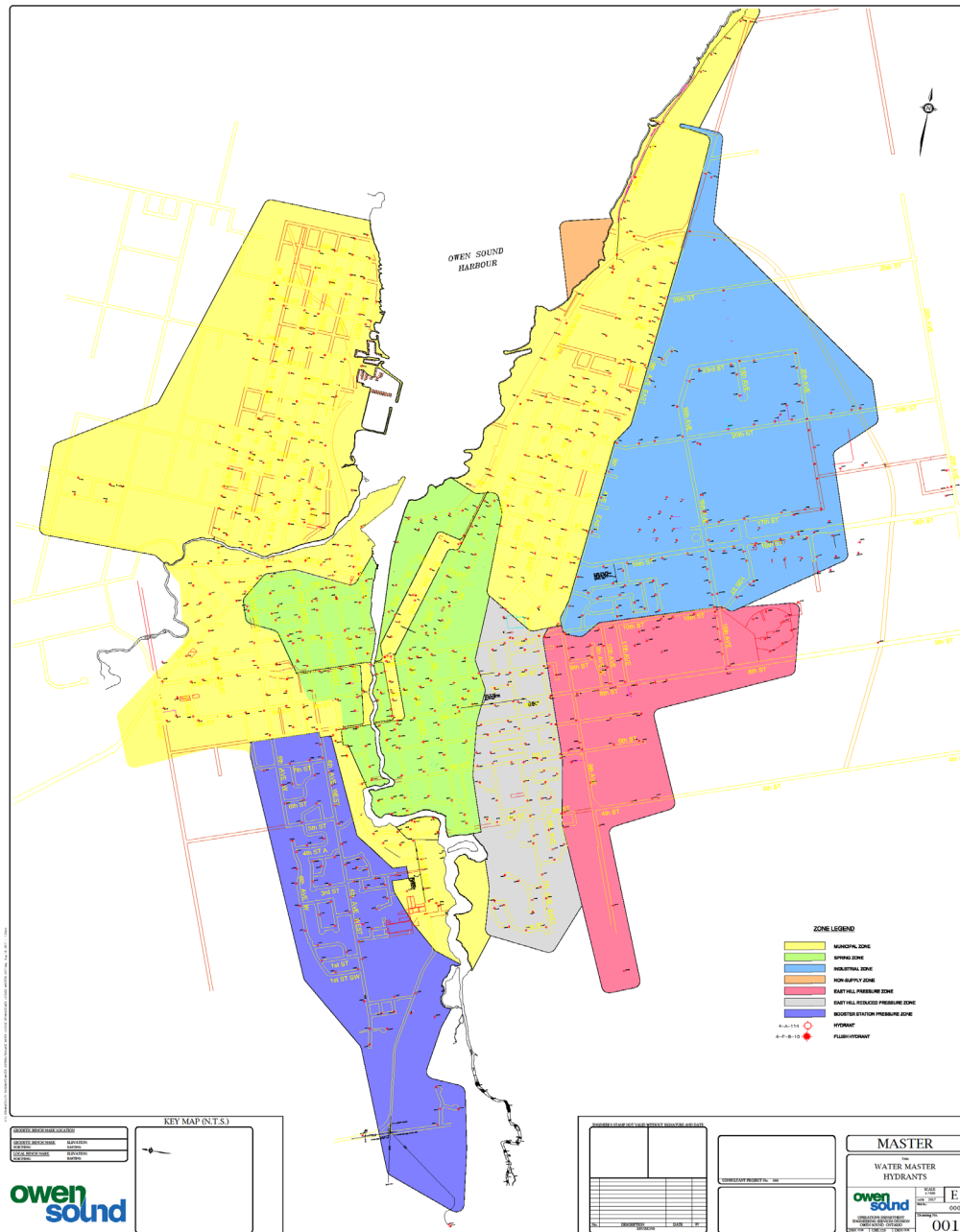
- Raw water screening (removal of larger debris, fish, etc.),
- Prechlorination (initial application of chlorine to the raw water),
- Zebra mussel control (chlorination at Intake during warmer months only, temperature above 10 degrees C),
- Flash mixing (initial addition of coagulant to the raw water through a rapid mixer),
- Coagulation/Flocculation (slower mixing of coagulant in larger tanks),
- UV disinfection (done just prior to water entering treated water wells),
- Post chlorination (adding of additional chlorine for the purpose of meeting CT requirements and having enough chlorine for water in the distribution system),
- Fluoridation (added in the two main treated water wells),
- Residue management tank for treating backwash wastewater. See Figure 1 below for a process schematic.

Figure 1



The City has a 22,000 m³ reservoir, 6 pressure zones (see Figure 2), 158.6 km of water mains, 11 pressure reducing /sustaining chambers, 10 check valve chambers, 663 City hydrants, 136 private hydrants, 65 flush hydrants/blow-offs/auto flushing units, and two booster stations that provides addition pressure in the Southeast and southwest portions of the City and outskirts.

Figure 2



The City also has an additional agreement with the Municipality of Meaford to provide potable water to Leith from our boundary point on East Bayshore Rd.

Section 2 – Drinking Water Inspections and Audit Summaries

1. Ministry of the Environment, Conservation and Parks (MECP) Inspection –

During 2021, there was one MECP inspection completed in February 2021. There were two AWQI's during the review period (2020-2021), a coagulant pump failure and a flow meter failure. The City received 96.32% on the Inspection report card.

2. Internal Audit/External Audit -Drinking Water Quality Management System- (DWQMS)

Internal Audit – An independent auditor evaluated our DWQMS in December, 2021. Nine (9) opportunities for improvements (OFIs) were identified and generally relating to communication and documentation.

One general non-conformance was identified relating to water main construction, inspection and disinfection procedures on development properties.

External Audit – In April 2021, NSF International performed the external audit, two OFI's were identified, one regarding calibration forms, and one regarding the depth of review for the risk assessment process.

One non-conformance was identified, in regards to formally incorporating the MECP inspection recommendations into the continual improvement process (Element 21).

Section 3 – List of Water Treatment Chemicals Used:

- 1. Chlorine Gas** (68 kg cylinders) – used in pre chlorination (treatment before filtration), and post chlorination (treatment after filtration).
- 2. PAX XL-6** – is a coagulant used prior to filtration in the colder months (<10 degrees C). A coagulants primary objective is to adhere to suspended particulates, make them bigger in size, so to allow a higher removal rate of particulates in the filtration process.
- 3. PAX XL-1900** – is a coagulant used prior to filtration in the warmer months (>10 degrees C). A coagulants primary objective is to adhere to suspended particulates, make them bigger in size, so to allow a higher removal rate of particulates in the filtration process.
- 4. Sodium Bisulphite** – is a chemical used in the process to remove chlorine from water for the purpose of reintroducing water back to the source, Georgian Bay. It is also used when filters are being prepared for use after a backwash called the ripening process.
- 5. Polymer** – A polymer is used during a filter backwash to settle suspended particles in the wastewater detention tank, so they can be pumped to the sanitary system to be treated at the wastewater plant.

Section 4 – Significant Costs Incurred

Significant costs are costs associated with new equipment purchased, installed, repaired, or replaced;

Water Treatment

Item	Description	Cost (\$)
UV Bulbs	UV Lamps for 4 UV reactors.	\$9,900
Online Equipment	Chlorine Analyzer	\$4,600
Rolling Steel Door	New door and operator replaced	\$9,900
Diesel Generator and Diesel Pump	Annual Servicing and Load Bank Testing	\$9,150
Capital Project - Flash Mixer # 2	Replaced with New Mixer	\$26,000
Capital Project- Automated Gate Retrofit	Automated main gate to Water Plant.	\$25,000
Capital Project – SCADA System Upgrade	Upgrade to communications, hardware and software that control and monitor water treatment processes.	\$100,000
Capital Project – Mould Abatement	Mould Abatement project at Water Plant	\$81,000
Capital Project – 36 th Street Chlorine Analyzer enclosure	A new enclosure for monitoring chlorine residuals entering the Leith water system.	\$10,000

Water Distribution

Item	Description	Cost (\$)
Capital Work - New Watermain	9 th Ave E from 2050 9 th Ave E to 2250 9 th Ave E New 12" PVC	\$202,000
New 450mm Industrial CV	New 450mm Industrial Hydraulic CV with 200mm bypass	\$523,000
2021 Leak Detection Survey	Approximately 159 kms of watermain and hydrants sounded	\$10,000

Capital Work – Cathodic Protection	New cathodic protection installed throughout the city	\$250,000
Fire flows and Calculation Model	Fire flows conducted throughout City with Watermark Solutions and City Staff	\$40,000
Broken Watermains	20 broken watermains occurred, estimated repair at \$6,000 each	\$120,000

Section 5 – Adverse Water Quality Incidents reported

#	Reporting Date	AWQI #	Adverse Location	Adverse Parameter	Adverse Result	Units	Remedial Action
	03-Feb	153502	Water Plant - coagulation system	Insufficient coagulant addition	n/a	n/a	Plant 1 (Filters 1+2) were shut down until flow meter fixed. Sensors required cleaning. Was back in service within 6 hours. CT requirements were met during this event.
	16-Jun	154311	3595 3rd Ave East	Total Coliform	1	TCU	Total Coliform protocol followed as per O Reg 170/03. Bacti sampling and flushing.

Section 6 – Microbiological Test Results

Microbiological testing done as required in Ontario Regulation 170/03 Schedule 10;

Location	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	<10-30	0-840	n/a	n/a
Treated	52	0-0	0-0	52	<10- 240
Distribution	459	0-0	0-1	98	<10- 20

Section 7 – Operational Testing Results

Operational testing done as required in Ontario Regulation 170/03 Schedule 7;

Parameter	Number of Grab Samples	Range of Results (min #) - (max #)
Filter 1 Turbidity	8760	0.02 NTU – 1.09 NTU * The high value occurred on September 26 th , and was over 1 NTU for only 6 minutes.
Filter 2 Turbidity	8760	0.00 NTU – 1.25 NTU * The low was caused by filter being offline. The High value occurred on September 26 th , and was over 1 NTU for only 2 minutes.
Filter 3 Turbidity	8760	0.02 NTU – 0.97 NTU
Filter 4 Turbidity	8760	0.01NTU – 2.06 NTU * The high value was caused by a momentary spike. Was over 1 NTU for only 2 minutes, 30 seconds.
Post 1 Chlorine	8760	0.00 – 4.35 * low occurred on November 18 th , and caused by a sample pump failure. The high was caused by servicing of the chlorinator on September 2 nd .
Post 2 Chlorine	8760	0.00 – 5.00 * low was caused by a sample pump failure of the chlorine analyzer, and the High level occurred on September 3 rd , during servicing of the chlorinator.
Municipal Chlorine	8760	0.07 – 2.17 * Low residual was caused by a shutdown of the municipal header for an air valve replacement.
Industrial Chlorine	8760	0.86 – 2.21
Municipal Fluoride	8760	0.47 – 0.83
Industrial Fluoride	8760	0.36 – 1.03

Note: Unit of measurement is in milligrams per litre (mg/L), unless stated otherwise. The number of grab samples is expressed in hours/year, equivalent to continuous monitoring.

Section 8 – Summary of Additional Testing

A summary of additional testing and sampling carried out by an approval, order, or other legal instrument.

Legal Document	Date of Legal Instrument Issued	Parameter	Date Sampled	Result	Unit of Measure
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	06-Jan	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Aluminum	13-Jan	0.060	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	04-Feb	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Total Suspended Solids	13-Feb	33	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	03-Mar	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	02-Apr	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	7-Apr	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Aluminum	15-Apr	0.083	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	03-May	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Total Suspended Solids	10-May	4	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	10-May	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	01-Jun	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	06-Jul	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Aluminum	12-Jul	0.101	mg/L
Municipal License # 092-101	January 10 th , 2017	Total Suspended Solids	14-Aug	2	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	03-Aug	0.00	mg/L
Municipal License # 092-101	January 10 th , 2017	Chlorine – Wastewater System	08-Sep	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	01-Oct	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Aluminum	12 Oct	0.106	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	3-Nov	0.00	mg/L
Municipal License # 094-101	October 2 nd , 2020	Total Suspended Solids	3-Nov	4	mg/L
Municipal License # 094-101	October 2 nd , 2020	Chlorine – Wastewater System	6-Dec	0.00	mg/L

Section 9 – Inorganic and Organic Testing Summary

Under Ontario Regulation 170/03, Schedule 13, 13-2 and 13-4 are required to be sampled annually.

Inorganic Parameters

Parameter	Sample Date	Result Value	Unit of Measure	MAC Level	1/2 MAC Level	Exceedance
Antimony	13-Jan	<0.00009	mg/L	0.006	0.003	No
Arsenic	13-Jan	0.0002	mg/L	0.025	0.0125	No
Barium	13-Jan	0.0136	mg/L	1.0	0.5	No
Boron	13-Jan	0.013	mg/L	5.0	2.5	No
Cadmium	13-Jan	0.000006	mg/L	0.005	0.0025	No
Chromium	13-Jan	0.00068	mg/L	0.05	0.025	No
Mercury	13-Jan	<0.00001	mg/L	0.001	0.0005	No
Selenium	13-Jan	0.00009	mg/L	0.01	0.005	No
Sodium	5-Feb-18	5.6	mg/L	>20	>10	No
Uranium	13-Jan	0.000186	mg/L	0.02	0.01	No
Fluoride – Municipal	31-Dec	0.70	mg/L	1.50	n/a	No
Fluoride - Industrial	31-Dec	0.73	mg/L	1.50	n/a	No
Nitrite	12-Oct	<0.003	mg/L	1.0	0.5	No
Nitrate	12-Oct	0.250	mg/L	10.0	5.0	No

Note: Unit of measurement is in milligrams per litre (mg/L), unless stated otherwise.

Organic Parameters

Parameter	Sample Date	Result Value	Unit of Measure	MAC Level	1/2 MAC Level	Over MAC?
Alachlor	13-Jan	<0.00002	mg/L	0.005	0.0025	No
Atrazine + N-dealkylated metabolites	13-Jan	<0.00001	mg/L	0.009	0.0045	No
Azinphos-methyl	13-Jan	<0.00005	mg/L	0.005	0.0025	No
Benzene	13-Jan	<0.00032	mg/L	0.001	0.0005	No
Benzo(a)pyrene	13-Jan	<0.000004	mg/L	0.00001	0.000005	No
Bromoxynil	13-Jan	<0.00033	mg/L	0.005	0.0025	No
Carbaryl	13-Jan	<0.00005	mg/L	0.09	0.045	No

Carbofuran	13-Jan	<0.00001	mg/L	0.09	0.045	No
Carbon Tetrachloride	13-Jan	<0.00017	mg/L	0.002	0.001	No
Chlorpyrifos	13-Jan	<0.00002	mg/L	0.09	0.045	No
Diazinon	13-Jan	<0.00002	mg/L	0.02	0.01	No
Dicamba	13-Jan	<0.0002	mg/L	0.12	0.06	No
1,2-Dichlorobenzene	13-Jan	<0.00041	mg/L	0.2	0.1	No
1,4-Dichlorobenzene	13-Jan	<0.00036	mg/L	0.005	0.0025	No
1,2-Dichloroethane	13-Jan	<0.00035	mg/L	0.005	0.0025	No
1,1-Dichloroethylene (vinylidene chloride)	13-Jan	<0.00033	mg/L	0.014	0.007	No
Dichloromethane	13-Jan	<0.00035	mg/L	0.05	0.025	No
2-4 Dichlorophenol	13-Jan	<0.00015	mg/L	0.9	0.45	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	13-Jan	<0.00019	mg/L	0.1	0.05	No
Diclofop-methyl	13-Jan	<0.0004	mg/L	0.009	0.0045	No
Dimethoate	13-Jan	<0.00006	mg/L	0.02	0.01	No
Diquat	13-Jan	<0.001	mg/L	0.07	0.035	No
Diuron	13-Jan	<0.00003	mg/L	0.15	0.075	No
Glyphosate	13-Jan	<0.001	mg/L	0.28	0.14	No
Malathion	13-Jan	<0.00002	mg/L	0.19	0.095	No
MCPA	13-Jan	<0.00012	mg/L	0.1	0.05	No
Metolachlor	13-Jan	<0.00001	mg/L	0.05	0.025	No
Metribuzin	13-Jan	<0.00002	mg/L	0.08	0.04	No
Monochlorobenzene	13-Jan	<0.0003	mg/L	0.08	0.04	No
Paraquat	13-Jan	<0.001	mg/L	0.01	0.005	No
Pentachlorophenol	13-Jan	<0.00015	mg/L	0.06	0.03	No
Phorate	13-Jan	<0.00001	mg/L	0.002	0.001	No
Picloram	13-Jan	<0.001	mg/L	0.19	0.095	No
Polychlorinated Biphenyls(PCB)	13-Jan	<0.00004	mg/L	0.003	0.0015	No
Prometryne	13-Jan	<0.00003	mg/L	0.001	0.0005	No
Simazine	13-Jan	<0.00001	mg/L	0.01	0.005	No
THM (latest annual average)	2021	0.035	mg/L	0.100	0.05	No
Terbufos	13-Jan	<0.00001	mg/L	0.001	0.0005	No
Tetrachloroethylene	13-Jan	<0.00035	mg/L	0.01	0.005	No
2,3,4,6-Tetrachlorophenol	13-Jan	<0.0002	mg/L	0.10	0.05	No
Triallate	13-Jan	<0.00001	mg/L	0.23	0.115	No

Trichloroethylene	13-Jan	<0.00044	mg/L	0.005	0.0025	No
2,4,6-Trichlorophenol	13-Jan	<0.00025	mg/L	0.005	0.0025	No
Trifluralin	13-Jan	<0.00002	mg/L	0.045	0.0225	No
Vinyl Chloride	13-Jan	<0.00017	mg/L	0.001	0.0005	No
Haloacetic Acids (latest annual average)	2021	0.007975	mg/L	0.08	.04	No

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

*Nothing to report at this time.

Section 10 – Summary of Lead Testing

Lead testing is required as per Ontario Regulation 170/03, Schedule 15.1, and requires Municipalities to sample in areas that have a potential for higher lead levels. Since Owen Sound has no known Lead services since 2012, a reduced sampling program has been approved by the MECP, which only requires testing of the distribution system for Lead every third year. 2021 was a year to test the distribution system only.

Location Type	# of Samples	Range of Lead Results (min#) – (max #)	# of Exceedances
Plumbing	n/a	n/a	n/a
Distribution	8	<0.00001-0.00008	0