SAULT STE. MARIE
DRINKING WATER SYSTEM
WATERWORKS # 260006685

ANNUAL & SUMMARY
REPORTS 2023

Introduction

This annual and summary report has been prepared in accordance with both section 11 and Schedule 22 of Ontario Regulation 170/03. The requirements of the regulation for each report have been consolidated into a single document. This report is intended to brief the owner and consumers of the Sault Ste. Marie Drinking Water System (DWS) on the performance of the system over the past calendar year from January 1 to December 31, 2023.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Large Municipal Residential DWS (as it pertains to the Sault Ste. Marie DWS) and how limits were met, or if shortfalls were revealed. The last section contains a list of tables and definition of terms identified in this report.

System Description

PUC Services Inc. operates, maintains, and manages the Sault Ste. Marie drinking water system on behalf of the City's Public Utilities Commission. The PUC Services Inc. business office is located at 500 Second Line East. Regular business hours are 09:00 to 16:30, Monday to Friday. The telephone number is (705) 759-6500.

PUC certified operators monitor and control all aspects of water production and quality, using a computerized control system.

Water for Sault Ste. Marie is obtained from two principal sources: surface water from Lake Superior and ground water from six deep wells. Raw water from the intake at Gros Cap is pumped to the water treatment plant, where it passes through a process of filtration and disinfection. Water from the deep wells is also disinfected prior to being pumped to the distribution system. pH stabilization and blended phosphate are added for corrosion control to mitigate lead.

On a typical day our customers use approximately 30,000,000 litres of water. Three water storage reservoirs that hold up to 52,000,000 litres of water (or 1-2 days-average consumption).

Chemicals

Chemicals utilized in the Sault Ste. Marie drinking water treatment facilities during 2023 include:

- SSM WTP:
  - Aluminum sulfate for coagulation
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
  - Soda ash for pH stabilization
- Goulais Pump Station:
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
- Steelton Pump Station:
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
- Shannon Pump Station:
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
  - Carbon dioxide gas for pH stabilization
- Lorna Pump Station:
  - Chlorine gas for disinfection
  - Blended phosphates for corrosion control
  - Carbon dioxide gas for pH stabilization

2023 Expenditures

During the year of 2023, expenses were incurred to maintain and replace various treatment and distribution assets:

Gros Cap Pump Station:

- Generator parts and maintenance, compressor parts

SSM WTP:

- SCADA support services
- Chlorine system critical spare parts, shower/ eyewash station
- SCBA equipment
- Chemical mixer replacements
- Instrumentation probes (continuous monitoring equipment)
- Seal kits for main pressure and level control valves
- Solenoid valves for Low-lift level control, filter actuator repairs
- Engineering and fabrication of lifting device
- Replacement batteries for UPS
- Building repairs, exterior lighting
- Storage cabinets, hatch covers

Goulais Pump Station:

- Pressure relief valve for chlorine booster pumps
- Chemical metering pumps and flow monitors

Steelton Pump Station:

- Chlorine Vacuum Regulators
- Replacement turbidimeter

Zone 2 Booster:

- Station discharge watermain replacement

Distribution System:

- Corrosion control coupons and analysis
- 44 watermain breaks were repaired in 2023

Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

- Merrifield Development
- Wemyss Street
- Blake Avenue
- Biggings Street
- Industrial Park Crescent
- Zone 2 Pump Station discharge watermain replacement
- CIPP Lining - Chicora Cres, Griffon St., Williams St.
- SIPP Lining - Turner Ave, Northwood St., Victor Emanual Ave, Tilley Rd.

Form 2 – Record of Minor Modification or Replacements

- Replacement 200mm gate valve (C12-85) Glen Ave.
- Replacement 150mm gate valve (D08-91) Willow Ave.
- Replacement 150mm gate valve (C08-64) Summit Ave.
- Replacement 150mm gate valve (C09-32) Findlay Dr.
- Replacement turbidity analyzer, vacuum regulator (Steelton)
- Replacement chemical metering pumps (Goulais)

Form 3 – Record of addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere

- n/a

Water Quality

Microbiological Sampling and Testing

Sampling is conducted weekly for the DWS at the frequencies and locations identified by Schedule 10 of O. Reg. 170/03 for Large Municipal Residential systems.

Table 1: Microbiological sampling requirements

Location	Sample Analysis	# samples	Frequency
Raw	EC, TC	each source	Weekly
Treated	EC, TC, HPC	each source	Weekly
Distribution	EC, TC, HPC (25%)	83 samples	monthly

The raw and treated samples in Sault Ste. Marie are collected from each of the wells in production (Goulais 1 & 2, Steelton, and Shannon) and the WTP surface water source. Lorna Wells are not used for regular production but are sampled and available in the event of increased water demand. Distribution samples are collected from 14 locations throughout the system. In total 1167 microbiological samples were collected in the DWS.

Table 1a: Microbiological Sample Results

Site	Type	# samples	EC (range)	TC (range)	# HPC	HPC (range)
WTP	Raw	52	0-2	0 - 120	-	-
	Treated	53	0	1	53	0 - 10
Goulais #1	Raw	51	0	0	-	-
	Treated	52	0	0	52	0 - 20
Goulais #2	Raw	45	0	0	-	-
	Treated	45	0	0	45	0 - 10
Steelton	Raw	52	0	0	-	
	Treated	52	0	0	52	0 - 10
Shannon	Raw	52	0	0	-	-
	Treated	52	0	0	52	0 - 2
Lorna #1 *	Raw	9	0	0	-	-
	Treated	-	-	-	-	-
Lorna #2 *	Raw	9	0	0	-	-
	Treated		-	-	-	-
Various Locations	Distribution	1167	0	0	390	0 - 40

Lorna Wells are flushed and sampled to be available for production if required, but not operated to the system in 2023.

Operational Checks and Testing

Operational testing is completed as per Schedule 7 of O. Reg. 170/03 for Large Municipal Residential systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers are utilized for measurement of filter turbidity and chlorine residuals. Data summaries for turbidity and chlorine are summarized in Tables 2 and 3.

Table 2: Monthly Filter Turbidity Results (SSM WTP)

Month	Filter #1		Filter #2		Filter #3		Filter #4		Monthly Compliance
	Average NTU	Range NTU	Average NTU	Range NTU	Average NTU	Range NTU	Average NTU	Range NTU	%
Jan	0.03	0.03 - 0.08	0.03	0.02 - 0.07	0.02	0.02 - 0.06	0.02	0.02 - 0.07	100
Feb	0.04	0.03 - 0.09	0.03	0.02 - 0.09	0.02	0.02 - 0.07	0.03	0.02 - 0.08	100
Mar	0.04	0.03 - 0.15	0.03	0.02 - 0.09	0.03	0.02 - 0.15	0.03	0.02 - 0.11	100
Apr	0.03	0.02 - 0.09	0.03	0.02 - 0.09	0.02	0.02 - 0.07	0.02	0.01 - 0.08	100
May	0.03	0.02 - 0.19	0.03	0.02 - 0.58	0.03	0.02 - 0.15	0.03	0.01 - 0.38	100
Jun	0.03	0.02 - 0.11	0.02	0.02 - 0.20	0.02	0.02 - 0.09	0.02	0.01 - 0.25	100
Jul	0.02	0.01 - 0.07	0.02	0.02 - 0.07	0.02	0.01 - 0.06	0.02	0.01 - 0.09	100
Aug	0.02	0.02 - 0.04	0.02	0.02 - 0.04	0.02	0.01 - 0.06	0.02	0.01 - 0.05	100
Sep	0.02	0.02 - 0.04	0.02	0.02 - 0.20	0.02	0.02 - 0.03	0.02	0.02 - 0.29	100
Oct	0.02	0.02 - 0.04	0.02	0.02 - 0.04	0.02	0.02 - 0.07	0.02	0.02 - 0.05	100
Nov	0.02	0.02 - 0.05	0.02	0.02 - 0.05	0.02	0.02 - 0.07	0.02	0.02 - 0.05	100
Dec	0.02	0.02 - 0.05	0.03	0.02 - 0.05	0.02	0.02 - 0.04	0.02	0.02 - 0.05	100

Filter turbidity is monitored on SCADA in real time. Filter efficiency is calculated by tracking the readings in five-minute intervals above and below 0.30 NTU during filter run time. ***Sault Ste. Marie maintained filter compliance each month above 95%***, the required limit for dual media filtration to achieve necessary filtration credits for primary disinfection.

Table 3: Chlorine Residuals (Production Sites)

Production Site	WTP		Goulais Well		Steelton Well		Shannon Well	
Month	Average (mg/L)	Range (mg/L)	Average (mg/L)	Range (mg/L)	Average (mg/L)	Range (mg/L)	Average (mg/L)	Range (mg/L)
Jan	1.21	1.09 - 1.33	1.13	0.82 - 1.42	1.04	0.76 - 1.48	0.86	0.54 - 1.12
Feb	1.23	1.14 - 1.32	1.15	0.93 - 1.35	1.06	0.71 - 1.25	0.86	0.61 - 0.95
Mar	1.19	1.07 - 1.37	1.10	0.93 - 1.26	1.05	0.65 - 1.16	0.83	0.62 - 1.04
Apr	1.20	1.04 - 1.30	1.12	0.94 - 1.43	0.99	0.75 - 1.10	0.84	0.56 - 0.94
May	1.20	0.97 - 1.32	1.15	0.97 - 1.26	1.02	0.81 - 1.40	0.83	0.51 - 1.03
Jun	1.24	1.05 - 1.34	1.17	0.97 - 1.32	1.02	0.70 - 1.45	0.81	0.60 - 0.93
Jul	1.22	0.96 - 1.35	1.24	1.03 - 1.39	0.95	0.83 - 1.18	0.86	0.61 - 1.17
Aug	1.27	0.98 - 1.47	1.24	0.78 - 1.51	0.94	0.77 - 1.24	0.94	0.60 - 1.13
Sep	1.22	1.01 - 1.45	1.24	0.72 - 1.41	0.97	0.75 - 1.07	0.83	0.47 - 1.00
Oct	1.25	0.91 - 1.50	1.25	0.81 - 1.50	1.03	0.72 - 1.15	0.88	0.59 - 1.03
Nov	1.23	0.94 - 1.46	1.16	0.95 - 1.58	0.96	0.78 - 1.11	0.82	0.35 - 0.99
Dec	1.24	1.01 - 1.38	1.25	0.97 - 1.36	1.00	0.24 - 1.31	0.88	0.59 - 1.00

Chlorine residuals are continuously monitored and tracked in real time in SCADA. Minimum residuals were always maintained consistent with primary disinfection requirements.

Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling requirements for Large Municipal Residential systems. Sample collection for Schedule 23 (inorganics) and 24 (organics) is required every 12 months and quarterly sampling for Nitrites/Nitrates, THM's and HAA's. Sodium and fluoride are required to be sampled every 60 months. Lorna Wells were not sampled as they were not operated for production of water to distribution system in year 2023.

Table 4: Schedule 23 - Inorganics (µg/L)

Parameter	WTP	Goulais #1	Goulais #2	Steelton	Shannon	MAC
Antimony	<0.5	<0.6	<0.6	<0.6	<0.6	**6**
Arsenic	<1	<1	<1	<1.0	2.4	**25**
Barium	9	38	40	38	62	**1,000**
Boron	<2	<50	<50	<50	190	**5,000**
Cadmium	<0.1	<0.1	<0.1	<0.1	<0.1	**5**
Chromium	<1	1.8	1.8	1.5	<1	**50**
Mercury	<0.1	<0.10	<0.1	<0.1	<0.1	**1**
Selenium	0.2	<1.0	12.3	<1.0	<1	**10**
Uranium	<1	<2	<2	<2	9.4	**20**

All results for inorganic parameters are within the maximum acceptable concentrations (MAC) of the Ontario Drinking Water Quality Standards as defined in O. Reg. 169/03

Table 5: Fluoride and Sodium Results (mg/L)

Parameter	WTP	Goulais #1	Goulais #2	Steelton	Shannon	MAC
Fluoride	<0.05	<0.05	0.02	<0.05	0.208	**1.5**
***Sodium**	3.2	10.2	10.1	10.9	34.4	**20**

***Sodium has an aesthetic objective (AO) of 200 mg/L but has a limit of 20 mg/L for medical reasons and would require notifications if exceeded.**

Table 6: Nitrate/Nitrite Results (mg/L)

Q	Nitrite Nitrate	WTP	Goulais #1	Goulais #2	Steelton	Shannon	MAC (mg/L)
Q1	NO_2	<0.05	<0.05	0.46	<0.05	<0.05	**1.0**
	NO_3	0.43	1.26	1.38	0.92	<0.05	**10**
Q2	NO_2	<0.05	<0.05	<0.05	<0.05	<0.05	**1.0**
	NO_3	0.32	0.91	0.89	0.79	<0.05	**10**
Q3	NO_2	<0.01	<0.01	<0.01	<0.01	<0.01	**1.0**
	NO_3	0.343	0.982	0.93	0.877	<0.02	**10**
Q4	NO_2	<0.01	<0.01	<0.01	<0.01	<0.01	**1.0**
	NO_3	0.332	0.94	0.946	0.85	<0.02	**10**

All quarterly results are well below ODWS MAC.

Table 7: Disinfection Byproducts THM/HAA Results (µg/L)

THM	Q1	Q2	Q3	Q4	MAC
Q Average	6.4	9.1	11	8.5	**100**
RAA	Running Annual Average (µg/L)			8.75	**100**
HAA	**Q1**	**Q2**	**Q3**	**Q4**	**MAC**
Q Average	8	12.3	7.9	5.71	**80**
RAA	Running Annual Average (µg/L)			8.5	**80**

All quarterly results for THMs and HAAs are well below ODWS MAC.

Table 8: Schedule 24 Organics – WTP

Parameter	Date	Result	Unit	MAC
Alachlor	15-Mar-23	<0.249	µg/L	5
Atrazine + N-dealkylated metabolites	15-Mar-23	<0.5	µg/L	5
Azinphos-methyl	15-Mar-23	<0.187	µg/L	20
Benzene	15-Mar-23	<0.1	µg/L	5
Benzo(a)pyrene	15-Mar-23	<0.01	µg/L	0.01
Bromoxynil	15-Mar-23	<0.0948	µg/L	5
Carbaryl	15-Mar-23	<3	µg/L	90
Carbofuran	15-Mar-23	<5	µg/L	90
Carbon Tetrachloride	15-Mar-23	<0.2	µg/L	5
Chlorpyrifos	15-Mar-23	<0.187	µg/L	90
Diazinon	15-Mar-23	<0.187	µg/L	20
Dicamba	15-Mar-23	<0.083	µg/L	120
1,2-Dichlorobenzene	15-Mar-23	<0.2	µg/L	200
1,4-Dichlorobenzene	15-Mar-23	<0.3	µg/L	5
1,2-Dichloroethane	15-Mar-23	<0.2	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	15-Mar-23	<0.3	µg/L	14
Dichloromethane	15-Mar-23	<1	µg/L	50
2-4 Dichlorophenol	15-Mar-23	<0.2	µg/L	900
2,4-Dichlorophenoxy acetic acid	15-Mar-23	<0.356	µg/L	100
Diclofop-methyl	15-Mar-23	<0.119	µg/L	9
Dimethoate	15-Mar-23	<0.187	µg/L	20
Diquat	15-Mar-23	<0.2	µg/L	70
Diuron	15-Mar-23	<20	µg/L	150
Glyphosate	15-Mar-23	<20	µg/L	280
Malathion	15-Mar-23	<0.187	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	15-Mar-23	<5.93	µg/L	100
Metolachlor	15-Mar-23	<0.125	µg/L	50
Metribuzin	15-Mar-23	<0.125	µg/L	80
Monochlorobenzene	15-Mar-23	<0.5	µg/L	80
Paraquat	15-Mar-23	<0.2	µg/L	10
Pentachlorophenol	15-Mar-23	<0.3	µg/L	60
Phorate	15-Mar-23	<0.125	µg/L	2
Picloram	15-Mar-23	<0.083	µg/L	190
Polychlorinated Byphenols (PCB)	15-Mar-23	<0.06	µg/L	3
Prometryne	15-Mar-23	<0.0623	µg/L	1
Simazine	15-Mar-23	<0.187	µg/L	10
Terbufos	15-Mar-23	<0.125	µg/L	1
Tetrachloroethylene	15-Mar-23	<0.3	µg/L	30
2,3,4,6-Tetrachlorophenol	15-Mar-23	<0.3	µg/L	100
Triallate	15-Mar-23	<0.125	µg/L	230
Trichloroethylene	15-Mar-23	<0.2	µg/L	50
2,4,6-Trichlorophenol	15-Mar-23	<0.2	µg/L	5
Trifluralin	15-Mar-23	<0.125	µg/L	45
Vinyl Chloride	15-Mar-23	<0.1	µg/L	2

All results are below the ODWS MAC and half MAC as per O. Reg. 169/03.

Table 9: Schedule 24 Organics – Goulais Wells sampled - June 27, 2023

Parameter	Goulais 1	Goulais 2	Unit	MAC
Alachlor	<0.1	<0.1	µg/L	5
Atrazine + N-dealkylated metabolites	<0.2	<0.2	µg/L	5
Azinphos-methyl	<0.1	<0.1	µg/L	20
Benzene	<0.5	<0.5	µg/L	5
Benzo(a)pyrene	<0.005	<0.005	µg/L	0.01
Bromoxynil	<0.2	<0.2	µg/L	5
Carbaryl	<0.2	<0.2	µg/L	90
Carbofuran	<0.2	<0.2	µg/L	90
Carbon Tetrachloride	<0.2	<0.2	µg/L	5
Chlorpyrifos	<0.1	<0.1	µg/L	90
Diazinon	<0.1	<0.1	µg/L	20
Dicamba	<0.2	<0.2	µg/L	120
1,2-Dichlorobenzene	<0.5	<0.5	µg/L	200
1,4-Dichlorobenzene	<0.5	<0.5	µg/L	5
1,2-Dichloroethane	<0.5	<0.5	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	<0.5	<0.5	µg/L	14
Dichloromethane	<1	<1	µg/L	50
2-4 Dichlorophenol	<0.3	<0.3	µg/L	900
2,4-Dichlorophenoxy acetic acid	<0.05	<0.05	µg/L	100
Diclofop-methyl	<0.1	<0.1	µg/L	9
Dimethoate	<0.1	<0.1	µg/L	20
Diquat	<1	<1	µg/L	70
Diuron	<1	<1	µg/L	150
Glyphosate	<0.2	<0.2	µg/L	280
Malathion	<0.1	<0.1	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	<0.0002	<0.0002	µg/L	100
Metolachlor	<0.1	<0.1	µg/L	50
Metribuzin	<0.1	<0.1	µg/L	80
Monochlorobenzene	<0.5	<0.5	µg/L	80
Paraquat	<1	<1	µg/L	10
Pentachlorophenol	<0.5	<0.5	µg/L	60
Phorate	<0.1	<0.1	µg/L	2
Picloram	<0.2	<0.2	µg/L	190
Polychlorinated Byphenols (PCB)	<0.03	<0.03	µg/L	3
Prometryne	<0.1	<0.1	µg/L	1
Simazine	<0.10	<0.10	µg/L	10
Terbufos	<0.1	<0.1	µg/L	1
Tetrachloroethylene	<0.5	<0.5	µg/L	30
2,3,4,6-Tetrachlorophenol	<0.5	<0.5	µg/L	100
Triallate	<0.1	<0.1	µg/L	230
Trichloroethylene	<0.5	<0.5	µg/L	50
2,4,6-Trichlorophenol	<0.5	<0.5	µg/L	5
Trifluralin	<0.1	<0.1	µg/L	45
Vinyl Chloride	<0.5	<0.5	µg/L	2

All results are below the ODWS MAC and half MAC as per O. Reg. 169/03.

Table 10: Schedule 24 Organics – Shannon & Steelton Wells Aug 14, 2023

Parameter	Steelton	Shannon	Unit	MAC
Alachlor	<0.1	<0.10	µg/L	5
Atrazine + N-dealkylated metabolites	<0.2	<0.20	µg/L	5
Azinphos-methyl	<0.1	<0.10	µg/L	20
Benzene	<0.5	<0.50	µg/L	5
Benzo(a)pyrene	<0.005	<0.005	µg/L	0.01
Bromoxynil	<0.2	<0.20	µg/L	5
Carbaryl	<0.2	<0.20	µg/L	90
Carbofuran	<0.2	<0.20	µg/L	90
Carbon Tetrachloride	<0.2	<0.20	µg/L	5
Chlorpyrifos	<0.1	<0.10	µg/L	90
Diazinon	<0.1	<0.10	µg/L	20
Dicamba	<0.2	<0.20	µg/L	120
1,2-Dichlorobenzene	<0.5	<0.50	µg/L	200
1,4-Dichlorobenzene	<0.5	<0.50	µg/L	5
1,2-Dichloroethane	<0.5	<0.50	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	<0.50	<0.50	µg/L	14
Dichloromethane	<1.0	<1.0	µg/L	50
2-4 Dichlorophenol	<0.30	<0.30	µg/L	900
2,4-Dichlorophenoxy acetic acid	<0.05	<0.30	µg/L	100
Diclofop-methyl	<0.10	<0.10	µg/L	9
Dimethoate	<0.10	<0.10	µg/L	20
Diquat	<1.0	<1.0	µg/L	70
Diuron	<1.0	<1.0	µg/L	150
Glyphosate	<0.20	<0.20	µg/L	280
Malathion	<0.10	<0.10	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	<0.0002	<0.0002	µg/L	100
Metolachlor	<0.10	<0.10	µg/L	50
Metribuzin	<0.1	<0.10	µg/L	80
Monochlorobenzene	<0.50	<0.50	µg/L	80
Paraquat	<1.0	<1.0	µg/L	10
Pentachlorophenol	<0.50	<0.50	µg/L	60
Phorate	<0.10	<0.10	µg/L	2
Picloram	<0.20	<0.20	µg/L	190
Polychlorinated Byphenols (PCB)	<0.03	<0.03	µg/L	3
Prometryne	<0.10	<0.10	µg/L	1
Simazine	<0.100	<0.100	µg/L	10
Terbufos	<0.10	<0.10	µg/L	1
Tetrachloroethylene	<0.50	<0.50	µg/L	30
2,3,4,6-Tetrachlorophenol	<0.50	<0.50	µg/L	100
Triallate	<0.10	<0.10	µg/L	230
Trichloroethylene	<0.50	<0.50	µg/L	50
2,4,6-Trichlorophenol	<0.50	<0.50	µg/L	5
Trifluralin	<0.10	<0.10	µg/L	45
Vinyl Chloride	<0.50	<0.10	µg/L	2

All results are below the ODWS MAC and half MAC as per O. Reg. 169/03.

Lead Sampling:

The Ontario Drinking Water Standard for lead is 10 µg/L. This applies to water at the point of consumption since lead is only present as a result of corrosion of lead solder, brass containing lead fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings.

In July 2017, the required number of Lead samples was reduced to 22 Residential/Non-Residential plumbing and 8 distribution points as per Municipal Drinking Water License #216-101, Schedule C, 5.0, Table 1.

Table 11: Community Lead Sampling Results

Location Type	Number of Sample Locations	Range of Lead Results (min#) – (max #)	Number of Location Exceedances
Plumbing – Residential and Non-Residential	29	0 - 15.2	1
Distribution	8	0 - 1.2	0

In 2023, 1 of 29 plumbing locations or 3% of the tested homes exceeded the ODWS. Tests were done in homes with record of lead or suspected lead pipe – this is a small subset of homes in Sault Ste. Marie.

As part of PUC's lead service line replacement program, one additional address was sampled with zero exceedances. A total 3 of service lines were replaced in 2023 – 1 on the municipal side, and 2 both municipal and private.

Providing clean, safe, and reliable drinking water is a responsibility that PUC takes very seriously. Unfortunately, the challenge of reducing the occurrence of lead in drinking water is something communities across North America are faced with. In Sault Ste. Marie, PUC employs a robust community water sampling program that monitors lead levels in drinking water.

For the program to function efficiently, PUC partnered with the SSM Innovation Centre and Algoma Public Health to develop a system that would focus lead testing on homes with suspected lead service pipes and that may have occupants that would be especially sensitive to lead exposure (ex. infants or expecting mothers). While it is beyond PUC's authority to replace lead services on a homeowner's property, if a home is found to have a lead service the PUC offers programs to consumers that will protect them from lead exposure.

The preferred option provided to homeowners is an interest-free loan to help them replace their lead service lines. When an owner replaces their lead service line, PUC will replace the public portion of the service at no charge to the owner. PUC will offer service pipelining as an affordable alternative to replacement. Another option the PUC provides to consumers is to issue tap-mounted water filters (certified for lead reduction) at no charge to the homeowner until the service can be replaced or changes to water treatment processes can be shown to satisfactorily reduce lead concentrations.

In accordance with drinking water regulations PUC implemented a Corrosion Control Plan (as part of the Water Quality Improvement Project) that is designed to reduce lead uptake in the drinking water. PUC continues to evaluate the long-term changes to the distribution system and water quality after implementing corrosion control plan.

Compliance

Adverse Water Quality Incidents

During 2023, the Sault Ste. Marie DWS reported eight incidents of adverse water quality.

Table 12: Adverse Water Quality Incidents

Sample Date	Incident Reported
20-Jun-23	Shannon Well treated - Bromate exceedance (14.8ug/l)
22-Jun-23	Shannon Well treated - Bromate exceedance (15.4ug/l)
18-Jul-23	WTP Treated - presence of Total Coliform (3)
25-Jul-23	Turner Ave. – temporary water service installed (BWA)
31-Aug-23	Northwood Ave - temporary water service installed (BWA)
11-Sep-23	Turner Ave. – temporary water service installed (BWA)
25-Sep-23	Shannon Well treated - Bromate exceedance (13.9ug/l)
23-Nov-23	Shannon Well treated - Bromate exceedance (16.3ug/l)

Sampling in 2023 included four events of bromate exceedances at Shannon Well (treated). This was a known issue as station piping from the disinfection contact main to the sample tap contributed to the conversion of bromide to bromate. Additional sampling in the distribution confirmed the absence of bromate in the treated and distributed water from the source supply. A sampling plan is in place to monitor any future changes and to address the piping issue at the sampling point originally used.

One event at the WTP revealed the presence of total coliform. Repeated samples were collected with results non-detect for this sample site.

Three events during watermain lining resulted in implementing temporary water services (under BWA), followed up with microbiological sampling with results non-detect.

Annual Drinking Water System Inspection

The annual DWS inspection took place on March 13, 2023. There were zero non-compliances, zero recommendations and best practices identified.

Ministry of Environment, Conservation, and Parks - Risk Assessment Process

Maximum Question Rating: 546

Table 13: MECP Risk Assessment Rating

Inspection Module	Non-Compliance Rating
Operations Manuals	0 / 28
Other Inspection Findings	0 / 424
Reporting and Corrective Actions	0 / 35
Treatment Processes	0 / 35
Water Quality Monitoring	0 / 24
TOTAL	**0/546**

Inspection Risk Rating 0.0%

The DWS received a final inspection rating of 100%

Flows

Municipal Drinking Water Works Permit: 216-201 specifies maximum rated flows for the raw water supplies listed in Table 12.

Table 14: Permit to Take Water

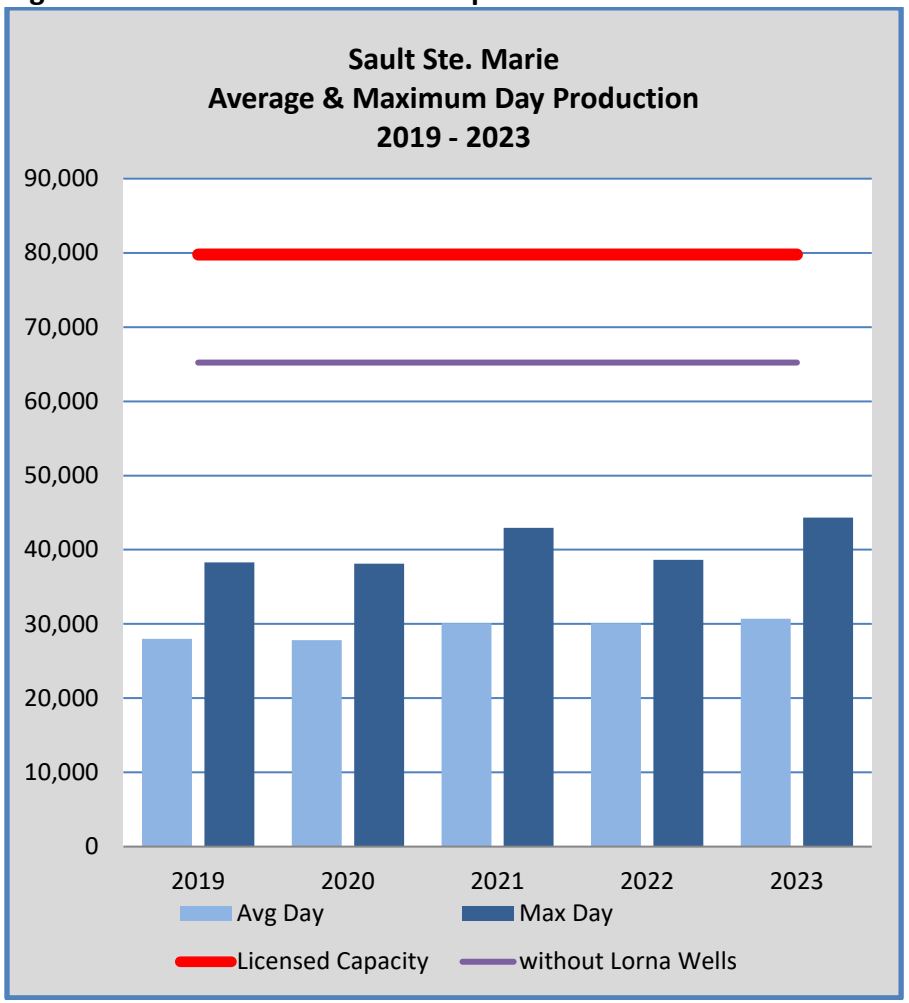
Facility	Permit to Take Water
Gros Cap Pump Station	75,000 m^3/d
Goulais Wells	10,013 m^3/d
Steelton Well	8,208 m^3/d
Shannon Well	7,000 m^3/d
Lorna Wells	14,558.4 m^3/d

$1m^3$ = 1,000 L

Water Treatment capacity is less than the available raw water supply. The Water Treatment Plant is currently rated at 40,000 m^3/d based on regulatory requirements for primary disinfection. The maximum capacity for the Sault Ste. Marie DWS is 79,779 m^3/d. Lorna Wells remains available for emergency demand if needed.

The Sault Ste. Marie WTP and production Wells treated a total of 11,279,908 m^3 of water during the year of 2023.
The average daily treated flow was 30,698 m^3, and the maximum daily flow was 44,314 m^3 on June 5th, 2023.

Figure 1: Five Year Production Comparison



Capacity available production without Lorna Wells – 65,221 m^3/d

Table 15: WTP Raw and Treated Water Production 2023

2023	Raw Water Production				Treated Water Production				
Month	Raw Water (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	Treated Water (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max. Flow Day of rated Capacity
January	439,598	14,092	14,555	14,181	420,071	9,265	16,707	13,551	41.8
February	395,169	12,745	14,477	14,113	384,966	10,950	16,108	13,749	40.3
March	440,864	11,959	16,081	14,221	426,345	11,529	17,791	13,753	44.5
April	476,564	13,483	16,346	15,885	464,442	10,904	18,150	15,481	45.4
May	506,765	15,449	19,760	16,347	494,940	13,448	19,608	15,966	49.0
June	567,570	17,894	20,977	18,919	552,412	15,634	21,879	18,414	54.7
July	517,969	13,599	19,912	16,709	501,650	12,328	20,365	16,182	50.9
August	549,623	14,992	21,610	17,730	533,512	14,002	21,610	17,210	54.0
September	494,687	13,374	19,741	16,490	490,507	12,592	19,793	16,350	49.5
October	509,480	15,064	19,665	16,435	498,038	12,010	19,665	16,066	49.2
November	480,616	13,705	17,267	16,021	478,787	13,355	19,120	15,960	47.8
December	484,836	13,705	17,772	15,640	478,316	13,056	19,624	15,430	49.1

Figure 2: Sault Ste. Marie WTP Production 2023

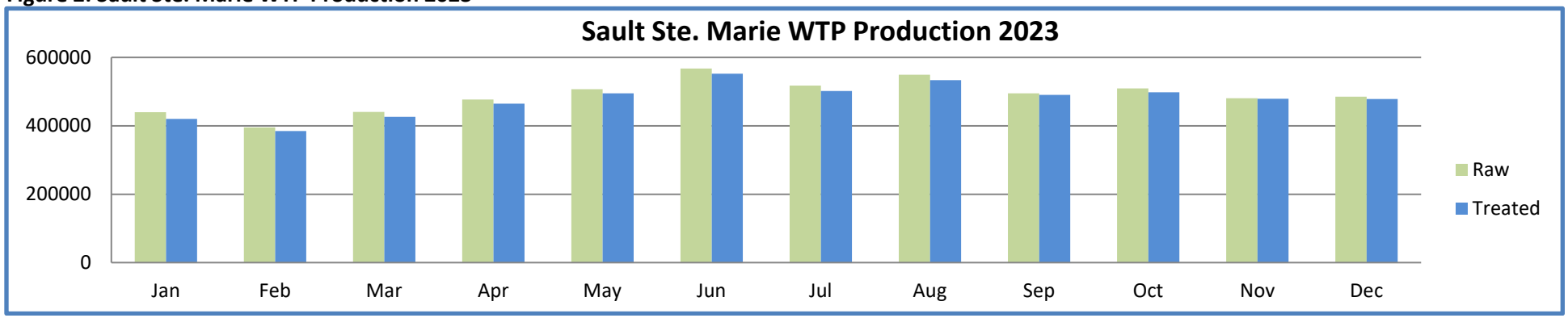


Table 16: Goulais Wells Production 2023

2023	Goulais Well #1 Production					Goulais Well #2 Production				
Month	Total Volume (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max Flow Day of PTTW	Total Volume (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max Flow Day Of PTTW
January	146,706	2,789	5,831	4,732	88.3	19,628	0	3,031	633	89.0
February	131,497	1,277	6,007	4,696	90.9	5,674	0	2,533	203	74.3
March	152,465	2,454	6,001	4,918	90.8	4,613	0	2,060	149	60.5
April	132,308	1,164	5,967	4,410	90.3	12,737	0	2,338	425	68.6
May	160,166	3,789	6,530	5,167	98.8	23,715	0	3,417	765	100
June	147,713	0	6,506	4,924	98.5	60,787	0	3,420	2,026	100
July	157,727	3,168	6,013	5,088	91.0	32,497	0	3,034	1,048	89.1
August	157,727	3,168	6,013	5,088	91.0	32,497	0	3,034	1,048	89.1
September	137,966	0	6,111	4,599	92.5	25	0	25	1	0.7
October	88,029	0	5,003	2,840	75.7	27,673	0	3,034	893	89.1
November	23,279	0	4,912	776	74.4	80,703	0	3,136	2,690	92.0
December	113,668	0	5,258	3,667	79.6	29,380	0	3,032	948	89.0

Figure 3: Goulais Wells Production 2023

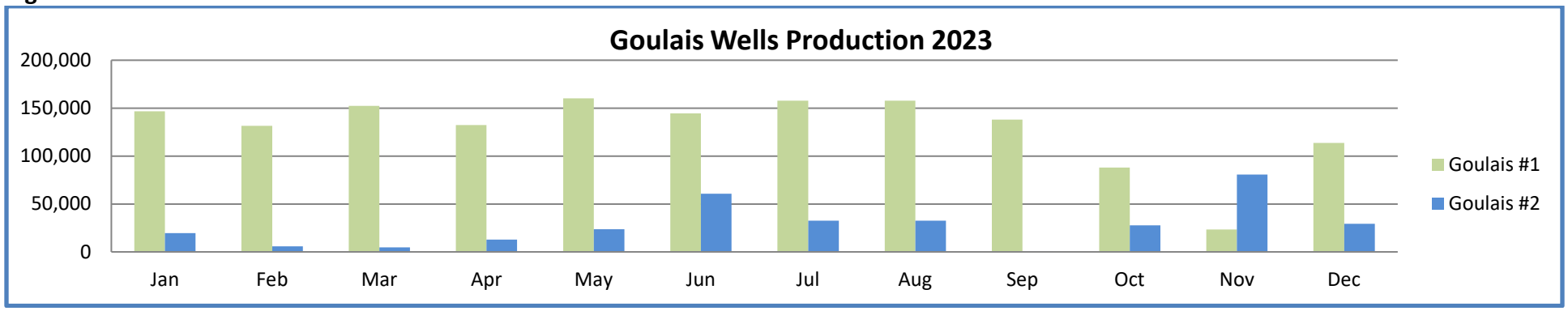
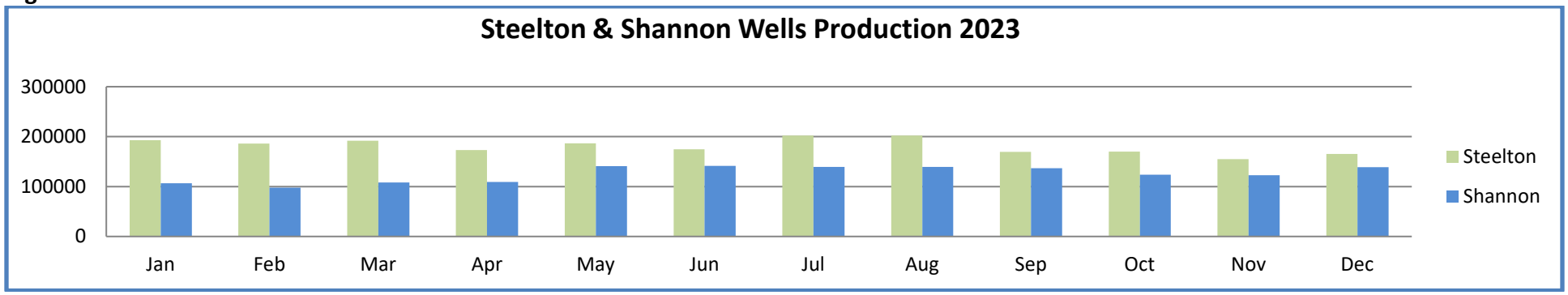


Table 17: Steelton & Shannon Wells Production 2023

2023	Steelton Well Production					Shannon Well Production				
Month	Total Volume (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max Flow Day of PTTW	Total Volume (m^3)	Minimum Day (m^3/d)	Maximum Day (m^3/d)	Average Day (m^3/d)	% Max Flow Day of PTTW
January	192,855	4,999	7,499	6,221	91.4	106,829	2,139	3,500	3,446	50.0
February	185,875	5,365	7,997	6,638	97.4	97,903	3,403	3,500	3,497	50.0
March	191,990	4,029	7,579	6,193	92.3	108,352	3,352	3,500	3,495	50.0
April	173,094	4,001	6,999	5,770	85.3	109,157	3,303	5,000	3,639	71.4
May	186,810	4,254	7,970	6,026	97.1	140,957	3,500	5,998	4,547	85.7
June	174,389	2,470	7,996	5,813	97.4	141,328	3,500	6,058	4,711	86.5
July	201,996	4,712	7,399	6,516	90.1	139,502	3,379	5,878	4,500	84.0
August	201,996	4,712	7,399	6,516	90.1	139,502	3,379	5,878	4,500	84.0
September	169,460	3,858	7,346	5,649	89.5	136,490	3,557	6,000	4,550	85.7
October	169,889	4,073	7,707	5,480	93.9	123,552	3,500	6,000	3,986	85.7
November	154,729	4,513	6,233	5,158	75.9	122,757	3,500	4,819	4,092	68.8
December	165,397	2,853	6,835	5,335	83.3	138,933	3,847	5,795	4,482	82.8

Figure 4: Steelton & Shannon Wells Production 2023



Report Availability

Annual Report

Section 11 of O. Reg. 170/03 defines that this Annual Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public at the PUC Services Office.

PUC Services Inc.
500 Second Line East
Sault Ste. Marie, ON
P6A 6P2

Summary Report

This Summary report for The Sault Ste. Marie Drinking Water System for the period of January 1st to December 31st, 2023 has been prepared in accordance to Schedule 22 of O. Reg. 170/03.

In accordance with Schedule 22 of O. Reg. 170/03, this Summary Report has been provided to the Public Utilities Commission of the City of Sault Ste. Marie.

Tables, Definition of Terms

Appendix A: List of Tables/ Charts

Appendix B: Definition of Terms

Acronym	Definition
AWQI	Adverse water quality incident
BWA	Boil Water Advisory
CT Value	Product of disinfectant concentration & contact time (mg-min/L)
DM	Dual Media
DWS	Drinking water system
EC	E. Coli
HAA	Haloacetic acids
HPC	Heterotrophic plate count
MAC	Maximum Acceptable Concentration
MECP	Ministry of the Environment, Conservation and Parks
m^3	Cubic metres (1,000 L)
m^3/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1,000 m^3)
NTU	Nephelometric turbidity unit
ODWS	Ontario Drinking Water Standards
O. Reg. 170/03	Ontario Regulation 170/03
PLC	Programmable logic controller
PTTW	Permit to take water
SCADA	Supervisory control and data acquisition
SSM	Sault Ste. Marie
TC	Total coliforms
THM	Trihalomethane
µg/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant