









DESBARATS  
DRINKING WATER SYSTEM  
WATERWORKS # 210001870

ANNUAL & SUMMARY  
REPORTS 2022

## Introduction

This Annual and Summary Report has been prepared in accordance with both Schedule 22 and section 11 of Ontario Regulation 170/03. In this manner, the requirements by regulation for each report have been consolidated into a single document. This Report is intended to brief the ownership and consumers of the Desbarats Drinking Water System on the system's performance over the past calendar year January 1 to December 31, 2022.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Small Municipal Residential DWS (as it pertains to the Desbarats 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.

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## System Description

The Desbarats water treatment plant is rated as a Class 2 Water Treatment subsystem, and for the purposes of O. Reg. 170/03 it is categorized as a Small Municipal Residential system.

The treatment process begins with two low lift centrifugal pumps, each pump rated at 4.24 L/s, that deliver surface water from Lake Huron. The treatment system uses an Ecodyne Monoplant complete with mechanical flocculation, sedimentation, and dual media filtration compartments. The filter portion of the package plant is a dual media design, with sand and anthracite, which also provides for filtering to waste after backwashing. Waste from the clarifier is drained at timed intervals to backwash settling tanks from which supernatant travels by gravity to a diffuser in Lake Huron, located downstream from the intake site.

Sodium hypochlorite is injected after filtration, before the clear well to achieve primary and secondary disinfection. There are three cells to the clear well (reservoir) with a total storage capacity of 142 cubic meters. There is standby power for continued pumping capacity and plant operations. The system also includes six (6) pre-charged pressure tanks for distribution pressure control.

There are approximately 276 residents using the system with 110 service connections (93 private residences) and an elementary/secondary school with a total population of approximately 600 students. Water is provided to the distribution system through a submarine transmission main.

## Chemicals

Chemicals utilized at the Desbarats Treatment plant during 2022 include:

- Sodium Hypochlorite for primary and secondary disinfection
- Aluminum Sulphate for coagulation
- Polymer (LT20) as a coagulant aid
- Soda Ash for pH and alkalinity adjustment

## 2022 Expenditures

During the year of 2022, expenses were incurred to maintain treatment and distribution functions:

- ESA services
- 12-month surveillance and 3-year reaccreditation audits (SAI Global)
- Floc motor replacement
- Dehumidifier
- Chemical pump flow switches
- Chlorine analyzer sensor, probe, and cap

## 2022 Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

- n/a

Form 2 – Record of Minor Modification or Replacements

- n/a

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 11 of O. Reg 170/03 for Small Municipal Residential Systems.

**Table 1: Microbiological sampling requirements**

Location	Sample Analysis	# samples	Frequency
Raw	EC / TC	1 sample	monthly
Treated	N/A	-	-
Distribution	EC / TC/ HPC	1 sample	bi-weekly

*Desbarats' raw samples are collected from a sample tap from the raw water header. Treated samples are collected from a sample tap from the treated discharge header prior to distribution. Distribution samples are rotated weekly at the following locations representing areas throughout the hamlet: Township Office, Baptist Church, Arena, and Central Algoma Secondary School. Other locations may be sampled as required.*

**Table 1a: Microbiological Sample Results**

Type	# samples	EC (range)	TC (range)	# samples	HPC (range)
Raw	12	0 - 14	0 - 165	-	-
Distribution	30	0	0	30	0 - 20

## Operational Checks and Testing

Operational testing is completed as per Schedules 6 & 7 of O. Reg. 170/03 for Small Municipal Residential Systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers (collecting 5-minute readings) are utilized for measurement of filter turbidity and chlorine residuals.

**Table 2: Monthly Filter Turbidity Results**

Month	Avg turbidity (NTU)	Range (NTU)	Monthly Filter Efficiency
January	0.05	0.03 - 0.21	100
February	0.04	0.03 - 0.07	100
March	0.04	0.03 - 0.17	100
April	0.14	0.03 - 0.99	91.5
May	0.04	0.03 - 0.09	100
June	0.03	0.03 - 0.06	100
July	0.04	0.03 - 0.08	100
August	0.04	0.03 - 0.23	100
September	0.04	0.03 - 0.06	100
October	0.04	0.03 - 0.11	100
November	0.07	0.03 - 1.32	99.4
December	0.09	0.03 - 0.97	98.4

*Desbarats maintained filter compliance each month except for the month of April (reported AWQI). 95% of monthly readings must be <0.30NTU, the required limit to achieve filtration credits for primary disinfection.*

**Table 3: Chlorine Residuals**

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)
January	1.65	0.90 - 2.75
February	1.50	1.30 - 1.85
March	1.37	1.08 - 1.64
April	1.37	1.18 - 1.87
May	1.33	1.12 - 1.52
June	1.30	1.04 - 1.44
July	1.34	0.93 - 2.72
August	1.37	0.79 - 2.28
September	1.38	1.11 - 1.76
October	1.58	1.29 - 1.99
November	1.50	1.29 - 2.02
December	1.56	1.27 - 2.02

*Chlorine residuals are continuously monitored, and data is recorded on 5-minute intervals.*

## Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling requirements for Small Municipal Residential systems. Schedules 23 (inorganics) and 24 (organics) are collected every 60 months as well as sodium and fluoride. This system requires quarterly sampling for Nitrites/Nitrates, THMs and HAAs. Desbarats' lead sampling follows the regulation's plumbing exemption but monitors the distribution system water quality for changes that may impact lead corrosion.

**Table 4: Schedule 23 - Inorganics**

Parameter	Sample Date	Result (µg/L)	Units	ODWS
Antimony	8-Jan-18	<0.60	µg/L	6
Arsenic	8-Jan-18	<1.0	µg/L	25
Barium	8-Jan-18	<10	µg/L	1000
Boron	8-Jan-18	<50	µg/L	5000
Cadmium	8-Jan-18	<0.10	µg/L	5
Chromium	8-Jan-18	<1.0	µg/L	50
Fluoride	8-Jan-18	<0.020	mg/L	1.5
Mercury	8-Jan-18	<0.10	µg/L	1
Selenium	8-Jan-18	<1.0	µg/L	10
Sodium	8-Jan-18	5.05	mg/L	20
Uranium	8-Jan-18	<2.0	µg/L	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. No result is above the half MAC.*

**Table 5: Nitrite/ Nitrate Results**

Date	ODWS	4-Jan-22	4-Apr-22	4-Jul-22	7-Oct-22
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.05	<0.05	<0.05	<0.5
Nitrate	10	0.29	0.34	0.34	0.30

*All quarterly results for Nitrites and Nitrates are well below ODWS.*

**Table 6: Disinfection By-products Results (THM/HAA)**

Date	ODWS	7-Jan22	4-Apr-22	4-Jul-22	7-Oct-22	RAA
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
THM	100	10.1	15.9	22.6	21.8	17.6
HAA	80	19	8	18	13	14.5

*ODWS established a MAC of 80 for HAAs effective January 1, 2020.*

**Table 7: Community Lead Sampling Results**

Location Type	Alkalinity, mg/L	pH
Distribution monitoring	55	7.5

*Desbarats water system is eligible for plumbing exemption, however alkalinity and pH are required for analysis in the distribution every winter and summer collection periods and Lead in distribution every 3 years for the winter and summer periods.*

**Table 8: TSS – C of A requirement for plant process wastewater**

Quarter	Result Value	Unit
Q1	28.7	mg/L
Q2	25	mg/L
Q3	15.9	mg/L
Q4	39.9	mg/L

*The 2022 annual average suspended solids concentration is 27.4 mg/L for plant service water (backwash and instrumentation flows) released back to the environment.*

Table 9: Schedule 24 - Organics

Parameter	Date	Result	Unit	ODWS
Alachlor	8-Jan-18	<0.10	µg/L	5
Atrazine + N-dealkylated metabolites	8-Jan-18	<0.20	µg/L	5
Azinphos-methyl	8-Jan-18	<0.10	µg/L	20
Benzene	8-Jan-18	<0.50	µg/L	5
Benzo(a)pyrene	8-Jan-18	<0.010	µg/L	0.01
Bromoxynil	8-Jan-18	<0.20	µg/L	5
Carbaryl	8-Jan-18	<0.20	µg/L	90
Carbofuran	8-Jan-18	<0.20	µg/L	90
Carbon Tetrachloride	8-Jan-18	<0.20	µg/L	5
Chlorpyrifos	8-Jan-18	<0.10	µg/L	90
Diazinon	8-Jan-18	<0.10	µg/L	20
Dicamba	8-Jan-18	<0.20	µg/L	120
1,2-Dichlorobenzene	8-Jan-18	<0.50	µg/L	200
1,4-Dichlorobenzene	8-Jan-18	<0.50	µg/L	5
1,2-Dichloroethane	8-Jan-18	<0.50	µg/L	5
1,1-Dichloroethylene (Vinylidene chloride)	8-Jan-18	<0.50	µg/L	14
Dichloromethane	8-Jan-18	<5.0	µg/L	50
2-4 Dichlorophenol	8-Jan-18	<0.30	µg/L	900
2,4-Dichlorophenoxy acetic	8-Jan-18	<0.20	µg/L	100
Diclofop-methyl	8-Jan-18	<0.20	µg/L	9
Dimethoate	8-Jan-18	<0.10	µg/L	20
Diquat	8-Jan-18	<1.0	µg/L	70

Parameter	Date	Result	Unit	ODWS
Diuron	8-Jan-18	<1.0	µg/L	150
Glyphosate	8-Jan-18	<5.0	µg/L	280
Malathion	8-Jan-18	<0.10	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	8-Jan-18	<0.20	µg/L	100
Metolachlor	8-Jan-18	<0.10	µg/L	50
Metribuzin	8-Jan-18	<0.10	µg/L	80
Monochlorobenzene	8-Jan-18	<0.50	µg/L	80
Paraquat	8-Jan-18	<1.0	µg/L	10
Pentachlorophenol	8-Jan-18	<0.50	µg/L	60
Phorate	8-Jan-18	<0.10	µg/L	2
Picloram	8-Jan-18	<0.20	µg/L	190
Polychlorinated Byphenols	8-Jan-18	<0.035	µg/L	3
Prometryne	8-Jan-18	<0.10	µg/L	1
Simazine	8-Jan-18	<0.10	µg/L	10
Terbufos	8-Jan-18	<0.20	µg/L	1
Tetrachloroethylene	8-Jan-18	<0.50	µg/L	30
2,3,4,6-Tetrachlorophenol	8-Jan-18	<0.50	µg/L	100
Triallate	8-Jan-18	<0.10	µg/L	230
Trichloroethylene	8-Jan-18	<0.50	µg/L	5
2,4,6-Trichlorophenol	8-Jan-18	<0.50	µg/L	5
Trifluralin	8-Jan-18	<0.10	µg/L	45
Vinyl Chloride	8-Jan-18	<0.20	µg/L	2

All results for the required organic sampling of schedule 24 are below the MAC.

## Compliance

### Adverse Water Quality Incidents

During 2022, the Desbarats DWS reported two incidents of adverse water quality.

**Table 10: Adverse Water Quality Incidents**

Date	Incident Reported
1-May-22	April filter efficiency not met >95% (91.5)
24-Aug-22	Low distribution pressure (new service connection)

### Annual Drinking Water System Inspection

The annual DWS inspection took place on August 4, 2022, by MECP Drinking Water inspector Mark Kowalyk. Zero non-compliance and zero additional recommendations and best practice were identified.

**The DWS received a final inspection rating of 100.0%.**

## Flows

The Permit to Take Water authorizes the municipality to draw water from Lake Huron at a rate not to exceed 547.2 m<sup>3</sup>/d.

**The maximum daily volume taken was 124 m<sup>3</sup>/d, 22.7 % of the permit limit.**

Municipal Drinking Water License: 275-201 specifies a maximum intake capacity of 366 m<sup>3</sup>/d.

**The max flow rate reported was 110m<sup>3</sup>/d, 30.1% of the rated capacity.**

The Desbarats WTP treated and distributed a total of 25,262 m<sup>3</sup> during the year of 2022. The average day treated flow demand was 69.3 m<sup>3</sup>/d, and maximum day flow was 110 m<sup>3</sup>/d on October 25, 2022.

**Chart 1: 5-year Flow History**

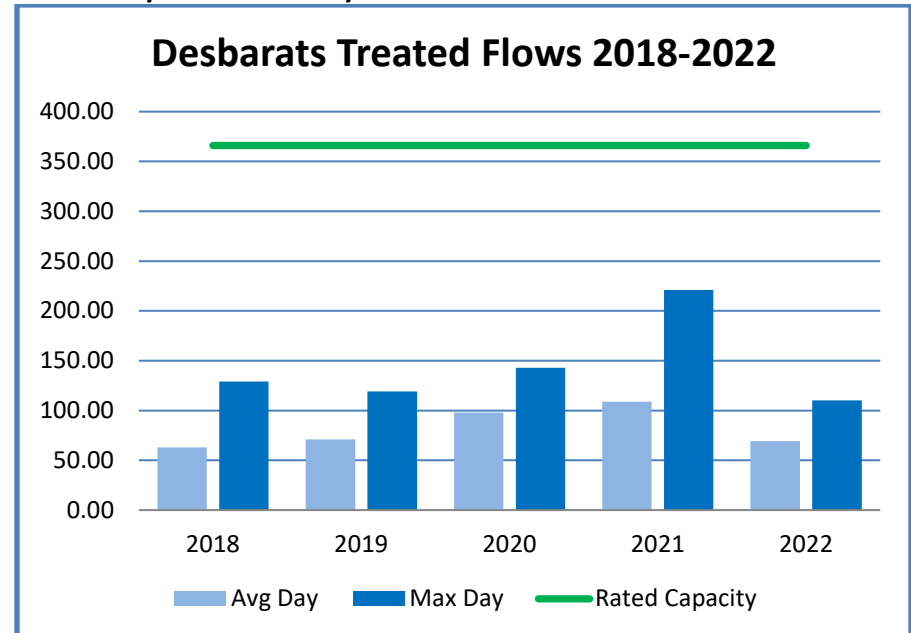
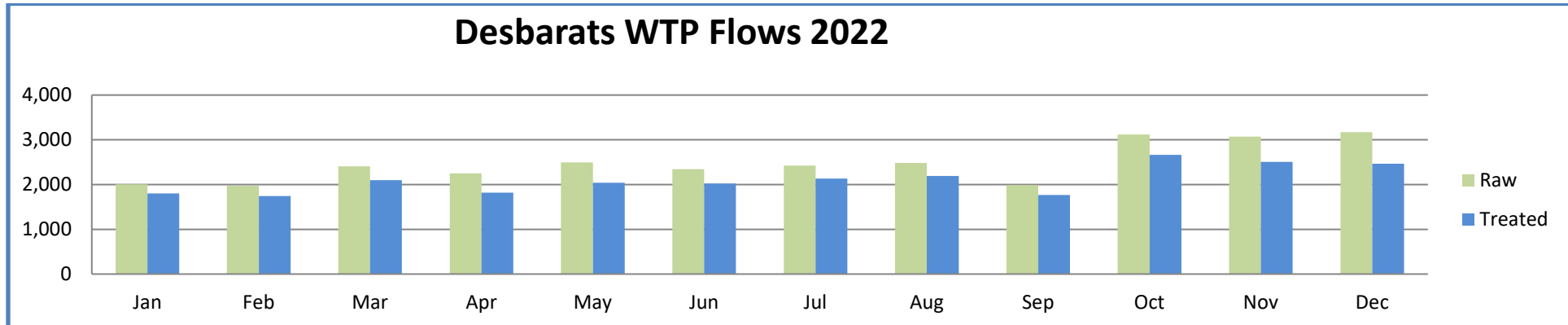


Table 11: Raw and Treated water Flows 2022

2022	Raw Water Flows					Treated Water Flows				
Month	Raw Water (m <sup>3</sup> )	Minimum Day (m <sup>3</sup> /d)	Maximum Day (m <sup>3</sup> /d)	Average Day (m <sup>3</sup> /d)	% Max. Flow Day of PTTW	Treated Water (m <sup>3</sup> )	Minimum Day (m <sup>3</sup> /d)	Maximum Day (m <sup>3</sup> /d)	Average Day (m <sup>3</sup> /d)	% Max Flow Day of Rated Capacity
January	2,008	53	80	64.8	14.6	1,802	48	73	58.1	19.9
February	1,969	53	82	70.3	15.0	1,745	49	76	62.3	20.8
March	2,409	63	94	77.7	17.2	2,097	57	85	67.6	23.2
April	2,249	54	124	75.0	22.7	1,821	47	74	62.8	20.2
May	2,492	55	99	80.4	18.1	2,043	49	96	65.9	26.2
June	2,344	66	89	78.1	16.3	2,022	57	83	67.4	22.7
July	2,426	65	113	78.3	20.7	2,136	57	99	68.9	27.0
August	2,485	54	98	80.2	17.9	2,193	50	87	70.7	23.8
September	1,990	53	96	66.3	17.5	1,769	47	71	59.0	19.4
October	3,120	77	120	100.6	21.9	2,661	64	110	85.8	30.1
November	3,072	81	123	102.4	22.5	2,508	64	104	83.6	28.4
December	3,168	88	123	102.2	22.5	2,465	64	95	79.5	26.0

Chart 2: Desbarats WTP Flows 2022



## 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 on the Town Office.

Township of Johnson  
1 Johnson Drive  
Desbarats, ON  
P0R 1E0

### Summary Report

This Summary report for The Desbarats Drinking Water System for the period of January 1st to December 31<sup>st</sup>, 2022, 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 Township of Johnson.

## Tables, Definition of Terms

### Appendix A: List of Tables/ Charts

<b>Table 1:</b>	Microbiological sampling requirements
<b>Table 1a:</b>	Microbiological Sample Results
<b>Table 2:</b>	Monthly Filter Turbidity Results
<b>Table 3:</b>	Treated Chlorine Residuals
<b>Table 4:</b>	Schedule 23 - Inorganics
<b>Table 5:</b>	Nitrite/ Nitrate Results
<b>Table 6:</b>	Disinfection By-products Results (THM/RAA)
<b>Table 7:</b>	Community Lead Sampling Results
<b>Table 8:</b>	TSS – C of A requirement for plant process waste water
<b>Table 9:</b>	Schedule 24 - Organics
<b>Table 10:</b>	Adverse Water Quality Incidents
<b>Table 11:</b>	Raw and Treated water Flows 2022
<b>Chart 1:</b>	5-year Flow Comparison
<b>Chart 2:</b>	Desbarats WTP Flows 2022

### Appendix B: Definition of Terms

Acronym	Definition
<b>AWQI</b>	Adverse water quality incident
<b>BWA</b>	Boil Water Advisory
<b>DM</b>	Dual Media
<b>DWS</b>	Drinking water system
<b>EC</b>	E. Coli
<b>HAA</b>	Haloacetic acids
<b>HPC</b>	Heterotrophic plate count
<b>MAC</b>	Maximum Acceptable Concentration
<b>m<sup>3</sup></b>	Cubic metres
<b>m<sup>3</sup>/d</b>	Cubic metres per day
<b>mg/L</b>	Milligram per litre (part per million)
<b>ML</b>	Megalitre (1000 m <sup>3</sup> )
<b>NTU</b>	Nephelometric turbidity unit
<b>ODWS</b>	Ontario Drinking Water Standards
<b>O. Reg. 170/03</b>	Ontario Regulation 170/03
<b>PTTW</b>	Permit to take water
<b>SCADA</b>	Supervisory control and data acquisition
<b>TC</b>	Total coliforms
<b>THM</b>	Trihalomethane
<b>µg/L</b>	Microgram per litre (part per billion)
<b>WD</b>	Water distribution
<b>WT</b>	Water treatment
<b>WTP</b>	Water treatment plant