









**DESBARATS  
DRINKING WATER SYSTEM  
WATERWORKS # 210001870**

**ANNUAL & SUMMARY  
REPORTS 2017**

## 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, 2017.

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.

 System Description	Page 3
 Water Quality	Page 4
 Compliance	Page 8
 Flows	Page 9
 Report Endorsement	Page 11
 Tables, Definition of Terms App: A/B	Page 12

## 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 plant includes two (2) low lift centrifugal pumps, each pump rated at 4.24 L/s that deliver surface water from Lake Huron.

The treatment system includes an Ecodyne Monoplant complete with mechanical flocculation, sedimentation and dual media filtration compartments. The filter portion of the package plant involves a dual media of sand and anthracite and 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.

Post chlorination using sodium hypochlorite is injected after filtration before the clearwell to achieve primary and secondary chlorination. There are three (3) cells to the clearwell (reservoir) with a total storage capacity of 142 cubic meters. There is standby power for continued pumping capacity and plant operations. The system also involves 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 a secondary school with a population of about 600 students. Water is provided to the distribution system through a submarine transmission main

## Chemicals

Chemicals utilized at the Desbarats Treatment plant during 2017 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

## 2017 Expenditures

During the year of 2017, expenses were incurred to maintain treatment and distribution functions:

- Straighten and repair of distribution valves
- Compressor replacement

## 2017 Drinking Water System Changes

- Form 1 – Record of Watermains Authorized as a Future Alteration
  - N/A
- Form 2 – Record of Minor Modification or Replacements
  - 2017-07-19 MOE Form 2 - Replaced 4 bulk propane tanks
  - 2017-09-19 MOE Form 2 - Replaced Air Compressor
- 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 – 19	0 – 517	N/A	-
Treated	N/A	-	-	N/A	-
Distribution	35	0	0	35	0 – 17

## 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 – 0.18	100
February	0.07	0.04 – 0.30	100
March	0.08	0.03 – 0.34	99.4
April	0.06	0.04 – 0.80	99.6
May	0.04	0.03 – 0.08	100
June	0.04	0.03 – 0.06	100
July	0.03	0.03 – 0.10	100
August	0.04	0.03 – 0.09	100
September	0.04	0.03 – 0.06	100
October	0.05	0.03 – 0.22	100
November	0.08	0.01 – 0.64	99.5
December	0.07	0.03 – 0.25	100

*Filter Efficiency is monitored by tracking the turbidity readings above and below 0.30 NTU during filter run time. Desbarats 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**

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)
January	1.50	1.02 – 2.10
February	1.45	1.14 – 1.76
March	1.49	1.31 – 1.67
April	1.38	1.18 – 1.91
May	1.27	1.11 – 1.39
June	1.28	1.10 – 1.50
July	1.30	0.98 – 1.47
August	1.41	1.09 – 1.67
September	1.39	1.21 – 1.56
October	1.46	0.99 – 1.97
November	1.38	1.12 – 2.02
December	1.33	1.08 – 1.52

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 regiments 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 and THM's. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Desbarats' lead sampling follows the reduced sampling requirements every third year.

**Table 4: Schedule 23 - Inorganics**

Parameter	Sample Date	Result (µg/L)	Units	ODWS
Antimony	9-Jan-13	<0.6	µg/L	6
Arsenic	9-Jan-13	<1.0	µg/L	25
Barium	9-Jan-13	<10.0	µg/L	1000
Boron	9-Jan-13	<50.0	µg/L	5000
Cadmium	9-Jan-13	<0.1	µg/L	5
Chromium	9-Jan-13	<1.0	µg/L	50
Fluoride	9-Jan-13	<0.03	mg/L	1.5
Mercury	9-Jan-13	<0.1	µg/L	1
Selenium	9-Jan-13	<1.0	µg/L	10
Sodium	9-Jan-13	4.47	mg/L	20
Uranium	9-Jan-13	<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	10-Jan-17	10-Apr-17	17-Jul-17	16-Oct-17
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.010	<0.010	<0.010	<0.010
Nitrate	10	0.329	0.330	0.293	0.290

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

**Table 5a: THM/HAA Results**

Date	ODWS	Q1	Q2	Q3	Q4	RAA
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
THM	100	7.4	8.8	17.2	10.3	10.9
HAA	80	4.5	9.3	13.6	3.56	7.7

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

**Table 6: Schedule 24 - Organics**

Parameter	Date	Result	Unit	ODWS
Alachlor	9-Jan-13	<0.1	µg/L	5
Aldicarb	9-Jan-13	<1.0	µg/L	9
Aldrin + Dieldrin	9-Jan-13	<0.04	µg/L	0.7
Atrazine + N-dealkylated metabolites	9-Jan-13	<0.2	µg/L	5
Azinphos-methyl	9-Jan-13	<0.1	µg/L	20
Bendiocarb	9-Jan-13	<0.2	µg/L	40
Benzene	9-Jan-13	<0.5	µg/L	5
Benzo(a)pyrene	9-Jan-13	<0.01	µg/L	0.01
Bromoxynil	9-Jan-13	<0.2	µg/L	5
Carbaryl	9-Jan-13	<0.2	µg/L	90
Carbofuran	9-Jan-13	<0.2	µg/L	90
Carbon Tetrachloride	9-Jan-13	<0.5	µg/L	5
Chlordane (Total)	9-Jan-13	<0.3	µg/L	7
Chlorpyrifos	9-Jan-13	<0.1	µg/L	90
Cyanazine	9-Jan-13	<0.1	µg/L	10
Diazinon	9-Jan-13	<0.1	µg/L	20
Dicamba	9-Jan-13	<0.2	µg/L	120
1,2-Dichlorobenzene	9-Jan-13	<0.5	µg/L	200
1,4-Dichlorobenzene	9-Jan-13	<0.5	µg/L	5
Dichlorodiphenyltrichloroethane (DDT) + metabolites	9-Jan-13	<0.4	µg/L	30
1,2-Dichloroethane	9-Jan-13	<0.5	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	9-Jan-13	<0.5	µg/L	14
Dichloromethane	9-Jan-13	<0.5	µg/L	50
2-4 Dichlorophenol	9-Jan-13	<0.3	µg/L	900
2,4-Dichlorophenoxy acetic acid	9-Jan-13	<0.2	µg/L	100
Diclofop-methyl	9-Jan-13	<0.2	µg/L	9
Dimethoate	9-Jan-13	<0.1	µg/L	20
Dinoseb	9-Jan-13	<0.2	µg/L	10

Parameter	Date	Result	Unit	ODWS
Diquat	9-Jan-13	<1.0	µg/L	70
Diuron	9-Jan-13	<1.0	µg/L	150
Glyphosate	9-Jan-13	<5.0	µg/L	280
Heptachlor + Heptachlor Epoxide	9-Jan-13	<0.2	µg/L	3
Lindane (Total)	9-Jan-13	<0.1	µg/L	4
Malathion	9-Jan-13	<0.1	µg/L	190
Methoxychlor	9-Jan-13	<0.1	µg/L	900
Metolachlor	9-Jan-13	<0.1	µg/L	50
Metribuzin	9-Jan-13	<0.1	µg/L	80
Monochlorobenzene	9-Jan-13	<0.5	µg/L	80
Paraquat	9-Jan-13	<1.0	µg/L	10
Parathion	9-Jan-13	<0.1	µg/L	50
Pentachlorophenol	9-Jan-13	<0.5	µg/L	60
Phorate	9-Jan-13	<0.1	µg/L	2
Picloram	9-Jan-13	<0.2	µg/L	190
Polychlorinated Byphenols (PCB)	9-Jan-13	<0.035	µg/L	3
Prometryne	9-Jan-13	<0.1	µg/L	1
Simazine	9-Jan-13	<1.0	µg/L	10
Temephos	9-Jan-13	<0.1	µg/L	280
Terbufos	9-Jan-13	<0.2	µg/L	1
Tetrachloroethylene	9-Jan-13	<0.5	µg/L	30
2,3,4,6-Tetrachlorophenol	9-Jan-13	<0.5	µg/L	100
Triallate	9-Jan-13	<0.1	µg/L	230
Trichloroethylene	9-Jan-13	<0.5	µg/L	5
2,4,6-Trichlorophenol	9-Jan-13	<0.5	µg/L	5
2,4,5-Trichlorophenoxy acetic acid	9-Jan-13	<0.2	µg/L	280
Trifluralin	9-Jan-13	<0.1	µg/L	45
Vinyl Chloride	9-Jan-13	<0.5	µg/L	2

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

Lead Sampling: The maximum acceptable concentration for lead in drinking water is 10µg/L. This applies to water at the point of consumption since lead is only present as a result of corrosion of lead solder, lead containing brass fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings.

**Table 7: Community Lead Sampling Results**

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	24	<1.0	0
Distribution	2	<1.0	0

*Lead samples are collected during the two prescribed periods each year (Dec 15 – Mar15 and June 15- Oct 15). Sample results revealed zero exceedances during year 2017.*

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

Month	Result Value	Unit
January	10	mg/L
February	4	mg/L
March	11	mg/L
April	16	mg/L
May	20	mg/L
June	14	mg/L
July	7	mg/L
August	14	mg/L
September	0	mg/L
October	3	mg/L
November	7	mg/L
December	9	mg/L

*The 2017 annual average suspended solids is 9.6 mg/L for plant service water (BW, instrumentation flows) released back to the environment, and is under the C of A limit of 25 mg/L.*

## Compliance

### Adverse Water Quality Incidents

During 2017, the Desbarats DWS reported one incident of adverse water quality.

**Table 9: Adverse Water Quality Incident**

Date	Incident Reported
11-Jun-2017	AWQI# 133334 Loss of System Pressure

### Annual Drinking Water System Inspection

The annual DWS inspection took place on October 27, 2017 by MOECC Drinking Water inspector Stephanie Robbins. Zero non-conformances and zero additional recommendations and best practice were identified. The DWS received a final inspection rating of 100%



## Flows

The Permit to Take Water authorizes the municipality to draw water from Lake Huron at a rate not to exceed 547.2m<sup>3</sup>/d. The maximum daily volume taken was 171 m<sup>3</sup>, 31.2 % of the permit limit.

Municipal Drinking Water Licence: 275-201 specifies a maximum intake capacity of 366m<sup>3</sup>/d. The max flow rate reported was 149m<sup>3</sup>/d, 40.7% of the rated capacity.

The Desbarats WTP treated and distributed a total of 23,211m<sup>3</sup> during the year of 2017. The average day treated flow was 63.6m<sup>3</sup>/d, and maximum day flow was 149m<sup>3</sup>/d on Nov 15, 2017.

**Chart 1: 5 year Flow Comparison**

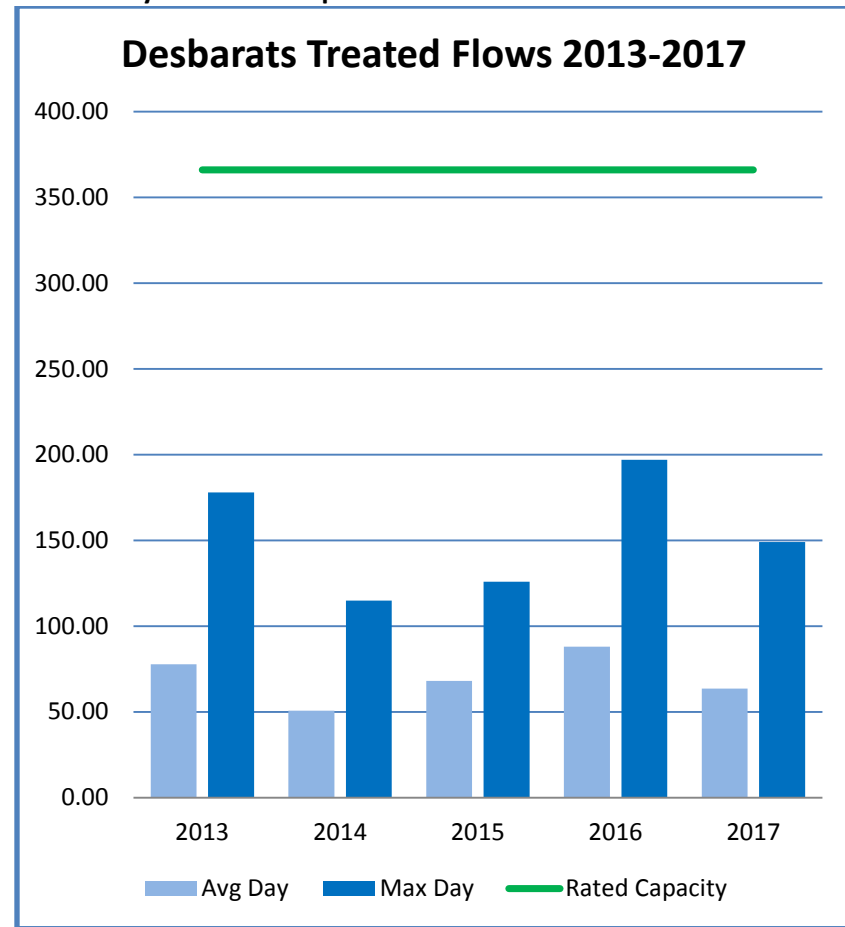
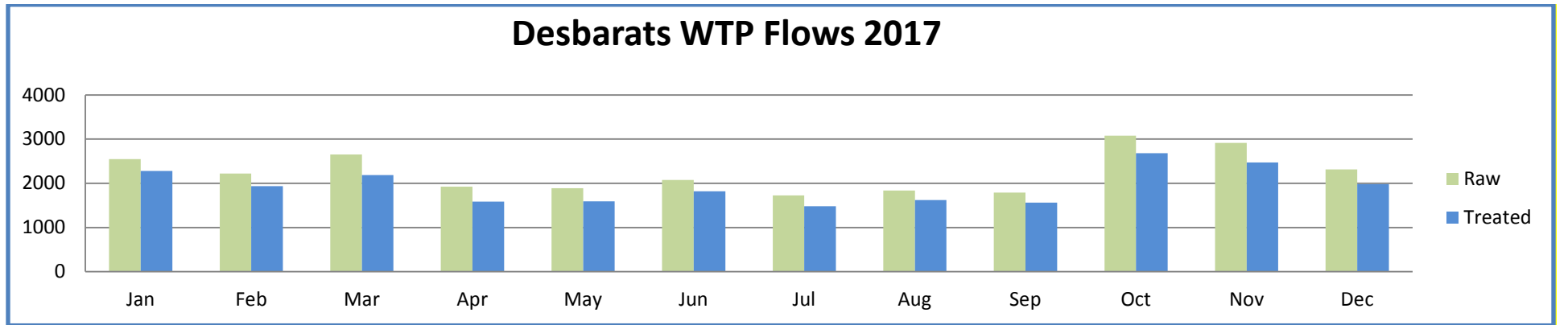


Table 10: Raw and Treated water Flows 2017

2017	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)
January	2,545	66	97	82.1	17.7	2,279	60	87	73.5
February	2,223	61	92	79.4	16.8	1,937	58	84	69.2
March	2,652	60	136	85.5	24.9	2,189	52	103	70.6
April	1,922	43	98	64.1	17.9	1,588	42	63	52.9
May	1,892	51	75	61.0	13.7	1,592	42	67	51.4
June	2,077	47	111	69.2	20.3	1,820	40	97	60.7
July	1,725	36	76	55.6	13.9	1,483	35	69	47.8
August	1,836	31	77	59.2	14.1	1,619	39	68	52.2
September	1,793	37	82	59.8	15.0	1,565	43	68	52.2
October	3,079	78	155	104.8	28.3	2,684	62	105	86.6
November	2,912	67	171	97.1	31.2	2,472	46	149	82.4
December	2,314	52	94	74.6	17.2	1,983	47	78	64.0

Chart 2: Desbarats WTP Flows 2017



## Report Endorsement

### Report Availability

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

In accordance with Schedule 22 of O. Reg. 170/03, this Annual Report must be given to the members of the municipal council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's Safe Drinking Water Act also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system.

### Report Endorsement

This Summary report for The Desbarats Drinking Water System for the period of January 1st to December 31st 2017 has been prepared in accordance to Schedule 22 of O. Reg. 170/03. The report has been reviewed and accepted by the Township of Johnson council.

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**Date**

## 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>Table3:</b>	Treated Chlorine Residuals
<b>Table 4:</b>	Schedule 23 - Inorganics
<b>Table 5:</b>	Nitrite/ Nitrate Results
<b>Table 5a:</b>	THM/RAA Results
<b>Table 6:</b>	Schedule 24 - Organics
<b>Table 6a:</b>	Organics - Sampling exceeding half MAC
<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>	Adverse Water Quality Incidents
<b>Table 10:</b>	Raw and Treated water Flows 2017
<b>Chart 1:</b>	5 year Flow Comparison
<b>Chart 2:</b>	Desbarats WTP Flows 2017

### 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>GUDI</b>	Groundwater under direct influence of surface water
<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 (1000m <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>TSS</b>	Total suspended solids
<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