









**DESBARATS
DRINKING WATER SYSTEM
WATERWORKS # 210001870
ANNUAL & SUMMARY
REPORTS 2018**



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, 2018.

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 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 2018 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

2018 Expenditures

During the year of 2018, expenses were incurred to maintain treatment and distribution functions:

- Replacement of 6 pressure tanks in plant
- Chemical pump replacements
- Raw water pump replacement and the addition of inlet strainers
- Highlift pump replacements
- Replacement of treated chlorine analyzer
- 12 month surveillance audit for DWQMS (SAI Global)

2018 Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

Form 2 – Record of Minor Modification or Replacements

- Replacement of pressure tanks, low lift pumps, on-line chlorine analyzer

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

Water Quality

Microbiological Sampling and Testing

Sampling is conducted bi-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-25%	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 - 5	8 - 187	-	-
Distribution	26	0	0	26	0 - 1

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	0.06	0.03 - 0.33	99.9
February	0.06	0.03 - 0.65	99.5
March	0.06	0.03 - 0.15	100
April	0.09	0.03 - 0.88	99.3
May	0.06	0.03 - 0.34	99.9
June	0.05	0.03 - 0.50	99.7
July	0.05	0.03 - 0.23	100
August	0.05	0.03 - 0.08	100
September	0.05	0.03 - 0.15	100
October	0.15	0.04 - 2.39	94.0*
November	0.11	0.04 - 0.64	98.4
December	0.14	0.04 - 1.01	95.3

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

Desbarats maintained filter compliance 11 of 12 months above 95%, the required limit for dual media filtration to achieve necessary filtration credits for primary disinfection. *Notification to SAC and APH was required for the month of October when filter compliance dipped to 94.0%.

Table 3: Chlorine Residuals

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)
January	1.37	1.15 - 1.64
February	1.40	0.93 - 1.56
March	1.42	1.06 - 2.66
April	1.25	0.97 - 1.59
May	1.32	0.98 - 1.86
June	1.36	1.19 - 1.61
July	1.37	1.05 - 1.67
August	1.36	1.14 - 1.72
September	1.43	1.12 - 1.73
October	1.49	1.22 - 2.01
November	1.44	0.99 - 2.17
December	1.49	0.92 - 2.18

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 DWS requires quarterly sampling for Nitrites/Nitrates, Trihalomethanes (THM's) and Haloacetic acids (HAA'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	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.

Table 5: Nitrite/ Nitrate Results

Date	ODWS	8-Jan-18	10-Apr-18	9-Jul-18	16-Oct-18
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.010	<0.010	<0.010	<0.010
Nitrate	10	0.337	0.351	0.293	0.328

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	7.6	5.0	16.4	9.6	9.65
HAA	80	7.3	6.1	6.15	5.52	6.27

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



DWQMS Form 05-17 – Desbarats DWS Annual & Summary Reports 2018

Table 6: 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 acid	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 (PCB)	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.



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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	n/a		
Distribution	n/a		

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, thus relief of sampling is in effect until 2020.

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

Month	Result Value	Unit
January	7	mg/L
February	13	mg/L
March	11	mg/L
April	8	mg/L
May	18	mg/L
June	19	mg/L
July	15	mg/L
August	6	mg/L
September	16	mg/L
October	14	mg/L
November	9	mg/L
December	10	mg/L

Plant service water (backwash waste and instrumentation flows) are released back to the environment. Schedule C of the MDWL defines a limit of 25 mg/L for residue management.

The 2018 annual average suspended solids are 12.2 mg/L.

Compliance

Adverse Water Quality Incidents

During 2018, the Desbarats DWS reported three incidents of adverse water quality.

Table 9: Adverse Water Quality Incidents

Date	Incident Reported
Mar 13	Loss of Distribution pressure due to planned maintenance at wtp
Oct 19	Filter effluent turbidity over 1 NTU for approximately 30 minutes due to alum line leak
Nov 1	Filter compliance not met for the month of October – must attain > 95% of readings <0.30 NTU. Filter efficiency achieved 94.01%

Annual Drinking Water System Inspection

The annual DWS inspection took place on Nov 2, 2018 by MECP Drinking Water inspector Stephanie Robbins. Zero non-conformances and zero 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 547.2m³/d. The maximum daily volume taken was 145m³, 26.5% of the permit limit.

Municipal Drinking Water License: 275-201 specifies a maximum intake capacity of 366m³/d.

The max flow rate reported was 129m³/d, 35.2% of the rated capacity.

The Desbarats WTP treated and distributed a total of 22,997m³ during the year of 2018. The average day treated flow demand was 63.0m³/d, and maximum day flow was 129m³/d on Aug 16, 2018.

Chart 1: 5 year Flow Comparison

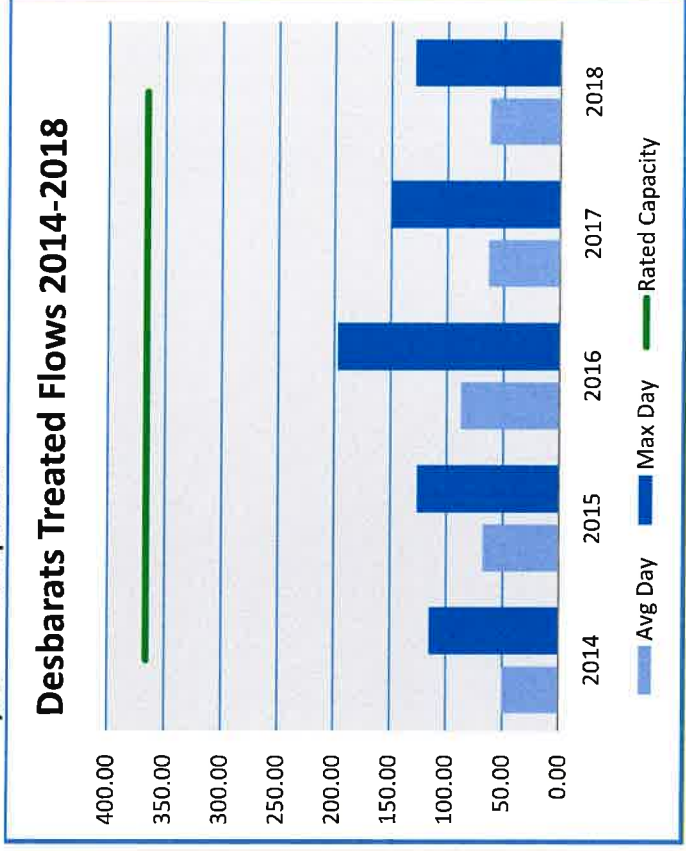
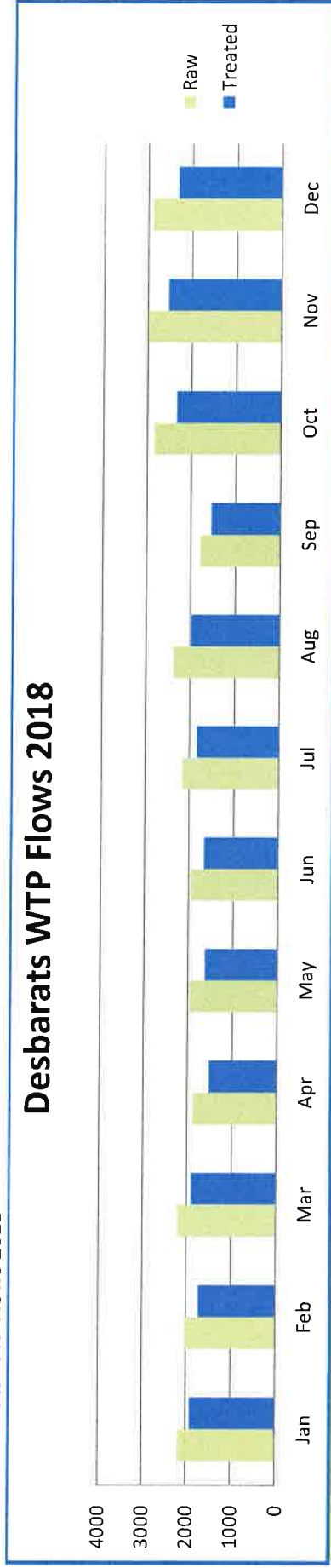


Table 10: Raw and Treated water Flows 2018

2018 Month	Raw Water Flows					Treated Water Flows				
	Raw Water (m ³)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)	% Max. Flow Day of PTTW	Treated Water (m ³)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)	
January	2,199	55	92	70.9	16.8	1,923	46	78	62.0	
February	2,050	61	95	73.2	17.4	1,737	42	80	62.0	
March	2,222	43	101	71.7	18.5	1,909	43	80	61.6	
April	1,884	45	116	62.8	21.2	1,523	41	64	50.8	
May	1,969	41	86	63.5	15.7	1,628	38	63	52.5	
June	1,974	52	82	65.8	15.0	1,661	43	75	55.4	
July	2,173	50	104	70.1	19.0	1,845	44	85	59.5	
August	2,327	49	145	75.1	26.5	1,986	41	129	64.1	
September	1,804	48	76	60.1	13.9	1,555	41	60	51.8	
October	2,857	48	142	92.2	26.0	2,349	34	122	75.8	
November	2,993	73	144	99.8	26.3	2,548	66	128	84.9	
December	2,913	73	133	94.0	24.3	2,333	51	101	75.3	

Chart 2: Desbarats WTP Flows 2018





DWQMS Form 05-17 – Desbarats DWS Annual & Summary Reports 2018



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 2018 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.

Mar 20/19

Date

Tables, Definition of Terms

Appendix A: List of Tables/ Charts

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Appendix B: Definition of Terms

Acronym	Definition
AO	Aesthetic objective
AWQI	Adverse water quality incident
BWA	Boil Water Advisory
DWS	Drinking water system
EC	E. Coli
HAA	Haloacetic acids
HPC	Heterotrophic plate count
MAC	Maximum Acceptable Concentration
MDWL	Municipal Drinking Water Licence
m ³	Cubic metres
m ³ /d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1000 m ³)
NTU	Nephelometric turbidity unit
ODWS	Ontario Drinking Water Standards
O. Reg. 170/03	Ontario Regulation 170/03
PTTW	Permit to take water
RAA	Running annual average
TC	Total coliforms
THM	Trihalomethane
TSS	Total Suspended Solids
µg/L	Microgram per litre (part per billion)
WTP	Water treatment plant