

BASS LAKE WOODLANDS

**Water Supply and
Distribution System
DWS# 220005143**



2019 Summary Report

**For the period of January 1, 2019
To December 31, 2019**

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Overview and Background

Safe Drinking Water Act






Safe Drinking Water Act Ontario Regulation 170/03, Schedule 22-2, requires that owners of municipal drinking water systems prepare a Summary Report and present this report to the members of Municipal Council by March 31st of each year. The report is prepared for the previous calendar year and the following criteria must be included as per the regulation:

- a) List the requirements of the Act, the regulations, the system's approval, drinking water works permit, municipal drinking water license, and orders applicable to the system that were not met during the period covered by the report.
- b) For each requirement referred to in clause (a) that was not met specify the duration of the failure and the measures that were taken to correct the failure.
- c) A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows.
- d) A comparison of the summary referred to in (c) to the rated capacity and flow rates approved by the system's certificate of approval, drinking water works permit or municipal drinking water license.

This Summary Report also serves as a comprehensive review of the systems performance as it relates to regulations and criteria that fall under the municipal drinking water licensing program.

Municipal Drinking Water Licensing Program

A Municipal Drinking Water License (MDWL) is required in Ontario to operate the drinking water system. The Municipal Drinking Water License (#148-102 Issue Number 2) was re-issued in May of 2016 and is valid until May 25, 2021. The reissuance was initiated by the Ministry of Environment, Conservation and Parks (MECP) due to regulatory amendments that required timelines to be outlined in the MDWL. There are five requirements that must be achieved in order to obtain an MDWL:

-  A valid Drinking Water Works Permit (#148-202 Issue Number 2)
-  A valid Permit to Take Water for each source (#0578-9JFPKZ)
-  An Operational Plan
-  Must have an Accredited Operating Authority (C0124837-DWQ3-C0122096)
-  A Financial Plan approved by Council

Introduction

System and Process Description

The Corporation of the Township of Severn is the owner and operator of the Bass Lake Woodlands Water Treatment and Distribution System. The system was constructed in 1976 and was expanded in 1987 and 2008. It currently has 161 service connections. It is classified as a Class 2 Water Distribution and Supply System.

Source Water

Bass Lake Woodlands obtains its raw water from three drilled wells located on the pump house property at 1852 Ridley Blvd. The wells are located in a confined artesian aquifer found locally in the elevation range of approximately 210 and 225 meters above sea level.

Raw Water Characteristics

The raw water is of low turbidity and is of acceptable pH. Due to the depth of the source water the temperature is relatively constant.

Water Treatment

Sodium hypochlorite is the primary disinfection of the raw water source. Water is pumped from the wells into the pump house. The piping is then combined to a common discharge header. At this point, the water is disinfected by sodium hypochlorite. Water is then directed to the 32 m³ baffled chlorine contact chamber and then into the 136 m³ clear wells for storage.

Online analyzers monitor and record raw and treated water flows, chlorine, pH, and turbidity values. Level sensing probes record the well levels and reservoir level. The plant is equipped with full SCADA control.

A propane fueled generator provides backup power to the treatment plant and its equipment.

Water Distribution

The distribution system is comprised of 2.8 km of 150mm PVC water main. There are 4 sample stations and 3 blow-offs located throughout the system.

Regulatory Compliance

All municipally owned and operated water systems are governed under the Safe Drinking Water Act, 2002, Ontario Water Resources Act (OWRA), and associated regulations. The following regulations, and associated standards and documents, are all applicable, and most relevant, to the compliant operation of the Township of Severn's Drinking Water system:

Ontario Regulation 170/03

This regulation includes requirements for:

- 💧 Sampling and analytical testing (microbiological and chemical)
- 💧 Adverse water quality incidents
- 💧 Corrective actions
- 💧 Continuous water quality monitoring

Ontario Regulation 169/03

This regulation includes requirements for:

- 💧 Water Quality Standards

Ontario Regulation 128/04

This regulation includes requirements for:

- 💧 Classifications of Drinking Water Systems
- 💧 Certifications and responsibilities of Operators
- 💧 Proper record keeping of the drinking water system

Wells Regulation 903

This regulation includes requirements for:

- 💧 Well maintenance
- 💧 Well specifications

Drinking Water Quality Management Standard (DWQMS)

This Standard specifies:

- 💧 Minimum requirements for the Quality Management System to allow for the accreditation of the Operating Authority

Municipal Drinking Water License

This document includes requirements for:

- 💧 Specific conditions / testing / monitoring
- 💧 Flow limits through the treatment system
- 💧 Regulatory relief conditions
- 💧 Operations & Maintenance manual criteria

Drinking Water Works Permit License

This document includes criteria for:

- 🔥 Making alterations to the system

Summary of Non-Compliance and Adverse Water Quality Incidents

There were NO Adverse Water Quality Incidents that occurred in 2019.

DWQMS & Municipal Drinking Water Licensing Program

Third Party Audit and Accreditation

On an annual basis, a third-party accreditation authority conducts an audit to determine whether the Quality Management System conforms to the requirements of the MECP Drinking Water Quality Management Standard (DWQMS).

In November 2019, NSF International completed a satellite audit with no non-conformances noted.

Internal Audit

As per the DWQMS, an internal audit is to be conducted once per year. September 23-24, 2019 an internal audit was conducted by the Aet Group Inc. The findings were included during Management Review.

Management Review

As per the DWQMS, an annual Management Review is to be conducted and findings conveyed to the Owner. Management Reviews were conducted June 5, 2019 and December 10, 2019. The review included findings from the internal and external audits, MECP inspections and other prescribed items.

System Improvements and Maintenance

The following maintenance and improvements were carried out in 2019 in order to provide the highest possible drinking water quality:

1. The water distribution system was directionally flushed to maintain the drinking water quality.
2. Over 25% of the main valves in the distribution system were exercised to ensure their reliability.
3. The standby generator was tested under load monthly to ensure reliability.

4. All critical alarms were tested monthly to ensure reliability.
5. Drinking water quality was tested at the water treatment plant and in the distribution system weekly.
6. Distribution flow meter was replaced.
7. Vertical turbine high lift pump #1 was rebuilt to ensure reliability.

Microbiological Testing

E. Coli and Total Coliform

Bacteriological samples, to be tested for E. Coli and Total Coliforms, are taken weekly from the raw and treated water at the facility and from the distribution system. Extra samples are taken after major repairs or maintenance work as per Regulation 170/03. E. Coli or Total Coliform results above 0 in treated water must be reported to the MECP and MOH. Resamples and other required actions are undertaken as quickly as possible. The results are from the 2019 sampling program are shown on the table below.

	Number of Samples	Range of E-Coli Results (cfu/100ml) (Min – Max) MAC=0	Range of Total Coliform Results (cfu/100ml) (Min – Max) MAC=0
Raw	158	0 - 0	0 - 2
Treated	156	0 - 0	0 - 0

Heterotrophic Plate Count (HPC)

HPC analyses are completed weekly from the distribution water for large systems. HPC should be less than 500 colonies (cfu) per 1mL. Results over 500 colonies (cfu) per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water. The results from the 2019 sampling program are shown on the table below.

	Number of Samples	Range of HPC Results (cfu/1ml) (Min – Max)
Distribution	102	0 – 120

Chlorine Residual and Turbidity

Free chlorine levels of the treated water are monitored continuously at the discharge point of the treatment facility. In the distribution system, free chlorine is checked twice weekly at various locations. As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported to the MECP and corrective action taken. There were no reportable incidents in 2019. The results from the 2019 sampling program are shown on the table below.

Turbidity of treated water is continuously monitored at the treatment facility, as a change in turbidity can indicate an operational problem. Turbidity of the wells are checked monthly. Turbidity is measured in Nephelometric Turbidity Units (NTU). The results from the 2019 sampling program are shown on the table below.

Parameter	Number of Tests	Range of Results (Min – Max) Average
Chlorine residual in distribution (mg/L)	365	(0.60 – 1.22) 0.92
Chlorine residual after treatment (mg/L)	CONTINUOUS	(0.61 – 1.21) 0.96
Turbidity after treatment (NTU)	CONTINUOUS	(0.06- 0.47) 0.17

Chemical Testing

The Safe Drinking Water Act requires periodic testing of the water for different chemical parameters. The latest results for all parameters are provided in Appendix A. The sampling frequency varies for different types and sizes of water systems and chemical parameters. If the concentration of a parameter is above half of the Maximum Allowable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation. Where concerns regarding a parameter exist, the MECP can also require additional sampling. Information on the health effects and allowable limits of components in drinking water may be found on the MECP web page.

Understanding Chemical Test Results

Tables below are shown with concentrations units of either milligrams per litre (mg/L) or micrograms per litre (µg/L): 1 mg/L is equal to 1000 µg/L. The Maximum Acceptable

Concentration (MAC) is the highest amount of a parameter that is acceptable in Municipal drinking water and can be found in the MECP Drinking Water Standards. The Method Detection Limit (MDL) is the lowest amount to which the laboratory can confidently measure. A result of “ND” stands for “Not Detected” and means that the concentration of the chemical is lower than the laboratory’s equipment is capable of measuring.

Nitrate and Nitrite samples are required every 3 months in normal operation

Parameter	Result Range (Min – Max)	Average	MAC (mg/L)	MDL (mg/L)
Nitrite (mg/L)	0.003 - 0.003	0.003	1	0.003
Nitrate (mg/L)	1.10 – 1.70	1.28	10	0.006

A Trihalomethane (THM) sample is required every 3 months from the distribution system

Parameter	Annual	Result (Avg.)	MAC (µg/L)	MDL (µg/L)
THM	2019	7.05	100	0.37

A Haloacetic Acid (HAA) sample is required every 3 months from the distribution system

Parameter	Annual	Result (Avg.)	MAC (µg/L)	MDL (µg/L)
HAA	2019	< 5.3	--	5.3

Summary of the most recent sodium and fluoride results

Parameter	Sample Date	Result (mg/L)	MAC (mg/L)	MDL (mg/L)
Sodium	2019	51.5	20	0.01
Fluoride	2018	0.08	1.5	0.06

Summary of the most recent lead testing results

Parameter	Sample Date	Result Range (Min – Max)	Number of samples	Acceptable Level
Distribution Alkalinity	2019	229 – 233 mg/L	2	30 -500 mg/L
Distribution pH	2019	7.3 - 7.7	2	6.5 - 8.5
Distribution Lead 2019	2019	0.05-0.11 µg/L	2	10 µg/L

Summary of the most recent Schedule 23/24 testing as per Regulation 170/03

All results are measured in µg/L unless otherwise stated.

Parameter	Sample Date	Result Value	MAC	MDL
Antimony	Oct. 29, 2019	0.11	6	0.02
Arsenic	Oct. 29, 2019	0.2	10	0.2
Barium	Oct. 29, 2019	173	1000	0.02
Boron	Oct. 29, 2019	23	5000	2
Cadmium	Oct. 29, 2019	0.003	5	0.003
Chromium	Oct. 29, 2019	0.73	50	0.03
Mercury	Oct. 29, 2019	0.01	1	0.01
Selenium	Oct. 29, 2019	0.13	50	0.04
Uranium	Oct. 29, 2019	0.218	20	0.002
Benzene	Oct. 29, 2019	0.32	1	0.32
Carbon tetrachloride	Oct. 29, 2019	0.17	2	0.16
1,2-Dichlorobenzene	Oct. 29, 2019	0.41	200	0.41
1,4-Dichlorobenzene	Oct. 29, 2019	0.36	5	0.36
1,1-Dichloroethylene	Oct. 29, 2019	0.33	14	0.33
1,2-Dichloroethane	Oct. 29, 2019	0.35	5	0.35
Dichloromethane	Oct. 29, 2019	0.35	50	0.35
Monochlorobenzene	Oct. 29, 2019	0.3	80	0.3
Tetrachloroethylene	Oct. 29, 2019	0.35	10	0.35
Trichloroethylene	Oct. 29, 2019	0.44	5	0.44
Vinyl Chloride	Oct. 29, 2019	0.17	1	0.17
Bromoform	Oct. 29, 2019	0.92	--	0.34
Bromodichloromethane	Oct. 29, 2019	3.3	--	0.26
Chloroform	Oct. 29, 2019	2.2	--	0.29
Dibromochloromethane	Oct. 29, 2019	3.2	--	0.37
Diquat	Oct. 29, 2019	1	70	1
Paraquat	Oct. 29, 2019	1	10	1
Glyphosate	Oct. 29, 2019	1	280	1
PCBs	Oct. 29, 2019	0.04	3	0.04
Benzo(a)pyrene	Oct. 29, 2019	0.004	0.01	0.004
Alachlor	Oct. 29, 2019	0.02	5	0.02
Atrazine+N-daelkylated metabolites	Oct. 29, 2019	0.01	5	0.01
Atrazine	Oct. 29, 2019	0.01	--	0.01

Parameter	Sample Date	Result Value	MAC	MDL
Desethyl atrazine	Oct. 29, 2019	0.01	--	0.01
Azinphos-methyl	Oct. 29, 2019	0.05	20	0.05
Carbaryl	Oct. 29, 2019	0.05	90	0.05
Carbofuron	Oct. 29, 2019	0.01	90	0.01
Chlorpyrifos	Oct. 29, 2019	0.02	90	0.02
Diazinon	Oct. 29, 2019	0.02	20	0.02
Dimethoate	Oct. 29, 2019	0.06	20	0.03
Diuron	Oct. 29, 2019	0.03	150	0.03
Malathion	Oct. 29, 2019	0.02	190	0.02
Metolachlor	Oct. 29, 2019	0.01	50	0.01
Metribuzin	Oct. 29, 2019	0.02	80	0.02
Phorate	Oct. 29, 2019	0.01	2	0.01
Prometryne	Oct. 29, 2019	0.03	1	0.03
Simazine	Oct. 29, 2019	0.01	10	0.01
Terbufos	Oct. 29, 2019	0.01	1	0.01
Triallate	Oct. 29, 2019	0.01	230	0.01
Trifluralin	Oct. 29, 2019	0.02	45	0.02
2,4-dichlorophenoxyacetic acid	Oct. 29, 2019	0.19	100	0.19
2,4,5-trichlorophenoxyacetic acid	Jan. 8, 2018	0.22	280	0.22
Bromoxynil	Oct. 29, 2019	0.33	5	0.33
Dicamba	Oct. 29, 2019	0.20	120	0.20
Dichlofop-methyl	Oct. 29, 2019	0.40	9	0.40
Dinoseb	Jan. 8, 2018	0.36	10	0.36
MCPA (mg/L)	Oct. 29, 2019	0.00012	0.1	0.00012
Picloram	Oct. 29, 2019	1	190	1
2,4-dichlorophenol	Oct. 29, 2019	0.15	900	0.15
2,4,6-trichlorophenol	Oct. 29, 2019	0.25	5	0.25
2,3,4,6-tetrachlorophenol	Oct.29, 2019	0.20	100	0.2
Pentachlorophenol	Oct. 29, 2019	0.15	60	0.15

Water Quantity

Continuous monitoring of flow rates from supply wells into the treatment system and from the facility into the distribution system is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water issued by the MECP regulate the amount of water that can be utilized over a given time period. A summary of the 2019 flows are provided in the tables below.

FLOW SUMMARY	QUANTITY
Permit to Take Water Limit	Well 1 - 655.2 m ³ /day Well 2 - 280.8 m ³ /day Well 3 - 741.6 m ³ /day
Total Taking	1211.2 m ³ /day
Municipal Drinking Water License Limit	818 m ³ /day
2019 Average Daily Flow	104 m ³ /day
2019 Maximum Daily Flow	225 m ³ /day
2019 Total Amount of Water Supplied	37957 m ³

Summary of Raw Water Flows

Month	Well #1 (m ³)	Well #2 (m ³)	Well #3 (m ³)
January	2444	7	9
February	2202	10	14
March	2355	8	9
April	2421	13	17
May	3127	11	17
June	3525	9	11
July	4927	15	26
August	4510	20	14
September	1446	13	1286
October	8	10	2560
November	15	15	2208
December	13	14	3060
TOTAL	26993	145	9231

Summary of Distribution Flows

Month	Monthly Total (m ³)	Average Daily Flow (m ³ /day)	Minimum Daily Flow (m ³ /day)	Maximum Daily Flow (m ³ /day)
January	2607	84	61	100
February	2351	84	63	107
March	2521	81	60	100
April	2601	87	64	102
May	3300	106	72	156
June	3651	122	76	158
July	5053	168	112	219
August	4652	150	91	225
September	2870	96	64	122
October	2735	88	57	144
November	2389	80	52	86
December	3226	104	48	166
TOTAL	37957			

Appendix A – Flow Charts

