

## 2022 Year End Report: Baysville Wastewater Treatment Plant (WWTP)



Environmental Compliance Approval: # 8132-7QXPCV

Engineering and Public Works Department

70 Pine Street, Bracebridge, Ontario P1L 1N3

Phone: 705-645-6764

Toll-Free: 1-800-281-3483

Fax: 705-645-7599

Email: [publicworks@muskoka.on.ca](mailto:publicworks@muskoka.on.ca)

Website: [www.muskoka.on.ca](http://www.muskoka.on.ca)

## Introduction

The Baysville Wastewater Treatment Plant (WWTP), which services the Village of Baysville, is owned and operated by the District Municipality of Muskoka. The plant is located at 2825 Highway 117; and was commissioned in September 2006. It services a population of approximately 348 people.

The Plant operates under the Ministry of the Environment Conservation and Parks (MECP) Environmental Compliance Approval (ECA) # 8132-7QXPCV, issued August 04, 2009. Under the terms of the Certificate of Approval, the plant is permitted to treat an average daily flow of 475m<sup>3</sup>/day. Additionally, effluent limit criteria are as follows:

Table 1 Effluent Limit Criteria

<b>Effluent Parameter</b>	<b>Concentration</b>
CBOD	15 mg/L
Total Suspended Solids	15 mg/L
Total Phosphorous	1.00 mg/L
Total Ammonia Nitrogen Summer (May 01 to November 30)	4.0 mg/L
Total Ammonia Nitrogen Winter (December 01 to April 30)	10.0 mg/L
E. Coli	Geometric Mean Density 80 Organisms/100 mL
pH	6.00 to 9.50 inclusive, at all times.

The plant is a Sequencing Batch Reactor (SBR) package plant, consisting of equalization basins, tertiary filters, aeration blowers, and sludge holding tanks. Disinfection is accomplished by ultraviolet irradiation. The facility is also equipped with aerated sludge digesters for bio-solids stabilization.

Waste sludge from the plant process is digested aerobically at the plant and periodically hauled off site for disposal.

## General Information

A review of the District of Muskoka's infrastructure needs is conducted annually by the Director of Water and Sewer Services, Area Manager and Chief Operator, and recommendations for maintenance, rehabilitation and renewal programs are considered.

Efforts to eliminate the discharge of untreated or partially treated wastewater to receiving waters are being accomplished by a long-term financial commitment to correct excessive infiltration into the wastewater collection system by means of sewer main rehabilitation/replacement, manhole rehabilitation and pumping station rehabilitation programs.

The treatment facility is capable of effective operation during emergencies, maintenance shutdowns, and power failures. This is achieved through such measures as preventive maintenance of duty/standby units, the duplication of major treatment components, the

provision of standby power sources and extensive use of the SCADA systems. All pumping stations and treatment control systems use SCADA (Supervisor Control and Data Acquisition), in combination with Data Highway Plus, and programmable logic controllers.

All operators are qualified to operate the systems efficiently and effectively to achieve the highest level of treatment at all times. A commitment to provide Operator training and certification is being sustained.

Regulatory sampling is carried out to meet the requirements outlined in the ECA, and additional in-house operational sampling beyond these regulatory requirements is being performed on a routine basis. These efforts have resulted in an effective treatment process which ensures that effluent discharges consistently meet effluent objectives and are environmentally safe.

All data in this report is a compilation of test results received from SGS Canada and their accredited laboratory, Lakefield Research. All in-plant sampling, analysis and recording of results conforms, in order of precedence, to the following 3 standards: Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the American Water Works Association/Water Environment Federation (AWWA/WEF) publication "Standard Methods for the Examination of Water and Wastewater".

### Executive Summary

In 2022, test results of the treated effluent for the parameters of CBOD<sub>5</sub>, suspended solids, total phosphorous, total ammonia nitrogen and E. Coli are in compliance with the limits outlined in the ECA regarding monthly allowable concentrations and total effluent loading throughout the entire year. Plant systems functioned well, and no adverse or reportable incidents were observed.

Overall, the plant treatment processes performed satisfactorily and are deemed to be adequate.

### Quantity of Flow Summary

The plant has a daily average flow design capacity of 475 m<sup>3</sup>/day. The actual average daily flow for the 2022 was 91 m<sup>3</sup>/day, however, the 3-year average is 99 m<sup>3</sup>/day, which represents 21% of the plant capacity. None of the individual system components exceeded the design flow rating.

### Plant Operational Upsets or Process Failures

There were no plant operational upsets or process failures observed in 2022.

## Summary of Maintenance

In 2022, only routine, scheduled maintenance was completed. No capital upgrades were required in 2022.

All equipment information at this plant is entered into a computer database. From this information, a scheduled preventive maintenance program has been established. The maintenance program includes (but is not limited to):

- Monthly testing of emergency testing (under load) of the standby generators.
- Annual servicing of emergency standby generators.
- Annual calibration of flow metering devices.
- Annual cleaning of all sewage pumping stations if required.
- Marine inspection of effluent outfall and diffuser completed in 2022. (5-year cycle)

All flow meter and analytical calibration verifications indicated all equipment was within calibration tolerances as required the ECA.

## Evaluation of the Need for Improvement Works

The treatment facility is operating at a plant capacity of 21% and is in compliance with specified effluent parameter criteria. As a result, there is no need for improvements to the existing works beyond scheduled annual maintenance typical to this type of facility.

## Evaluation Summary of Proposed Work Requiring Approval under OWRA

Since the treatment facility is operating satisfactorily there is no anticipated works requiring an ECA amendment for 2023.

## Interpretation of Analytical Results

All sample results for Raw Sewage and Final Effluent are reported in this section. Other tables in this report include Chemical Usage, Biosolids Quality, and Biosolids Quantity.

## Raw Sewage

The information reported in the Raw Sewage sample results summary table consists of test results of analysis conducted on composite samples of the plant influent flow as required by the plant ECA. Samples are sent for analysis to Lakefield Research, as well as analysis conducted on site using Standard Methods or equivalent. Weekly analysis has been performed and reported as specified under the terms outline in the ECA.

## Influent Analysis

Table 2 Influent Analysis

Influent Parameter	Minimum	4 Week Average Maximum	Annual Average	Average loading kg/day
BOD5 (mg/L)	287	519.75	388.38	41.30
Suspended Solids (mg/L)	114.5	529.25	257.60	27.38
Total Phosphorus (mg/L)	5.61	8.44	6.77	0.71
TKN (mg/L)	52.98	74.90	59.38	6.24

### Effluent Analysis

The information reported in the Final Effluent sample results summary, table 3, consists of results of analysis conducted on final effluent composite samples. Bacteriological samples, however, consisted of grab samples. Weekly analysis has been performed and reported as specified under the terms outlined in the ECA.

### Effluent Objective Analysis

The effluent objectives were met during all sample periods for CBOD5, Suspended Solids, E.coli, Total Phosphorous and pH and Total Ammonia Nitrogen throughout 2022.

### Final Effluent Analysis Summary

All final effluent samples tested for CBOD5, suspended solids, ammonia, E. Coli, total phosphorous and total ammonia nitrogen were below non-compliance limits outlined in the ECA.

Table 3 Final Effluent Analysis Summary

Parameter	Minimum	4 Week Average Maximum	Annual Average	Average Loading kg/day
CBOD5 (mg/L)	2.0	3.50	2.19	0.20
Suspended Solids (mg/L)	2.0	3.20	2.29	0.21
Ammonia (mg/L)	0.10	0.73	0.29	0.04
E. Coli (#/100 mL)	0	0	0	N/A
Total Phosphorus (mg/L)	0.04	0.09	0.05	0.01
pH	6.70	7.93	7.22	N/A

Average daily flow comparisons by day of week ensure ECA requirements for scheduled sampling are taken at a time, and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored. Average daily flow rates by day of the week compare the flow to the average daily flow for the entire year. This data is used to

determine if a particular day of the week is best to ensure samples are taken to meet the requirements of scheduled monitoring sections of the ECA's. Sampling plans are reviewed and updated yearly based on the previous yearly flow data.

### Final Effluent Sampling Summary

All samples were collected following the frequency and methods required by the facility approval. For the coming year, 2023, no changes to the sampling plan are being considered at this time.

### Biosolids Generation

The quality and quantity of biosolids hauled from the facility for disposal is outlined in the table provided. Private contractors were used by the District of Muskoka to transfer all material for disposal in 2022 and will continue to do so in 2023. It is not anticipated that there will be a significant increase in the total volume of bio-solids produced in 2023.

### Summary of Complaints received throughout the reporting period

There were no complaints received in the reporting period.

## Baysville Wastewater Collection Summary

### New Sewer Services:

A total of two customers connected to existing sewer laterals in 2022.

### New Sewer Mains:

There were no new sewer mains installed in 2022.

### Sewer Main Replacements:

No sewer mains replaced in 2022.

### Low Pressure Sewer Breaks:

There were no low-pressure sewer breaks in 2022.

### Sewer Force Main Breaks:

There were no sewer forcemain breaks in 2022.

### Sewer Force Main Replacement

No sewer force mains replaced in 2022.

### Main Line Sewer Blockage

There were no sewer main blockages in 2022.

### Sewer Lateral Blockage

There were no sewer lateral blockages in 2022.

### Service Low Pressure Sewer Blockages:

There were no low-pressure sewer blockages in 2022.

### Frozen Sewer Force Mains:

No sewer force mains froze in 2022.

### Frozen Sewer Service Laterals:

No sewer service laterals froze in 2022.

### Frozen Low Pressure Sewer Services:

No low-pressure sewer services froze in 2022.

### Sewer Flushing/Video:

There was no sewer main flushing or video required in 2022.

### Sewer Locates:

Field staff addressed fifty-six written locate requests in 2022.

Table 4 Effluent Flow Summary - 2022

Month	Plant Total Monthly (m <sup>3</sup> )	Average Day Flow (m <sup>3</sup> /d)	Maximum Day Flow (m <sup>3</sup> /d)	Minimum Day Flow (m <sup>3</sup> /d)	Lagoons Monthly Flow (m <sup>3</sup> )	Facility Total Monthly Flow (m <sup>3</sup> )
January	2214	71	100	49	N/A	2214
February	2375	85	190	54	N/A	2375
March	3100	100	164	49	N/A	3100
April	2555	85	142	46	N/A	2555
May	2895	93	173	33	N/A	2895
June	3148	105	148	57	N/A	3148
July	3249	105	159	57	N/A	3249
August	3300	106	143	62	N/A	3300
September	2707	90	140	54	N/A	2707
October	2730	88	151	56	N/A	2730
November	2404	80	121	39	N/A	2404
December	2446	79	139	34	N/A	2446

Total Flow: 33,125  
 Average Day: 91  
 Maximum Day: 190  
 Minimum Day: 31



Table 5 Influent Quarterly Analysis Summary – Weekly 24-Hour Composite Sample

Sample Date	Sample Identification Number	BOD5 mg/L	Total Phosphorus mg/L	Suspended Solids mg/L	Total Kjeldahl Nitrogen mg/L	Total Ammonia Nitrogen mg/L
February 8, 2022	CA12338	278	6.21	102	51.8	55.8
May 3, 2022	CA13101	154	4.17	47	40.7	37.0
August 2, 2022	CA12111	338	6.23	345	54.4	48.9
November 8, 2022	CA13324	332	7.12	232	67.5	59.9
<b>Yearly Average</b>		275.5	5.93	181.5	53.6	50.4
<b>Maximum</b>		338	7.12	345	67.5	59.9
<b>Minimum</b>		154	4.17	47	40.7	37.0

Table 6 Chemical Usage Summary: Aluminum Sulphate Coagulant

Month	Average Dosage mg/L	Total kg (dry)
January	46.5	122.7
February	42.0	130.3
March	47.3	170.0
April	46.2	143.7
May	47.8	168.5
June	46.3	176.5
July	47.8	186.9
August	47.8	185.2
September	46.3	156.9
October	47.8	99.7
November	57.0	103.3
December	64.1	119.4
Average	48.9	146.9

Total Yearly Kilograms: 1,910.0

Table 7 Chemical Usage Summary: Soda Ash

Month	Average Dosage mg/L	Total kg (dry)
January	35.3	93.1
February	35.3	98.9
March	33.3	119.3
April	31.0	93.3
May	29.6	104.3
June	29.6	109.3
July	29.6	115.7
August	26.9	114.7
September	29.6	97.2
October	29.6	96.0
November	29.6	80.8
December	29.6	85.7
Average	31.0	100.7

Total Yearly Kilograms: 1,208.3

Table 8 Effluent Quarterly Analysis Summary – Weekly 24-Hour Composite Sample Part 1

Sample Date	Sample Identification Number	CBOD5 mg/L	pH	Total Phosphorus mg/L	Suspended Solids mg/L
8-Feb-21	CA12338	2	7.45	0.03	2
3-May-21	CA13101	2	7.56	0.05	2
2-Aug-21	CA12111	2	7.71	0.07	2
8-Nov-21	CA13324	2	8.08	0.07	2
<b>Yearly Average</b>		2	7.70	0.05	2
<b>Maximum</b>		2	8.08	0.07	2
<b>Minimum</b>		2	7.45	0.03	2

Table 9 Effluent Quarterly Analysis Summary – Weekly 24-Hour Composite Sample Part 2

Sample Date	Sample Identification Number	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L
8-Feb-21	CA12338	1.1	13.0	0.08	0.7
3-May-21	CA13101	1.3	3.51	0.03	1.0
2-Aug-21	CA12111	1.0	2.22	0.03	0.4
8-Nov-21	CA13324	0.8	6.00	0.04	0.1
<b>Yearly Average</b>		1.05	6.24	0.05	0.55
<b>Maximum</b>		1.3	13.0	0.08	1.0
<b>Minimum</b>		0.8	2.22	0.03	0.1

Table 10 Effluent Loading and Concentration Summary 2022: CBOD5

<b>Month</b>	<b>Average mg/L</b>	<b>Average kg/day</b>	<b>Maximum Daily kg/day</b>
<b>January</b>	3.50	0.25	0.27
<b>February</b>	2.00	0.17	0.38
<b>March</b>	2.00	0.20	0.33
<b>April</b>	2.25	0.19	0.32
<b>May</b>	2.00	0.19	0.35
<b>June</b>	2.25	0.24	0.33
<b>July</b>	2.00	0.21	0.32
<b>August</b>	2.00	0.21	0.29
<b>September</b>	2.00	0.18	0.28
<b>October</b>	2.00	0.18	0.30
<b>November</b>	2.00	0.16	0.24
<b>December</b>	2.25	0.18	0.31
<b>Average Monthly</b>	2.19	0.20	0.32
<b>Effluent Objective</b>	5.00	2.38	2.38
<b>Non-Compliance</b>	15.00	7.13	7.13

Table 11 Effluent Loading and Concentration Summary 2022: Suspended Solids

<b>Month</b>	<b>Average mg/L</b>	<b>Average kg/day</b>	<b>Maximum Daily kg/day</b>
<b>January</b>	2.00	0.14	0.20
<b>February</b>	2.00	0.17	0.38
<b>March</b>	2.80	0.28	0.46
<b>April</b>	2.25	0.59	0.32
<b>May</b>	2.00	0.19	0.35
<b>June</b>	2.20	0.23	0.33
<b>July</b>	2.00	0.21	0.32
<b>August</b>	3.20	0.34	0.46
<b>September</b>	2.00	0.18	0.28
<b>October</b>	2.25	0.20	0.34
<b>November</b>	2.00	0.16	0.24
<b>December</b>	2.75	0.22	0.38
<b>Average Monthly</b>	2.29	0.21	0.34
<b>Effluent Objective</b>	5.00	2.38	2.38
<b>Non-Compliance</b>	15.00	7.13	7.13

Table 12 Effluent Loading and Concentration Summary 2022: Total Ammonia Nitrogen Summer

<b>Month</b>	<b>Average mg/L</b>	<b>Average kg/day</b>	<b>Maximum Daily kg/day</b>
<b>May</b>	0.56	0.05	0.10
<b>June</b>	0.12	0.01	0.22
<b>July</b>	0.38	0.04	0.06
<b>August</b>	0.40	0.04	0.06
<b>September</b>	0.10	0.01	0.01
<b>October</b>	0.13	0.01	0.02
<b>November</b>	0.12	0.01	0.01
<b>Average Monthly</b>	0.26	0.03	0.04
<b>Effluent Objective</b>	1.00	0.48	0.48
<b>Non-Compliance</b>	4.00	1.90	1.90



Table 13 Effluent Loading and Concentration Summary 2022: Total Ammonia Nitrogen Winter

<b>Month</b>	<b>Average mg/L</b>	<b>Average kg/day</b>	<b>Maximum Daily kg/day</b>
<b>January</b>	0.23	0.02	0.02
<b>February</b>	0.33	0.03	0.06
<b>March</b>	0.73	0.07	0.12
<b>April</b>	0.10	0.01	0.01
<b>December</b>	0.23	0.02	0.03
<b>Average Monthly</b>	0.32	0.03	0.05
<b>Effluent Objective</b>	4.00	1.90	1.90
<b>Non-Compliance</b>	10.0	4.75	4.75

Table 14 Effluent Loading and Concentration Summary 2022: Fecal Coliform

<b>Month</b>	<b>Geomean (#/100mL)</b>	<b>Maximum Daily (#/100mL)</b>
<b>January</b>	0.00	0.00
<b>February</b>	0.00	0.00
<b>March</b>	0.00	0.00
<b>April</b>	0.00	0.00
<b>May</b>	0.00	0.00
<b>June</b>	0.00	0.00
<b>July</b>	0.00	0.00
<b>August</b>	0.00	0.00
<b>September</b>	0.00	0.00
<b>October</b>	0.00	0.00
<b>November</b>	0.00	0.00
<b>December</b>	0.00	0.00
<b>Average Monthly</b>	0	0
<b>Effluent Objective</b>	50 Organisms/100mL	80 Organisms/100mL
<b>Non-Compliance</b>	50 Organisms/100mL	80 Organisms/100mL

Table 15 Effluent Loading and Concentration Summary 2022: Total Phosphorus

<b>Month</b>	<b>Average mg/L</b>	<b>Average kg/day</b>	<b>Maximum Daily kg/day</b>
<b>January</b>	0.04	0.003	0.0040
<b>February</b>	0.04	0.004	0.0081
<b>March</b>	0.04	0.004	0.0072
<b>April</b>	0.04	0.003	0.0050
<b>May</b>	0.04	0.004	0.0065
<b>June</b>	0.05	0.005	0.0074
<b>July</b>	0.09	0.009	0.0135
<b>August</b>	0.08	0.008	0.0112
<b>September</b>	0.06	0.005	0.0080
<b>October</b>	0.06	0.005	0.0091
<b>November</b>	0.07	0.006	0.0089
<b>December</b>	0.05	0.004	0.0069
<b>Average Monthly</b>	0.05	0.005	0.0080
<b>Effluent Objective</b>	0.30	0.143	0.143
<b>Non-Compliance</b>	1.00	0.475	0.475

Table 16 Sludge Quality Analysis 2022

<b>Parameter Sampled (mg/L)</b>	<b>First Quarter</b>	<b>Second Quarter</b>	<b>Third Quarter</b>	<b>Fourth Quarter</b>
<b>Date</b>	Feb 8, 2022	May 3, 2022	Aug 2, 2022	Nov 8, 2022
<b>Sample ID</b>	CA12348	CA13095	CA12099	CA13319
Mercury	0.058	0.068	0.114	0.058
Potassium	66	69	78	50
Chromium	1.4	1	1.2	0.97
Cobalt	0.05	0.04	0.04	0.04
Copper	6.2	4.6	5.7	4.4
Lead	0.2	0.2	0.2	0.20
Molybdenum	0.2	0.16	0.2	0.15
Nickel	0.77	0.58	0.65	0.55
Selenium	0.10	0.10	0.1	0.1
Arsenic	0.1	0.1	0.1	0.1
Zinc	8	6	6	5
Cadmium	0.017	0.013	0.018	0.015
Ammonia	1.4	3.8	68.3	1.0
Total Kjeldahl Nitrogen	596	844	799	597
Total Phosphorus	650	510	630	460
Total Solids	17000	15600	17500	15500
Nitrate	94	110	180	290
Nitrite	0.5	1.9	2.4	0.2

## Certification of Reports

I certify that the information in this document and all attachments are correct, accurate, and complete to the best of my knowledge.

Michael Currie  
Director, Water and Wastewater Services