



# HAWKESBURY

## Wastewater Treatment Plant 2023 Annual Performance Report

Prepared by the Environmental Service  
M. Perron, B.Sc, Superintendent / N. Beks, QMS Rep.  
January 19, 2024

## TABLE OF CONTENTS

<b>Introduction .....</b>	<b>1</b>
<b>Wastewater Treatment Process .....</b>	<b>1</b>
<b>Interpretation of Monitoring and Analytical Data .....</b>	<b>2</b>
<b>Operating Problems Encountered and Correction Actions Taken .....</b>	<b>3</b>
<b>Maintenance Summary.....</b>	<b>3</b>
<b>Effluent Quality Assurance and Control Measures Undertaken .....</b>	<b>4</b>
<b>Calibrations &amp; Inspection .....</b>	<b>4</b>
<b>Efforts and Results Achieved in Meeting Effluent Objectives .....</b>	<b>4</b>
<b>Biosolid Generation .....</b>	<b>5</b>
<b>Summary of Complaints.....</b>	<b>5</b>
<b>By-passing / Spills / Abnormal Discharges .....</b>	<b>6</b>
<b>Additional Information Requested .....</b>	<b>6</b>
<b>Availability of Report .....</b>	<b>6</b>
<b>Appendix A - 2023 Monthly Performance Assessment Report .....</b>	<b>7</b>
<b>Appendix B - 2023 Monthly Raw Sewage Data Report .....</b>	<b>9</b>
<b>Appendix C - 2023 Monthly Effluent Data Report.....</b>	<b>11</b>
<b>Appendix D - 2023 Monthly Chemical Data Report .....</b>	<b>13</b>
<b>Appendix E - 2023 Monthly Biosolids Analysis Report .....</b>	<b>14</b>
<b>Appendix F - 2023 Bypass Event Report .....</b>	<b>15</b>
<b>Appendix G - 2023 Annual Bypass Summary Report.....</b>	<b>16</b>

## Introduction

The Corporation of the Town of Hawkesbury owns and operates the Wastewater Treatment Plant (WWTP) located at 815, Main East Street in Hawkesbury, Ontario, which services a population of around 10,000. The plant has a rated capacity of 13,800 m<sup>3</sup>/d, a peak flow of 41,000 m<sup>3</sup>, is designated a Class IV Wastewater Treatment Facility and is operated 24 hours a day, 7 days a week.

This Annual Performance Report for the January 1, 2023, to December 31, 2023, reporting period has been prepared to meet the requirements of the Ministry of the Environment, Conservation and Parks (MECP) Amended Environmental Compliance Approval (ECA) #4692-8DVQTW for the design and operation of the Corporation of the Town of Hawkesbury Wastewater Treatment Plant (WWTP). It also serves to explain the operations of an essential part of the Town’s infrastructure. All efforts have been made to ensure the information presented is accurate.

## Wastewater Treatment Process

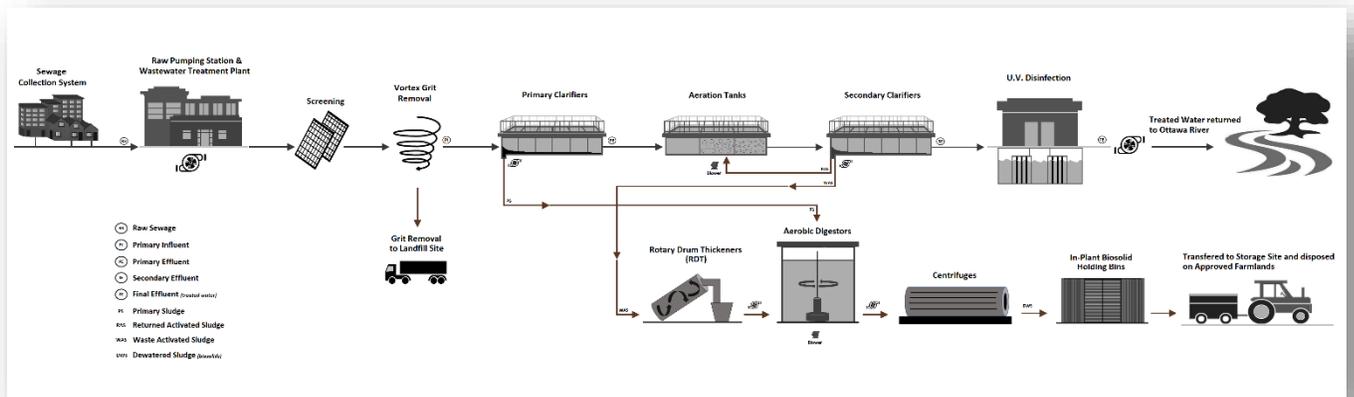
The Hawkesbury wastewater system is primarily composed by a sewage collection system and a wastewater treatment plant. The sewage collection system consists of more than 45 km of sanitary sewers, approximately 4.7 kilometres of combined sewers, 1 combined sewer overflow by-pass manhole and 6 sewage lift stations to convey wastewater from lower-lying areas. The wastewater treatment plant includes a raw sewage pumping station with several treatment process buildings and reservoirs.

Wastewater that leaves all homes and businesses in the town travels via gravity through the underground sewage collection system towards the raw sewage pumping station where four pumps are available to deliver the wastewater to the treatment plant.

The wastewater treatment plant uses the activated sludge process, a multi-stage treatment process which consists of two screens, two vortex grit removal, three primary clarifiers, three aeration tanks, four secondary clarifiers, 128 ultraviolet lamps for disinfection, two aerobic digesters, one sludge stabilizer and two centrifuges.

Once the treatment process is completed, the effluent is discharged into the Ottawa River and the biosolids (dewatered sludge) are disposed of on approved and certified farmlands for amendments.

### Treatment Process Flowchart



## Interpretation of Monitoring and Analytical Data

In 2023, no effluent parameter exceeded the Monthly Average Effluent Limits outlined in Condition 7(1) to 7(4) of the amended ECA. Please refer to *Appendix A* for a detailed summary of monthly concentrations and waste loadings. *Table 1* (below) compares the Monthly Average Effluent Concentration Range and Waste Loading Range with the Amended ECA Monthly Criteria Effluent Compliance Limits, whereas *Table 2* summarizes the individual Notification of Monthly Average Effluent Quality Non-Compliance with the ECA issued during the year.

Pursuant to condition 9(5) of the ECA, un-ionized ammonia was calculated on weekly total ammonia nitrogen, temperature and pH. Sample results ranged from 0.0008 mg/L to 0.0114 mg/L with an annual average of 0.0037 mg/L. Please refer to *Appendix C* for the detailed monthly results. Acute lethality for rainbow trout and *Daphnia magna* was also tested with Aquatox Testing and Consulting Inc. laboratory. The certificate of analysis from the lab showed 0% mortality, meaning no lethality for rainbow trout and *Daphnia magna*.

**TABLE 1**  
**Monthly Average Effluent Concentration Range and Waste Loading Range compared with the Amended ECA Monthly Criteria Effluent Compliance Limits**

Effluent Parameter	Monthly Average Effluent Concentration Results in mg/L	ECA Monthly Effluent Concentration Limit in mg/L	Monthly Average Effluent Waste Loading Results in kg/day	ECA Monthly Effluent Waste Loading Limit in kg/day
CBOD-5	<b>3.0 – 3.3</b>	25.0	<b>18 – 43.5</b>	345
Total Suspended Solid	<b>3.5 – 8.0</b>	25.0	<b>25.2 – 107.2</b>	345
Total Phosphorous	<b>0.05 – 0.10</b>	0.89	<b>0.35 – 0.99</b>	12.3
E. Coli* (ct/100ml)	<b>2.0 – 35</b>	200 ct/100ml	n/a	n/a
Total Ammonia	<b>0.12 – 0.43</b>	12.0 (June 1 to Sept 30)	<b>1.10 – 2.60</b>	166 (June 1 to Sept 30)
Total Ammonia	<b>0.20 – 1.86</b>	20.0 (Oct. 1 to May 31)	<b>1.59 – 15.82</b>	276 (Oct. 1 to May 31)
pH	<b>6.9 to 7.8</b>	6.0 to 9.5	n/a	n/a

\* *Monthly Geometric Mean Density*

**TABLE 2**  
**Notification of Monthly Average Effluent Quality Non-Compliance**

<b>Month</b>	<b>Parameter &amp; Limit</b>	<b>Result</b>
January	No effluent quality non-compliance	
February	No effluent quality non-compliance	
March	No effluent quality non-compliance	
April	No effluent quality non-compliance	
May	No effluent quality non-compliance	
June	No effluent quality non-compliance	
July	No effluent quality non-compliance	
August	No effluent quality non-compliance	
September	No effluent quality non-compliance	
October	No effluent quality non-compliance	
November	No effluent quality non-compliance	
December	No effluent quality non-compliance	

\* Monthly Geometric Mean Density

### **Operating Problems Encountered and Correction Actions Taken**

There were no major breakdown or major operating problems in 2023. Occasional problems were diagnosed quickly and corrected immediately.

The plant was effective at treating the wastewater and maintaining the effluent parameters levels within the non-compliance limits.

### **Maintenance Summary**

Regular preventive and scheduled maintenance were performed throughout the year to ensure availability of equipment and continuous operation of the plant. The following are the major maintenance completed this year:

- Primary and secondary clarifier tanks inspection and maintenance
- Air blower rebuilt
- West Street sanitary main replacement
- Maintenance on dynamic seal of aerobic digesters transfer pump
- Genset repair
- Inspection, cleaning and replacement of UV lights as required

## **Effluent Quality Assurance and Control Measures Undertaken**

All sampling and plant operations were performed by licenced operators, in accordance with the Terms and Conditions of the Amended Environmental Compliance Approval (ECA).

Analytical tests to monitor the required parameters of the ECA, including the biosolids (dewatered sludge) for land application, were performed by the Caduceon Environmental Laboratories, accredited to the ISO/IEC 17025 standard by the Canadian Association for Laboratory Accreditation Inc.

And, once again this year, the Town of Hawkesbury continued to participate in the Ontario Wastewater Surveillance Initiative that monitors the presence of COVID-19 in wastewater. Sampling results were performed at the Queen's University in Kingston and can be found under the Eastern Ontario Health Unit (EOHU) COVID-19 Update's web page.

## **Calibration and Inspection**

The following calibrations and inspections were performed:

- Flowmeters and level sensors by Capital Controls and Instrumentation Inc.
- Gas sensors from every building by CDTEC Calibrations Inc. (twice, every six month)
- Backflow preventers by Backflow Preventer and Plumbing
- Fire extinguishers by Champlain Fire Protection
- Fire alarm system by Chubb Edwards
- Heating maintenance by BGIS Integrated Technical Services Canada Ltd
- Lifting devices by Corbett & Corbett Inc

## **Efforts and Results Achieved in Meeting Effluent Objectives**

Efforts made to achieve effluent objectives included:

- Continuous monitoring and process adjustments (as required)
- In-house and 3rd party laboratory sampling and testing
- Regular data review
- Preventive maintenance routines of essential equipment and process components
- Monitoring & sampling wastewater of companies with special sewer discharge agreements

*Table 3* (below) illustrates the Monthly Average Effluent Concentration Range compared to the Monthly Average Effluent Objectives outlined in Conditions 6(1) and 6(2) (a), (b) and (c) of the amended ECA.

**TABLE 3**  
**Monthly Average Effluent Concentration Range Vs Monthly ECA Average Effluent Objectives**

<b>Effluent Objectives Parameter</b>	<b>Monthly Average Effluent Concentration Results in mg/L</b>	<b>Monthly ECA Average Effluent Objectives</b>
CBOD-5	<b>3.0 – 3.3</b>	15.0
Total Suspended Solids	<b>3.5 – 8.0</b>	15.0
Total Phosphorus	<b>0.05 – 0.10</b>	0.5
Total Ammonia (June 1 to Sept 30)	<b>0.12 – 0.43</b>	8.0
Total Ammonia (Oct 1 to May 31)	<b>0.20 – 1.86</b>	12.0
pH	<b>6.9 – 7.8</b>	6.5 to 8.5
E. Coli* (ct/100ml)	<b>2 – 35</b>	100 ct/100ml
Capacity (m <sup>3</sup> /day)	<b>8,567</b>	13,800

\* Monthly Geometric Mean Density

### **Biosolid Generation**

During 2023, the Hawkesbury WWTP hauled 250.64 dry tons of biosolids (dewatered sludge) to the transfer site (Ferme A.G.L. Malette, ECA # 8311-8UZJ8K). The *Table 4* (below) summarizes the amounts and locations of the soil conditioning activities in 2023. We anticipate the volume of biosolids to be 227 dry tons for 2024. This estimation is based on a five-year average.

**TABLE 4**  
**Location of Spreading the Organic Waste**

<b>Hawkesbury Biosolids Summary</b>			
<b>Biosolids Conditioning Location</b>	<b>NASM Plan</b>	<b>Field #</b>	<b>Dry Ton (kg)</b>
Ferme A.G.L. Malette	60329	n/a	<b>250.64</b>
<b>HAWKESBURY WWTP TOTAL GENERATED BIOSOLIDS</b>			<b>250.64</b>

### **Summary of Complaints**

There were no complaints reported in 2023.

## **By-passing / Spills / Abnormal Discharges**

There were 3 Wastewater Treatment Plant by-pass and 0 Combined Sewer Overflow (CSO) in 2023. Please refer to *Appendix F, 2023 Bypass Event Report* and *Appendix G, 2023 Annual Bypass Summary Report*. All bypasses were reported to the Spill Action Center and the Ministry of the Environment, Conservation and Parks (MECP) and the laboratory results of the bypasses were communicated to our MECP Environmental Officer by email. These bypasses represent 0.11% of the total annual raw sewage flow. There were no spills or abnormal discharge events to report during this year.

## **Additional Information Requested**

No additional information was requested during this reporting period. Ongoing communication with the MECP has occurred throughout the reporting year, addressing the MUMP's data to Ottawa and Etobicoke area offices. We trust this satisfies the Ministry of the Environment, Conservation and Parks (MECP) Amended Environmental Compliance Approval (ECA) #4692-8DVQTW for the design and operation of the Corporation of the Town of Hawkesbury Wastewater Treatment Plant (WWTP).

## **Availability of Report**

This report is available at no charge at the following places:

- 1. *Environmental Service***  
Corporation of the Town of Hawkesbury  
815 Main East  
Hawkesbury (Ontario) K6A 1B5  
(613) 678-9269
  
- 2. *Hawkesbury Public Library***  
550 Higginson Street  
Hawkesbury, Ontario  
K6A 1H1
  
- 3. *Town's website* [www.hawkesbury.ca](http://www.hawkesbury.ca)**

Additionally, this report is provided to the Ministry of the Environment, Conservation and Parks.

If the format of this document is inadequate, the Clerk's office can be contacted at 613-632-0106 and the municipality can provide, to the best of its abilities, the required assistance.

## Appendix A 2023 Monthly Performance Assessment Report

Raw Sewage Flow	January	February	March	April	May	June	July	August	September	October	November	December
Total (m3/mth)	260,542	188,045	292,697	401,970	295,024	180,044	272,117	283,714	191,992	248,168	229,849	289,274
Avg. (m3/day)	8,405	6,716	9,442	13,399	9,517	6,001	8,778	9,152	6,400	8,005	7,662	9,331
Max. (m3/day)	23,036	11,128	15,639	25,044	45,181	8,893	17,372	15,080	7,984	13,308	9,459	28,253
Min. (m3/day)	5,264	4,987	5,198	8,196	5,504	5,164	5,603	6,197	5,690	5,332	6,710	6,627

Total Annual Raw Flow (m<sup>3</sup>) = 3,133,436

Average Annual Raw Daily Flow (m<sup>3</sup>) = 8,567

Final Effluent Flow	January	February	March	April	May	June	July	August	September	October	November	December
Total (m3/mth)	254,768	182,780	287,078	396,841	289,291	173,441	265,330	277,236	185,233	241,881	223,691	283,832
Avg. (m3/day)	8,218	6,528	9,261	13,228	9,332	5,781	8,559	8,943	6,174	7,803	7,456	9,156
Max. (m3/day)	22,782	10,950	15,478	24,879	44,989	8,676	17,152	14,893	7,776	13,078	9,327	28,121
Min. (m3/day)	5,069	4,795	5,027	8,024	5,292	4,927	5,386	5,956	5,428	5,127	6,498	6,470

Total Annual Effluent Flow (m<sup>3</sup>) = 3,061,401

Average Annual Effluent Daily Flow (m<sup>3</sup>) = 8,370

Biochemical Oxygen Demand	January	February	March	April	May	June	July	August	September	October	November	December
Raw Avg. CBOD (mg/L)	90.2	82.0	61.5	32.8	62.6	116.8	57.5	58.6	89.8	48.4	78.5	29.8
Eff. Avg. CBOD (mg/L)	3.2	3.0	3.0	3.3	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
CBOD Loading (kg/d)	26.9	20.1	28.3	43.5	28.6	18.0	26.3	27.5	19.2	24.0	23.0	28.0
Percent Removal (%)	96.5	96.3	95.1	90.1	95.2	97.4	94.8	94.9	96.7	93.8	96.2	89.9

Suspended Solids	January	February	March	April	May	June	July	August	September	October	November	December
Raw Avg. SS (mg/L)	192.4	155.0	101.5	89.5	118.4	320.0	113.5	134.5	240.5	132.8	166.5	90.5
Eff. Avg. SS (mg/L)	4.8	3.8	5.3	8.0	5.8	4.3	3.5	3.8	4.5	3.6	5.0	4.0
SS Loading (kg/d)	40.3	25.2	49.6	107.2	55.2	25.5	30.7	34.8	28.8	28.8	38.3	37.3
Percent Removal (%)	97.5	97.6	94.8	91.1	95.1	98.7	96.9	97.2	98.1	97.3	97.0	95.6

Phosphorous	January	February	March	April	May	June	July	August	September	October	November	December
Raw Avg. PHOS (mg/L)	3.04	2.70	2.30	1.16	1.75	3.56	2.22	1.72	3.05	1.52	1.88	1.83
Eff. Avg. PHOS (mg/L)	0.07	0.09	0.06	0.06	0.10	0.06	0.05	0.05	0.06	0.06	0.05	0.06
Phos. Loading (kg/d)	0.55	0.62	0.54	0.74	0.99	0.38	0.46	0.42	0.35	0.45	0.38	0.51
Percent Removal (%)	97.8	96.6	97.5	95.2	94.1	98.2	97.6	97.3	98.2	96.3	97.3	97.0

**Appendix A**  
**2023 Monthly Performance Assessment Report**

Nitrogen Series	January	February	March	April	May	June	July	August	September	October	November	December
Inf. Avg. NH3 as N (mg/L)	11.49	11.01	10.36	3.77	9.11	12.78	10.45	9.34	11.39	10.84	12.43	7.72
Eff. Avg. NH3 as N (mg/L)	0.45	1.86	1.68	0.39	0.55	0.43	0.16	0.12	0.29	0.20	0.75	0.89
NH3 Loading (kg/d)	3.77	12.46	15.82	5.16	5.22	2.60	1.43	1.10	1.86	1.59	5.77	8.33
Percent Removal	96.10	83.15	83.83	89.79	93.98	96.61	98.44	98.72	97.45	98.17	93.94	88.44
Disinfection	January	February	March	April	May	June	July	August	September	October	November	December
Eff. Geo. Mean E. Coli (ct/100mL)	32.5	3.7	10.2	8.0	13.0	20.9	6.8	2.0	8.4	34.7	29.4	4.8
pH	January	February	March	April	May	June	July	August	September	October	November	December
Eff. Avg. pH	7.3	7.0	7.0	7.6	7.5	7.1	7.2	7.3	6.9	7.3	7.8	7.7
Temperature	January	February	March	April	May	June	July	August	September	October	November	December
Eff. Avg. Temp. (C°)	6.6	5.7	6.0	6.7	9.6	13.1	14.7	14.8	15.1	13.5	10.2	8.0

## Appendix B 2023 Monthly Raw Sewage Data Report

Raw Sewage Flow	January	February	March	April	May	June	July	August	September	October	November	December
Total (m3/mth)	260,542	188,045	292,697	401,970	295,024	180,044	272,117	283,714	191,992	248,168	229,849	289,274
Avg. (m3/day)	8,405	6,716	9,442	13,399	9,517	6,001	8,778	9,152	6,400	8,005	7,662	9,331
Max. (m3/day)	23,036	11,128	15,639	25,044	45,181	8,893	17,372	15,080	7,984	13,308	9,459	28,253
Min. (m3/day)	5,264	4,987	5,198	8,196	5,504	5,164	5,603	6,197	5,690	5,332	6,710	6,627

Total Annual Raw Flow (m<sup>3</sup>) = 3,133,436

Average Annual Raw Daily Flow (m<sup>3</sup>) = 8,567

BOD (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	120.40	110.50	81.50	46.00	87.40	201.25	69.50	76.00	106.75	100.40	101.25	85.75
Max.	173.00	168.00	120.00	54.00	100.00	417.00	82.00	102.00	144.00	195.00	123.00	149.00
Min.	79.00	63.00	45.00	41.00	68.00	117.00	59.00	62.00	59.00	28.00	84.00	47.00

CBOD - 5 (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	90.20	82.00	61.50	32.75	62.60	116.75	57.50	58.60	89.75	48.40	78.50	29.75
Max.	162.00	115.00	104.00	43.00	90.00	202.00	88.00	74.00	124.00	72.00	95.00	45.00
Min.	56.00	43.00	18.00	24.00	17.00	78.00	40.00	45.00	44.00	25.00	63.00	9.00

Suspended Solids (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	192.40	155.00	101.50	89.50	118.40	320.00	113.50	134.45	240.50	132.80	166.50	90.50
Max.	286.00	220.00	146.00	120.00	195.00	600.00	150.00	190.00	390.00	188.00	180.00	146.00
Min.	114.00	96.00	34.00	62.00	34.00	180.00	84.00	90.00	122.00	86.00	142.00	46.00

## Appendix B 2023 Monthly Raw Sewage Data Report

Total Phosphorous (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	3.04	2.70	2.30	1.16	1.75	3.56	2.22	1.72	3.05	1.52	1.88	1.83
Max.	4.70	4.54	3.14	1.64	2.72	5.51	3.71	3.04	5.59	3.26	2.42	3.24
Min.	1.02	1.18	0.67	0.62	0.66	2.61	1.34	0.94	1.74	0.88	1.49	1.13

NH3 as N (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	11.49	11.01	10.36	3.77	9.11	12.78	10.45	9.34	11.39	10.84	12.43	7.72
Max.	16.70	13.30	16.20	4.87	12.50	14.30	12.60	11.70	14.50	16.60	17.10	13.40
Min.	7.34	7.24	3.55	3.00	1.42	11.20	7.70	6.78	8.55	6.52	9.10	1.47

TKN (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	19.74	18.38	17.75	7.35	15.00	23.18	19.55	15.46	19.13	15.20	17.75	13.05
Max.	27.40	25.30	23.90	9.70	23.20	27.00	30.60	24.20	24.60	24.80	19.60	21.40
Min.	9.90	11.60	6.50	6.40	3.80	20.20	12.40	11.20	16.60	9.80	16.20	5.40

pH	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	7.4	7.4	7.5	7.7	7.5	7.3	7.4	7.3	7.0	7.2	7.5	7.5
Max.	7.4	7.7	7.7	8.0	7.8	7.4	7.6	7.6	7.4	7.4	7.7	7.7
Min.	7.4	7.1	7.1	7.5	7.4	7.2	7.2	6.9	6.8	6.9	7.4	7.4

## Appendix C 2023 Monthly Effluent Data Report

Final Effluent Flow	January	February	March	April	May	June	July	August	September	October	November	December
Total (m3/mth)	254,768	182,780	287,078	396,841	289,291	173,441	265,330	277,236	185,233	241,881	223,691	283,832
Avg. (m3/day)	8,218	6,528	9,261	13,228	9,332	5,781	8,559	8,943	6,174	7,803	7,456	9,156
Max. (m3/day)	22,782	10,950	15,478	24,879	44,989	8,676	17,152	14,893	7,776	13,078	9,327	28,121
Min. (m3/day)	5,069	4,795	5,027	8,024	5,292	4,927	5,386	5,956	5,428	5,127	6,498	6,470

Total Annual Effluent Flow (m<sup>3</sup>) = 3,061,401

Average Annual Effluent Daily Flow (m<sup>3</sup>) = 8,370

CBOD - 5 (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	3.20	3.00	3.00	3.25	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Max.	4.00	3.00	3.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Min.	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Suspended Solids (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	4.80	3.75	5.25	8.00	5.80	4.25	3.50	3.80	4.50	3.60	5.00	4.00
Max.	8.00	5.00	9.00	20.00	12.00	5.00	5.00	5.00	8.00	6.00	11.00	7.00
Min.	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Total Phosphorous (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	0.07	0.09	0.06	0.06	0.10	0.06	0.05	0.05	0.06	0.06	0.05	0.06
Max.	0.09	0.13	0.06	0.08	0.24	0.08	0.09	0.06	0.07	0.13	0.06	0.07
Min.	0.04	0.06	0.05	0.03	0.03	0.04	0.02	0.04	0.04	0.02	0.03	0.04

NH3 as N (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	0.45	1.86	1.68	0.39	0.55	0.43	0.16	0.12	0.29	0.20	0.75	0.89
Max.	0.72	2.68	3.18	0.50	1.40	0.64	0.44	0.23	0.76	0.33	0.98	2.15
Min.	0.19	0.88	0.52	0.26	0.14	0.09	0.05	0.05	0.05	0.06	0.54	0.08

## Appendix C 2023 Monthly Effluent Data Report

Un-ionized Ammonia (NH <sub>3</sub> ) (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	0.0024	0.0040	0.0032	0.0024	0.0058	0.0015	0.0008	0.0008	0.0008	0.0017	0.0114	0.0094
Max.	0.0060	0.0083	0.0059	0.0042	0.0202	0.0021	0.0023	0.0015	0.0016	0.0040	0.0142	0.0257
Min.	0.0003	0.0005	0.0007	0.0018	0.0008	0.0003	0.0003	0.0002	0.0001	0.0001	0.0077	0.0009

TKN (mg/L)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	1.66	3.05	2.90	1.30	1.68	1.55	1.18	1.02	1.33	1.16	1.83	1.85
Max.	2.20	4.30	4.50	1.40	2.40	1.90	1.60	1.20	1.80	1.20	1.90	3.40
Min.	1.00	2.50	1.50	1.10	1.30	1.20	0.90	0.80	1.10	1.00	1.70	0.80

Geo. Mean E. Coli (ct/100mL)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	32.5	3.7	10.2	8.0	13.0	20.9	6.8	2.0	8.4	34.7	29.4	4.8
Max.	97.0	24.0	134.0	34.0	38.0	170.0	34.0	2.0	90.0	278.0	146.0	68.0
Min.	2.0	2.0	2.0	2.0	7.0	4.0	2.0	2.0	2.0	4.0	10.0	2.0

pH	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	7.3	7.0	7.0	7.6	7.5	7.1	7.2	7.3	6.9	7.3	7.8	7.7
Max.	7.8	7.4	7.2	7.7	7.9	7.2	7.5	7.6	7.2	7.9	7.9	7.8
Min.	6.5	6.6	6.9	7.4	7.3	7.0	7.1	7.0	6.7	6.6	7.7	7.5

Temperature (°C)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	6.6	5.7	6.0	6.7	9.6	13.1	14.7	14.8	15.1	13.5	10.2	8.0
Max.	7.4	6.6	6.5	8.4	11.9	14.3	15.3	15.3	16.1	15.5	11.5	9.4
Min.	5.8	4.4	5.3	5.3	7.2	12.1	14.1	14.3	14.4	11.7	8.6	7.4

**Appendix D**  
**2023 Monthly Chemical Data Report**

Coagulant usage (kG)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	132	104	144	211	170	76	110	117	89	107	102	137
Total	4083	2910	4475	6319	5276	2287	3402	3617	2668	3302	3069	4242

Coagulant dosage dry (m)	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	8.1	8.1	8.0	8.3	9.3	6.7	6.5	6.6	7.3	6.9	7.0	7.5
Max.	9.2	11.6	9.2	9.5	9.9	9.0	7.0	7.2	14.1	7.5	7.8	8.6
Min.	7.4	7.6	7.3	7.3	8.7	6.0	6.1	6.3	6.2	6.5	6.2	6.2

Polymer usage (kG)	January	February	March	April	May	June	July	August	September	October	November	December
Total	849	894	973	1,010	959	918	653	825	830	954	842	785

**Appendix E**  
**2023 Monthly Biosolids Analysis Report**

Parameter	January	February	March	April	May	June	July	August	September	October	November	December
Biosolids Hauled (dry ton)	18.44	20.60	22.98	25.36	27.21	22.67	17.48	24.69	20.57	15.93	15.39	19.31
Biosolids Hauled (wet ton)	92.20	97.64	105.40	115.78	114.33	104.97	78.75	104.62	89.04	68.98	82.76	82.19
pH @ 25°C	6.00	5.82	6.15	6.24	6.32	5.30	5.30	5.76	5.67	6.18	4.48	5.29
Total Solids (%)	20	21.1	21.8	21.9	23.8	21.6	22.2	23.6	23.1	23.1	18.6	23.5
Ammonia (N)-Total (µg/g)	933	632	13	1210	1370	483	298	288	171	137	47	151
Total Kjeldahl Nitrogen (µg/g)	62900	50800	69400	65600	41500	45400	44100	39400	48800	46500	51000	57300
Nitrite (N) (µg/g)	10	10	4	4	4	4	188	4	4	4	1	4
Nitrate (N) (µg/g)	10	10	658	4	4	944	17	19	4	4	446	4
Phosphorus-Total (µg/g)	25600	18500	27800	27200	18100	20900	22500	22700	25600	26000	24600	25700
Potassium (µg/g)	2340	2410	2210	2660	2830	1860	1520	1650	1930	1490	1570	1700
Aluminum (µg/g)	66200	63500	59800	62700	45800	61400	52800	57500	82600	51200	68600	56500
Arsenic (µg/g)	4	3	3	3	3	3	3	3	3	3	4	3
Calcium (µg/g)	15100	13200	14000	15300	14900	11600	11400	17000	15700	14800	9850	18100
Cadmium (µg/g)	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.7	0.5	0.6
Chromium (µg/g)	31	28	26	26	31	32	34	41	38	34	31	27
Cobalt (µg/g)	3	3	3	2	4	4	3	4	4	4	3	3
Copper (µg/g)	292	261	248	235	223	234	247	296	286	285	280	297
Lead (µg/g)	13	11	9	9	11	13	14	20	22	20	16	18
Mercury (µg/g)	0.170	0.190	0.150	0.210	0.210	0.190	0.280	0.340	0.250	0.350	0.390	0.200
Molybdenum (µg/g)	4	4	3	3	3	4	3	4	4	4	4	4
Nickel (µg/g)	17	15	13	13	16	17	21	21	21	25	17	15
Selenium (µg/g)	2	2	3	2	3	2	2	2	2	3	2	2
Zinc (µg/g)	1030	870	814	788	694	791	835	904	971	1120	923	1090
E-Coli (cfu/g)	5000	4739	4590	13700	29500	4640	4510	4230	4330	4340	5370	4260

Total Biosolids Hauled (dry ton) = 250.64

**Appendix F  
2023 Bypass Event Report**

Date of Event	Location	Type	Duration	Estimate volume (m3)	Reason (Code)
May 1, 2023	Wastewater Treatment Plant	PB	1 hour, 15 minutes	1053	1
July 13, 2023	Wastewater Treatment Plant	PB	36 minutes	1454	1
July 28, 2023	Wastewater Treatment Plant	PB	38 minutes	947	1
Total bypass volume (m3)				3,454	

Type	Reason Codes
PB (Primary Bypass) SB (Secondary Bypass) STPO (Sewage Treatment Plant Overflow) PSO (Pumping Station Overflow) CSO (Combined Sewer Overflow)	1 (Heavy Precipitation) 2 (Snow Melt) 3 (Equipment Failure) 4 (Maintenance/upgraded) 5 (Sewer Problems) 6 (Power Failure) 7 (Exceed Design Capacity) O (Others)

**Appendix G**  
**2023 Annual Bypass Summary Report**

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Number ( <i>days</i> )	0	0	0	0	1	0	2	0	0	0	0	0	3
Duration ( <i>minute</i> )	0	0	0	0	75	0	74	0	0	0	0	0	149
Estimated Volume ( <i>m3</i> )	0	0	0	0	1053	0	2401	0	0	0	0	0	3,454

Volume of Bypass as % of Average Daily	0.11%
Flow ( <i>ADF</i> )*	ADF = 8,567 m <sup>3</sup> /day

\*ADF = Average Daily Flow