Wastewater Treatment Plant
2022
Annual Performance Report

Prepared by the Environmental Service
M. Perron, B.Sc, Superintendent / N. Beks, QMS Rep.
January 30, 2023

TABLE OF CONTENTS

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^3/d, a peak flow of 41,000 m^3, 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, 2022, to December 31, 2022, 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

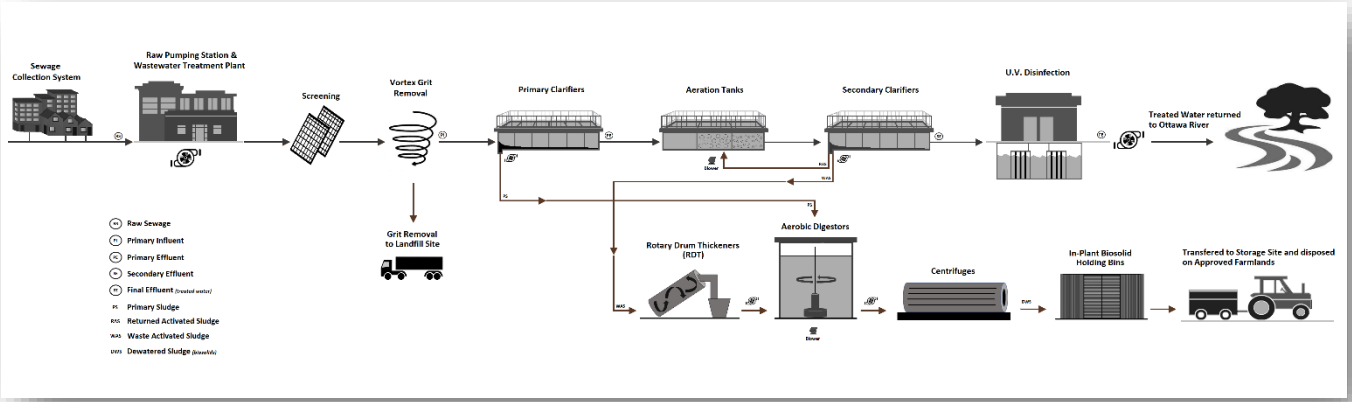
The Hawkesbury wastewater system is primarily composed by a sewage collection system and a wastewater treatment plant. The sewage collection system consists of more than 45 km of sanitary sewers, approximately 4.7 kilometres of combined sewers, 1 combined sewer overflow by-pass manhole and 6 sewage lift 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 2022, 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 and ranged from 0.0010 mg/L to 0.0149 mg/L with an annual average of 0.0051 mg/L during 2022. 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 Range in mg/L	ECA Monthly Effluent Concentration Limit in mg/L	Monthly Average Effluent Waste Loading Range in kg/day	ECA Monthly Effluent Waste Loading Limit in kg/day
CBOD-5	**3.0 – 4.0**	25.0	**16.9 – 37.4**	345
Total Suspended Solid	**3.0 – 7.0**	25.0	**18.1 – 64.5**	345
Total Phosphorous	**0.04 – 0.13**	0.89	**0.27 – 1.05**	12.3
E. Coli* (ct/100ml)	**2.0 – 54**	200 ct/100ml	**n/a**	n/a
Total Ammonia	**0.18 – 0.67**	12.0 (June 1 to Sept 30)	**1.08 – 4.63**	166 (June 1 to Sept 30)
Total Ammonia	**0.31 – 5.34**	20.0 (Oct. 1 to May 31)	**1.95 – 29.99**	276 (Oct. 1 to May 31)
pH	**7.1 to 7.6**	6.0 to 9.5	**n/a**	n/a

**** Monthly Geometric Mean Density***

TABLE 2
Notification of Monthly Average Effluent Quality Non-Compliance

Month	Parameter & Limit	Result
January	None (Effluent Quality in Compliance with ECA)	
February	None (Effluent Quality in Compliance with ECA)	
March	None (Effluent Quality in Compliance with ECA)	
April	None (Effluent Quality in Compliance with ECA)	
May	None (Effluent Quality in Compliance with ECA)	
June	None (Effluent Quality in Compliance with ECA)	
July	None (Effluent Quality in Compliance with ECA)	
August	None (Effluent Quality in Compliance with ECA)	
September	None (Effluent Quality in Compliance with ECA)	
October	None (Effluent Quality in Compliance with ECA)	
November	None (Effluent Quality in Compliance with ECA)	
December	None (Effluent Quality in Compliance with ECA)	

***** *Monthly Geometric Mean Density*

Operating Problems Encountered and Correction Actions Taken

There were no major breakdown or major operating problems in 2022. 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 were the major maintenance completed this year:

- Maintenance and training on equalization pump
- Primary and secondary clarifier tanks inspection and maintenance
- Metal roof flashing installation at the wastewater treatment plant following the severe derecho storm in May
- Intensive maintenance on the Centrifuge #1
- Air blower rebuilt
- Installation of davit fall security protection system bases for the clarifiers

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 Airon Group of Companies
- U.V. system by Trojan Technologies with on-site training

Effluent Objectives

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

Effluent Objectives Parameter	Monthly Average Effluent Concentration Range in mg/L	Monthly ECA Average Effluent Objectives
CBOD-5	**3.0 – 4.0**	15.0
Total Suspended Solids	**3.0 – 7.0**	15.0
Total Phosphorus	**0.04 – 0.13**	0.5
Total Ammonia (June 1 to Sept 30)	**0.18 – 0.67**	8.0
Total Ammonia (Oct 1 to May 31)	**0.31 – 5.34**	12.0
pH	**7.1 – 7.6**	6.5 to 8.5
E. Coli* (ct/100ml)	**2 – 54**	100 ct/100ml
Capacity (m3 /day)	**7,455**	13,800

***** *Monthly Geometric Mean Density*

Biosolids Generation

During 2022, the Hawkesbury WWTP hauled 214.59 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 2022. We anticipate the volume of biosolids to be 222 dry tons for 2023. This estimation is based on a three-year average.

TABLE 4
Location of Spreading the Organic Waste

Hawkesbury Biosolids Summary			
Biosolids Conditioning Location	**NASM Plan**	**Field #**	**Dry Ton (kg)**
Ferme A.G.L. Malette	23299	n/a	**214.59**
HAWKESBURY WWTP TOTAL GENERATED BIOSOLIDS			**214.59**

Summary of Complaints

There were no complaints reported in 2022.

By-passing / Spills / Abnormal Discharges

There were 4 Combined Sewer Overflow (CSO) and 1 Wastewater Treatment Plant by-pass in 2022. Please refer to *Appendix F*, 2022 Bypass Event Report and *Appendix G*, 2022 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 0.008% 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**

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
2022 Monthly Performance Assessment Report

Raw Sewage Flow	January	February	March	April	May	June	July	August	September	October	November	December
Total *(m3/mth)*	159,548	157,315	322,415	348,462	247,388	241,346	186,703	213,610	232,887	193,560	192,739	226,593
Avg. *(m3/day)*	5,147	5,618	10,400	11,615	7,980	8,045	6,023	6,891	7,763	6,244	6,425	7,309
Max. *(m3/day)*	5,521	14,546	26,449	32,733	14,552	14,322	8,478	16,781	17,716	7,989	12,897	11,703
Min. *(m3/day)*	4,858	4,515	4,633	8,227	5,878	6,015	5,218	5,477	5,493	5,249	5,400	5,578

Total Annual Raw Flow (m^3) = 2,722,565

Average Annual Raw Daily Flow (m^3) = 7,455

Final Effluent Flow	January	February	March	April	May	June	July	August	September	October	November	December
Total *(m3/mth)*	153,613	152,130	316,720	342,972	241,190	235,210	180,375	209,281	226,520	187,204	186,588	220,637
Avg. *(m3/day)*	4,955	5,433	10,217	11,432	7,780	7,840	5,819	6,751	7,551	6,039	6,220	7,117
Max. *(m3/day)*	5,339	14,284	26,178	32,758	14,277	14,055	8,263	16,872	17,547	7,761	12,607	11,557
Min. *(m3/day)*	4,681	4,339	4,442	8,003	5,675	5,837	5,014	5,290	5,291	5,041	5,200	5,384

Total Annual Effluent Flow (m^3) = 2,652,441

Average Annual Effluent Daily Flow (m^3) = 7,263

Biochemical Oxygen Demand	January	February	March	April	May	June	July	August	September	October	November	December
Raw Avg. CBOD *(mg/L)*	81.3	82.8	66.6	36.3	53.8	57.8	98.0	91.8	49.8	67.8	108.2	64.0
Eff. Avg. CBOD *(mg/L)*	4.0	3.0	3.6	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
CBOD Loading *(kg/d)*	20.6	16.9	37.4	34.8	23.9	24.1	18.1	20.7	23.3	18.7	19.3	21.9
Percent Removal *(%)*	95.1	96.4	94.6	91.7	94.4	94.8	96.9	96.7	94.0	95.6	97.2	95.3

Suspended Solids	January	February	March	April	May	June	July	August	September	October	November	December
Raw Avg. SS *(mg/L)*	251.3	251.5	192.2	101.0	137.0	150.0	177.5	149.2	141.0	153.0	167.8	142.3
Eff. Avg. SS *(mg/L)*	6.0	7.0	6.2	4.3	3.8	4.0	3.0	3.6	4.3	3.0	3.6	3.3
SS Loading *(kg/d)*	30.9	39.3	64.5	49.4	30.3	32.2	18.1	24.8	33.0	18.7	23.1	24.4
Percent Removal *(%)*	97.6	97.2	96.8	95.8	97.2	97.3	98.3	97.6	97.0	98.0	97.9	97.7

Phosphorous	January	February	March	April	May	June	July	August	September	October	November	December
Raw Avg. PHOS *(mg/L)*	4.59	3.33	2.37	1.90	1.90	2.53	2.80	2.69	1.94	2.65	2.71	2.46
Eff. Avg. PHOS *(mg/L)*	0.11	0.13	0.10	0.09	0.08	0.06	0.08	0.06	0.05	0.04	0.12	0.07
Phos. Loading *(kg/d)*	0.57	0.70	1.02	1.05	0.62	0.50	0.45	0.44	0.37	0.27	0.75	0.54
Percent Removal *(%)*	97.6	96.2	95.9	95.3	95.9	97.5	97.3	97.6	97.5	98.4	95.7	97.0

Appendix A
2022 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)*	14.48	15.33	8.52	7.27	8.51	11.20	13.68	13.05	10.21	13.13	11.68	11.60
Eff. Avg. NH3 as N *(mg/L)*	2.59	5.34	2.57	1.73	1.55	0.24	0.18	0.67	0.31	0.31	0.35	0.49
NH3 Loading *(kg/d)*	13.32	29.99	26.69	20.09	12.40	1.89	1.08	4.63	2.43	1.95	2.25	3.56
Percent Removal	82.12	65.17	69.88	76.20	81.73	97.90	98.68	94.85	96.94	97.62	97.00	95.81

Disinfection	January	February	March	April	May	June	July	August	September	October	November	December
Eff. Geo. Mean E. Coli *(ct/100mL)*	54.2	28.4	7.9	1.7	2.5	9.3	7.1	15.4	4.7	7.4	5.5	19.9

pH	January	February	March	April	May	June	July	August	September	October	November	December
Eff. Avg. pH	7.1	7.1	7.3	7.6	7.6	7.4	7.2	7.2	7.1	7.6	7.1	7.1

Temperature	January	February	March	April	May	June	July	August	September	October	November	December
Eff. Avg. Temp. *(C°)*	5.2	5.1	5.4	6.2	9.7	12.2	14.6	15.5	14.6	12.6	10.5	7.7

Appendix B
2022 Monthly Raw Sewage Data Report

Raw Sewage Flow	January	February	March	April	May	June	July	August	September	October	November	December
Total *(m3/mth)*	159,548	157,315	322,415	348,462	247,388	241,346	186,703	213,610	232,887	193,560	192,739	226,593
Avg. *(m3/day)*	5,147	5,618	10,400	11,615	7,980	8,045	6,023	6,891	7,763	6,244	6,425	7,309
Max. *(m3/day)*	5,521	14,546	26,449	32,733	14,552	14,322	8,478	16,781	17,716	7,989	12,897	11,703
Min. *(m3/day)*	4,858	4,515	4,633	8,227	5,878	6,015	5,218	5,477	5,493	5,249	5,400	5,578

Total Annual Raw Flow (m^3) = 2,722,565

Average Annual Raw Daily Flow (m^3) = 7,455

BOD *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	139.75	114.50	105.40	51.00	78.60	91.00	123.00	110.20	84.75	121.00	131.40	97.67
Max.	159.00	127.00	174.00	77.00	103.00	111.00	201.00	197.00	121.00	132.00	156.00	117.00
Min.	121.00	79.00	49.00	30.00	57.00	59.00	76.00	41.00	35.00	114.00	87.00	87.00

CBOD - 5 *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	81.25	82.75	66.60	36.25	53.80	57.75	98.00	91.80	49.75	67.75	108.20	64.00
Max.	94.00	118.00	109.00	45.00	75.00	79.00	156.00	172.00	68.00	93.00	211.00	79.00
Min.	63.00	51.00	23.00	21.00	30.00	42.00	60.00	47.00	29.00	53.00	42.00	42.00

Suspended Solids *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	251.25	251.50	192.20	101.00	137.00	150.00	177.50	149.20	141.00	153.00	167.80	142.33
Max.	330.00	440.00	305.00	132.00	200.00	200.00	270.00	190.00	190.00	160.00	230.00	175.00
Min.	190.00	146.00	96.00	52.00	75.00	105.00	125.00	66.00	70.00	144.00	116.00	108.00

Appendix B
2022 Monthly Raw Sewage Data Report

Total Phosphorous *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	4.59	3.33	2.37	1.90	1.90	2.53	2.80	2.69	1.94	2.65	2.71	2.46
Max	6.92	4.09	3.43	3.35	2.30	2.89	3.95	5.13	2.69	3.10	3.38	3.00
Min.	3.28	2.36	1.39	1.27	1.46	2.21	1.56	1.48	0.92	2.38	2.16	1.50

NH3 as N *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	14.48	15.33	8.52	7.27	8.51	11.20	13.68	13.05	10.21	13.13	11.68	11.60
Max.	15.80	17.20	15.50	10.50	13.50	12.50	15.80	22.10	14.60	14.50	14.20	13.50
Min.	13.20	13.20	0.51	5.61	1.18	9.79	12.00	7.34	3.52	12.50	9.91	9.11

TKN *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	24.18	25.70	15.52	16.05	15.84	18.70	25.43	21.70	17.05	21.43	19.44	18.40
Max.	25.30	31.50	23.20	31.70	20.60	21.10	35.50	37.00	23.70	22.30	22.80	20.40
Min.	22.70	20.20	7.20	8.80	13.20	15.40	17.70	15.40	7.90	19.30	16.90	14.60

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

Appendix C
2022 Monthly Effluent Data Report

Final Effluent Flow	January	February	March	April	May	June	July	August	September	October	November	December
Total *(m3/mth)*	153,613	152,130	316,720	342,972	241,190	235,210	180,375	209,281	226,520	187,204	186,588	220,637
Avg. *(m3/day)*	4,955	5,433	10,217	11,432	7,780	7,840	5,819	6,751	7,551	6,039	6,220	7,117
Max. *(m3/day)*	5,339	14,284	26,178	32,758	14,277	14,055	8,263	16,872	17,547	7,761	12,607	11,557
Min. *(m3/day)*	4,681	4,339	4,442	8,003	5,675	5,837	5,014	5,290	5,291	5,041	5,200	5,384

Total Annual Effluent Flow (m^3) = 2,652,441

Average Annual Effluent Daily Flow (m^3) = 7,263

CBOD - 5 *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	4.00	3.00	3.60	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Max.	7.00	3.00	6.00	3.00	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.	6.00	7.00	6.20	4.25	3.80	4.00	3.00	3.60	4.25	3.00	3.60	3.33
Max.	8.00	12.00	13.00	7.00	6.00	5.00	3.00	5.00	7.00	3.00	5.00	4.00
Min.	4.00	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.	0.11	0.13	0.10	0.09	0.08	0.06	0.08	0.06	0.05	0.04	0.12	0.07
Max	0.22	0.17	0.22	0.15	0.13	0.09	0.12	0.09	0.06	0.06	0.28	0.15
Min.	0.03	0.08	0.01	0.06	0.04	0.04	0.02	0.04	0.04	0.02	0.04	0.03

NH3 as N *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	2.59	5.34	2.57	1.73	1.55	0.24	0.18	0.67	0.31	0.31	0.35	0.49
Max.	6.17	7.12	4.89	2.90	3.82	0.61	0.29	2.06	0.65	0.63	0.63	0.72
Min.	0.75	3.74	0.51	0.60	0.26	0.07	0.06	0.05	0.13	0.04	0.07	0.20

Appendix C
2022 Monthly Effluent Data Report

Un-Ionized Ammonia (NH3) *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	0.0048	0.0109	0.0064	0.0149	0.0115	0.0016	0.0010	0.0041	0.0013	0.0031	0.0012	0.0010
Max.	0.0124	0.0159	0.0091	0.0299	0.0297	0.0041	0.0016	0.0114	0.0031	0.0068	0.0034	0.0012
Min.	0.0014	0.0051	0.0028	0.0024	0.0025	0.0005	0.0003	0.0002	0.0005	0.0007	0.0002	0.0007

TKN *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	4.50	8.15	3.96	3.15	3.58	1.40	1.20	1.78	1.33	1.33	1.64	1.73
Max.	9.70	11.80	6.30	4.70	6.00	1.90	1.80	3.80	1.80	1.80	2.30	2.30
Min.	1.90	5.80	1.30	1.60	1.30	1.10	0.20	1.10	1.00	1.00	1.00	1.30

Geo. Mean E. Coli *(ct/100mL)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	54.2	28.4	7.9	1.7	2.5	9.3	7.1	15.4	4.7	7.4	5.5	19.9
Max.	1,200.0	62.0	14.0	2.0	25.0	78.0	128.0	64.0	54.0	14.0	16.0	41.0
Min.	2.0	10.0	4.0	1.0	1.0	1.0	1.0	8.0	1.0	3.0	2.0	8.0

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

Temperature *(°C)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	5.2	5.1	5.4	6.2	9.7	12.2	14.6	15.5	14.6	12.6	10.5	7.7
Max.	7.0	6.1	6.3	7.4	11.3	13.3	15.8	16.4	15.9	13.6	12.3	9.0
Min.	4.3	4.5	4.5	5.0	7.6	11.1	13.2	13.9	13.0	11.6	8.9	6.0

Appendix D
2022 Monthly Chemical Data Report

Coagulant usage *(kG)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	107	116	217	242	194	276	212	195	204	116	115	129
Total	3326	3248	6739	7269	6001	8283	6563	6052	6129	3610	3453	4003

Coagulant dosage dry *(mg/L)*	January	February	March	April	May	June	July	August	September	October	November	December
Avg.	11.0	10.8	10.9	10.8	12.5	17.8	18.5	14.9	13.6	9.8	9.4	9.3
Max.	12.4	12.1	13.4	11.7	16.0	18.8	21.2	18.6	19.7	15.2	11.1	12.8
Min.	10.2	10.0	10.3	10.3	10.2	15.8	16.8	11.5	7.6	8.1	7.5	7.9

Polymer usage *(kG)*	January	February	March	April	May	June	July	August	September	October	November	December
Total	647	793	874	839	727	940	882	801	952	799	796	996

Appendix E
2022 Monthly Biosolids Analysis Report

Parameter	January	February	March	April	May	June	July	August	September	October[1]	November	December
Biosolids Hauled (dry ton)	13.94	15.97	17.98	19.92	16.39	23.23	22.15	15.72	18.87	13.74	16.76	19.93
pH @ 25°C	5.06	5.37	4.97	6.24	5.59	6.03	5.95	6.22	6.69		5.88	5.65
Total Solids *(%)*	20.2	25.7	18.9	21.8	22.4	14.9	24.5	24.8	22.9		20.3	20.9
Ammonia (N)-Total *(µg/g)*	273	239	341	887	375	530	555	233	644		4010	358
Total Kjeldahl Nitrogen *(µg/g)*	47200	28100	32300	27300	41500	45100	49900	36300	41600		63600	64500
Nitrite (N) *(µg/g)*	10	10	10	10	10	10	10	83	10		10	10
Nitrate (N) *(µg/g)*	209	355	380	359	477	519	238	621	24		10	10
Phosphorus-Total *(µg/g)*	27800	10900	14300	9080	28300	24000	29300	23300	18300		29500	28100
Potassium *(µg/g)*	2000	1870	1850	2140	2460	2180	1990	1970	1660		1930	2010
Aluminum *(µg/g)*	75700	74300	73700	60800	65800	63800	59500	62800	65500		61200	61100
Arsenic *(µg/g)*	4	4	4	4	4	4	4	4	3		3	4
Calcium *(µg/g)*	13200	12900	13800	16500	17700	18200	18600	17800	18000		13800	12600
Cadmium *(µg/g)*	0.7	0.7	0.6	0.7	0.5	0.6	0.5	0.6	0.8		0.8	0.6
Chromium *(µg/g)*	33	32	33	37	40	35	34	34	31		37	32
Cobalt *(µg/g)*	4	3	3	4	5	5	4	4	4		3	3
Copper *(µg/g)*	305	307	303	406	358	297	263	295	327		313	310
Lead *(µg/g)*	23	22	17	18	21	22	21	20	19		16	15
Mercury *(µg/g)*	0.440	0.460	0.530	0.145	0.440	0.300	0.290	0.420	0.280		0.230	0.220
Molybdenum *(µg/g)*	4	5	4	4	4	4	4	4	4		5	5
Nickel *(µg/g)*	19	18	19	20	22	19	18	18	17		20	17
Selenium *(µg/g)*	3	4	2	2	3	2	2	2	3		3	3
Zinc *(µg/g)*	1210	1170	1080	1090	922	949	921	953	1160		1090	1050
E-Coli *(cfu/g)*	9901	3890	5291	27586	4458	2685	408	403	2620		493	478

Total Biosolids Hauled (dry ton) = 214.59

Note :

[1]No samples were collected/analyzed in October

µg/g = mg/Kg

Appendix F
2022 Bypass Event Report

Date of Event	Location	Type	Duration	Estimate volume *(m3)*	Reason (Code)
May 15, 2022	Cameron/Main East	CSO	12 minutes	42.09	1
June 7, 2022	Cameron/Main East	CSO	15 minutes	19.52	1
June 8, 2022	815 Main St. East	SB	26 minutes	80	1
June 16, 2022	Cameron/Main East	CSO	13 minutes	41.5	1
August 9, 2022	Cameron/Main East	CSO	16 minutes	28.31	1
			Total bypass volume *(m3)*	211.42	

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
2022 Annual Bypass Summary Report

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Number *(days)*	0	0	0	0	1	3	0	1	0	0	0	0	5
Duration *(minute)*	0	0	0	0	12	54	0	16	0	0	0	0	82
Estimated Volume *(m3)*	0	0	0	0	42	141	0	28	0	0	0	0	211

Volume of Bypass as % of Average Daily			0.008%
Flow *(ADF)* *	ADF =	7,455	m^3/day

*ADF = Average Daily Flow