

Iroquois Wastewater System

Waterworks # 120000159

Annual Report

Prepared For: Municipality of South Dundas

Reporting Period of January 1st – December 31st 2022

Issued: March 9th, 2023

Revision: 0

Operating Authority:



This report has been prepared to meet the requirements of Certificate of Approval #9689-8MQHNK

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1 Revision History

Date	Rev#	Revisions	Revised By
2023-03-09	0	Annual Report Issued	Kurtis Winkenweder, OCWA

2 Operations and Compliance Reliability Indices

Compliance Event	# of Events
Ministry of Environment Inspections	0
Ministry of Labour Inspections	0
Non-Compliance	0
Community Complaints	0
Spills	0
Overflows	0
Bypass	0
Sewer main blockages	0

3 Process Description

Iroquois's sewage collection system is a gravity fed sanitary sewage collection system. There are two pumping stations which pump wastewater from the collection system to the wastewater treatment facility.

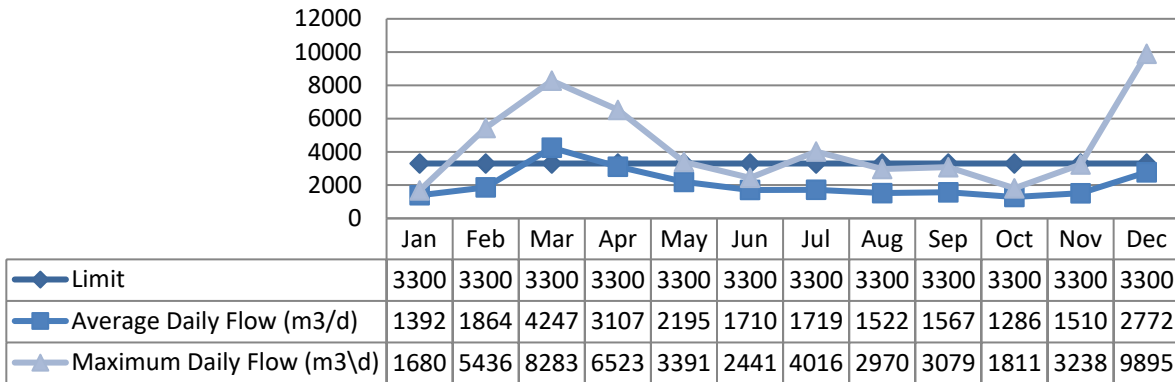
The Iroquois Wastewater Treatment Plant (WWTP) is a Class II wastewater treatment facility owned and operated by the Municipality of South Dundas. Raw sewage is pumped to the WWTP by the plant pumping station which is equipped with three submersible pumps. From the pumping station, wastewater passes through the inlet works, including mechanically cleaned fine screens and a grit removal and disposal system. Aluminum Sulphate is added to assist in phosphorous removal. The wastewater then moves through either of two parallel Sequencing Batch Reactors (SBRs) equipped with individual aeration systems, mixers, decanters and sludge removal pumps. Effluent decanted from the SBRs is treated by UV disinfection and subsequently passes through an outfall pipe to the St. Lawrence River.

Sludge removed from the SBRs is transferred to a waste activated sludge tank. From the tank, the sludge enters a rotary drum thickener. Polymer is added to assist with the thickening process. Thickened sludge is pumped to an Autothermal Thermophilic Aerobic Digestion (ATAD) system for stabilization. The ATAD system is equipped with an off-gas scrubber and biofilter to provide odour control. The digested sludge is then pumped to one of three biosolids storage tanks. From the storage tanks, biosolids are hauled off site to be utilized as soil conditioner.

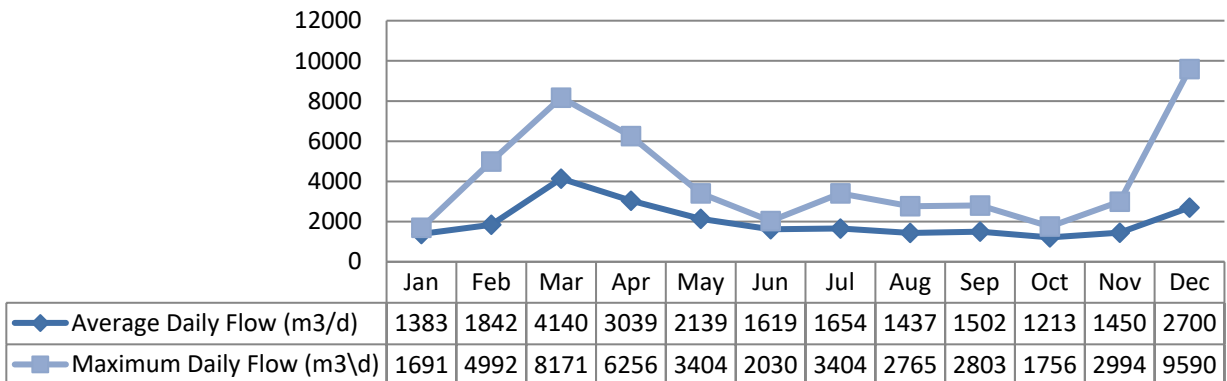
4 Treatment Flows

The hydraulic flows reaching the treatment facility in 2022 averaged 2074 m³/day which represents 63% of the 3,300 m³/day design. Please see the Performance Assessment Reports attached in Appendix A for details.

4.1 Raw Flow (m3/d)

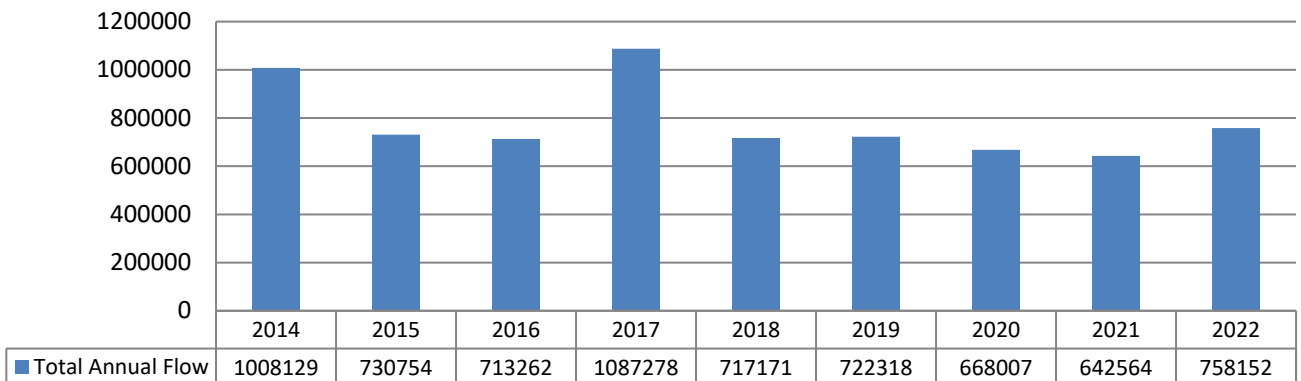


4.2 Effluent Flow (m3/d)



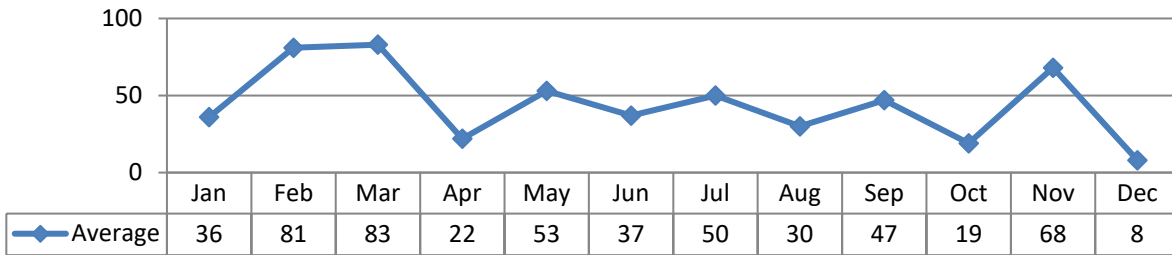
A total of 732,931 m³ of effluent was discharged from Iroquois’ Wastewater Treatment Facility in 2022.

Annual Comparison (m3)

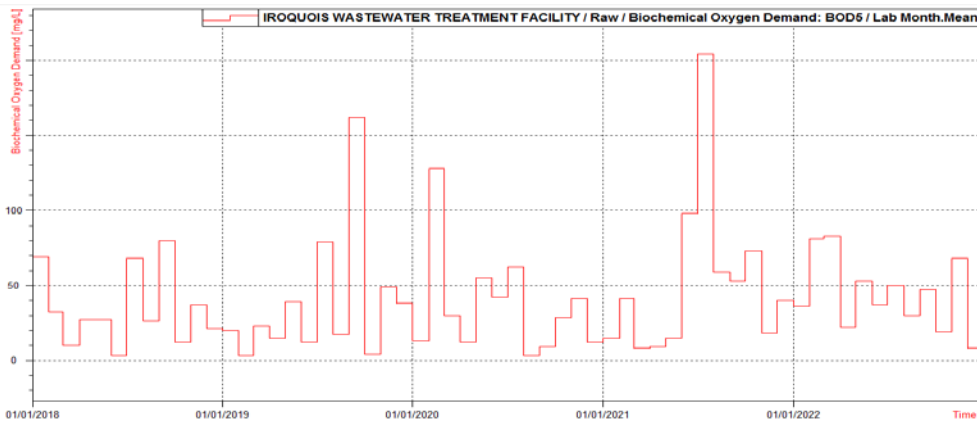


5 Raw Sewage Quality

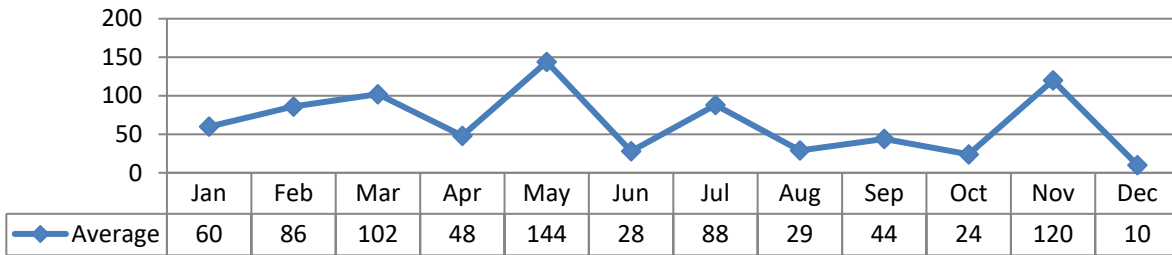
BOD₅ (mg/L)



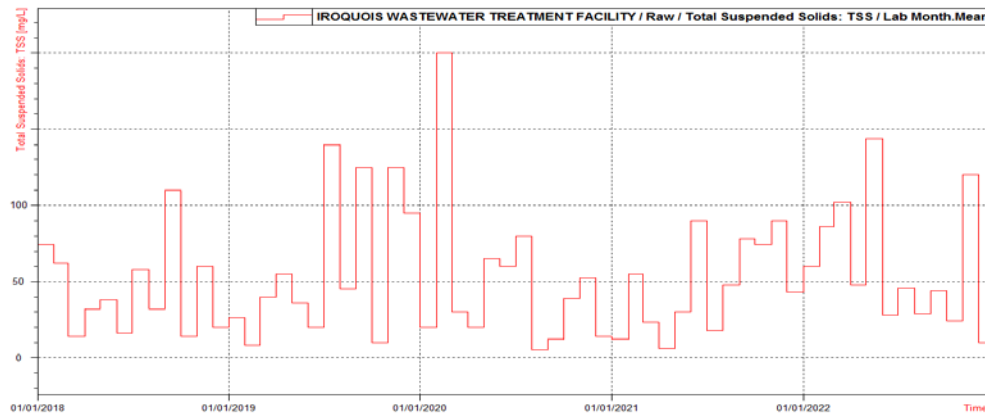
5-year Trend



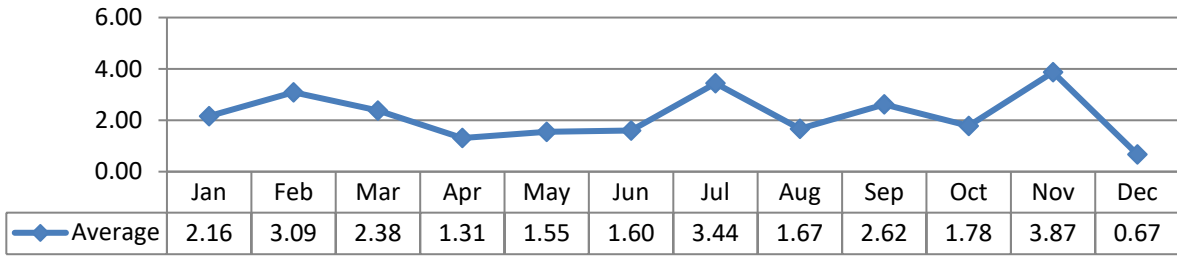
Total Suspended Solids (mg/L)



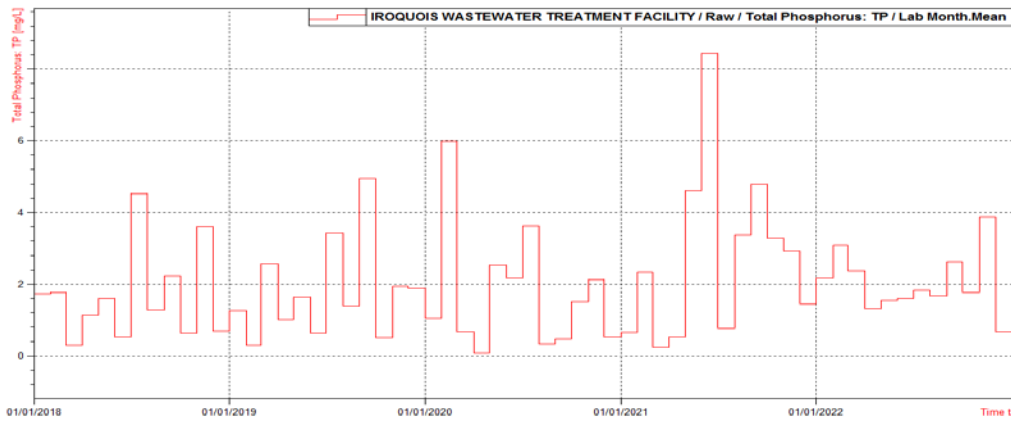
5-year Trend



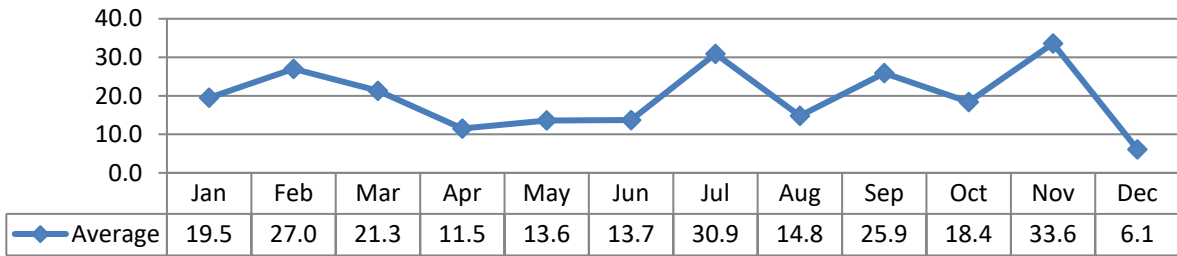
Total Phosphorus (mg/L)



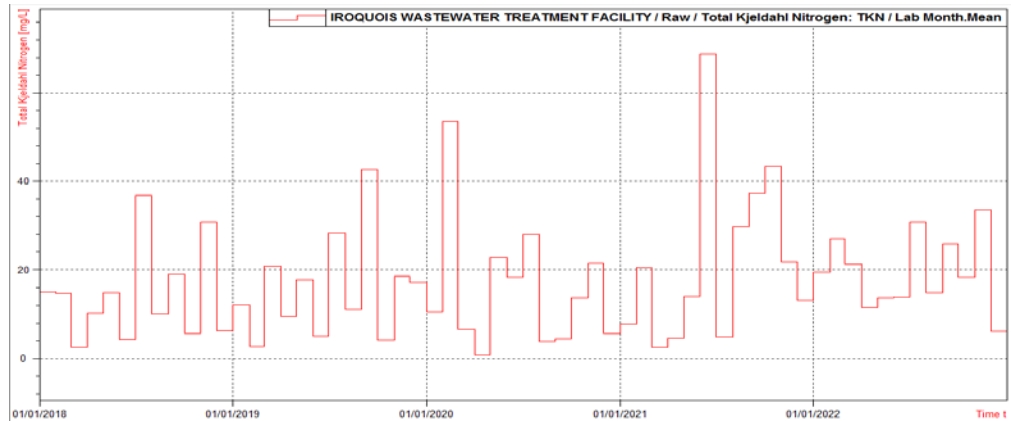
5-year Trend



Total Kjeldahl Nitrogen



5-year Trend



6 Effluent Quality

The monthly average concentrations of carbonaceous biochemical oxygen demand (CBOD₅), total suspended solids (TSS), total phosphorus (TP) and total ammonia nitrogen (TAN) remained below the effluent objectives and limits outlined in the facility's Certificate of Approval during 2022. The geometric mean density of E. coli in the effluent also remained below the ECA limit and objective in 2022. In addition, the effluent pH remained within the limits and objectives throughout the year.

Effluent results from the WWTP for 2022 are tabulated below. Additional data can be found in the Performance Assessment Reports attached in Appendix A.

6.1 Effluent Quality Assurance and Control Measures Taken

This system is part of the Township of South Dundas. The Township is supported by the Eastern Regional Hub of OCWA, and corporate resources. Operational Services are delivered by Town staff that live and work in the community. The systems are operated to meet compliance with applicable regulations. The system has comprehensive manuals detailing operations, maintenance, instrumentation, and emergency procedures. All procedures are treated as active documents and are updated as required. These documents are also part of OCWA's Quality & Environmental Management System.

The process is reviewed and maintained by certified operators. These operators complete in-house rounds and testing to monitor the process. All Sampling and analysis follow approved methods and protocols for sampling, analysis and recording as specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

All final effluent samples collected during the reporting period to meet legislated sampling requirements are submitted to Caduceon Ottawa for analysis, with the exception of pH and temperature. Caduceon Ottawa has been deemed accredited by the Canadian Association for Laboratory Accreditation (CALA), meeting strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, South Dundas is ensuring appropriate control measures are undertaken during sample analysis. The pH and temperature parameters are analyzed in the field at the time of sample collection by certified operators, to ensure accuracy and precision of the results obtained.

South Dundas uses a data management system provided by OCWA which include:

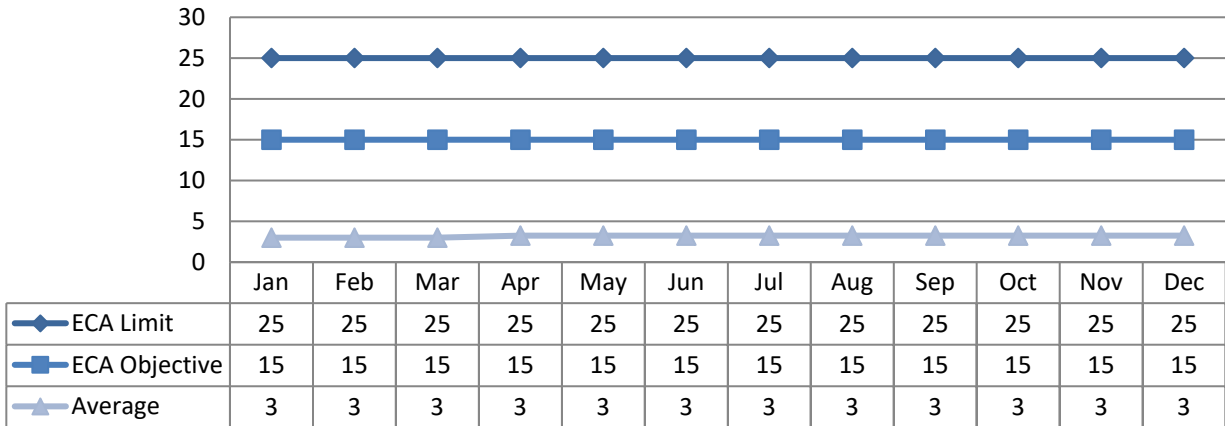
- Process Data Management (PDM)
 - This database program consolidates all operational data from a variety of sources including field data, online instrumentation, and electronic receipt of lab test results for reporting, tracking and analysis.

The operations team also has access to a network of operational compliance and process specialists to assist for emerging process issues. This aids in establishing additional control measures to ensure a quality effluent product.

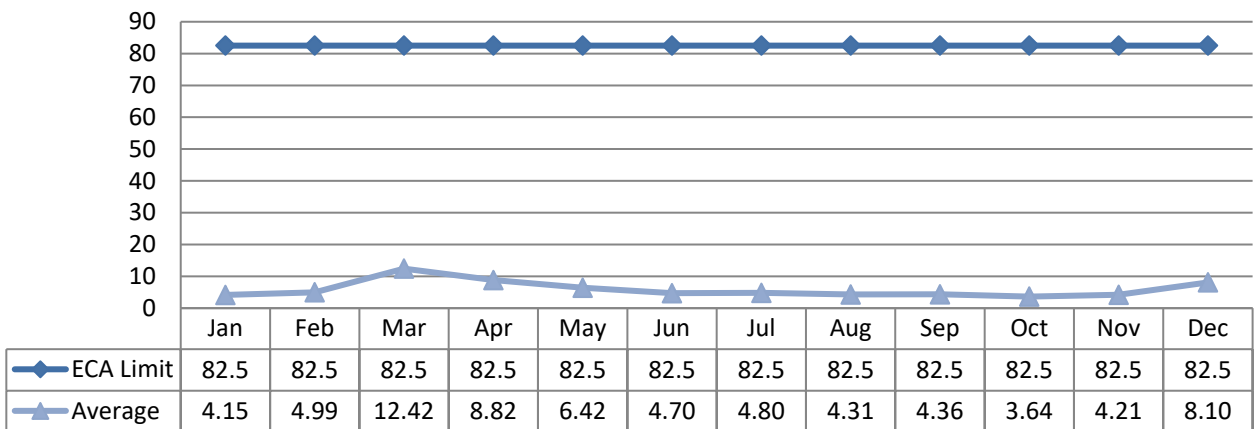
Detailed individual sample results for both raw sewage and final effluent can be requested from the operating authority.

6.2 CBOD5 (mg/L)

The compliance limit and objective have been met for 2022.

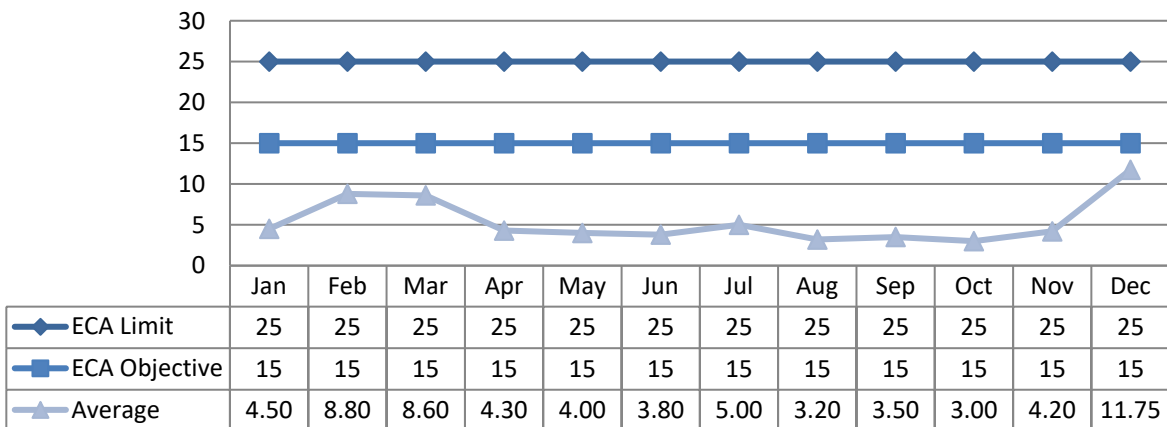


Loading (kg/d)

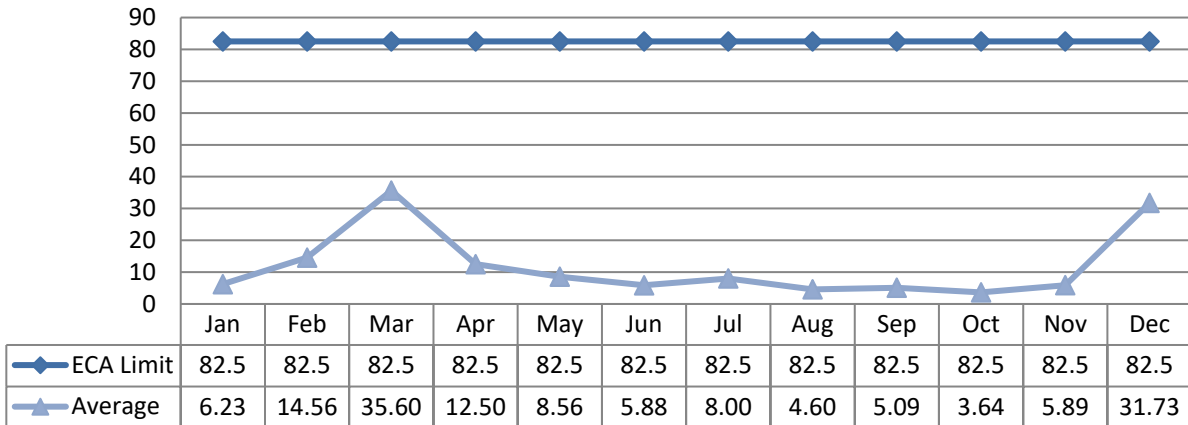


6.3 Total Suspended Solids (mg/L)

The compliance limit and objective have been met for 2022.

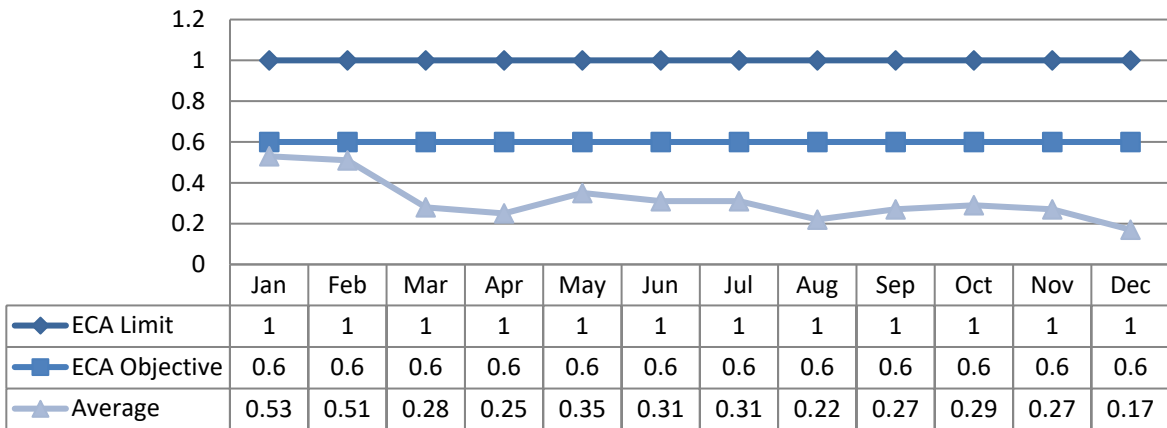


Loading (kg/d)

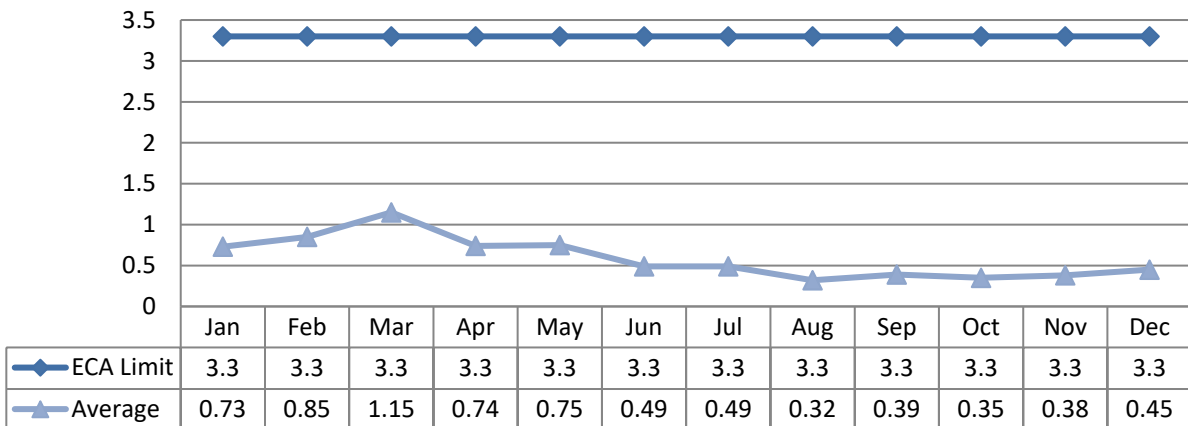


6.4 Total Phosphorus (mg/L)

The compliance limit and objective have been met for 2022.

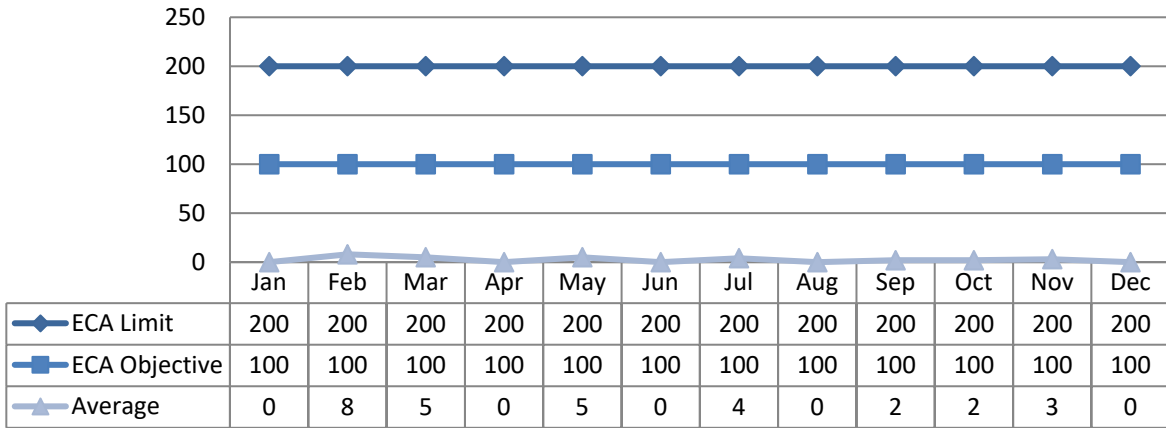


Loading (kg/d)



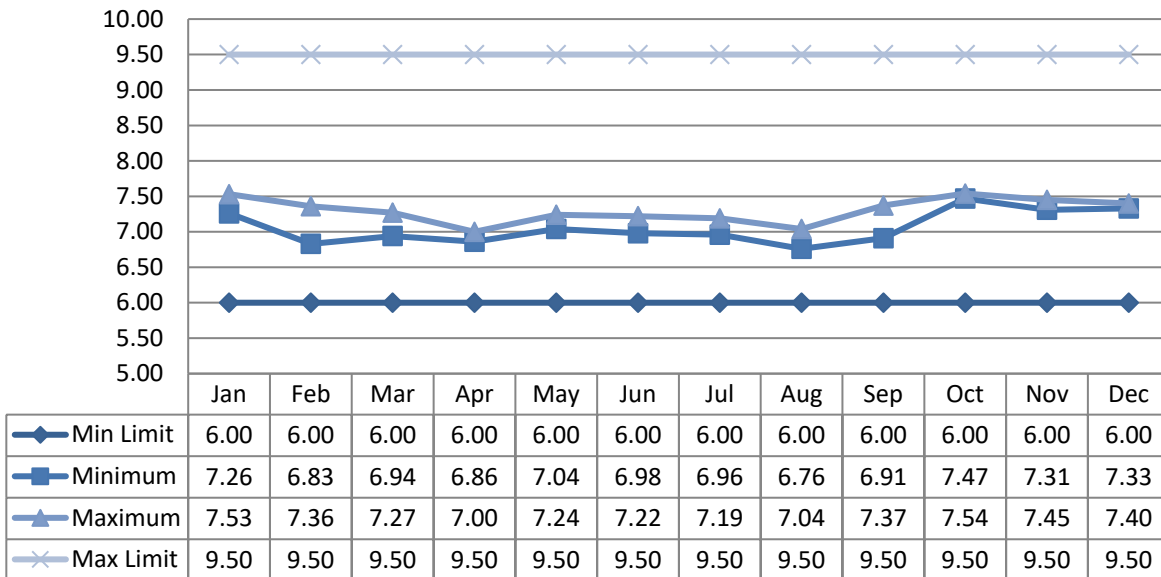
6.7 E-coli (cfu/100mL)

The compliance objective and limit were met in 2022.



6.8 pH

The pH is to remain in the range of 6-9.5. Each instance the pH is outside of that range is reported as a non-compliance.



6.9 Acute Lethality

One sample was collected in 2022 and tested for acute lethality to Rainbow Trout and Daphnia Magna. Results are displayed as % mortality. An adverse result is indicated by a > 50% mortality rate.

Date	Rainbow Trout	Daphnia Magna
01-11-2022	0%	0%

7 Monitoring Schedule

The 2023 Calendar can be viewed in Appendix B.

7.1 Deviations

Date	Details	Cause of Deviation
No deviations from the sample calendar or missed samples in 2022.		

8 Operating Issues

There were no operating issues in 2022.

8.1 Effluent Quality Non-Compliance Summary

Date	Exceedance of	Limit	Value	Corrective Action
There were no objective or limit exceedances in 2022.				

8.2 Summary of Abnormal Sewage Discharge Events

Abnormal Discharge Events include Bypass', Overflows, Diversions and Spills of Sewage. Summary Details are included in Appendix D.

8.3 Spills (Other than Sewage)

Date	Location	Details	Volume (m3)	Start Date and Time	End Date and Time
There were no spills of sewage to report in 2022.					

9 Maintenance

Routine planned maintenance activities:

- Inspect, adjust and calibrate process control equipment to ensure proper operation of water distribution systems, pumps, chemical feeders, and all other equipment installed at the facilities.
- Carry out a routine maintenance program including greasing and oiling as specified in the lubrication schedule.
- Perform day-to-day maintenance duties to equipment including checking machinery and electrical equipment when required.
- Maintain an equipment inventory

Unplanned maintenance is conducted as required.

9.1 Normal Maintenance and Repairs

Maintenance/Repairs
<ul style="list-style-type: none"> - Repaired screw in compactor - Replaced UV lamps that were burnt out - Replaced aluminium sulphate feed pumps - Cleaned wet wells - Repaired supernatant pump

9.2 Emergency Maintenance and Repairs

Maintenance/Repairs	Details
There was no emergency maintenance/repairs in 2022	

9.3 Flow Meter Calibrations and Maintenance

Location	Date of Calibration	Additional Maintenance
FIT-401 Waste Sludge Basin 1	June 8, 2022	N/A
FIT-402 Waste Sludge Basin 2	June 8, 2022	N/A
FIT-305 Raw Sewage Influent Channel 1	June 8, 2022	N/A
FIT-306 Raw Sewage Influent Channel 2	June 8, 2022	N/A
FIT-304 Raw Waste Water Flow	June 8, 2022	N/A
FIT-302 P.S. Inlet Sewage Flow	June 8, 2022	N/A
FIT-301 Inlet Sewage Plant Pump Station Flow	June 8, 2022	N/A
FIT-303 Supernatant	June 8, 2022	N/A
FIT-501 UV Channel Flow	July 6, 2022	N/A

9.4 Authorized Alterations in Collection System

Alteration	Details	Significant Drinking Water Threat (Y/N)
No alterations made to the collection system in 2022		

9.5 Notice of Modifications

Date	Process	Modification	Status
No modifications made to the collection system in 2022.			

10 Sludge Generation

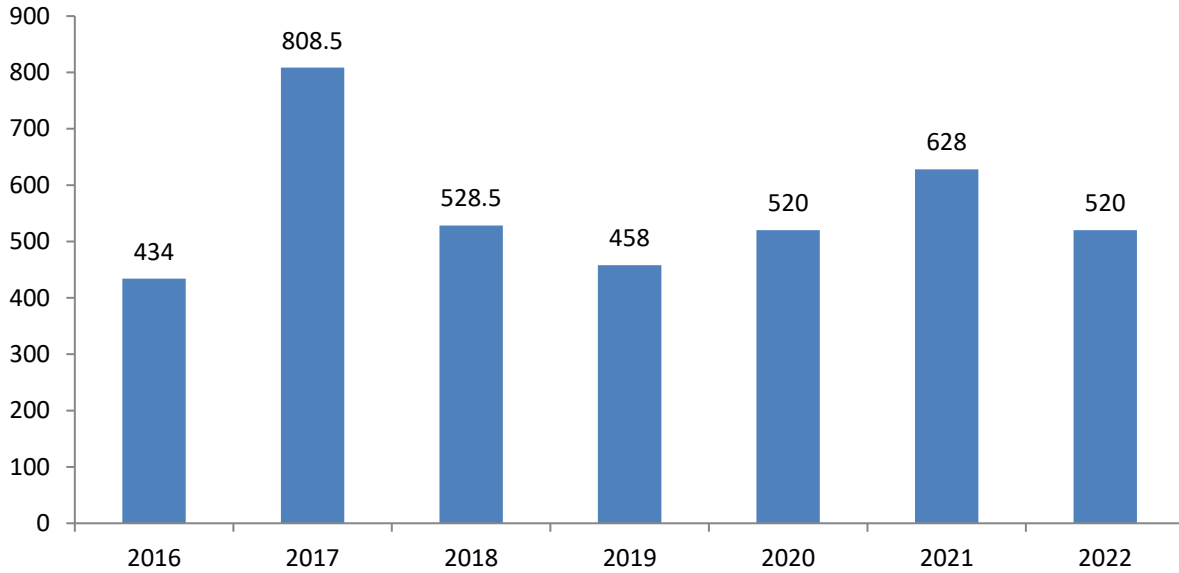
10.1 Sludge Disposal Summary

Date	Disposal Location	Approval Number	Total Volume (m3)
April	GFL – Nine Mile Tank ECA #A710174	ECA# H480300	98.19
May	GFL – Nine Mile Tank ECA #A710174	ECA# H480300	110
September	GFL – Nine Mile Tank ECA #A710174	ECA# H480300	311.71

In 2022, a total of 520 m³ of liquid sludge was removed from Iroquois' WWTP and was utilized as soil conditioner. The sludge was removed from the WWTP by GFL in April/May/September. There is no

NASM plan as all sludge was hauled to a holding tank for mixing. It is anticipated that approximately the same volume of sludge will be generated in 2023.

10.2 Annual Comparison (m3/year)



It is anticipated that sludge volumes will remain similar to the 2023 volumes.

11 Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
No complaints in 2022			

2022 - IROQUOIS WWTP EFFLUENT SAMPLING MONTHLY AVERAGES

MONTH	DATE	CBOD (mg/L)	TSS (mg/L)	TP (mg/L)	NH ₃ (mg/L)	E. Coli (CFU/100ml)
January	01/04/2022	< 3	< 3	0.45	0.04	2
	01/11/2022	< 3	3	0.51	0.06	6
	01/18/2022	< 3	5	0.54	0.03	0
	01/25/2022	< 3	7	0.6	0.06	0
	Monthly Average	3.0	4.5	0.53	0.05	0
	Compliant?	YES	YES	YES	YES	YES
February	02/01/2022	< 3	8	0.63	0.06	5
	02/08/2022	< 3	12	0.65	0.03	4
	02/15/2022	< 3	11	0.5	0.08	11
	02/22/2022	< 3	4	0.27	0.11	15
	Monthly Average	3.0	9.8	0.51	0.07	8
	Compliant?	YES	YES	YES	YES	YES
March	03/01/2022	< 3	3	0.33	0.05	5
	03/08/2022	3	20	0.64	0.06	32
	03/15/2022	< 3	7	0.25	0.05	3
	03/22/2022	< 3	6	0.13	0.09	5
	03/29/2022	< 3	7	0.04	0.04	2
	Monthly Average	3.0	8.6	0.28	0.06	5
Compliant?	YES	YES	YES	YES	YES	
April	04/05/2022	< 3	< 3	0.21	0.05	0
	04/12/2022	< 3	4	0.2	0.02	7
	04/19/2022	< 3	6	0.31	0.09	11
	04/26/2022	< 3	4	0.28	0.01	7
	Monthly Average	3.0	4.3	0.25	0.04	0
	Compliant?	YES	YES	YES	YES	YES
May	05/03/2022	< 3	3	0.42	0.05	6
	05/10/2022	< 3	3	0.25	< 0.01	5
	05/17/2022	< 3	8	0.35	0.03	10
	05/24/2022	< 3	3	0.39	0.02	5
	05/31/2022	< 3	3	0.34	0.02	-
	06/02/2022	---	---	---	---	3
Monthly Average	3.0	4.0	0.35	0.03	5	
Compliant?	YES	YES	YES	YES	YES	
June	06/07/2022	< 3	< 3	0.36	0.02	2
	06/14/2022	< 3	6	0.27	0.05	2
	06/21/2022	< 3	< 3	0.33	0.02	0
	06/28/2022	< 3	< 3	0.28	0.09	2
	Monthly Average	3.0	3.8	0.31	0.05	0
	Compliant?	YES	YES	YES	YES	YES
July	07/06/2022	< 3	< 3	0.31	0.04	2
	07/13/2022	< 3	< 3	0.2	0.08	1
	07/19/2022	< 3	10	0.44	0.24	46
	07/26/2022	< 3	4	0.27	0.05	4
	Monthly Average	3.0	5.0	0.31	0.11	4
	Compliant?	YES	YES	YES	YES	YES
August	08/02/2022	< 3	< 3	0.28	0.04	3
	08/09/2022	< 3	< 3	0.26	0.02	<
	08/16/2022	< 3	4	0.19	0.01	0
	08/23/2022	< 3	< 3	0.17	0.06	3
	08/30/2022	< 3	< 3	0.2	0.03	7
	Monthly Average	3.0	3.2	0.22	0.03	0
Compliant?	YES	YES	YES	YES	YES	
September	09/06/2022	< 3	4	0.23	0.03	2
	09/13/2022	< 3	4	0.21	0.01	2
	09/20/2022	< 3	< 3	0.28	0.04	1
	09/27/2022	< 3	3	0.34	0.02	5
	Monthly Average	3.0	3.5	0.27	0.03	2
	Compliant?	YES	YES	YES	YES	YES
October	10/04/2022	< 3	3	0.25	0.08	4
	10/11/2022	< 3	< 3	0.41	< 0.01	3
	10/18/2022	< 3	< 3	0.25	0.05	1
	10/25/2022	< 3	< 3	0.26	0.05	1
	Monthly Average	3	3.0	0.29	0.05	2
	Compliant?	YES	YES	YES	YES	YES
November	11/01/2022	< 3	< 3	0.27	0.11	5
	11/08/2022	< 3	7	0.23	0.05	1
	11/15/2022	< 3	< 3	0.27	< 0.01	6
	11/22/2022	< 3	5	0.3	0.04	3
	11/29/2022	< 3	< 3	0.27	0.03	2
	Monthly Average	3.0	4.2	0.27	0.05	3
Compliant?	YES	YES	YES	YES	YES	
December	12/06/2022	< 3	6	0.2	0.04	0
	12/13/2022	< 3	< 3	0.19	0.05	14
	12/20/2022	< 3	< 3	0.18	< 0.01	4
	12/28/2022	< 3	35	0.1	0.77	1
	Monthly Average	3.0	11.75	0.17	0.22	0
	Compliant?	YES	YES	YES	YES	YES

2022 - IROQUOIS WWTP LOADING CALCULATIONS

MONTH	Total Effluent Flow (m ³)		BOD	TSS	TP	NH ₃
January	42,887	Monthly Average (mg/L)	3.0	4.5	0.5	0.05
		Loading (kg/d)	4.15	6.23	0.73	0.07
		Compliant?	YES	YES	YES	YES
February	51,584	Monthly Average (mg/L)	3.0	8.75	0.51	0.07
		Loading (kg/d)	4.99	14.56	0.85	0.12
		Compliant?	YES	YES	YES	YES
March	128,343	Monthly Average (mg/L)	3.0	8.6	0.28	0.06
		Loading (kg/d)	12.42	35.60	1.15	0.24
		Compliant?	YES	YES	YES	YES
April	91,179	Monthly Average (mg/L)	3.0	4.25	0.25	0.04
		Loading (kg/d)	8.82	12.50	0.74	0.13
		Compliant?	YES	YES	YES	YES
May	66,319	Monthly Average (mg/L)	3.0	4	0.35	0.028
		Loading (kg/d)	6.42	8.56	0.75	0.06
		Compliant?	YES	YES	YES	YES
June	48,567	Monthly Average (mg/L)	3.0	3.75	0.31	0.05
		Loading (kg/d)	4.70	5.88	0.49	0.07
		Compliant?	YES	YES	YES	YES
July	49,631	Monthly Average (mg/L)	3.0	5.0	0.31	0.11
		Loading (kg/d)	4.80	8.00	0.49	0.17
		Compliant?	YES	YES	YES	YES
August	44,542	Monthly Average (mg/L)	3.0	3.2	0.22	0.03
		Loading (kg/d)	4.31	4.60	0.32	0.05
		Compliant?	YES	YES	YES	YES
September	45,067	Monthly Average (mg/L)	3.0	3.5	0.27	0.03
		Loading (kg/d)	4.36	5.09	0.39	0.04
		Compliant?	YES	YES	YES	YES
October	37,608	Monthly Average (mg/L)	3.0	3.0	0.29	0.05
		Loading (kg/d)	3.64	3.64	0.35	0.06
		Compliant?	YES	YES	YES	YES
November	43,499	Monthly Average (mg/L)	3.0	4.2	0.27	0.05
		Loading (kg/d)	4.21	5.89	0.38	0.07
		Compliant?	YES	YES	YES	YES
December	83,705	Monthly Average (mg/L)	3.0	11.8	0.17	0.22
		Loading (kg/d)	8.10	31.73	0.45	0.59
		Compliant?	YES	YES	YES	YES

2022 - IROQUOIS WWTP EFFLUENT UN-IONIZED AMMONIA

Sample Date	Sample Temperature ° C	Sample Temp. Kelvin	Dissociation Constant pK _a	Effluent Sample pH on-site	Fraction of Un-ionized Ammonia	Total Ammonia (mg/L) (NH ₃ + NH ₄ as N)	Un-ionized Ammonia (mg/L)	
01/04/2022	11.9	285.05	9.67	7.26	0.0039	0.04	0.0002	
01/11/2022	12.0	285.15	9.66	7.34	0.0047	0.06	0.0003	
01/18/2022	13.4	286.55	9.62	7.50	0.0076	0.03	0.0002	
01/25/2022	15.0	288.15	9.56	7.53	0.0092	0.06	0.0005	
02/01/2022	13.3	286.45	9.62	7.36	0.0055	0.06	0.0003	
02/08/2022	13.4	286.55	9.62	7.29	0.0047	0.03	0.0001	
02/15/2022	12.4	285.55	9.65	7.21	0.0036	0.08	0.0003	
02/22/2022	10.8	283.95	9.70	6.83	0.0013	0.11	0.0001	
03/01/2022	10.7	283.85	9.71	6.94	0.0017	0.05	0.0001	
03/08/2022	12.2	285.35	9.66	7.13	0.0030	0.06	0.0002	
03/15/2022	9.3	282.45	9.76	7.27	0.0033	0.05	0.0002	
03/22/2022	10.6	283.75	9.71	7.04	0.0021	0.09	0.0002	
03/29/2022	9.4	282.55	9.75	7.02	0.0019	0.04	0.0001	
04/05/2022	15.1	289.25	9.56	6.86	0.0020	0.05	0.0001	
04/12/2022	10.1	283.25	9.73	7.00	0.0019	0.02	0.0000	
04/19/2022	11.7	284.85	9.67	7.00	0.0021	0.09	0.0002	
04/26/2022	12.2	285.35	9.66	7.00	0.0022	0.01	0.0000	
05/03/2022	12.1	285.25	9.66	7.09	0.0027	0.06	0.0002	
05/10/2022	12.8	285.95	9.64	7.12	0.0030	0.01	0.0000	
05/17/2022	13.7	286.85	9.61	7.11	0.0032	0.03	0.0001	
05/24/2022	14.1	287.25	9.59	7.24	0.0044	0.02	0.0001	
05/31/2022	18.2	291.35	9.46	7.04	0.0038	0.02	0.0001	
06/07/2022	15.3	289.45	9.55	7.01	0.0028	0.02	0.0001	
06/14/2022	17.0	290.15	9.50	7.22	0.0052	0.05	0.0003	
06/21/2022	15.0	288.15	9.56	7.04	0.0030	0.02	0.0001	
06/28/2022	16.0	289.15	9.53	6.89	0.0023	0.09	0.0002	
07/06/2022	15.6	288.75	9.54	6.96	0.0026	0.04	0.0001	
07/12/2022	16.4	289.55	9.52	6.87	0.0022	0.08	0.0002	
07/19/2022	19.8	292.95	9.41	7.19	0.0060	0.24	0.0014	
07/26/2022	17.6	290.75	9.48	7.09	0.0041	0.06	0.0002	
08/02/2022	17.1	290.25	9.50	7.04	0.0035	0.04	0.0001	
08/09/2022	17	290.15	9.50	6.81	0.0020	0.02	0.0000	
08/16/2022	18.5	291.65	9.45	6.76	0.0020	0.01	0.00002	
08/23/2022	18.1	291.25	9.46	6.80	0.0022	0.06	0.0001	
08/30/2022	18.7	291.85	9.44	6.81	0.0023	0.03	0.0001	
09/06/2022	17.4	290.55	9.49	6.95	0.0029	0.03	0.0001	
09/13/2022	18.7	291.85	9.44	7.23	0.0061	0.01	0.0001	
09/20/2022	17.8	290.95	9.47	6.91	0.0027	0.04	0.0001	
09/27/2022	17.5	290.65	9.48	7.37	0.0077	0.02	0.0002	
10/04/2022	17.8	290.95	9.47	7.47	0.0098	0.08	0.0008	
10/11/2022	16.4	289.55	9.52	7.51	0.0097	<	0.01	0.0001
10/18/2022	16.8	289.95	9.51	7.54	0.0107	0.05	0.0005	
10/25/2022	16.6	289.75	9.51	7.50	0.0096	0.05	0.0005	
11/01/2022	17.4	290.55	9.49	7.40	0.0081	0.11	0.0009	
11/08/2022	16.7	289.85	9.51	7.31	0.0063	0.05	0.0003	
11/15/2022	15.2	288.35	9.56	7.40	0.0069	<	0.01	0.0001
11/22/2022	15.6	288.75	9.54	7.45	0.0080	0.04	0.0003	
11/29/2022	14.6	287.75	9.58	7.40	0.0066	0.03	0.0002	
12/06/2022	13.9	287.05	9.60	7.40	0.0063	0.04	0.0003	
12/13/2022	13.3	286.45	9.62	7.41	0.0061	0.05	0.0003	
12/20/2022	13.4	286.55	9.62	7.33	0.0051	<	0.01	0.0001
12/28/2022	13	286.15	9.63	7.35	0.0052	0.77	0.0040	

pK_a = 0.09018 + 2729.92/T, where pK_a is the dissociation constant of ammonia at a given temperature.

T = (K = degrees C + 273.16), where T is the ambient water temperature in Kelvin.

Appendix B

13 Appendix B - 2023 Sample Calendar

Iroquois WWTP Sampling Schedule - 2023

	Weekly Effluent				Influent Sample	Sludge Sample	Trout & Daphnia
January							
February							
March							
April							
May							
June							
July							
August							
September							
October							
November							
December							

Effluent Limits		
Parameters	Objectives	Limits
CBOD5	15 mg/L	25 mg/L
TSS	15 mg/L	25 mg/L
Total Phosphorus	0.6 mg/L	1 mg/L
Total Ammonia	June-Sept: 5 mg/L Oct-May: 7 mg/L	10 mg/L 15 mg/L
E.Coli	100/100 mL	200/100 mL
Trout & Daphnia	Non- Accutely Lethal	
Effluent pH	6.0 - 9.5	

Weekly Samples: 2 GWC, 1 Bacti, 1 Phosphorus	Influent Samples: 1 GWC, 1 Yellow Cap	Sludge Samples: 2 GWC
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CLI-ECA Sample Before Oct 23	Sampled from Elizabeth St SFS
*Collect at least one (1) grab sample, for BOD (or COD, if agreed upon by the District Manager), total suspended solids, total phosphorus, total Kjeldahl nitrogen, and E. Coli	

Appendix C

14 Appendix C - Biosolids Quality Report

2022 - IROQUOIS WWTP MONTHLY AEROBIC BIOSOLIDS CONCENTRATION RATIO

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia	1290	1250	1060	1460	1240	1240	1290	964	1090	1960	1280	1120
Nitrate	5.8	4.1	2.0	3.0	2.3	3.0	1.0	1.7	1.4	44.9	1.0	4.5
Ammonia + Nitrate	1296	1254	1062	1463	1242	1243	1291	966	1091	2005	1281	1125
Total Phosphorus	936	839	749	460	663	656	597	657	792	1300	896	1010
Total Solids	32000	27900	23400	30500	21300	56600	22500	7400	25700	38400	38300	39000
Aluminum	820	730	468.00	690	573.0	535.0	938	775	851	1170	940	378
Arsenic	0.20	0.10	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.20	0.10
Cadmium	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03
Chromium	1.10	0.99	0.70	1.07	0.95	0.76	1.86	1.64	1.09	1.63	1.27	1.62
Cobalt	0.12	0.09	0.09	0.13	0.12	0.11	0.19	0.11	0.11	0.15	0.14	0.11
Copper	43.60	36.30	26.10	34.30	30.90	24.80	50.80	27.20	29.90	47.20	31.60	38.80
Lead	0.90	0.80	0.60	0.80	0.70	0.60	2.30	0.70	1.20	0.90	0.90	0.70
Mercury	0.02	0.02	0.01	0.01	0.03	0.01	0.71	0.11	0.13	0.03	0.01	0.02
Molybdenum	0.44	0.38	0.28	0.41	0.42	0.33	0.53	0.34	0.30	0.37	0.37	0.29
Nickel	0.97	0.91	0.67	1.07	0.94	0.75	1.26	1.00	0.81	1.76	0.86	2.88
Selenium	0.20	0.20	0.10	0.20	0.20	0.10	0.10	0.10	0.10	0.20	0.10	0.20
Zinc	21.60	18.60	12.60	17.30	14.90	12.00	15.60	12.60	12.40	24.00	18.10	14.00

Metals ratio = mg metals/kg solids

	Metal/Solids Ratio (Sludge)												Limit
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
Arsenic	6.25	3.58	4.27	3.28	4.69	1.77	8.89	27.03	7.78	5.21	5.22	2.56	170
Cadmium	1.56	1.08	1.28	0.98	1.41	0.53	1.33	4.05	1.17	1.04	0.78	0.77	34
Chromium	34.4	35.5	29.9	35.1	44.6	13.4	82.7	221.6	42.4	42.4	33.2	41.5	2800
Cobalt	3.75	3.23	3.85	4.26	5.63	1.94	8.44	14.86	4.28	3.91	3.66	2.82	340
Copper	1363	1301	1115	1125	1451	438	2258	3676	1163	1229	825	995	1700
Lead	28.1	28.7	25.6	26.2	32.9	10.6	102.2	94.6	46.7	23.4	23.5	17.9	1100
Mercury	0.56	0.57	0.43	0.46	1.41	0.19	31.38	14.32	4.94	0.65	0.29	0.62	11
Molybdenum	13.75	13.62	11.97	13.44	19.72	5.83	23.56	45.95	11.67	9.64	9.66	7.44	94
Nickel	30.3	32.6	28.6	35.1	44.1	13.3	56.0	135.1	31.5	45.8	22.5	73.8	420
Selenium	6.25	7.17	4.27	6.56	9.39	1.77	4.44	13.51	3.89	5.21	2.61	5.13	34
Zinc	675	667	538	567	700	212	693	1703	482	625	473	359	4200

Sludge is Acceptable	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE
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SOME ANALYSIS RESULTS EXPRESSED AS "<" (LESS THAN); HOWEVER, IN ORDER TO COMPLETE THE CALCULATION, ONLY THE NUMERIC VALUE WAS USED; THEREFORE THE AVG. CONC. IS GREATER THAN ACTUAL.

Appendix D

15 Appendix D - Details of Abnormal Sewage Discharge Events

15.1.1 Facility Bypass

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
No facility bypass' to report in 2022.								

15.1.2 Facility Overflow

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
No facility overflows to report in 2022.								

15.1.3 Collection Overflow

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
One Sanitary Sewer Overflow Point in Table B5 of Draft CLI-ECA: Elizabeth Street SPS No overflows to report in 2022								

15.1.4 Spills of Sewage

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
No spills of sewage to report in 2022.								

15.2 Collection System Monitoring Data

Event Date	Event Location	Volume (m3)	Parameter	mg/L	Source Loading	Any Adverse Impacts & Corrective Actions
There was no collection system overflow or spill to report in 2022.						

Appendix E

16 Appendix E - ECA Annual Report Requirements

Facility ECA # 9689-8MQHNK Section 10.6	Section in Report
(a) A summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7, including an overview of the success and adequacy of the Works;	Section 6 – Effluent Quality
(b) A description of any operating problems encountered and corrective actions taken;	Section 8 – Operating Issues
(c) A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works;	Section 9 - Maintenance
(d) A summary of any effluent quality assurance or control measures undertaken in the reporting period;	Section 6 – Effluent Quality
(e) A summary of the calibration and maintenance carried out on all effluent monitoring equipment; and	Section 9.3 – Flow Meter Calibrations
(f) A description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6.	Section 6 – Effluent Quality
(g) A tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;	Section 10 – Sludge Generation
(h) A summary of any complaints received during the reporting period and any steps taken to address the complaints;	Section 11 - Complaints
(i) A summary of all By-pass, spill or abnormal discharge events; and	Appendix D
(j) Any other information the District Manager requires from time to time.	N/A