Killaloe Wastewater System

Annual Report

Prepared For: The Township of Killaloe, Hagarty and Richards

Reporting Period of January 1st – December 31st 2021

Issued: March 16th, 2022

Revision: 0

Operating Authority:

OCWA

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

This report has been prepared as a general summary of results and events. The Certificate of Approval governing this facility does not require an annual report to be prepared, or define effluent objectives and limits. It is there by operated based solely on provincial guidelines.

Table of Contents

Operations and Compliance Reliability Indices

Compliance Event	# of Events
Ministry of Environment Inspections	1 MECP Inspection on September 14th 2021
Ministry of Labour Inspections	0
Environment Canada Inspections	0
Non-Compliance	0 - see Operating Issues for details
Bypass/Overflows/Spills	0 / 0 / 0
Community Complaints	1 - see Summary of Complaints for details
Sewer Main Blockages	0

System Process Description

The Killaloe Wastewater Treatment System consists of a sewage treatment plant and one sewage pumping station. In the event of a power failure, emergency power is supplied from the main treatment facility to the pumping station. Wastewater from the Village of Killaloe is collected at the Henry Street pumping station, and is then pumped to the Class II Wastewater Treatment Facility located at 113 Keetch Street. Upon entering the facility the incoming wastewater receives primary treatment consisting of two grit removal channels equipped with two proportional weirs, an emergency by-pass bar screen, and a three inch Parshall Flume for measuring influent flows.

Secondary treatment is achieved through the Extended Aeration Process consisting of a comminutor, an aeration chamber with fine bubble aeration, a clarifier with chemical addition of PAS-8 for phosphorus removal, and an aerated sludge holding tank/digester. The activated sludge which settles to the bottom of the clarifier is either returned to the head of the aeration tank or is diverted to the digester. Bio-solids are aerobically digested, stored on site and later land applied under the Nutrient Management Act.

The clear effluent overflows the clarifier weirs and is collected in the channel leading to the chorine contact chamber. Disinfection is achieved in the contact chamber by the addition of sodium hypochlorite prior to being de-chlorinated with sodium sulfite pucks before discharging into Brennan's Creek and ultimately Golden Lake.

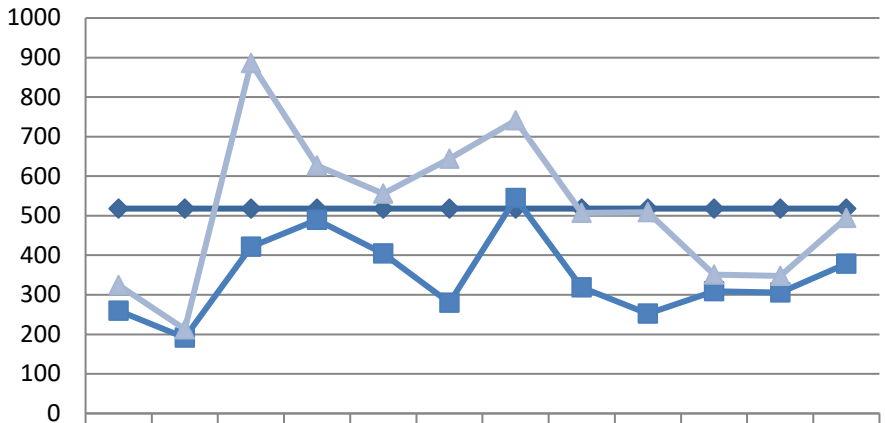
The addition of two chemical dosing pumps each with a capacity of 30 L/hr, dosing calcium thiosulfate to the 12 inch diameter outfall sewer is scheduled to be installed in the summer of 2022 for a permanent de-chlorinating solution.

Flows

The annual average daily flow for 2021 was 347 m^3/d, which represents 66% of the facility's 518 m^3/d rated capacity.

Raw Flows

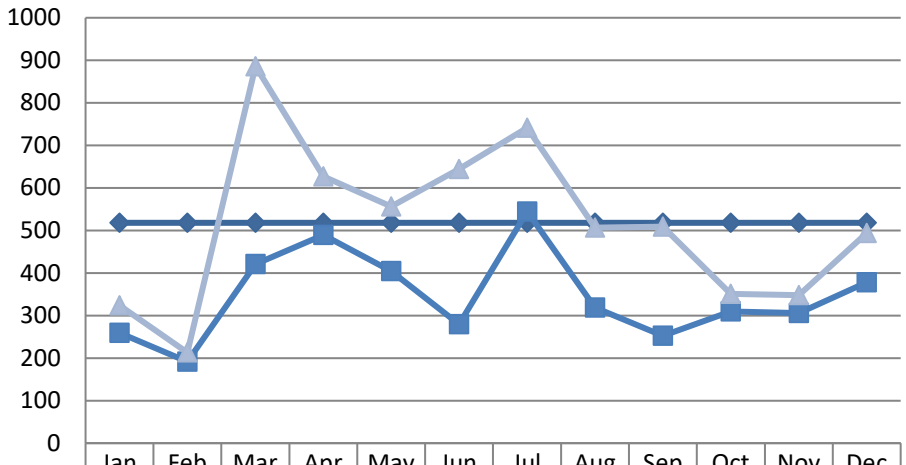
2021 Raw Flows



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rated Capacity (m3/d)	518	518	518	518	518	518	518	518	518	518	518	518
Average Daily Flow (m3/d)	259	192	421	489	404	279	544	319	252	309	306	378
Maximum Daily Flow (m3/d)	324	213	886	627	556	644	741	507	509	351	348	494

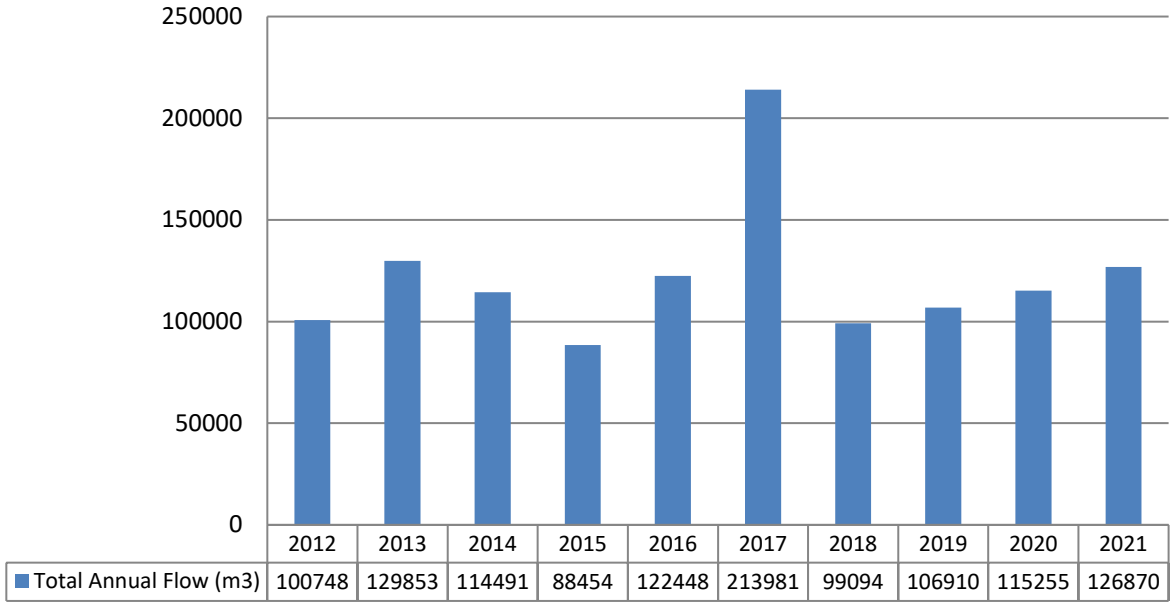
Effluent Flow

2021 Effluent Flow



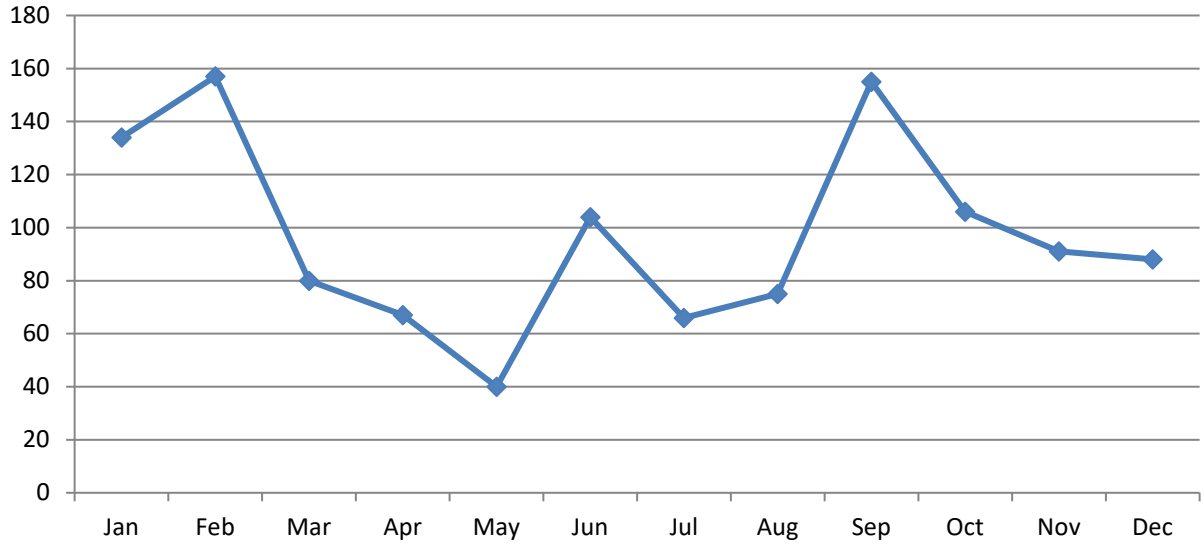
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit	518	518	518	518	518	518	518	518	518	518	518	518
Average Daily Flow (m3/d)	259	192	421	489	404	279	544	319	252	309	306	378
Maximum Daily Flow (m3\d)	324	213	886	627	556	644	741	507	509	351	348	494

Annual Effluent Flow Comparison

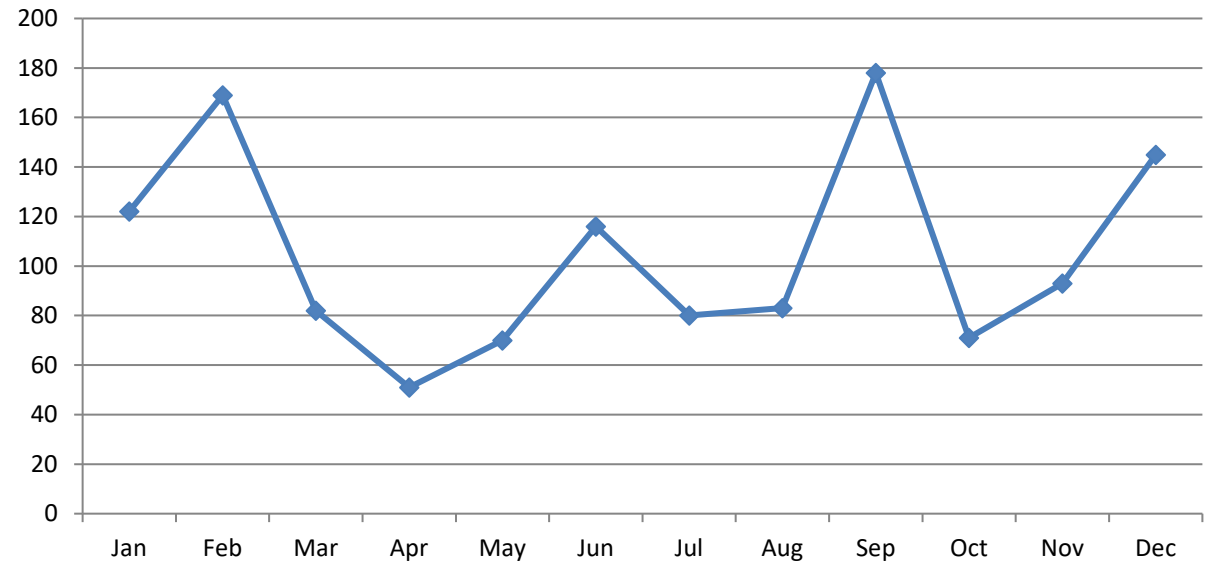


Raw Sewage Quality

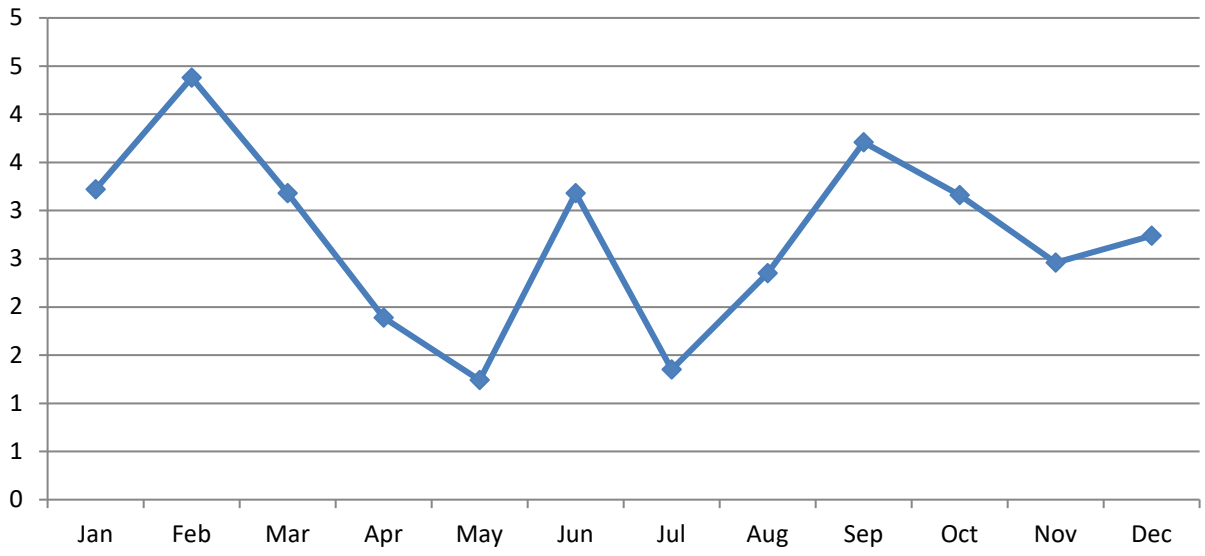
BOD5 Influent Monthly Average Concentration (mg/L)



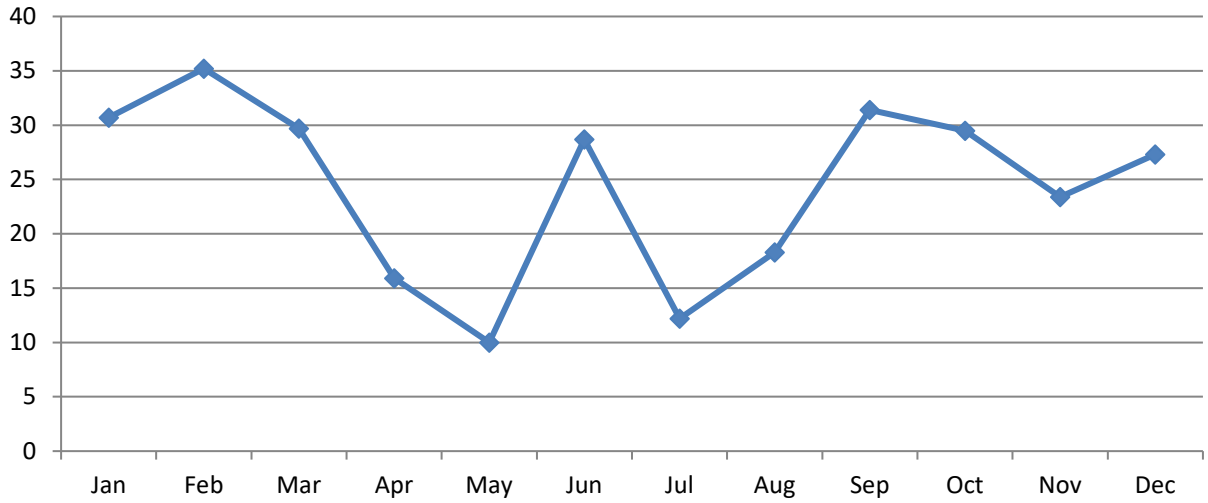
Total Suspended Solids Influent Monthly Average Concentration (mg/L)



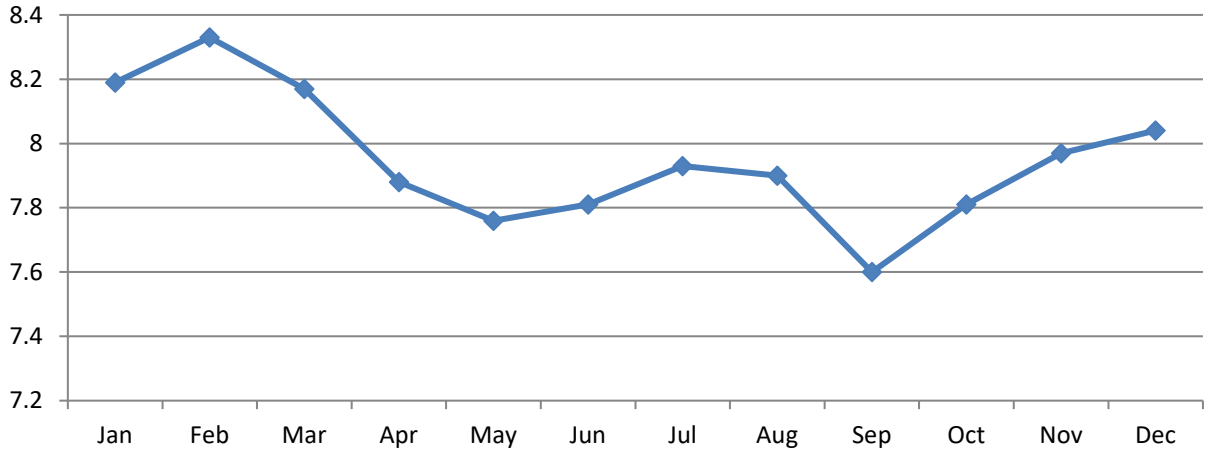
Total Phosphorus Influent Monthly Average Concentration (mg/L)



Total Ammonia Nitrogen Influent Monthly Average Concentration (mg/L)



pH Influent Monthly Average



Effluent Quality Assurance or Control Measures

Effluent control measures include in-house sampling and testing for operational parameters such as suspended solids, pH, total chlorine, soluble phosphorus, and dissolved oxygen. In-house testing provides real time results which are then used to enhance process and operational performance. All in-house sampling and analysis is performed by certified operations staff utilizing 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 the Ministry's sampling requirements were submitted to SGS Lakefield Research Ltd. laboratory in Lakefield, Ontario for analysis, with the exception of pH, and temperature. The pH and temperature parameters were analyzed in the field at the time of sample collection by certified operators, to ensure accuracy and precision of the results obtained. SGS Lakefield Research 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, the Ontario Clean Water Agency is ensuring appropriate control measures are undertaken during sample analysis.

Effluent Quality

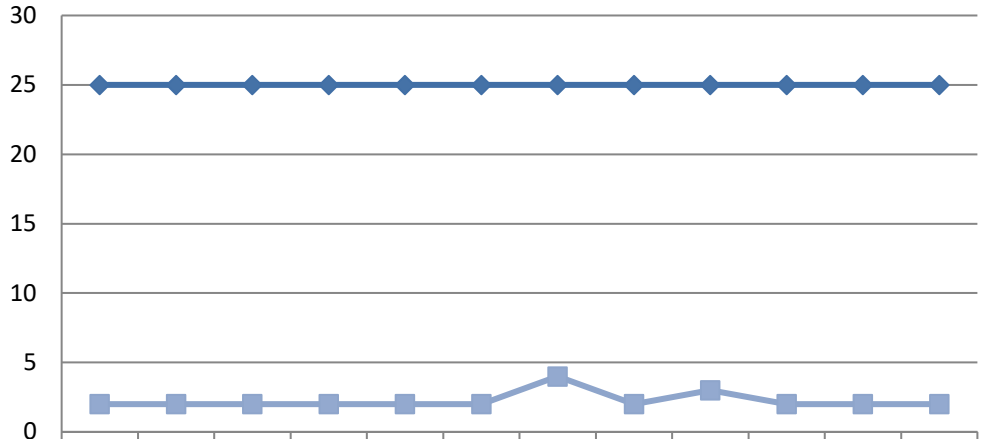
There are no effluent limits defined in the Certificate of Approval for this facility. This facility operates to ensure current provincial guidelines are not exceeded, see the operating issues section of this report for further details.

The Federal Government also regulates the effluent flow, and the monthly average CBOD and suspended solids in the effluent under the Federal Fisheries Act. The results are submitted to Environment and Climate Change Canada's effluent regulatory reporting information system, under wastewater systems effluent regulations (WSER) on a quarterly basis.

Effluent results from the Killaloe wastewater treatment facility for 2021 are tabulated below.

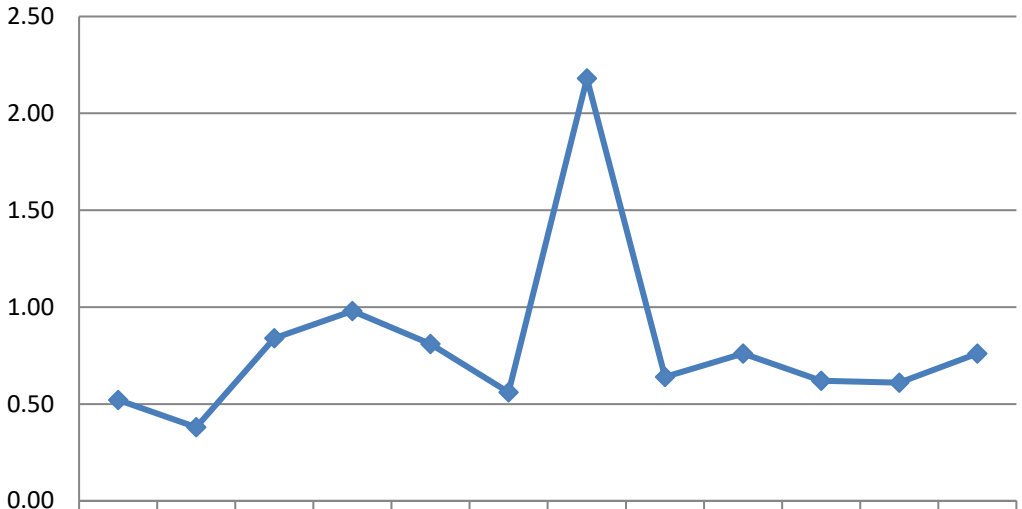
Carbonaceous Biochemical Oxygen Demand (5-Day)

CBOD5 Effluent Monthly Average Concentration



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Guideline (mg/L)	25	25	25	25	25	25	25	25	25	25	25	25
Average (mg/L)	2	2	2	2	2	2	4	2	3	2	2	2

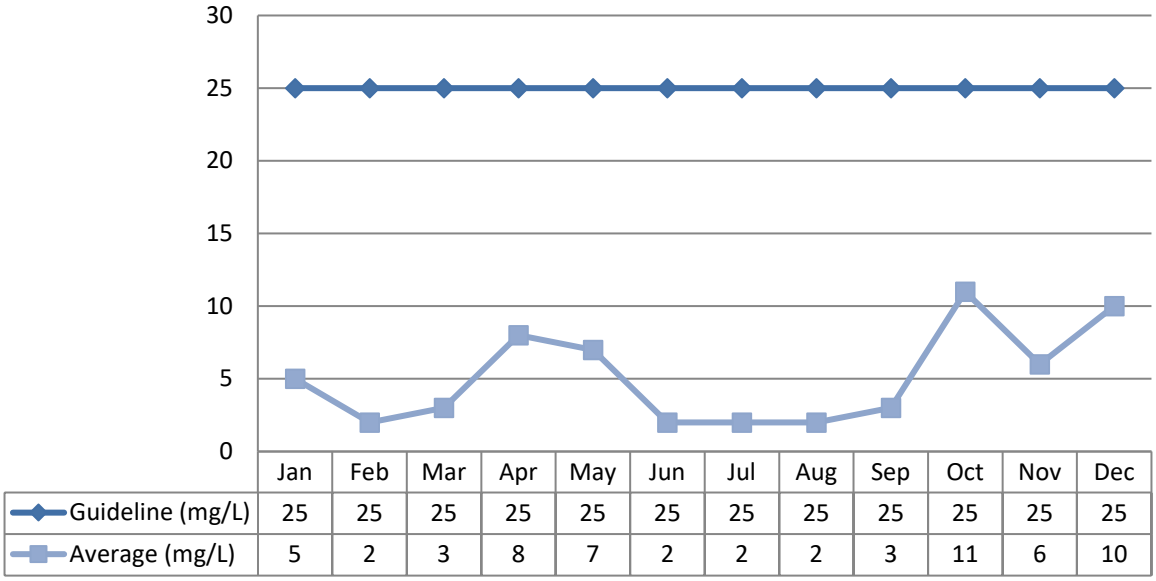
CBOD5 Monthly Average Loading



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (kg/d)	0.52	0.38	0.84	0.98	0.81	0.56	2.18	0.64	0.76	0.62	0.61	0.76

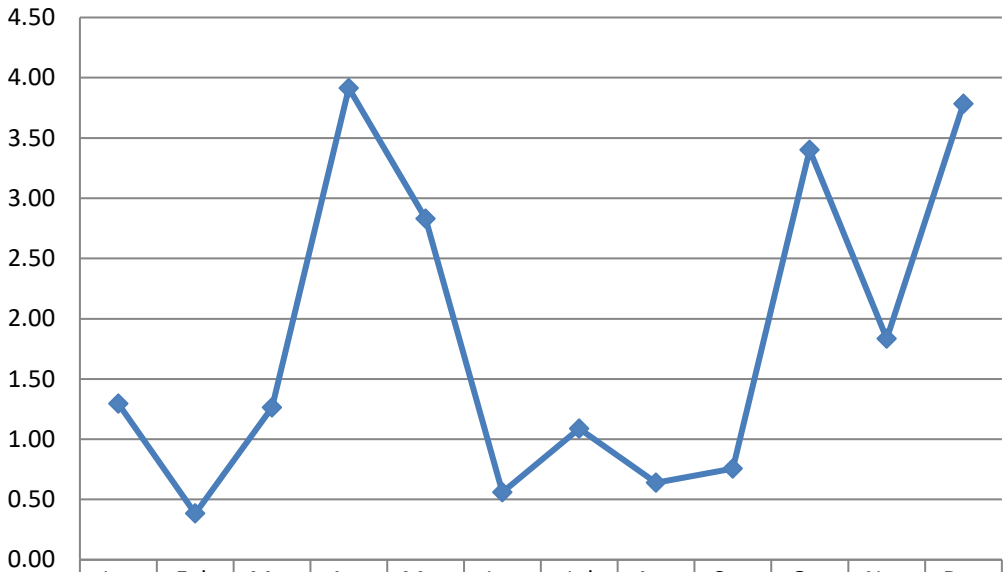
Total Suspended Solids

TSS Effluent Monthly Average Concentration



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Guideline (mg/L)	25	25	25	25	25	25	25	25	25	25	25	25
Average (mg/L)	5	2	3	8	7	2	2	2	3	11	6	10

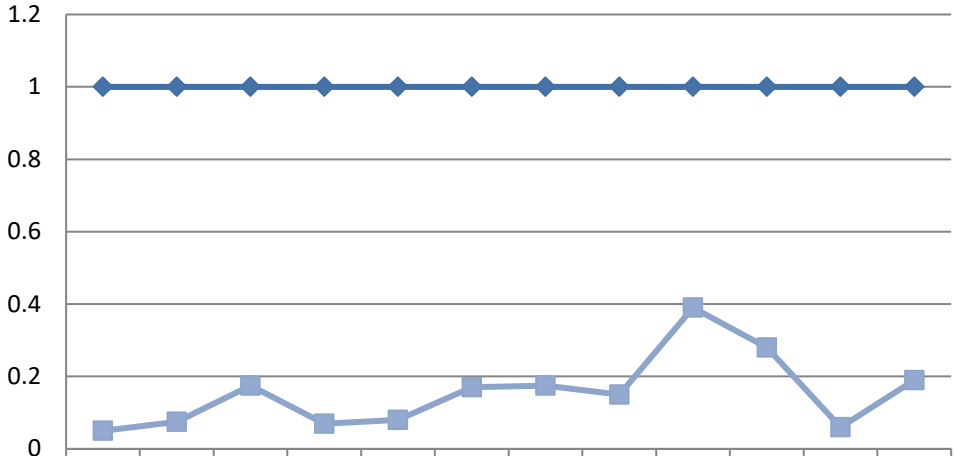
TSS Monthly Average Loading



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (kg/d)	1.30	0.38	1.26	3.91	2.83	0.56	1.09	0.64	0.76	3.40	1.83	3.78

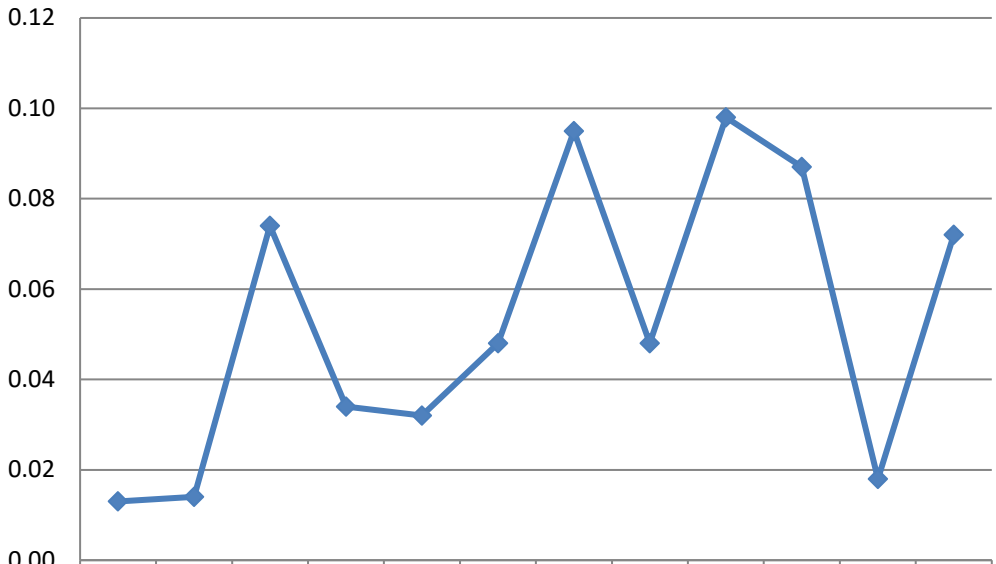
Total Phosphorus

TP Effluent Monthly Average Concentration



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Guideline (mg/L)	1	1	1	1	1	1	1	1	1	1	1	1
Average (mg/L)	0.05	0.08	0.18	0.07	0.08	0.17	0.18	0.15	0.39	0.28	0.06	0.19

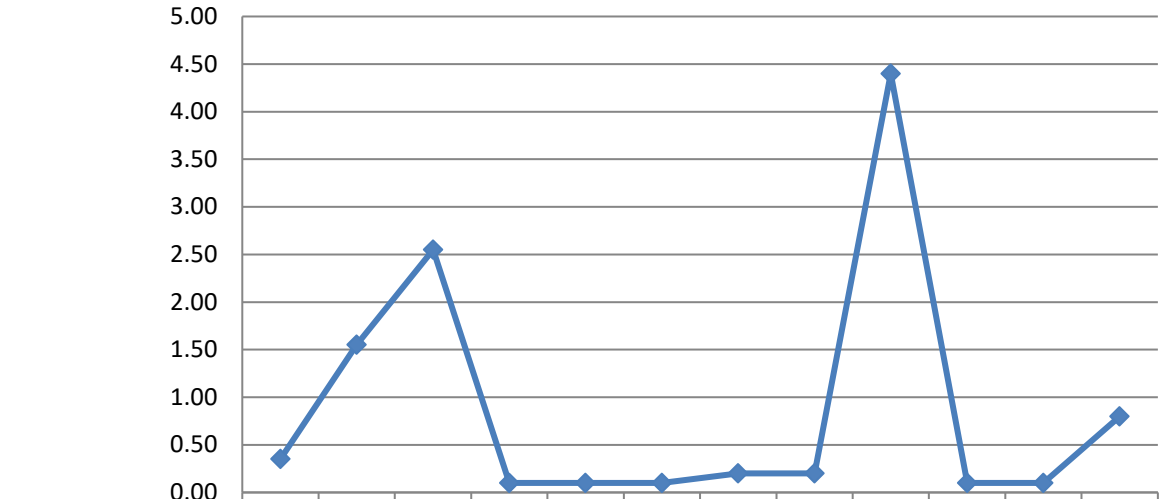
TP Monthly Average Loading



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (kg/d)	0.01	0.01	0.07	0.03	0.03	0.05	0.10	0.05	0.10	0.09	0.02	0.07

Total Ammonia Nitrogen

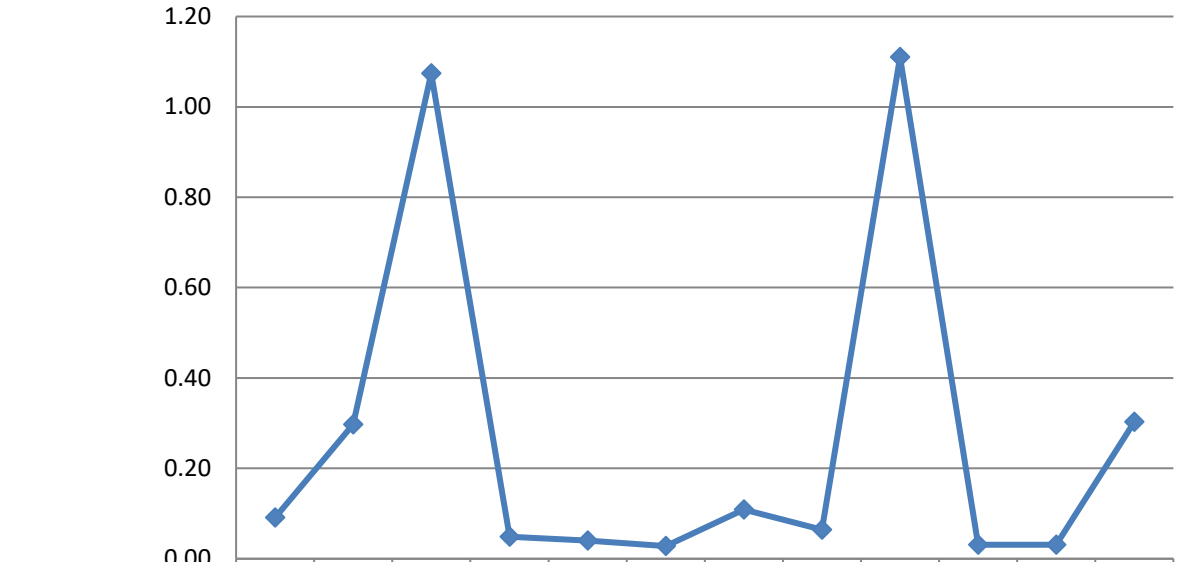
TAN Effluent Monthly Average Concentration



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (mg/L)	0.35	1.55	2.55	0.10	0.10	0.10	0.20	0.20	4.40	0.10	0.10	0.80

Note: There is no guideline limit on Total Ammonia Nitrogen

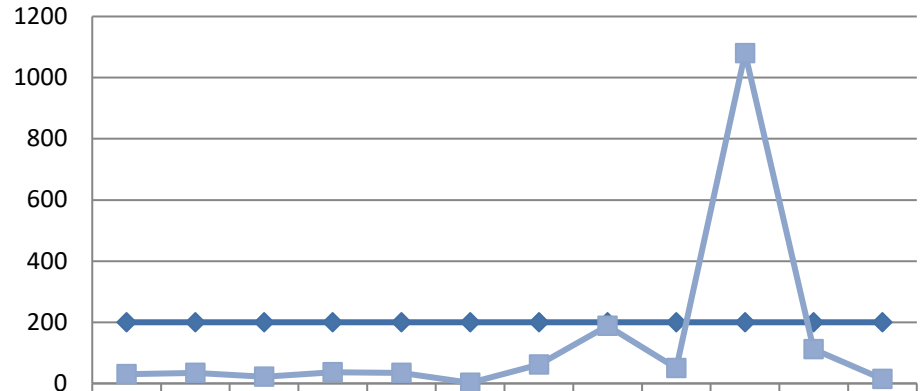
TAN Monthly Average Loading



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (kg/d)	0.09	0.30	1.07	0.05	0.04	0.03	0.11	0.06	1.11	0.03	0.03	0.30

E.Coli

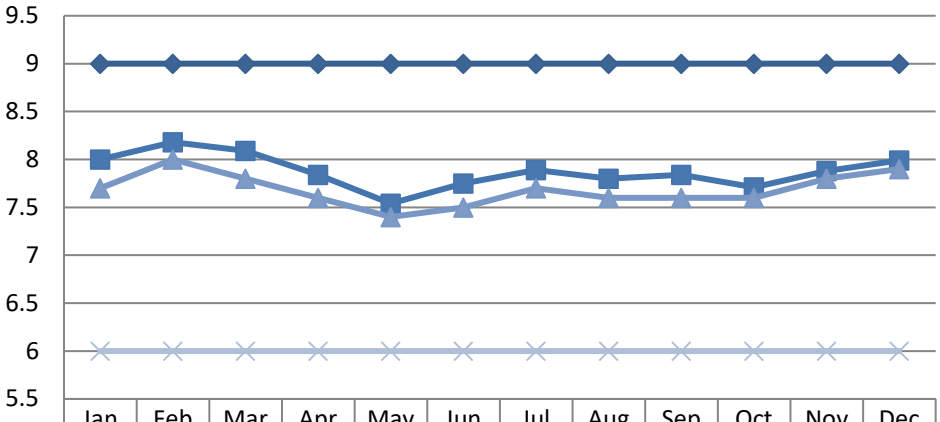
E.Coli Monthly Geometric Mean Density



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Guideline (CFU/100 mL)	200	200	200	200	200	200	200	200	200	200	200	200
Average (CFU/100 mL)	30	34	22	36	34	2	62	188	50	1080	112	14

pH

Monthly minimum and maximum pH results



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Guideline	9	9	9	9	9	9	9	9	9	9	9	9
Maximum	8	8.18	8.09	7.84	7.54	7.75	7.89	7.8	7.84	7.71	7.88	7.99
Minimum	7.70	8.00	7.80	7.60	7.40	7.50	7.70	7.60	7.60	7.60	7.80	7.90
Minimum Guideline	6	6	6	6	6	6	6	6	6	6	6	6

Operating Issues

The Killaloe WPCP operated very well during 2021, though there was one sample collected on October 5th 2021 that lead to an exceedance of the Ministry's *E.Coli* monthly geometric mean density (GMD) guideline of 200 CFU/100 mL. As the Killaloe WPCP Certificate of Approval does not have defined effluent limits, the GMD exceedance is considered a guideline non-conformance and is not reportable to the Ministry.

Date	Exceedance of	Value	Details
October 2021	Ministry's Guideline: F-5 Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters, *E.Coli* monthly geometric mean density (GMD) guideline of 200 CFU/100 mL	1080 CFU/100 mL	Suspected additional bacterial load from sanitary system flushing before sampling occurred

Major Maintenance Summary

Flow Meter Calibrations and Maintenance

Copies of the flow meter calibration certificates for 2021 are attached in Appendix B.

Effluent Flow Meter

Calibration of the effluent flow meter was completed May 12th, 2021 by Franklin Empire.

Maintenance Summary

WO#	Details
2091322	Repaired PAS-8 pump, diaphragm was leaking
2224169	Replaced Henry Street Pumping Station Pump #1
2314351	Replaced chlorine dosing line to contact chamber

Notice of Modifications

Date	Process	Modification	Status
December 3, 2021	Disinfection	Received MECP approval to install a 310 Liter double wall polyethylene storage tank and two chemical dosing pumps each with a capacity of 30 L/hr to dose Calcium Thiosulfate to the 12 inch diameter outfall sewer of the wastewater treatment plant for de-chlorinating the treated effluent	Scheduled to be installed in summer of 2022

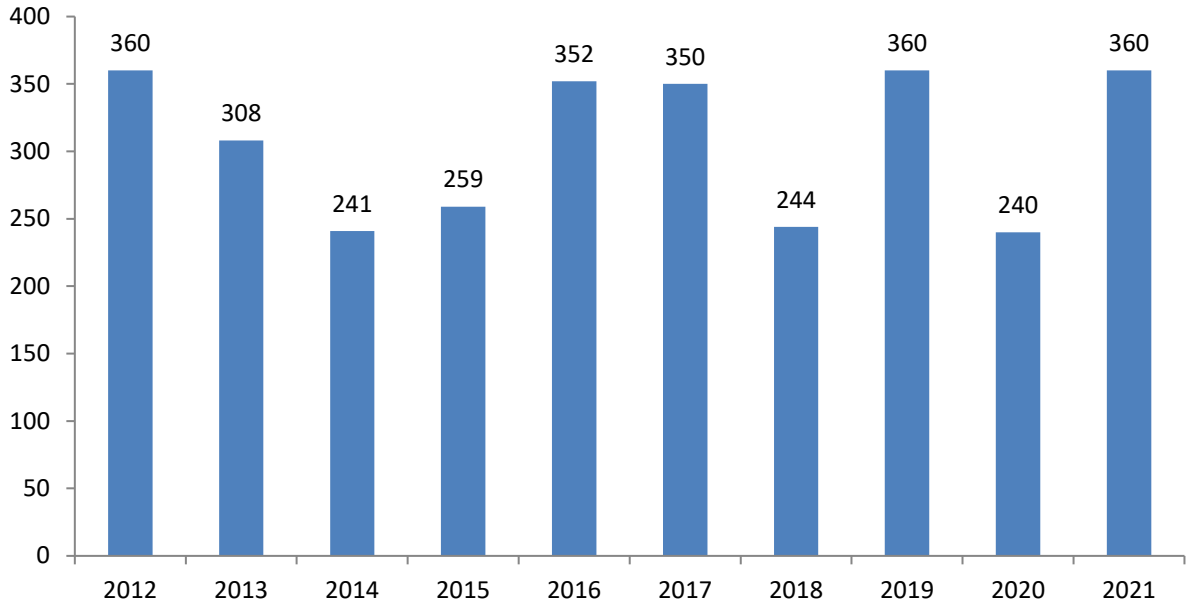
Sludge Generation

Sludge Disposal Summary

In 2021, a total of 360 m^3 of liquid bio-solids was hauled offsite by Terrapure Organics Solutions and utilized as soil conditioner or hauled to processing facility. It is anticipated that approximately the same volume of sludge will be generated in 2022.

Date	Landowner / Disposal Location	NASM # / ECA #	Total Volume (m3)
05/12/2021	Trotter - Graham	23904	80
05/13/2021	Trotter - Graham	23904	40
09/13/2021	Parks, David - Home	24817	120
10/26/2021	Terrapure Storage Facility	S-3708-42	80
10/27/2021	Terrapure Storage Facility	S-3708-42	40
		Total Annual Volume (m3)	360

Annual Sludge Disposal Comparison (m3/year)



Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
9 William Street	June 2nd 2021	Sewer Back-Up	Customer's toilet had overflowed during scheduled sewer flushing to remove blockage in maintenance hole #35-4. OCWA staff confirmed no damage occurred within the home

Summary of Abnormal Discharge Events

Bypass/Overflow/Spills

No bypass, overflow or spill events during reporting period.

Appendix A

Biosolids Quality Report

Ontario Clean Water Agency
Biosolids Quality Report - Liquid
Digestor Type: AEROBIC
Solids and Nutrients

Facility: KILLALOE WASTEWATER TREATMENT FACILITY
Works: 5539
Period: 01/01/2021 to 12/31/2021

Facility Works Number: *1.10001532E8*
Facility Name: *KILLALOE WASTEWATER TREATMENT FACILITY*
Facility Owner: *Municipality: Township of Killaloe, Hagarty & Richards*
Facility Classification: *Class 2 Wastewater Treatment*
Receiver: *Brennan Creek*
Service Population:
Total Design Capacity: *518 m3/day*

Note: all parameters in this report will be derived from the Bslq Station

Month	Total Sludge Hauled (m3)	Avg. Total Solids (mg/L)	Avg. Volatile Solids (mg/L)	Avg. Total Phosphorus (mg/L)	Ammonia (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	TKN (mg/L)	Ammonia + Nitrate (mg/L)	Potassium (mg/L)
Site	**KILLALOE WASTEWATER TREATMENT FACILITY**									
Station	**Bslq Station only**									
Parameter Short Name	**HauledVol**	**TS**	**VS**	**TP**	**NH3p_NH4p_N**	**NO3-N**	**NO2-N**	**TKN**	**calculation in report - no T/S**	**K**
T/s	**IH Month.Total**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**		**Lab Published Month Mean**
Jan		23,300.000	17,300.000	643.000	3.500	2.000	0.500	1,210.000	2.750	171.000
Feb		22,700.000	16,800.000	657.000	9.900	23.000	1.100	1,340.000	16.450	179.000
Mar		26,600.000	20,700.000	770.000	4.500	1.100	0.400	1,480.000	2.800	200.000
Apr		29,400.000	22,200.000	770.000	12.200	1.500	0.600	458.000	6.850	210.000
May	120.000	27,300.000	15,900.000	930.000	10.900	1.300	0.300	1,800.000	6.100	220.000
Jun		31,500.000	23,900.000	890.000	65.000	0.400	2.000	1,870.000	32.700	240.000
Jul		26,700.000	21,300.000	540.000	32.600	0.300	0.200	1,920.000	16.450	140.000
Aug		23,500.000	18,800.000	640.000	30.400	0.300	0.300	1,760.000	15.350	160.000
Sep	120.000	21,400.000	17,000.000	750.000	271.000	0.300	0.700	1,820.000	135.650	200.000
Oct	120.000	21,000.000	16,900.000	630.000	20.800	0.300	0.200	1,450.000	10.550	160.000
Nov		23,400.000	18,900.000	600.000	9.300	0.300	0.400	1,380.000	4.800	160.000
Dec		23,400.000	19,600.000	740.000	30.800	0.300	0.300	1,680.000	15.550	190.000
Average	120.000	25,016.667	19,108.333	713.333	41.742	2.592	0.583	1,514.000	22.167	185.833
Total	360.000	300,200.000	229,300.000	8,560.000	500.900	31.100	7.000	18,168.000	266.000	2,230.000

Ontario Clean Water Agency
Biosolids Quality Report - Liquid
Digestor Type: AEROBIC
Metals and Criteria

Facility: KILLALOE WASTEWATER TREATMENT FACILITY
Works: 5539
Period: 01/01/2021 to 12/31/2021

Note: all parameters in this report will be derived from the Bslq Station

Month	Arsenic (mg/L)	Cadmium (mg/L)	Cobalt (mg/L)	Chromium (mg/L)	Copper (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)
Site	**KILLALOE WASTEWATER TREATMENT FACILITY**										
Station	**Bslq Station only**										
Parameter Short Name	**As**	**Cd**	**Co**	**Cr**	**Cu**	**Hg**	**Mo**	**Ni**	**Pb**	**Se**	**Zn**
T/s	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**	**Lab Published Month Mean**
Jan	0.100	0.020	0.040	0.290	32.000	0.006	0.150	0.400	0.400	0.100	14.000
Feb	0.100	0.020	0.040	0.360	40.000	0.010	0.140	0.430	0.400	0.100	14.000
Mar	0.100	0.026	0.040	0.330	35.000	0.006	0.160	0.420	0.500	0.100	16.000
Apr	0.100	0.020	0.040	0.300	32.000	0.006	0.150	0.410	0.400	0.100	14.000
May	0.100	0.028	0.040	0.330	35.000	0.011	0.180	0.440	0.500	0.100	16.000
Jun	0.100	0.025	0.040	0.370	37.000	0.010	0.170	0.450	0.500	0.100	17.000
Jul	0.100	0.015	0.030	0.220	22.000	0.008	0.100	0.310	0.300	0.100	11.000
Aug	0.100	0.019	0.040	0.270	26.000	0.008	0.120	0.360	0.300	0.100	13.000
Sep	0.100	0.019	0.040	0.300	31.000	0.007	0.180	0.350	0.300	0.100	15.000
Oct	0.100	0.022	0.040	0.240	27.000	0.006	0.120	0.320	0.300	0.100	12.000
Nov	0.100	0.014	0.040	0.260	28.000	0.005	0.120	0.360	0.400	0.100	13.000
Dec	0.100	0.019	0.050	0.310	36.000	0.005	0.120	0.400	0.400	0.100	15.000
Average	0.100	0.021	0.040	0.298	31.750	0.007	0.143	0.388	0.392	0.100	14.167
Max. Permissible Metal Concentrations (mg/kg of	170.000	34.000	340.000	2,800.000	1,700.000	11.000	94.000	420.000	1,100.000	34.000	4,200.000
Metal Concentrations in Sludge (mg/kg)	3.997	0.823	1.599	11.925	1,269.154	0.293	5.696	15.490	15.656	3.997	566.289

Appendix B

Flow Meter Calibration Records

CALIBRATION REPORT

Report No.: OCWA CP'21

Date: 12-May-21

SITE:	Killaloe WWTP	**SERVICE DATE:**	May 12, 2021
PROCESS AREA:	WWTP		
INSTR. TAG:		**TECHNICIAN:**	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	OCM III	**JOB REFERENCE:**	OCWA CP'21
SERIAL No.:	05020703102XV		
OCWA Code:	0000191515		

Input	**(Test)**		**Output**	**(Signal)**	**(Process)**	
Type:	Head meters		**Type or EGU:**	mA	L/s	m3/day
Min:	0.0000		**Min:**	0.00	0.00	0.00
Max:	0.3503		**Max:**	34.72	34.72	3000.00
Weir Width (in.)	3	**Parshall Flume**				
exponent	1.55	1.547				
constant	176.5000					

			Before Calibration		**After Calibration**	
Input (m)	**Calc flow (l/s)**	**Calc. O/P (m3/d)**	**Output (m3/day)**	**%Error**	**Output (m3/day)**	**%Error**
0.000	0.000	0.00	0.00	0.00%	0.00	0.00%
0.100	4.974	429.79	427.47	-0.54%	422.00	-1.81%
0.200	14.566	1258.51	1244.47	-1.12%	1275.00	1.31%
0.350	34.678	2996.15	2999.63	0.12%	3019.00	0.76%

Calibration Equipment

Type:	Spare transducer	DMM	Tape Measure
Manufacturer:		Fluke	
Model:		Model 87	
Serial No.:		94140067	
Last Cal. Date:		March 19, 2021	

Comments: TOT: 2253949
4mA=4.03, 8.00=8.02,12.02,16.01,20.02

AS FOUND: PASS **AS LEFT:** PASS

CERTIFIED BY: Mike Humphries