Ontario Clean Water Agency
Agence Ontarienne Des Eaux

Zurich Sewage Treatment Lagoons

Annual

2020

Compliance Report

Municipality of Bluewater

WW#110001444

The Zurich Sewage Lagoon system is a Class 1 Wastewater Treatment facility; the collection system is a Class 1 Collection system.

The Zurich Sewage Lagoon system operates under Environmental Compliance Approval # 4039-877J9R issued July 21, 2010; Environmental Compliance Approval # 4039-877J9R identifies the following proposed work which was completed:

Main Lift Station

- Installation of 2 new submersible sewage pumps in the existing wet well to replace the existing pumps;
- Installation of 1 standby diesel generator with a capacity of 70 kW.

Waste Stabilization Pond

- Division of the existing two cells to create a total of four cells;
- Berm work to increase the depth of the lagoons;
- Installation of aeration equipment in Cell 1 and Cell 2 and three positive displacement blowers capable of providing 168.5 L/s of air;
- Installation of one 400 mm diameter pipe to drain facultative lagoon Cell 3 and discharge to the filter pumping station through MH1;
- Installation of one 400 mm diameter pipe to drain facultative lagoon Cell 4 and discharge to the filter pumping station through MH1;
- Installation of sewage transfer structures from Cell 1 to Cell 2, 3 and 4; from Cell 2 to Cell 3; from Cell 3 to Cell 4 and from Cell 1 to Cell 4.

Effluent Filtration System

Installation of effluent filtration system consisting of:

- Two intermittent sand filters for alternate dosing, each having a minimum total surface area of 900 m² comprised of approximately 1,060 mm of filter media, including an under drain system comprised of 150 mm diameter perforated collection laterals spaced at 4.5 to 5.0 m and bedded in gravel layer, continuously discharging the final effluent;
- One filter pump station equipped with two submersible pumps (one duty and one standby) each with a rated capacity of 64.4 L/s to the filter at 12.5 m TDH and discharging effluent to filters through separate 200 mm diameter discharge headers;
- One valve and effluent metering chamber; and
- One 450 mm diameter gravity sewer to convey the effluent of the filters to Zurich drain, from where it flows to Lake Huron approximately 10 km downstream of the lagoons.

Phosphorus Removal System

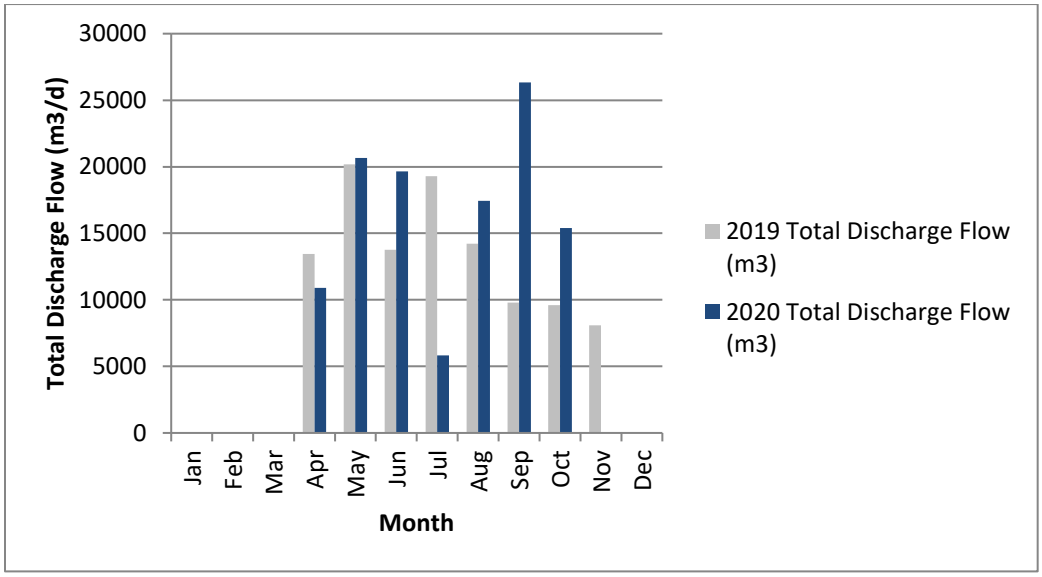
- A phosphorus removal system for the continuous addition of chemicals, consisting of one chemical storage tank and two feed pumps (one duty and one standby) each capable of supplying minimum and maximum alum dosages of 1.35 L/hr. and 36.77 L/hr.

Discharge

The lagoon was discharged in 2020 during the months of April, May, June, July, August, September and October.

The lagoon was discharged into the Zurich Drain approximately 10 kilometers upstream of Lake Huron. The total volume discharged into the Zurich Drain for the 2020 reporting period was 116,223.00 m^3. The 2020 average daily discharge flow was 403.80 m^3 with a maximum daily discharge flow of 1,723 m^3; the maximum daily discharge flow value was recorded in August 2020, see chart 1.

Chart 1: Zurich Lagoons Discharge Final Effluent Flows in 2020 compared to 2019 flows.



(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;

Effluent Limits		2020 Annual Average Concentration Results	2020 Maximum Monthly Concentration Results
Effluent Parameters	Concentration Limits		
April 16 – December 14			
CBOD5 (mg/L)	10	< 2.07	< 2.50
Total Suspended Solids (mg/L)	10	< 3.54	< 6.33
Total Phosphorus (mg/L)	0.5	< 0.037	0.055
Total Ammonia (mg/L)	3.0	< 0.107	< 0.15
E. Coli (per 100 ml)	100 organisms per 100 ml	11.75	21.53
December 15 – April 15			
CBOD5 (mg/L)	15	< 2.00	< 2.00
Total Suspended Solids (mg/L)	15	7.0	7.0
Total Phosphorus (mg/L)	1.0	0.06	0.06
Total Ammonia (mg/L)	5.0	< 0.1	< 0.1
E. Coli	100 organisms per 100 ml	3	3
pH of the effluent maintained between 6.0 – 9.5, inclusive, at all times.		7.21	Min. - Max. 6.45-7.66

The 2020 average daily flow of raw sewage was 326.87 m^3/ day; this is 66.03 % of the average daily flow rated capacity of 495 m^3/ day. The facility rated capacity was exceeded in the months of January (6 days), February (2 days), March (12 days) and April (3 days) of 2020. Compliance is an annual average; daily exceedances are not a reportable event.

The maximum daily raw sewage flow for 2020 was 1,153 m^3/day; this is 233 % of the rated capacity. The maximum daily flow of 1,153 m^3/ day occurred in January 2020; the high flows were related to wet weather conditions. The 2020 maximum daily raw sewage flow of 1,153 m^3/ day is 45.23 % of the peak daily raw sewage flow rated capacity of 2549 m^3/ day; see charts 2a and 2b.

Chart 2a: Zurich Lagoons Average Daily Raw Sewage flows in 2020 compared to 2019 flows.

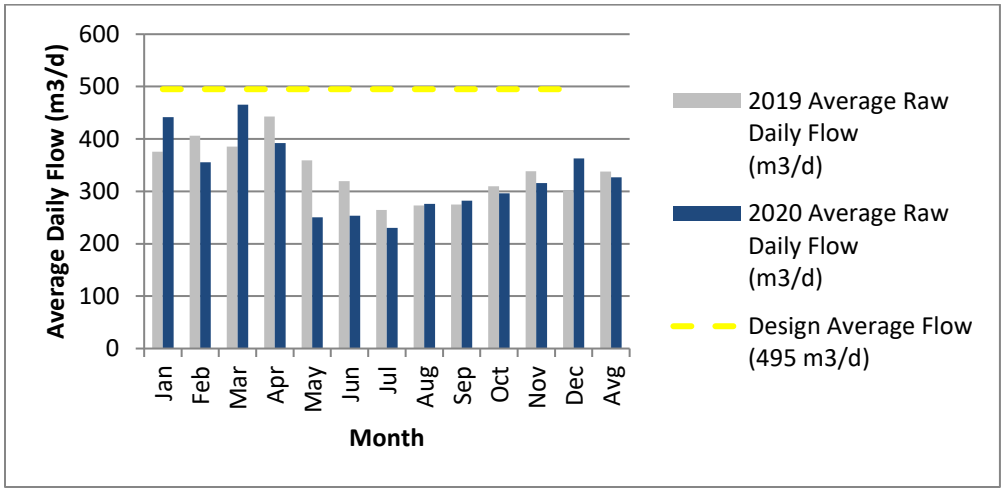
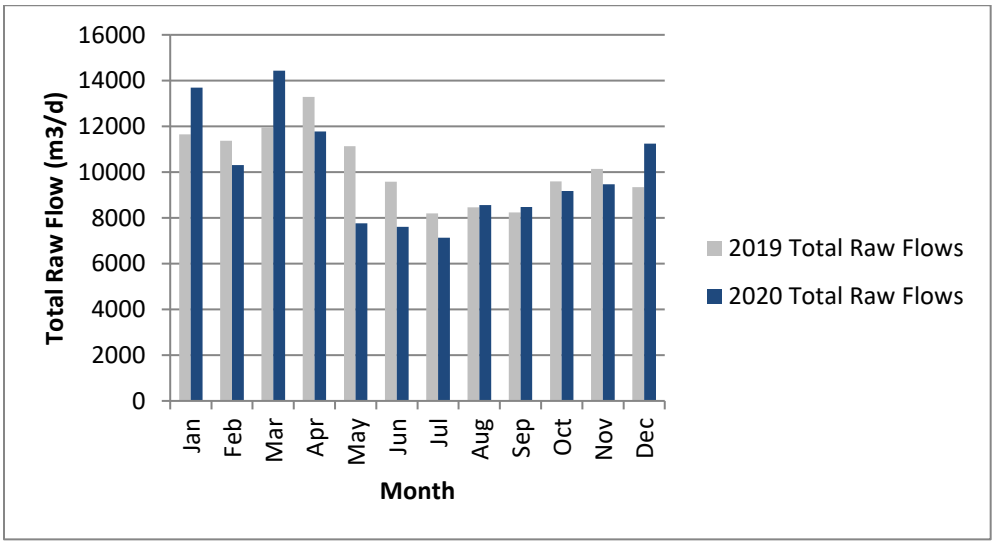


Chart 2b: Zurich Lagoons Total Raw Sewage flows in 2020 compared to 2019 flows.



The effluent is sampled weekly during lagoon discharge . The Zurich Sewage Lagoons provided effective wastewater treatment in 2020; all effluent concentration limits specified by the MECP in Environmental Compliance Approval # 4039-877J9R were met. See charts below comparing parameters values for 2020 and 2019; see charts 3-8 below.

Chart 3: Zurich Lagoons Average Monthly Effluent Carbonaceous Biochemical Oxygen Demand (CBOD5) results for 2020 compared to 2019. Monthly CBOD results met ECA identified limit and objective.

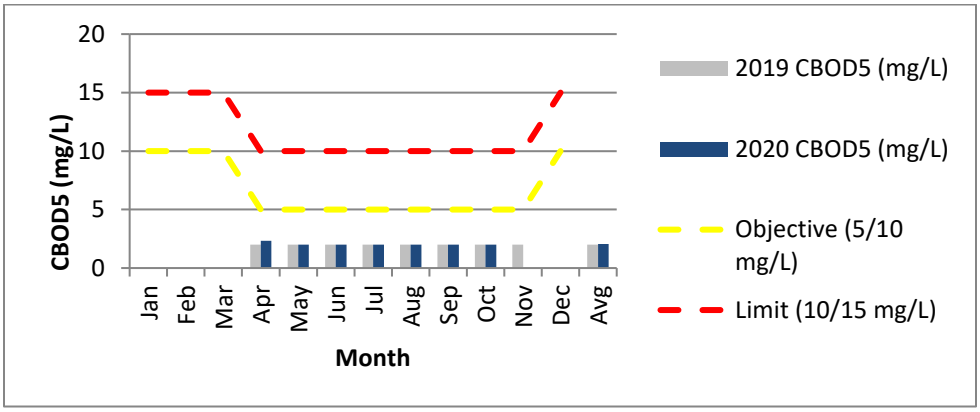


Chart 4: Zurich Lagoons Average Monthly Effluent Total Suspended Solids (TSS) results for 2020 compared to 2019. Monthly TSS results met ECA identified limit; the June (5.8 mg/L) & October (6.33 mg/L) monthly average values did not meet the design objective value of 5 mg/L.

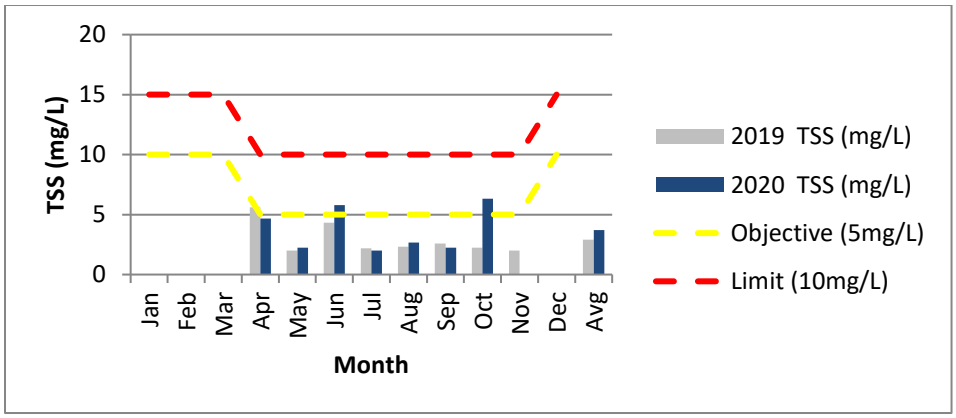


Chart 5: Zurich Lagoons Average Monthly Effluent Total Phosphorus (TP) results for 2020 compared to 2019. Monthly TP results met ECA identified limit and objective.

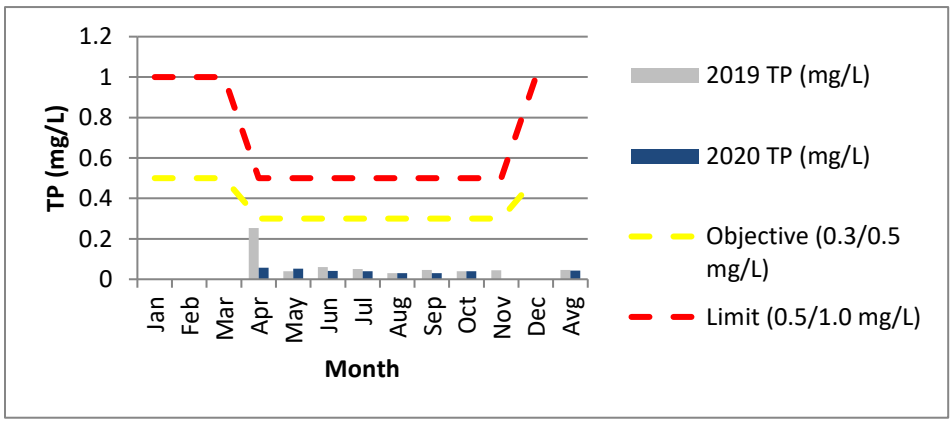


Chart 6: Zurich Lagoons Average Monthly Effluent Total Ammonia Nitrogen (TAN) results for 2020 compared to 2019. Monthly TAN results met ECA identified limit and objective.

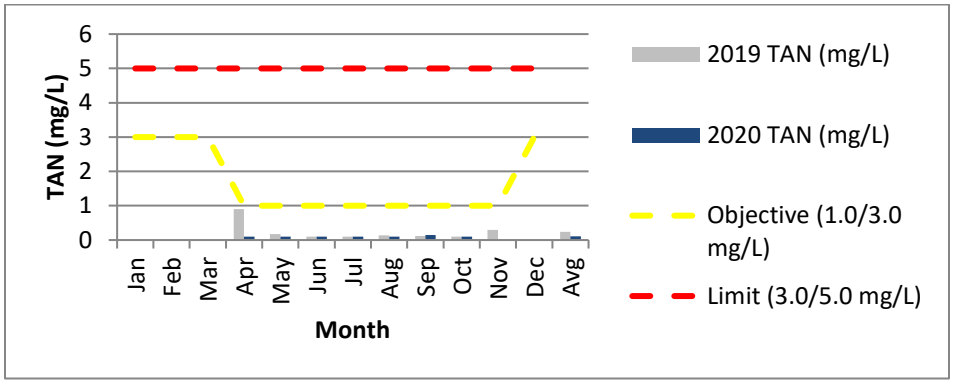


Chart 7: Zurich Lagoons Final Effluent E. coli Geometric Mean Density (GMD) results for 2020 compared to 2019. Monthly E.coli GMD results met ECA identified limit and objective.

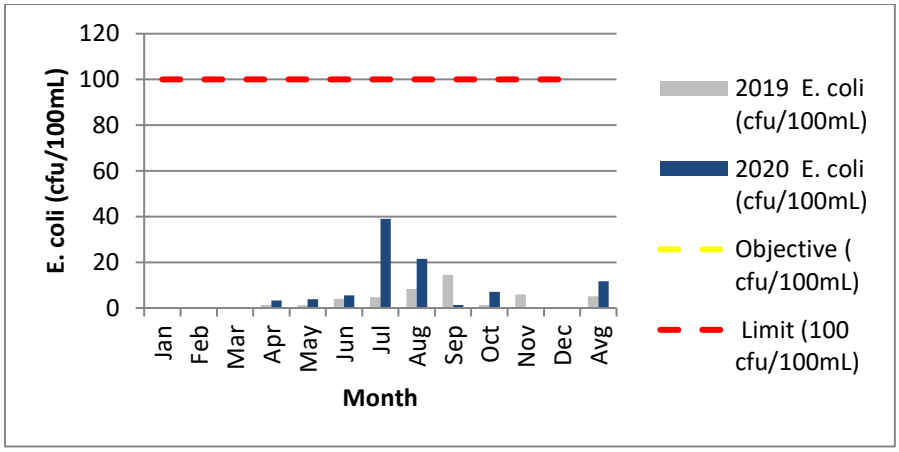
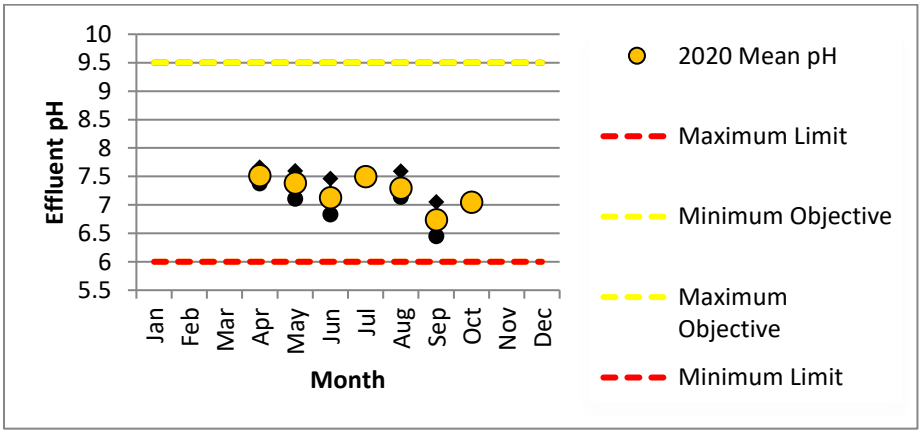


Chart 8: Zurich Lagoons Final Effluent pH results for 2020. Daily pH results met ECA identified limit and objective values.



Please see Appendix A for the flow and sampling summary.

(b) a description of any operating problems encountered and corrective actions taken;

Grease build up in wet wells is an ongoing issue; a contractor was brought in to remove grease build up from the wet wells on multiple occasions.

Operational staff closely monitored vegetative growth on the effluent sand filter beds; the filter beds were mowed and rototilled on numerous occasions to curtail growth.

Eramosa representative and Pierce Services were brought on site to investigate lagoon SCADA flow meter issue identified. Greg Pierce repaired and calibrated the flow meter at Zurich Lagoon.

Hay Communications replaced the phone communication unit at Knell Cres. SPS and Greg Pierce repaired alarm dialer at this location.

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the works;

Regular-scheduled monthly preventative maintenance has been assigned and is monitored using OCWA's Work Management System program (Maximo). Pierce Services is contracted to complete annual calibration services for the Zurich Sewage Lagoon System; see Appendix B (attached).

Equipment preventive maintenance requirements are built into the regular work schedule and corrective maintenance work requests are added according to their priority and staff and contractor availability. The following chart notes the number of maintenance work orders generated and completed in 2020.

Preventative Maintenance Work Orders Generated											
JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
4	4	5	4	4	5	4	8	11	12	5	4

Maintenance such as wet well cleaning, pump pulling, lifting device inspection, gas monitoring equipment inspection and fire extinguisher inspections were also completed. In-house meters used for pH analysis are calibrated as per manufacturer's instructions.

Additional unscheduled maintenance is completed as needed. Additional maintenance completed during 2020 included:

- Periodic wet well cleaning completed by hydro vac due to grease build-up;
- Flushing alum lines;
- Chemical pump repair;
- Replaced check valves and gaskets at Knell Crescent pump station;
- Completed periodic rototilling of the sand filter beds;
- Replaced alarm auto dialer;
- Repaired Pump #2 at the Zurich Pump Station;
- Repaired the flow meter at the lagoon;
- Cleaned check valve;
- Cleaned and inspected the collection system;
- Completed repairs to float system at Knell Crescent pump station;
- Repaired the milltronic eye at the main pumping station.

(d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

The effluent parameters are analyzed by SGS Lakefield which is an accredited laboratory in Ontario.

Annually a facility sampling schedule calendar is prepared and reviewed with operational staff; the sampling schedule calendar identifies sample collection dates to meet regulatory requirements of the Environmental Compliance Approval.

The system is monitored on an on-going basis to ensure proper operations. System checks include recording well levels, pump hours, testing of alarms and running the generators to ensure all systems are operating effectively.

Operators are on-site a minimum of once a week monitoring the facility and/or discharge.

The lab results are reviewed by the operators as they are received to ensure compliance.

(e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment

In 2020 the facility flow meter calibrations were completed by Pierce Services and Solutions Inc.
See Appendix B for calibration records.

(f) a description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6;

Effluent Objectives		2020 Annual Average Concentration Results	2020 Maximum Monthly Concentration Results
Effluent Parameter	Concentration Objective		
April 16 – December 14			
CBOD5 (mg/L)	5	< 2.07	< 2.50
Total Suspended Solids (mg/L)	5	< 3.54	< 6.33
Total Phosphorus (mg/L)	0.3	< 0.037	0.055
Total Ammonia (mg/L)	1.0	< 0.107	< 0.15
December 15 – April 15			
CBOD5 (mg/L)	10	< 2.00	< 2.00
Total Suspended Solids (mg/L)	10	7.0	7.0
Total Phosphorus (mg/L)	0.8	0.06	0.06
Total Ammonia (mg/L)	3.0	< 0.1	< 0.1
pH of the effluent maintained between 6.0 – 9.5, inclusive at all times.		7.21	Min. - Max. 6.45 – 7.66

The Zurich Sewage Lagoons provided effective wastewater treatment in 2020; all effluent concentration objectives specified by the MECP in Environmental Compliance Approval # 4039-877J9R were met for CBOD, Total Phosphorus and Total Ammonia Nitrogen. The Total Suspended Solids monthly average objective of 5.0 mg/L was not met in the months of June (5.8mg/L) & October (<6.33 mg/L) of 2020; see section a) charts above.

Regular scheduled filter maintenance, alum dosage adjustments and effluent monitoring are completed by operational staff to strive and meet Environmental Compliance Approval design objectives.

(g) a summary of any complaints received during the reporting period and any steps taken to address the complaints.

There was one complaint received applicable to the 2020 reporting period; complaint was received on December 8, 2020.

Operating Authority received a call from a resident of 17 Main Street Zurich; resident noted that water splashed out of the toilet. The Operating Authority responded to resident. Flushing of the collection system was determined to be the cause of the identified issue; no further action required.

(h) summary of by-pass, spill or abnormal discharge events

One spill event occurred in 2020.

On the afternoon of November 20, 2020 OCWA operator discovered a small volume of fluid bubbling onto the surface. The operator determined that raw sewage was bubbling up from the Zurich forcemain; the raw sewage was being absorbed into the immediate area with a small trickle making its way to the Zurich Drain in close proximity to area where the lagoon final effluent discharge enters the Zurich Drain. Spill was reported to the MECP and the Health Unit as required. Repairs were completed on the forcemain by late afternoon the same day.

i) any other information the District manager required from time to time.

No applicable information was identified in 2020.

REPORT PREPARED BY

Deb Thomson
Process & Compliance Technician
Ontario Clean Water Agency

APPENDIX A

ANNUAL SUMMARY OF RESULTS & FLOW DATA

Ontario Clean Water Agency
Performance Assessment Report Wastewater/Lagoon

From: **01/01/2020 to 31/12/2020**

Facility: **[5876] ZURICH WASTEWATER TREATMENT LAGOON**

Works: **[110001444]**

	01/2020	02/2020	03/2020	04/2020	05/2020	06/2020	07/2020	08/2020	09/2020	10/2020	11/2020	12/2020	<--Total-->	<--Avg.-->	<--Max.-->	<--Criteria-->
Flows:																
Raw Flow: Total - Raw Sewage (m^3)	13690.00	10313.00	14427.00	11770.00	7769.00	7609.00	7140.00	8563.00	8470.00	9182.00	9467.00	11241.00	119641.00			
Raw Flow: Avg - Raw Sewage (m^3/d)	441.61	355.62	465.39	392.33	250.61	253.63	230.32	276.23	282.33	296.19	315.57	362.61		326.87		
Raw Flow: Max - Raw Sewage (m^3/d)	1153.00	600.00	600.00	517.00	273.00	290.00	272.00	342.00	333.00	328.00	386.00	443.00			1153.00	
Eff. Flow: Total - Effluent (m^3)	0.00	0.00	0.00	10902.00	20662.00	19653.00	5818.00	17444.00	26346.00	15398.00		0.00	116223.00			
Eff. Flow: Avg - Effluent (m^3/d)	0.00	0.00	0.00	363.40	666.52	655.10	646.44	562.71	878.20	669.48		0.00		403.80		
Eff. Flow: Max - Effluent (m^3/d)	0.00	0.00	0.00	1056.00	835.00	774.00	661.00	1723.00	1667.00	1542.00		0.00			1723.00	
Carbonaceous Biochemical Oxygen Demand: CBOD:																
Eff: Avg cBOD5 - Effluent (mg/L)				< 2.333	< 2.000	< 2.000	< 2.000	< 2.000	< 2.000	< 2.000				< 2.048	< 2.333	15.0
Eff: # of samples of cBOD5 - Effluent (mg/L)				3	4	5	1	3	4	3			23			
Loading: cBOD5 - Effluent (kg/d)				< 0.848	< 1.333	< 1.310	< 1.293	< 1.125	< 1.756	< 1.339				< 1.286	< 1.756	
Biochemical Oxygen Demand: BOD5:																
Raw: Avg BOD5 - Raw Sewage (mg/L)	153.000	167.000	81.000	294.000	235.000	248.000	184.000		46.000	114.000	106.000	134.000		160.182	294.000	
Raw: # of samples of BOD5 - Raw Sewage (mg/L)	1	1	1	1	1	1	1		1	1	1	1	11			
Total Suspended Solids: TSS:																
Raw: Avg TSS - Raw Sewage (mg/L)	236.000	267.000	191.000	206.000	236.000	291.000	216.000		433.000	195.000	282.000	224.000		252.455	433.000	
Raw: # of samples of TSS - Raw Sewage (mg/L)	1	1	1	1	1	1	1		1	1	1	1	11			
Eff: Avg TSS - Effluent (mg/L)				4.667	< 2.250	5.800	< 2.000	< 2.667	< 2.250	< 6.333				< 3.710	6.333	15.0
Eff: # of samples of TSS - Effluent (mg/L)				3	4	5	1	3	4	3			23			
Loading: TSS - Effluent (kg/d)				1.696	< 1.500	3.800	< 1.293	< 1.501	< 1.976	< 4.240				< 2.286	4.240	
Percent Removal: TSS - Raw Sewage (mg/L)				97.735	99.047	98.007	99.074		99.480	96.752					99.480	
Total Phosphorus: TP:																
Raw: Avg TP - Raw Sewage (mg/L)	2.440	2.360	2.210	3.910	3.790	3.940	3.050		2.990	3.100	2.990	2.640		3.038	3.940	
Raw: # of samples of TP - Raw Sewage (mg/L)	1	1	1	1	1	1	1		1	1	1	1	11			
Eff: Avg TP - Effluent (mg/L)				0.057	< 0.053	< 0.042	0.040	< 0.033	< 0.033	< 0.043				< 0.043	0.057	
Eff: # of samples of TP - Effluent (mg/L)				3	4	5	1	3	4	3			23			
Loading: TP - Effluent (kg/d)				0.021	< 0.035	< 0.028	0.026	< 0.019	< 0.029	< 0.029				< 0.026	0.035	
Percent Removal: TP - Raw Sewage (mg/L)				98.551	98.615	98.934	98.689		98.913	98.602					98.934	
Nitrogen Series:																
Raw: Avg TKN - Raw Sewage (mg/L)	36.200	23.500	19.700	39.300	33.800	41.700	40.700		49.300	33.400	43.500	29.700		35.527	49.300	
Raw: # of samples of TKN - Raw Sewage (mg/L)	1	1	1	1	1	1	1		1	1	1	1	11			
Eff: Avg TAN - Effluent (mg/L)				< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.150	< 0.100				< 0.107	< 0.150	
Eff: # of samples of TAN - Effluent (mg/L)				3	4	5	1	3	4	3			23			
Loading: TAN - Effluent (kg/d)				< 0.036	< 0.067	< 0.066	< 0.065	< 0.056	< 0.132	< 0.067				< 0.070	< 0.132	
Disinfection:																
Eff: GMD E. Coli - Effluent (cfu/100mL)				3.302	3.834	5.511	39.000	21.513	1.316	7.034				11.644	39.000	
Eff: # of samples of E. Coli - Effluent (cfu/100mL)				3	4	5	1	3	4	3			23			

Ontario Clean Water Agency
Time Series Info Report

From: 01/01/2020 to 31/12/2020

Facility Org Number: 5876
Facility Works Number: 110001444
Facility Name: ZURICH WASTEWATER TREATMENT LAGOON
Facility Owner: Municipality: The Corporation of the Municipality of Bluewater
Facility Classification: Class 1 Wastewater Treatment
Receiver: Zurich Drain
Service Population: 900.0
Total Design Capacity: 495.0 m3/day

	01/2020	02/2020	03/2020	04/2020	05/2020	06/2020	07/2020	08/2020	09/2020	10/2020	11/2020	12/2020	Total	Avg	Max	Min
Effluent / Dissolved Oxygen: DO - mg/L																
Count IH	0	0	0	3	1	3	0	3	3	3	0	0	16			
Max IH				11.82	8.37	8.94		8.22	9.32	9.39					11.82	
Mean IH				10.903	8.37	8.187		7.937	8.983	9.05				8.972		
Min IH				10.01	8.37	7.28		7.66	8.67	8.65						7.28
Effluent / pH - ---																
Count IH	0	0	0	3	4	3	1	3	3	3	0	0	20			
Max IH				7.66	7.6	7.46	7.5	7.59	7.05	7.11					7.66	
Mean IH				7.517	7.39	7.127	7.5	7.3	6.74	7.047				7.213		
Min IH				7.38	7.11	6.83	7.5	7.14	6.45	7						6.45

APPENDIX B

ANNUAL CALIBRATIONS

Pierce Services & Solutions Inc.

PO Box 26027
Guelph, ON N1E 6W1

Phone: 519.820.4853
Fax: 519.824.9402

max flow 1

Flowmeter Report

Verification: X **Calibration:**

Client: OCWA Bluewater
Description: Mag Meter
Manufacturer: ABB
Model: Magmaster
Inventory No.: 249226

Location: Zurich Lift Station
Date: 20-Aug-20
Checked By: Greg Pierce
Serial No.: 9726

Volocity	Input	As Found	As Left	Pass/Fail
0 m/s	0.00 l/s	0.00 l/s	0.00 l/s	Pass
	24.14 l/s	24.14 l/s	24.14 l/s	Pass
6.36 m/s	50.00 l/s	50.00 l/s	50.00 l/s	Pass

Confirmed Run Mode: X

Returned to service: X

Service Comments:

Flowmeter Information

Flow Unit: l/s
Meter Size: 100 mm
Pipe Material: Cast Steel
Liner Material: PU
Range: 0-50 l/s
Tag Number: FIT 100

Comments:
Verification of original calibration

Signature:

Greg Pierce, CCST

Pierce Services & Solutions Inc.

PO Box 26027
Guelph, ON N1E 6W1

Phone: 519.820.4853
Fax: 519.824.9402

max flow 1

Flowmeter Report

Verification: X **Calibration:**

Client: OCWA Bluewater
Description: Mag Flow Meter
Manufacturer: Krohne
Model: Aquaflux
Inventory No.:

Location: Zurich Lagoons
Date: 20-Aug-20
Checked By: Greg Pierce
Serial No.: C103696

Volocity	Input	As Found	As Left	Pass/Fail
0 m/s	0.00 l/s	0.00 l/s	0.00 l/s	Pass
1.05 m/s	33.11 l/s	33.0 l/s	33.0 l/s	Pass
4.77 m/s	150.00 l/s	150.00 l/s	150.00 l/s	Pass

Confirmed Run Mode: X

Returned to service: X

Service Comments:

Flowmeter Information

Flow Unit: l/s
Meter Size: 200 mm
Pipe Material: Stainless Steel
Liner Material: PU
Range: 0-150 l/s
Tag Number: FIT 107

Comments:
Verification of original calibration
High Electrode Temperature Alarm on Unit

Signature:
Greg Pierce, CCST

Pierce Services
& Solutions Inc.
519.820.4853 Fax 519.824.9402

Instrument Verification Sheet

Client Name: Ontario Clean Water Agency

Date: August 20, 2020

Equipment Description: Level Sensor

Assigned Number: Wet Well Level

Area Located: Zurich Pumping Station

AMMS Number: N/A

Instrument Data

Manufacturer: Milltronics

Model Number: MultiRanger Plus

Type: Ultrasonic

Serial Number: N/A

Range: 0 - 2.050 m

Accuracy: +/- 5%

Method Of Calibration: Standard Measurement

Application: Waste Water

Calibration Data

Input %	Input	As Found	As Left	% Error
	15.13 mA	1.41 m	1.41 m	

Confirmed Run Mode: ✓

Placed back in service: ✓

Comments:

Checked By: Greg Pierce CCST

Signature:

Pierce Services & Solutions Inc.

Alphabetical Parameter Listing Milltronics 100/200

Tag # Wet Well Level Zurich
Date: August 20, 2020

Parameter #	Parameter Description	Parameter Value	Value Description	Relay #
P001	Operation	1	Level measurement	
P002	Material	1	Liquid surface	
P003	Process Speed	3	Medium (1m/min)	
P004	Transducer	104	XPS 10	
P005	Units	1	Meters	
P006	Empty	2.500	Transducer to base	
P007	Span	2.050	Maximum reading	
P065	Reading Override Value	0.00	Relay Value Inserted	
P111	Pump Fixed Duty Setting	1	Pump Fixed Duty Setting	1
P112	Relay on Level	0.700	Meters	1
P113	Relay off Level	0.750	Meters	1
P309	Run Time	8.3	Hours	1
P111	Pump Fixed Duty Setting	52	Pump Fixed Duty Setting	2
P112	Relay on Level	1.800	Meters	2
P113	Relay off Level	0.900	Meters	2
P309	Run Time	3.1	Hours	2
P111	Pump Fixed Duty Setting	52	Pump Fixed Duty Setting	3
P112	Relay on Level	1.900	Meters	3
P113	Relay off Level	1.00	Meters	3
P309	Run Time	3.1	Hours	3
P111	Loss of Echo	6		4
P112	Relay on Level	0.00	Meters	4
P113	Relay off Level	0.00	Meters	4
P309	Run Time	0.4	Hours	4
P111	Loss of Echo	1		5
P112	Relay on Level	2.050		5
P113	Relay off Level	0.00		5
P309	Run Time			5
P340	Date of Manufacture	11:02:10		
P341	Run Time	2416		
P342	Start Ups	205		
P650	Offset Calibration			
P651	Sound Calibration			
P652	Offset Correction			
P653	Velosity	342.5		
P654	Velosity at 20 C	344.1		
P660	Temperature Source Fixed	1		
P791	Bus Error Count	8		
P802	Transducer Submergence	0		
	%	68.81		
	Echo	100		
	Temp	19 C		
	mA	15.13		
	Level	1.41		