

Township of North Glengarry

Alexandria Wastewater System

2021 Annual Report

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A. Performance Assessment

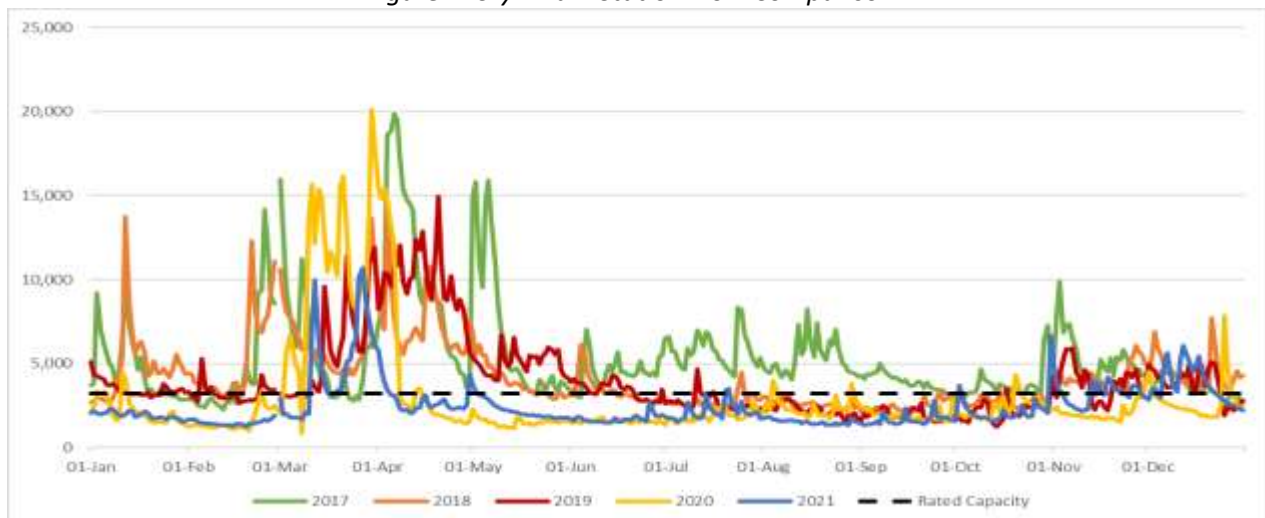
Summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in condition 7, including an overview of success and adequacy of works

The Alexandria sewage works system is categorized as a continuous discharge class 2 facility, which includes a sanitary sewage collection system and a wastewater lagoon treatment facility. The collection system is comprised of 25.0kms of sanitary sewage collection pipes and force mains of various sizes, with approximately 1585 service connections, 3 sanitary lift stations and 1 main pumping station. The lagoon treatment system is comprised of an aeration cell, with coagulant addition for phosphorous removal, 3 facultative cells that run-in series and a disinfection and dichlorination chamber, which discharges to an unnamed drain prior to entering the Delisle river. Sodium Hypochlorite is used to disinfect the treated wastewater, while sodium bisulfate is used to dechlorinate the effluent wastewater prior to discharge into the receiver.

During the 2021 calendar year 899,790m³ of raw untreated raw sewage was directed towards the Alexandria Lagoon Treatment Facility, based on the metered total from the main pumping station effluent flows. Included the total main station flows are 3,846.7m³ of leachate from the Alexandria Waste Disposal Site, hauled between April 19th and May 7th. There were no noted incidents of surface water from the Garry River system entering the wet well through the bypass channel. In other efforts to reduce inflow and infiltration, CCTV inspections of the sanitary sewer collection system was completed on the west side of Alexandria during this reporting period. The process included evaluation and leak detection completed in 7600m of sanitary piping, flushing, and cleaning of 9500m of sanitary mains and 90m of main relining to prevent infiltration.

Flow trending throughout 2021 was observed to be lower than historically observed but similar to the 2020 values, this may be attributed to infiltration and work completed in system over the last few years and work completed to prevent water entry into the Main Pumping Station, see Figure 1 below for a 5-year annual flow comparison.

Figure 1: 5-yr Main Station Flow Comparison



The system was operated well throughout 2021 and produced effluent meeting the Federal Effluent Limits and the Provincial Environmental Compliance Approval Limits, with exception of acute lethality testing between January and March, these overages will be discussed in **section G**. All calculated annual averages were found to be well below limit concentrations, please refer to Table 1 below for annual average concentration and to Appendix A for system summaries.

Table 1: Schedule C of the ECA states effluent limits are as follows:

Effluent Parameter	Average Concentration Limit	2021 Average Concentration
CBOD ₅	30 mg/L	3.3 mg/L
TSS	40 mg/L	4.7 mg/L
TP	0.5 mg/L	0.15 mg/L
E. Coli (<i>geometric mean density</i>)	<200 organisms/100 mL	1.3/100mL
pH (<i>maintained inclusive at all time</i>)	6.0-9.5	7.80
Total Chlorine Residual	0.02 mg/L	0.00 mg/L

B. Groundwater Monitoring

Summary and interpretation of all ground water monitoring data

A groundwater monitoring plan was prepared in 2012 by McIntosh Perry and submitted to the MOE, as per requirements. As part of these requirements the Township had the 2 monitoring wells installed on March 5, 2013. Samples to be used as background counts were taken on March 6, 2013, and sampling continues in March each year. All sampling results were found to indicate that no major impacts downstream were observed, but possible minor increases were noted in total ammonia, TKN and total organic carbon. Please refer to Table 2 below for summary and Appendix D for full summary of results.

Table 2: Monitoring Well Sampling Program:

Parameter	Monitoring Well #1		Monitoring Well #2	
	Background results (March 6, 2013)	2021 Sampling Results (March 01, 2021)	Background results (March 6, 2013)	2021 Sampling Results (March 01, 2021)
TOC	8 mg/L	11.7 mg/L	15.2 mg/L	10.1 mg/L
TP	3.8 mg/L	3.23 mg/L	0.47 mg/L	0.53 mg/L
TKN	0.83 mg/L	0.9 mg/L	1.12 mg/L	0.9 mg/L
Nitrogen	< 0.01 mg/L	0.09 mg/L	0.22 mg/L	0.28 mg /L
Nitrite	< 0.1 mg/L	< 0.1 mg/L	0.5 mg/L	< 0.1 mg/L
Nitrate	< 0.1 mg/L	< 0.1 mg/L	<0.1 mg/L	< 0.1 mg/L
E. coli	<2 cfu/100 mL	0 /100 mL	<2 cfu/100 mL	0/100 mL

C. Operational Problems

Description of any operating problems encountered, and corrective actions taken

Collection System:

- Sludge and/or grease build-up in all collection station wet wells, causing false levels or erratic pump operation
 - cleaned floats to restore operations
 - HydroCam used to clean all stations and debris was dumped into aeration cell of Lagoon system
- Pump fail due to Amperage Spikes (Leroux, Sandfield, Main Pumping Station)
 - debris removed from impeller and pump place back in service
- Various equipment malfunction at various stations
 - check valve assembly, panel contactor, generator battery, fuses, O₂ sensor, level indicators (float/pressure sensor)
 - replaced defective equipment
- Leroux Pump 1 failure
 - Sent to Surgeson's Electrical for repair to coupler and motor shaft
- Main Pumping Station Overflow monitor malfunction
 - causing false readings
 - repair to electrical circuit connection
- Main Pumping Station Pump 3 failure
 - caused by moisture infiltration due to damage to wiring
 - sent to Surgeson's Electrical for refurbishment
- Main Pumping Station fuel tank replacement
 - issues with TSSA inspection due to improper installation
 - on-going dispute to repair to get TSSA compliance certificate for fueling company
- Main Pumping Station PLC intermittent operation
 - during generator run, causing multiple alarms and system resets
 - issues reported to capital control, no resolution to date
- Main Pumping Station bypass door leaks
 - exterior building was parged and observed areas of concern were sealed to prevent backflow into station under high water conditions
 - all vegetation removed from area to prevent obstruction
- Main Pumping Station power loss
 - caused by defective connections at Hydro Pole
 - connection replaced, and transformer breakers reset

Treatment System:

- Adverse sampling results Mid-January to early March
 - believed to be caused by lack of oxygen, elevated total ammonia levels and TKN levels
- Leaking isolation valve from aeration chamber piping into Cell A
 - air balloon was installed to prevent treatment by-pass, operators monitor pressure
 - no repair to valve to date
- Loss of chemical due to line blockages, line ruptures, or pump issues
 - lines or pump(s) were repaired or replaced when issues was discovered.
- Aerators intermittent failure, caused by high amperage due debris build-up on paddles
 - electrician reversed direction to remove debris and amperage decreased.
- Splash plate on aerator 3 detached from unit and fell into the aeration cell
 - new plate was reconstructed and installed; aerator placed back in service after 19 days

D. Maintenance

Summary of all maintenance carried out on any structure, equipment, apparatus, mechanism or thing forming part of the works.

Collection System:

- Preventative Maintenance Program
 - schedule and forms at all stations, as required
- Monthly pest control
- Bi-annual calibration of all gas monitoring equipment
- Annual level monitoring and flow measurement calibrations
- Annual lifting and hoisting device inspection
- Flushing, Cleaning and CCTV inspection over selected portion of collection system (as previously described)

Treatment System:

- Preventative Maintenance program
 - schedule and forms at all stations, as required
- Construction of new Geotube area, and installation of 4 Geotubes for Cell B de-sludging program
- Monthly pest control
- Annual level monitoring and flow measurement calibrations

E. Effluent Quality Control and Assurance

Summary of any effluent quality assurance or control measures undertaken in the reporting period

All sampling was performed within provincial guidelines by licensed operators, as per internal SOP's. Sampling schedules with sign off are also used to ensure that operational staff are aware of sampling requirements and timelines as per ECA and Federal requirements.

Effluent quality control and assurance measures were undertaken by a MOE certified laboratory, Caduceon Environmental laboratories and AGAT Laboratories, which conduct analysis for the Township.

F. Flow Measurement Calibration

Summary of the calibration and maintenance carried out on all effluent monitoring equipment

Annual calibrations on the detection units (pumping station level indicators and chemical tank level indicators), and flow sensing devices (magmeter, miltronics, etc) were completed by St-Laurent Instrumentation between November 2021 and December 2021.

All handheld and benchtop testing analyzers were calibrated by ClearTech in June 2021.

No issues were noted in regard to the operation of the equipment.

G. Effluent Objectives

Description of effort made, and results achieved in meeting the effluent objectives of condition 6

A new Environmental Compliance Approval, hereafter referred to as ECA, was issued to the Township in February 2021 by the Ministry of the Environment. The ECA is conditional on proposed system upgrades and contains descriptions and provisions for existing and post-construction works. At this time, no construction has been completed, so the requirements

effluent limits have not changed to date, but there have been minor changes to required monitoring parameters and reporting.

Monthly discharge effluent monitoring showed that the effluent design objectives and limits were mostly met, as per Schedule B and Schedule C of ECA. The max pH exceeded the maximum objective on 4 occasions but did not exceed the limit, so no reports were made. Table 3 shows a summary of these results, please refer to Appendix A full summary of flows, raw and treated effluent quality analysis for the Alexandria Sewage Treatment Works. All municipal utility monitoring program reports were sent into the environmental monitoring and reporting branch of the Ministry of the Environment electronically for each month.

Table 3: Monthly Average Final Effluent Sampling Summary

	CBOD ₅ (mg/L)	TSS (mg/L)	TP (mg/L)	Total Chlorine Residual (mg/L)	pH		E. Coli (geometric mean density) (organisms/100 mL)
					Min	Max	
Concentration Limits	30	40	0.5 mg/L	0.2 mg/L	6.0	9.5	< 200
Concentration Objective	25	25	0.4 mg/L	non-detect	6.5	8.5	< 150
January	3.0	3.5	0.12	0.00	7.43	7.77	1.0
February	3.0	4.3	0.18	0.00	7.39	7.61	1.0
March	4.0	7.0	0.18	0.01	7.47	8.84	1.0
April	4.3	8.0	0.20	0.00	8.18	8.64	1.8
May	4.5	10.3	0.29	0.00	7.54	8.80	1.0
June	3.0	3.6	0.20	0.00	7.45	7.72	1.1
July	3.0	3.3	0.07	0.00	7.77	7.80	1.0
August	3.0	3.5	0.07	0.00	7.51	8.68	1.0
September	3.0	3.2	0.07	0.00	7.66	8.13	1.6
October	3.3	3.3	0.11	0.00	7.06	8.13	2.2
November	3.3	3.0	0.13	0.00	6.79	7.88	1.0
December	3.0	4.0	0.16	0.01	7.66	8.25	1.1

Quarterly monitoring included acute lethality, under Federal Wastewater Systems Effluent Regulations but is now also required under Schedule D of the ECA. The first quarter sampling for rainbow trout indicated samples that were acutely lethal, despite no observed quality issues, which have previously indicated occurring quality issues. Sampling was increased during this time as per requirement, until results meet the requirements to return to quarterly monitoring. It was determined at this time that that issue was most likely caused by elevated ammonia, as observed by high total ammonia and TKN results under ice cover. Once the ice cover was open, the total ammonia and TKN levels dropped dramatically. Sampling for acute lethality to daphnia only began in March and no issues were noted.

Table 4: Acute Lethality Testing Summary

Date	Rainbow Trout Lethality Result (%)	Comment	Daphnia Lethality Result (%)	Comment
20-Jan-21	100	Fail		
3-Feb-21	40	Pass		
17-Feb-21	90	Fail		

Date	Rainbow Trout Lethality Result (%)	Comment	Daphnia Lethality Result (%)	Comment
3-Mar-21	40	Pass		
17-Mar-21	0	Pass	0	Pass
31-Mar-21	0	Pass	0	Pass
14-Apr-21	0	Pass	0	Pass
21-Jul-21	0	Pass	0	Pass
20-Oct-21	0	Pass	0	Pass

As part of the quarterly monitoring, due to on-going adverse results under ice cover a technical memo was prepared for Environment Canada in 2019 by McIntosh Perry in consultations with Wood Environment & Infrastructure Solutions. Recommended future actions included metals, inorganic and VOC sampling are to be completed quarterly until the upgrades are commissioned, during acute lethality flows are to be decreased when possible, and a root cause was to be determined. The summary in Table 5 shows all results over the Provincial Water Quality Objectives. Intermittent issues with un-ionized ammonia, zinc, cobalt and toluene were observed. As per the report, the parameters listed do not appear to cause lethality, as most results were lower than 2019 observed values and lethality was not observed during the testing periods. The toluene is believed to come from an upstream source and other parameters are considered to be typically elements found in wastewater. It is believed that elevated unionized ammonia has been the cause of lethality due to a break down in treatment caused by ice cover, the aeration was fully functional throughout the ice cover period. With that said unionized ammonia results are known to fluctuate with temperature and pH levels.

Table 5: Additional Metal, Inorganic and VOC Elevated Results

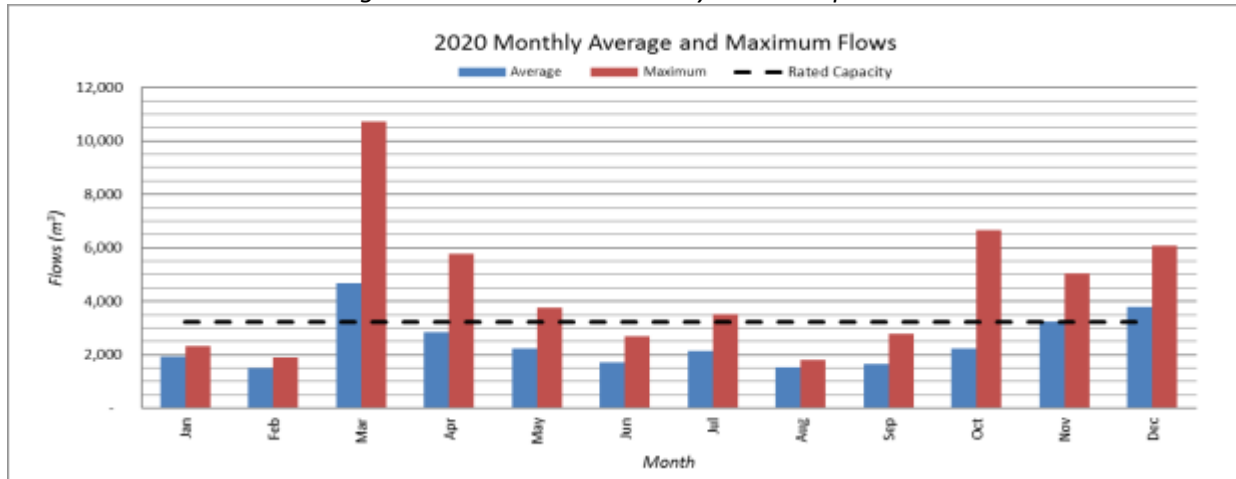
Date	Parameter	Result (mg/L)
20-Jan-21	Un-ionized Ammonia	0.0467
	Total Zinc	0.071
3-Mar-21	Un-ionized Ammonia	0.401
	Total Cobalt	0.0016
	Total Zinc	0.055
17-Mar-21	Un-ionized Ammonia	0.411
	Total Cobalt	0.0014
	Total Zinc	0.056
31-Mar-21	Un-ionized Ammonia	0.408
	pH	8.84
21-Jul-21	Toluene	1.68
20-Oct-21	Un-ionized Ammonia	0.0452

There were no reports made in regard to floating or settleable solids or that the wastewater contained oil or any other substance that created a visible film, sheen, foam or discoloration to the receiving waters.

Annual flow summaries indicate a calculated average daily flow of 2,456m³/day, which represents an average of 75.9% of the total rated capacity for this facility. The decrease in flows over the last 2 years demonstrates the commitment and works completed to reducing infiltration into the system and possibly fewer occurrences severe weather events that lead to

increased infiltration. The observed maximum daily flow for the year was reported to be 10,707m³/day, which was reported towards the end of March, when influent flows were observed to be elevated at the main pumping station, coinciding with Spring melt and following major rain events. Please refer to the figure 2 below and to Appendix A for a full summary of flows, for the Alexandria Sewage Treatment Works.

Figure 2: Main Station Monthly Flow Comparison



H. Sludge Accumulation

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 summary of the locations to where the sludge was disposed

A Sludge Management Plan was created by McIntosh Perry and put into place in 2008. As part of monitoring methods, it is recommended sludge levels are to be collected annually by staff. The levels were not measured during 2021, due to staff shortages but new Geotubes were installed and placed in service to help reduce the excessive sludge levels in Cell B.

Bishop Water was contracted for a multi-year Geotube project and were onsite for the first phase between June 7th and June 29th. As per the final report issued to the Township, on July 8, 2021, a total of 160.23 BDMT of solids were removed from the lagoons over a 15-day production period. A summary table of desludging operation, as per the report, is listed below in table 7. The water dispersed from the Geotubes was recycled back into the lagoon at Cell B via small pump which operated on floats with a timer to prevent overuse. The effluent quality was not analyzed nor were the volumes tracked.

Table 7: Desludging Operation Summary

Week	BDT	Volume Pumped	Total Polymer Usage	Average Polymer Dosage
		m ³	L	kg/BDT
Week 1	82.16	2399.80	326.17	3.97
Week 2	39.79	2088.04	387.69	9.74
Week 3	38/27	1560.57	179.84	4.70
Total	160.22	6048.41	893.7	6.14

I. Complaints

Summary of any complaints received during the reporting period and any steps taken to address the complaints

There were only about a dozen received complaints from homeowners, the majority of these complaints being backing up sewer laterals. In the most cases, the issues were on the homeowner's side resulting in private contracted services. In a few cases the laterals were inspected through CCTV, and services were repaired, or arrangements were made to repair by township if the problem was found to be on township side.

J. Bypass, Overflow, Spill, Abnormal Discharge Events

Summary of all bypass, spill or abnormal discharge event

There were no primary bypasses, overflows, spills or abnormal discharge events to reported during 2021. Quarterly reports for bypasses and overflows are now required to be submitted to Ministry of the Environment inspector as per the ECA.

Table 6: Quarterly Bypass and Overflow Report Submission Summary

Quarter	Month	Year	By-Pass Occur	Overflow Occur	Submitted to MECP	Report Name
1	January-March	2021	N	N	15-May-21	ALX WWS_2021 Q1
2	April-June	2021	N	N	15-Aug-21	ALX WWS_2021 Q2
3	July- September	2021	N	N	20-Dec-21	ALX WWS_2021 Q3
4	October- December	2021	N	N	27-Jan-22	ALX WWS_2021 Q4

K. Other

Any other information the District Manager requires from time to time

EOS 2000

i. Equipment Summary

The EOS unit was not installed or operated during this reporting period, so as such there was no additional monitoring was completed.

ii. Proposed Works

Any changes or updates to the schedule for the completion of construction and commissioning operation of major process(es)/equipment groups in the Proposed Works

Currently no funding has been acquired nor construction work commenced on this project to date. The Public Works Director is in the process of preparing a request for proposal for project management. A major limiting factor is the lack of available funding programs to aid in financing this project.

**NORTH GLENGARRY WATER WORKS
WASTEWATER TREATMENT WORKS PERFORMANCE RESULTS**

Municipality: North Glengarry

Year: 2021

Project: Alexandria STP

Receiving Stream: Delisle River

Description: 1 Pumping Station, 1 Aerated Cell, 3 Facultative Cells

Design Capacity: 3237 m³/day

Continuous Discharge with Phosphorous Removal

MONTH	Flows			Biochemical O ₂ Demand			Suspended Solids			Phosphorus		
	Total Flows (m ³)	Average Daily Flow (m ³)	Maximum Daily Flow (m ³)	Average Raw CBOD ₅ (mg/L)	Average Effluent CBOD ₅ (mg/L)	Percent Removal (%)	Average Raw SS (mg/L)	Average Effluent SS (mg/L)	Percent Removal (%)	Average Raw TP (mg/L)	Average Effluent TP (mg/L)	Percent Removal (%)
January	59,923	1,928	2,317	123.5	3.0	97.6	242.5	3.5	98.6	3.14	0.12	96.3
February	41,602	1,486	1,902	176.5	3.0	98.3	395.0	4.3	98.9	4.43	0.18	96.0
March	144,941	4,676	10,707	80.3	4.0	95.0	183.3	7.0	96.2	1.81	0.18	89.8
April	85,190	2,840	5,771	105.5	4.3	96.0	208.0	8.0	96.2	2.96	0.20	93.1
May	69,580	2,245	3,752	48.0	4.5	90.6	54.0	10.3	81.0	0.91	0.29	68.1
June	51,521	1,717	2,685	214.0	3.0	98.6	730.0	3.6	99.5	9.86	0.20	98.0
July	66,478	2,144	3,528	287.0	3.0	99.0	730.0	3.3	99.6	7.24	0.07	99.0
August	47,624	1,536	1,809	72.0	3.0	95.8	98.0	3.5	96.4	1.79	0.07	96.1
September	49,323	1,644	2,774	74.0	3.0	95.9	125.0	3.2	97.4	2.33	0.07	96.8
October	69,350	2,237	6,665	84.0	3.3	96.1	134.0	3.3	97.6	2.53	0.11	95.8
November	96,831	3,228	5,039	104.0	3.3	96.9	395.0	3.0	99.2	3.32	0.13	96.0
December	117,428	3,788	6,070	31.0	3.0	90.3	60.0	4.0	93.3	0.84	0.16	81.4
Total	899,790											
Average		2,456		116.7	3.4	96	279.6	4.7	96	3.43	0.15	92
Maximum			10707	287	4.5	99	730.0	10.3	100	9.86	0.29	99
Criteria		3,237			30			40		0.50		

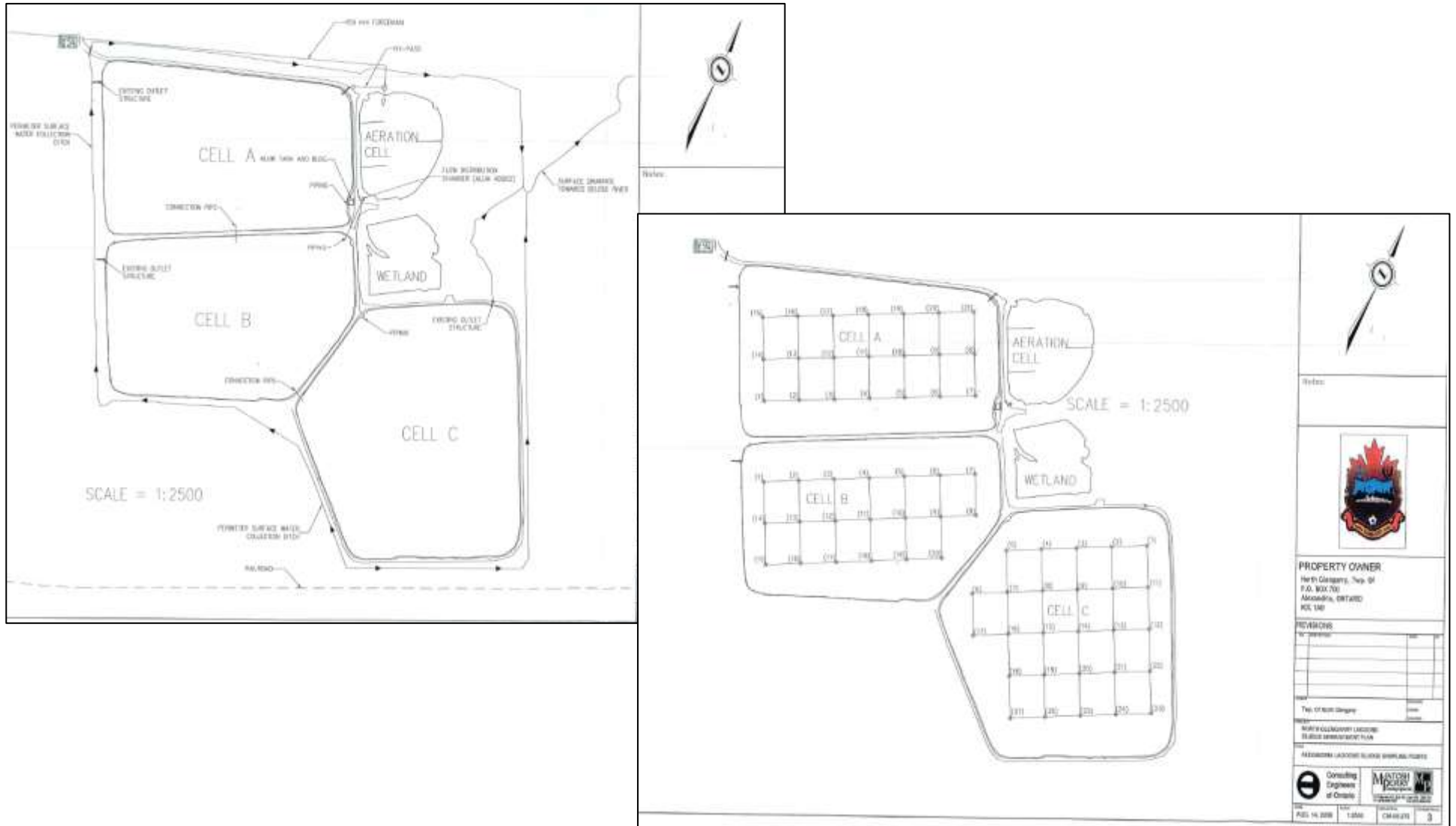
**NORTH GLENGARRY WATER WORKS
WASTEWATER TREATMENT PERFORMANCE RESULTS
2021**

MONTH	Ammonia			TKN			Nitrite			Nitrate		
	Average Raw Ammonia (mg/L)	Average Effluent Ammonia (mg/L)	Percent Removal (%)	Average Raw TKN (mg/L)	Average Effluent TKN (mg/L)	Percent Removal (%)	Average Raw Nitrite (mg/L)	Average Effluent Nitrite (mg/L)	Percent Removal (%)	Average Raw Nitrate (mg/L)	Average Effluent Nitrate (mg/L)	Percent Removal (%)
January	n/a	13.08		20.90	16.15	22.7	n/a	0.10		n/a	0.7	
February	n/a	13.65		26.55	16.95	36.2	n/a	0.10		n/a	0.1	
March	n/a	11.71		10.87	13.98	-28.7	n/a	0.12		n/a	0.7	
April	n/a	1.11		21.60	7.28	66.3	n/a	0.10		n/a	0.8	
May	n/a	1.18		15.20	3.83	74.8	n/a	0.10		n/a	0.3	
June	n/a	1.82		33.80	3.06	90.9	n/a	0.24		n/a	0.5	
July	n/a	0.32		38.70	1.38	96.4	n/a	0.10		n/a	0.3	
August	n/a	0.21		20.80	1.15	94.5	n/a	0.08		n/a	0.4	
September	n/a	0.26		25.60	2.24	91.3	n/a	0.12		n/a	0.2	
October	n/a	1.23		21.20	2.43	88.6	n/a	0.10		n/a	0.4	
November	n/a	4.93		15.90	6.88	56.8	n/a	0.13		n/a	0.5	
December	n/a	7.91		9.10	10.26	-12.7	n/a	0.12		n/a	0.7	
Total												
Average		4.78		21.68	7.13	56		0.12			0.45	
Maximum		13.65		38.7	16.95	96		0.24			0.8	
Criteria												

**NORTH GLENGARRY WATER WORKS
WASTEWATER TREATMENT PERFORMANCE RESULTS
2021**

MONTH	Hydrogen Sulphide			E. coli			pH			Temp	Cl ₂
	Average Raw H ₂ S (mg/L)	Average Effluent H ₂ S (mg/L)	Percent Removal (%)	Average Raw E.coli (cts/100ml)	Average Effluent E.coli (cts/100ml)	Percent Removal (%)	Minimum Effluent pH	Average Effluent pH	Maximum Effluent pH	Average Effluent Temp (°C)	Average Effluent Cl ₂ (mg/L)
Jan	n/a	0.01		n/a	1.0		7.43	7.57	7.77	4.26	0.00
Feb	n/a	0.02		n/a	1.0		7.39	7.47	7.61	2.68	0.00
Mar	n/a	0.02		n/a	1.0		7.47	7.97	8.84	4.20	0.01
Apr	n/a	0.02		n/a	1.8		8.18	8.41	8.64	11.30	0.00
May	n/a	n/a		n/a	1.0		7.54	8.00	8.80	15.38	0.00
Jun	n/a	n/a		n/a	1.1		7.45	7.59	7.72	20.41	0.00
Jul	n/a	n/a		n/a	1.0		7.77	7.78	7.80	22.48	0.00
Aug	n/a	n/a		n/a	1.0		7.51	7.98	8.68	23.85	0.00
Sep	n/a	n/a		n/a	1.6		7.66	7.95	8.13	19.26	0.00
Oct	n/a	n/a		n/a	2.2		7.06	7.62	8.13	13.45	0.00
Nov	n/a	n/a		n/a	1.0		6.79	7.50	7.88	7.70	0.00
Dec	n/a	n/a		n/a	1.1		7.66	7.90	8.25	4.40	0.01
Total											
Average		0.02			1.2			7.80		12.6	0.00
Maximum		0.02			2.2			8.84		25.4	0.01
Criteria					200		6.0		9.5		0.02

Sludge Monitoring Points Identification



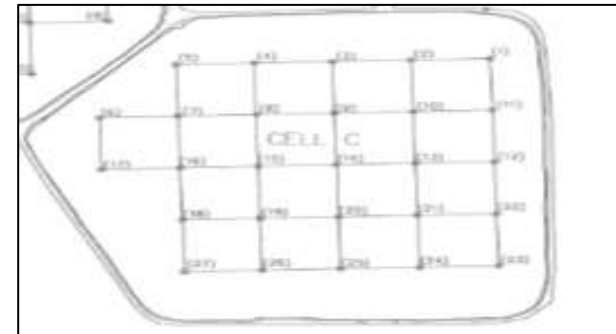
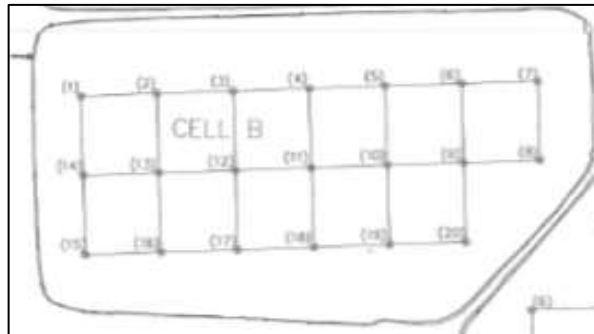
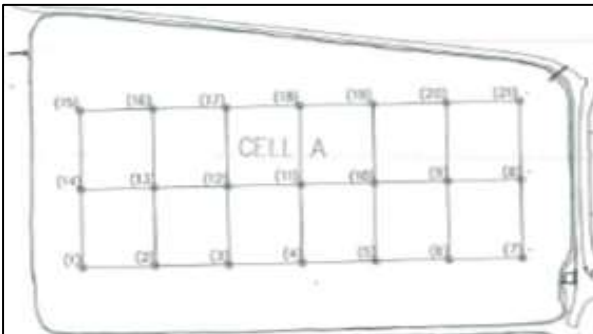
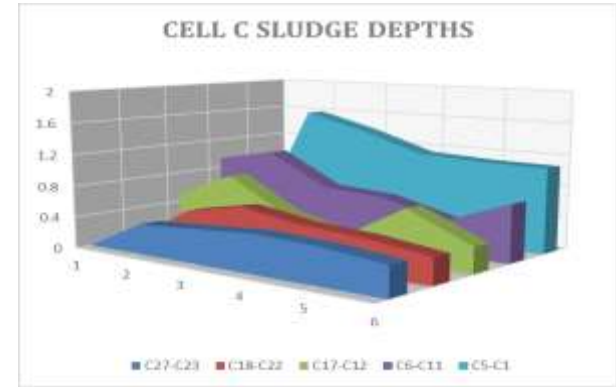
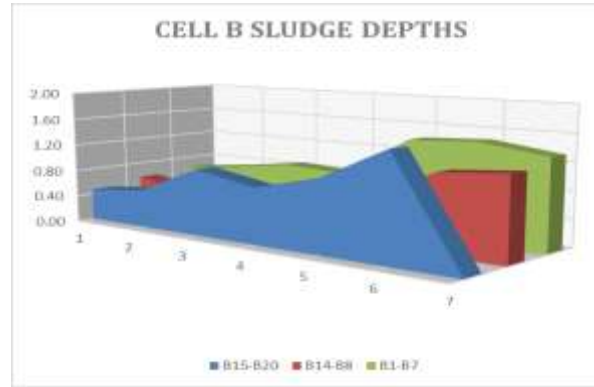
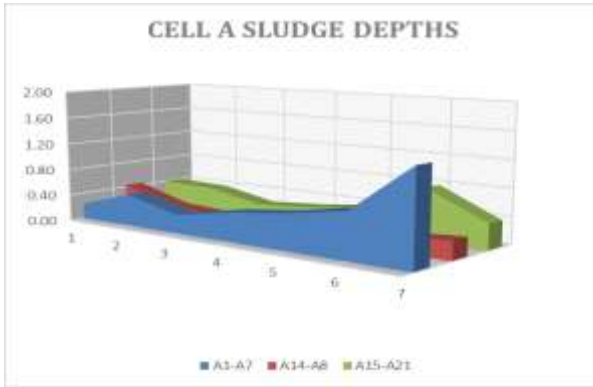
Sludge Sampling Point Volume Index

Cell A - Sample Point Sludge Volume m ³																									Total Sludge Volume (m ³)	Warning Trigger	Sludge Volume %			
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27			
17-Sep-09	1224	318	584	524	1106	656	1116	902	911	608	608	405	608	565	1413	1235	576	1049	593	214	730							15943		30.4
11-May-10	291	185	266	131	316	394	921	564	405	142	405	203	203	113	558	309	144	131	119	150	355							6302		12.0
11-Nov-10	204	265	398	1180	395	918	418	857	911	304	142	344	243	271	744	370	288	577	356	321	522							10028		19.1
12-Dec-11	437	450	266	1311	395	1312	921	857	770	547	547	405	405	339	632	1080	778	446	522	428	689							13534		25.8
24-Oct-12	379	344	266	262	658	787	1423	1037	608	567	506	770	263	1153	558	556	1037	393	309	321	1169							13364		25.5
06-Oct-14	525	397	717	550	1000	1758	2399	2187	871	466	365	446	567	543	558	926	922	1101	997	684	1294							19271		36.8
04-Nov-15	437	397	398	393	395	787	837	1375	608	608	304	304	608	678	558	926	864	1599	1448	321	960							14804		28.2
18-May-16	787	847	1274	1127	1922	2440	4017	1871	830	770	365	608	547	452	1190	525	490	1651	1021	919	2358							26011		49.6
17-Nov-16	641	609	611	603	605	1653	3850	744	668	668	466	770	243	611	818	1173	346	708	902	599	1315							18601		35.5
01-Jun-17	379	477	743	865	869	1679	2762	2232	891	668	466	263	263	633	1227	864	230	79	309	492	376							16767		32.0
15-Nov-17	350	344	611	734	605	1784	2288	744	972	567	-243	162	142	520	260	556	518	996	309	1347	1294							14859		28.3
07-Jun-18	816	79	823	682	1527	2047	3013	1420	1175	365	668	668	263	633	669	1729	720	734	831	1026	1315							21202		40.4
29-Oct-19	933	609	797	996	605	1391	4436	3810	1276	668	567	466	506	1018	1413	864	1008	708	878	919	1899							25766		49.1
05-Jun-20	1236	927	876	1520	1132	2309	3013	3404	709	972	668	466	770	837	1599	1173	1238	1049	1021	1240	1189							27347		52.2
28-Oct-20	670	1271	743	1127	1395	1784	3794	631	466	628	466	304	405	972	1487	0	634	655	902	1667	793							20796		39.7

Cell B - Sample Point Sludge Volume m ³																									Total Sludge Volume (m ³)	Warning Trigger	Sludge Volume %			
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27			
17-Sep-09	753	995	844	1123	1264	1663	4850	2717	1438	1742	608	810	608	933	368	720	780	1067	846	1850								25978		51.0
11-May-10	452	1081	844	1067	3398	3354	3861	3413	1843	1215	770	770	608	542	490	480	1170	1404	1693	1388								29841		58.6
11-Nov-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							0		0.0
12-Dec-11	2891	853	1069	1853	2836	5045	64	112	1013	2045	911	668	1337	651	49	959	1118	927	1778	3917								30096		59.1
24-Oct-12	1235	1308	1434	1488	1207	1968	2202	2740	1337	668	567	608	567	651	809	480	780	1629	2003	1264								24945		49.0
06-Oct-14	2168	2190	2391	2724	3229	4103	3446	1639	2592	1762	1053	1053	911	1345	1642	1247	1561	2303	2173	2991								42522	Total Sludge Volume High	83.5
04-Nov-15	2771	910	1744	899	3033	3687	3765	2201	2491	1883	1458	1154	749	911	1275	1127	1613	2303	2314	2097								38383	Total Sludge Volume High	75.3
18-May-16	2048	1934	2897	3678	4437	2994	5871	3211	2795	1885	2390	1580	911	1019	1593	1871	1743	2246	2173	3547								59521	Total Sludge Volume High	99.9
14-Nov-16	2048	1650	3319	2892	3594	4241	4244	1639	2187	1985	1377	1053	851	1995	1520	1367	1613	2190	2314	2991								45069	Total Sludge Volume High	88.5
01-Jun-17	2048	1650	1350	2050	3033	2744	4276	2987	1883	2693	1883	1175	1175	1041	1544	1271	1248	1769	2342	2560								40721	Total Sludge Volume High	79.9
16-Nov-17	1144	1081	2194	2050	3454	3964	2968	2201	1883	2187	1782	1175	972	1019	4094	1751	1899	2050	2624	2683								43173	Total Sludge Volume High	84.7
07-Jun-18	1897	2076	2616	3313	3454	1746	2617	2201	1458	1681	1580	1175	972	1019	1593	2351	1769	1881	2596	3176								41170	Total Sludge Volume High	80.8
29-Oct-19	2349	1934	2334	2892	3173	3964	5042	3458	2693	2187	1377	1013	1276	1345	1152	1631	1769	2246	2173	3176								47184	Total Sludge Volume High	92.6
04-Jun-20	2048	1792	2109	2892	4296	3271	4244	2987	1883	2491	2045	1053	749	1627	1348	1007	1691	2162	2370	2220								44286	Total Sludge Volume High	86.9
28-Oct-20	1897	2076	2419	2274	3259	4047	4244	2717	2288	1316	1114	1175	810	1236	1152	1367	2549	2303	2963	4718								46625	Total Sludge Volume High	91.5

Cell C - Sample Point Sludge Volume m ³																											Total Sludge Volume (m ³)	Warning Trigger	Sludge Volume %	
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27			
17-Sep-09	311	837	615	913	1425	679	770	567	668	608	615	432	709	344	405	446	402	594	446	506	608	362	305	352	798	602	1172	12291		18.6
11-May-10	467	419	196	554	1344	113	608	203	506	1013	329	324	304	203	101	304	709	350	203	405	101	213	457	146	285	410	533	8651		13.1
11-Nov-10	373	419	475	830	1909	340	608	405	405	1438	549	367	203	344	405	446	591	699	446	344	405	319	457	0	570	410	533	11594		17.5
12-Dec-11	840	921	1397	1107	1479	747	1681	1114	446	506	373	540	405	446	344	405	1181	594	506	506	1171	457	439	342	465	959	15538	15538		23.5
24-Oct-12	933	837	1146	1135	1102	815	729	1033	567	506	439	324	466	365	365	567	709	874	365	304	304	532	457	879	370	766	533	13579		20.5
06-Oct-14	1960	1395	1537	2574	2285	1924	1114	1296	1053	851	1405	1382	608	891	851	668	1772	1224	628	851	405	1703	2348	1025	1054	547	1456	26267		39.7
04-Nov-15	2085	2037	1761	3266	4517	2309	2187	1073	668	668	703	1123	446	446	142	648	1347	944	668	648	648	1107	1586	1084	1054	876	1491	27704		41.9
18-May-16	2894	2316	2878	3404	3441	1064	851	871	567	770	1823	929	668	446	608	567	1229	1993	749	648	547	1618	1738	1084	1054	876	1491	28713		43.4
14-Nov-16	2116	781	1202	1744	3119	1200	871	567	446	871	922	1361	567	770	567	466	756	1469	668	648	446	1341	1890	1318	1196	1833	2024	21108		31.9
01-Jun-17	1494	1339	1649	1218	2258	1879	972	1296	871	567	1713	1577	972	770	466	871	898	1503	365	648	972	1235	1616	1113	1082	766	1527	23242		35.1
17-Nov-17	2427	2762	3465	3958	3038	1766	1377	1073	871	567	1493	713	567	668	567	446	1016	1503	668	466	668	809	1768	1113	940	903	1349	29411		44.5
07-Jun-18	1805	1702	1062	2435	2097	1652	770	628	790	506	1208	1361	871	1215	770	1175	1229	1329	567	365	709	1235	1677	1318	1510	1176	1598	23534		35.6
28-Oct-19	3516	3292	3717	3542	4517	3237	2795	2086	1701	1175	2921	1469	770	668	871	1073	2433	2378	1175	1175	1478	1980	2531	1699	1510	1587	2414	44508	Total Sludge Volume High	67.3
04-Jun-20	3578	3097	4276	5424	4920	2558	1883	1235	1377	1114	1867	3910	1073	1013	1175	2592	2174	2902	972	1073	972	1767	2836	1523	1624	1751	2911	48211	Total Sludge Volume High	72.9
28-Oct-20	3361	3041	3046	3819	4248	2105	2187	1377	1276	871	1603																			

Sludge Volume Profile



- Last depth reading: October 28, 2020
- Cell volume calculated to be 39.7%
- Cell sludge volume reduced 9.4% from 2019 values
- 3 locations exceeded trigger levels
- Highest volume located in south-east corner of cell

- Last depth reading: October 28, 2020
- Cell volume calculated to be 91.5%
- Cell sludge volume reduced 1.1% from 2019 values
- 13 locations exceeded trigger levels
- Highest volume located in south-east corner of cell

- Last depth reading: October 28, 2020
- Cell volume calculated to be 55.8%
- Cell sludge volume reduced 11.5% from 2019 values
- 12 locations exceeded trigger levels
- Highest volume located in north-west corner of cell

Annual Bypass Report | Appendix C

1.0- Provide the following information for each bypass that occurred at each sewage pumping station or treatment plant bypass location for the reporting year. Start with a new line for each event.

**Facility Name: Alexandria WWTP
Report Year: 2021**

Date dd-mmm-yyyy	Location	Type (1)	Start Time	Duration	Volume	Disinfect (2)	Reason Code (3)	Sample Results				
				Hrs	m ³			BOD ₅ (mg/L)	SS (mg/L)	TP (mg/L)	E. Coli (mg/L)	

Comments Area for Pumping Stations and Plant Bypasses:

-No By-Passes occurred during this reporting period.

Type ⁽¹⁾	Disinfect ⁽²⁾	Reason Code ⁽³⁾
P: Primary <i>the discharge of raw sewage subject to no treatment</i>	Y: Yes	1: Heavy Precipitation
S: Secondary <i>excludes grit removal and/or chlorination</i> <i>the discharge of sewage that has undergone solids removal at the primary clarifiers but bypassed the secondary treatment process</i>	N: No	2: Snow Melt
	U: Unknown	3: Equipment Failure
		4: Equipment Maintenance
		5: Sewer Problems
		6: Power Failure
		7: Exceed Design
		8: Other

2.0- Pumping Station and Plant Bypass Monthly Summary

Facility Name: Alexandria WWTP

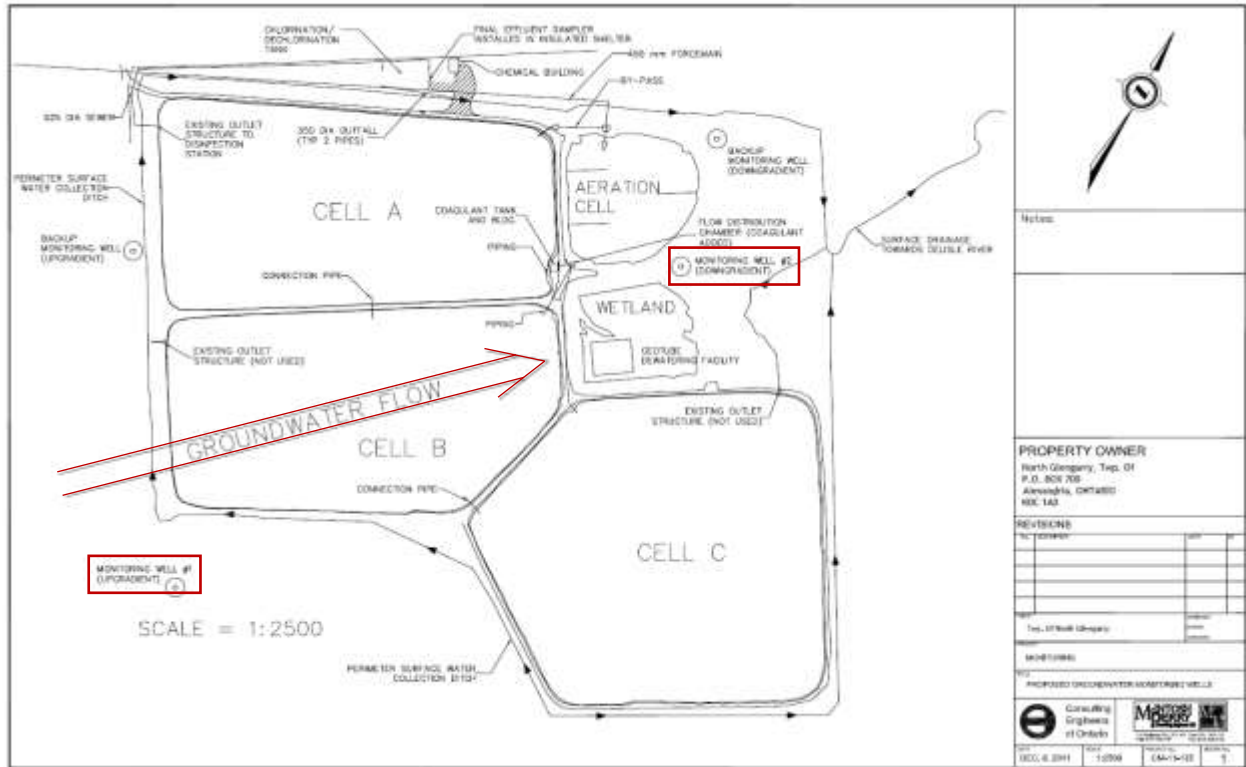
Month	Primary Bypass			Secondary Bypass		
	No. of Days (days)	Duration (hours)	Volume (m ³)	No. of Days (days)	Duration (hours)	Volume (1000m ³)
January	0			0		
February	0			0		
March	0			0		
April	0			0		
May	0			0		
June	0			0		
July	0			0		
August	0			0		
September	0			0		
October	0			0		
November	0			0		
December	0			0		
Total	0	0	0	0	0	0

AADF: Annual Average Daily Flow % of AADF= ((Volume of Bypass/AADF)/365)*100

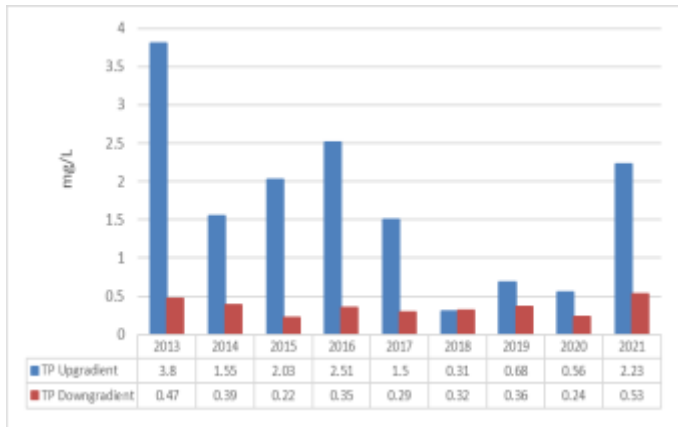
*AADF(m³/d) = 2,456

Volume of Bypass as % of AADF*
Daily Flow = 0.00

Alexandria Monitoring Well Location

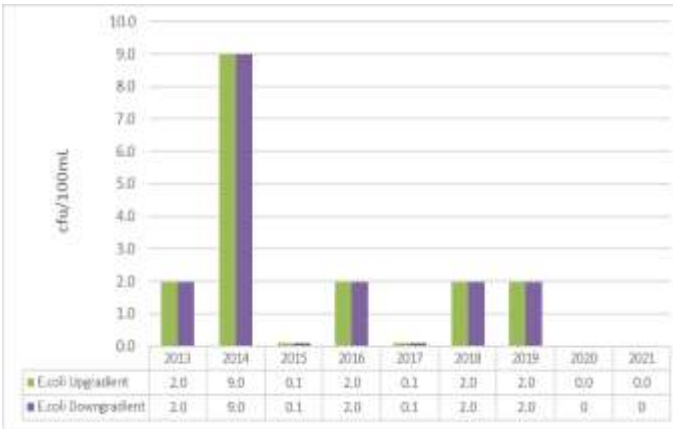


Alexandria Monitoring Sampling Results

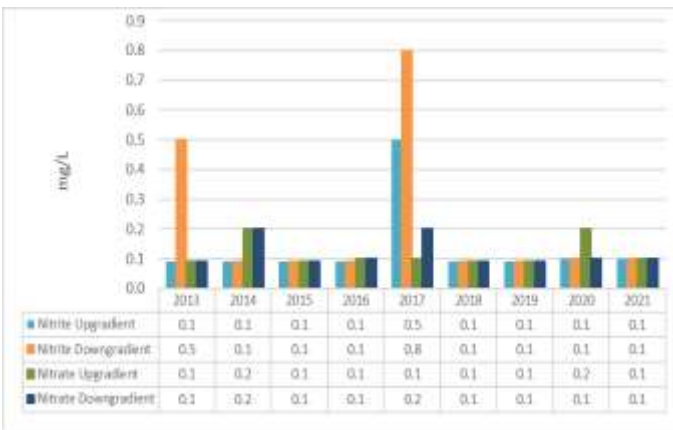


Total Phosphorous downgradient was found to be less than a quarter of the result than the upgradient results, which is in-line with historical results, indicating little to no impact from the lagoon system.

It is worth noting that although the upstream values appear to fluctuate greatly over the last 9 years, the downstream values are consistent.

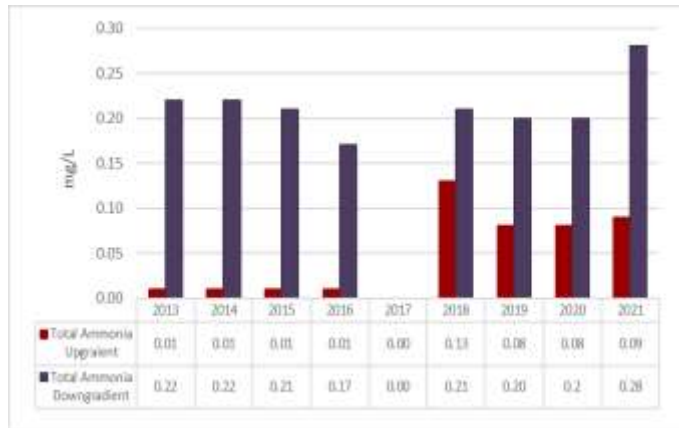


E. coli results downgradient and upgradient appear to be minimal, apart from an elevated sample in 2014. All results have been non-detect (represented by a reading of 0.1) or < 2, (represented by a reading of 2.0).



Nitrite/Nitrate samples have also been minimal in nature in most samples results. Increased levels for nitrites were visible in 2013 and 2017, while for nitrates increased levels were noted in 2014, 2017 and 2020.

In 2021 all samples were below detection limits. Based on sample history there appears to be little to no impact from the lagoon system.



Nitrogen (Total Ammonia) downgradient samples have been marginal in nature, on average 0.2mg/L, but all downgradient results are higher than the upgradient samples.

The sampling results indicate possible influence, but impact would be minimal based on results. It is also worth noting surrounding area is agricultural, which may also be a source of nitrogen.



As historical trending has displayed intermittent increases in both upstream and downstream samples, the TKN values from 2021 are slightly elevated from previous year but are the same upstream and downstream.

Overall, samples are marginal in nature, but there may be some influence but marginal in nature.



TOC sampling results were found to be slightly lower downstream. The current downstream values is lower than the initial results but similar to more recent results.

The annual reading appears to fluctuate over the last few years, which does not conclusive indicate impacts downstream, but levels could have marginal impact.

It should be noted that all results are based on observed testing as compared to previous results, and not from a hydrogeological expertise standpoint.