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Township of North Glengarry
Alexandria Wastewater System

2022 Annual Report

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A. Performance Assessment

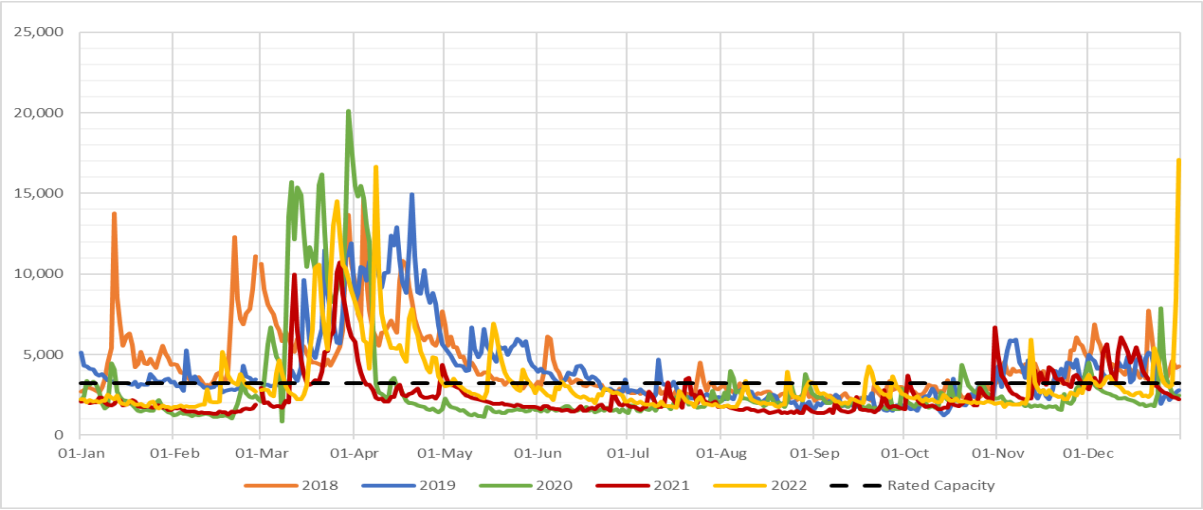
Summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in condition 7, including an overview of success and adequacy of works

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 dechlorination chamber, which discharges to and 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 2022 calendar year 1,162,810m^3 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 3,584.9m^3 of leachate from the Alexandria Waste Disposal Site, hauled between May 2nd and May 20th.

Flow trending throughout 2022 was observed to be slightly increased from 2021 values, but similar to previous observed 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 2022 and produced effluent meeting all Federal Effluent Limits and all Provincial Environmental Compliance Approval Limits, all sampling results 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	2022 Average Concentration
$CBOD_5$	30 mg/L	3.7 mg/L
TSS	40 mg/L	6.5 mg/L
TP	0.5 mg/L	0.19 mg/L
E. Coli *(geometric mean density)*	<200 organisms/100 mL	2.0 /100mL
pH *(maintained inclusive at all time)*	6.0-9.5	7.64
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 subsequent 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: Groundwater Monitoring Well Sampling Program:

Parameter	Monitoring Well #1		Monitoring Well #2	
	Background results (March 6, 2013)	2022 Sampling Results (March 16, 2022)	Background results (March 6, 2013)	2022 Sampling Results (March 16, 2022)
TOC	8 mg/L	8.7 mg/L	15.2 mg/L	7.8 mg/L
TP	3.8 mg/L	1.98 mg/L	0.47 mg/L	0.40 mg/L
TKN	0.83 mg/L	0.80 mg/L	1.12 mg/L	1.0 mg/L
Nitrogen	< 0.01 mg/L	0.07 mg /L	0.22 mg/L	0.42 mg/L
Nitrite	< 0.1 mg/L	< 0.1 mg/L	0.5 mg/L	< 1 mg/L
Nitrate	< 0.1 mg/L	< 0.1 mg/L	<0.1 mg/L	< 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:

- Issue
  - Pump operational issues caused by equipment failure (contactor, relay, level sensor probe)
    - replacement of defective parts

- Pump failure due to debris from collection system
  - remove debris from impeller or check valve as required
- Grease build-up in wet well
  - clean equipment and well periodically to maintain operations
- Intermittent SCADA communication issues
  - Capital Control repaired communication issues between PLCs
- Phone line failure, causing loss of alarm notification
  - Bell Canada repair defective lines

Treatment System:

- Issue
  - Sump pump failure, causing major damage to coagulant dosing system
    - pump water from building, and reset coagulant tank
    - repair or replace all equipment damaged by flooding
    - equipment also install battery back-up on sump pump
  - Aerator safety plate loss due to fastening device failure after removing debris form impeller
    - Eastern Welding replaced and secured safety plate and unit placed back in service
  - Chemical dosing loss due to equipment malfunction
    - repair and replace defective parts or prime lines
  - Faulty Alarm sensors and panel
    - Replaced defective equipment
  - Auto-sampler frozen influent lines
    - thaw and install heat tracing to prevent reoccurrences
  - Utility Power failure caused by line strike from birds
    - Contact Hydro to repair blown breakers at transformers and install alarm relay

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
- System Wide Flow Monitoring for Pump Needs Study by consultants

Treatment System:

- Preventative Maintenance program
  - schedule and forms at all stations, as required
- Continuation of desludging program in Cell B
- 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 in December 2022.

All handheld and benchtop testing analyzers were calibrated by ClearTech in June 2022.

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 2022 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.

Monthly discharge effluent monitoring showed that the effluent design objectives and limits were met at all times, as per Schedule B and Schedule C of ECA. The maximum pH exceeded the objectives, but all values were well below the compliance limits. 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 Min	pH Max	E. Coli *(geometric mean density)* (organisms/100 mL)
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	6.8	4.8	0.23	0.00	7.20	8.94	5.3
February	5.0	10.0	0.32	0.00	7.02	7.67	2.1
March	3.7	6.7	0.25	0.00	7.08	7.70	5.6
April	3.3	12.3	0.26	0.00	7.29	8.57	6.6

	$CBOD_5$ (mg/L)	TSS (mg/L)	TP (mg/L)	Total Chlorine Residual (mg/L)	pH Min	pH Max	E. Coli *(geometric mean density)* (organisms/100 mL)
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*
May	4.0	7.5	0.17	0.00	7.39	8.72	3.6
June	3.0	4.4	0.10	0.00	7.43	8.40	1.3
July	3.0	4.0	0.12	0.00	7.35	8.24	1.0
August	3.0	6.2	0.21	0.00	7.35	7.55	1.0
September	3.0	4.5	0.12	0.00	7.24	7.84	1.8
October	3.0	5.0	0.11	0.00	7.20	8.16	1.0
November	3.2	5.2	0.12	0.00	7.49	8.25	1.0
December	3.3	5.0	0.11	0.00	7.33	7.90	1.0
Annual Average	**3.7**	**6.5**	**0.19**	**0.00**	**7.64**		**2.0**

Quarterly monitoring included acute lethality, under Federal Wastewater Systems Effluent Regulations and under Schedule D of the ECA. All quarterly samples for rainbow trout and daphnia were not found to be acutely lethal.

Table 4: Acute Lethality Testing Summary

Date	Rainbow Trout Lethality Result (%)	Comment	Daphnia Lethality Result (%)	Comment
19-Jan-2022	0	Pass	0	Pass
20-Apr-2022	0	Pass	0	Pass
20-Jul-2022	0	Pass	0	Pass
19-Oct-2022	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. The summary in Table 5 shows all results over the Provincial Water Quality Objectives. As per previous testing results, intermittent issues with un-ionized ammonia, total silver, total zinc 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 no lethality was observed during the all-testing periods.

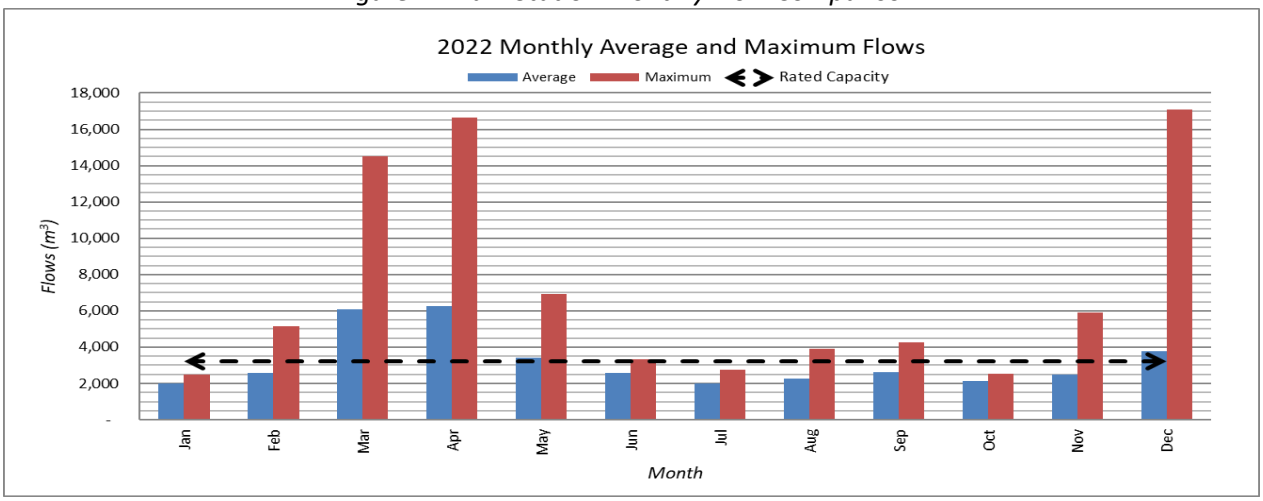
Table 5: Additional Metal, Inorganic and VOC Elevated Results

Date	Parameter	Result (mg/L)
19-Jan-2022	Un-ionized Ammonia	0.272
	Total Silver	0.0002
	Total Zinc	0.050
20-Apr-2022	Un-ionized Ammonia	0.168
19-Oct-2022	Toluene	2.01

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 discolouration to the receiving waters.

Annual flow summaries indicate a calculated average daily flow of 3,184m^3/day, which represents an average of 98% of the total rated capacity for this facility. The work continued in the wastewater collection system to eliminate inflow and infiltration into the works, demonstrates the commitment by the Township to prevent system bypasses and treatment surges created by severe weather events. The observed maximum daily flow for the year was reported to be 17,077m^3/day, which was reported towards the end of December. Significant influent flows were observed in March, April and December coinciding with a snow melt event coupled with a significant rainfall event. Please refer to 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 measured between November 4th - November 11th. Sludge levels in Cell A and Cell C were found to be increased from observed values, when last measured in 2020. Whereas Cell B levels were decreased, which can be attributed to the work described below.

Bishop Water was contracted for a multi-phased Geotube project to remove an excessive sludge build-up starting in 2021. During 2022, Bishop Water was on-site between May 2 and May 12, and removed a total volume of 3763.69m^3 from cell B. Based on the final report issued to the Township on May 31, 2022, the total solids removed from cell B was 88.48 BDMT. 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
		m3	L	kg/BDT
Week 1	57.07	2,211.75	334.98	5.87
Week 2	31.41	1,551.94	160.80	5.12
Total	**88.48**	**3,763.69**	**495.78**	**5.60**

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 cameraed, 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 was only one primary overflows event reported during 2022, no spills or by-passes were noted during this period. This overflow was caused by partially blocked sanitary sewer and degraded manhole structure located along Garry River. Temporary actions were taken to attempt to limit the overflow, and all repairs to manhole were completed in June 2022. Quarterly reports for bypasses and overflows were 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	2022	N	Y	13-Apr-2022	ALX WWS_2022 Q1
2	April-June	2022	N	N	17-Jul-2022	ALX WWS_2022 Q2
3	July- September	2022	N	N	18-Oct-2022	ALX WWS_2022 Q3
4	October- December	2022	N	N	23-Jan-2023	ALX WWS_2022 Q4

K. Other

Any other information the District Manager requires from time to time

EOS 2000

i. Equipment Summary

The date of installation and removal of the EOS-2000 unit within each unit

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

NORTH GLENGARRY WATER WORKS

WASTEWATER TREATMENT WORKS PERFORMANCE RESULTS

Municipality: *North Glengarry* **Year:** *2022*

Project: *Alexandria STP* **Receiving Stream:** *Delisle River*

Description: *1 Pumping Station, 1 Aerated Cell, 3 Facultative Cells* **Design Capacity:** *3237 m^3/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 (%)
Jan	62,453	2,015	2,495	127.0	6.8	94.7	160.0	4.8	97.0	1.74	0.23	86.9
Feb	72,709	2,597	5,169	165.0	5.0	97.0	560.0	10.0	98.2	4.91	0.32	93.5
Mar	187,946	**6,063**	14,509	101.0	3.7	96.4	335.0	6.7	98.0	0.48	0.25	48.6
Apr	187,526	**6,251**	16,656	56.0	3.3	94.2	96.0	12.3	87.2	1.31	0.26	80.3
May	105,742	**3,411**	6,904	44.0	4.0	90.9	85.0	7.5	91.2	1.50	0.17	88.8
Jun	77,861	2,595	3,334	141.0	3.0	97.9	390.0	4.4	98.9	4.23	0.10	97.5
Jul	61,580	1,986	2,761	163.0	3.0	98.2	465.0	4.0	99.1	4.38	0.12	97.3
Aug	70,245	2,266	3,926	188.0	3.0	98.4	560.0	6.2	98.9	5.83	0.21	96.4
Sep	78,388	2,613	4,251	37.0	3.0	91.9	48.0	4.5	90.6	1.20	0.12	90.0
Oct	66,719	2,152	2,521	139.0	3.0	97.8	325.0	5.0	98.5	3.63	0.11	97.0
Nov	75,197	2,507	5,904	3.0	3.2	-6.7	400.0	5.2	98.7	4.53	0.12	97.3
Dec	116,444	**3,756**	17,077	129.0	3.3	97.5	250.0	5.0	98.0	3.56	0.11	96.9
Total	1,162,810											
Average		3,184		107.8	3.7	87	306.2	6.3	96	3.11	0.18	89
Minimum												
Maximum			17,077	188	6.8	98	560.0	12.3	99	5.83	0.32	98
Criteria		**3,237**			**30**			**40**			**0.50**	

NORTH GLENGARRY WATER WORKS
WASTEWATER TREATMENT PERFORMANCE RESULTS
2022

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 (%)
Jan	n/a	9.31		17.30	17.18	0.7	n/a	0.10		n/a	0.3	
Feb	n/a	12.23		27.80	15.46	44.4	n/a	0.10		n/a	0.1	
Mar	n/a	10.39		13.70	13.82	-0.9	n/a	0.10		n/a	0.1	
Apr	n/a	4.25		9.90	7.53	24.0	n/a	0.10		n/a	0.8	
May	n/a	2.21		14.40	3.88	73.1	n/a	0.90		n/a	0.4	
Jun	n/a	0.60		22.30	1.74	92.2	n/a	0.10		n/a	0.3	
Jul	n/a	0.18		24.60	1.58	93.6	n/a	0.10		n/a	0.1	
Aug	n/a	0.41		30.90	2.40	92.2	n/a	0.10		n/a	0.1	
Sep	n/a	1.73		21.00	2.30	89.0	n/a	0.10		n/a	0.2	
Oct	n/a	1.09		21.30	2.28	89.3	n/a	0.10		n/a	0.3	
Nov	n/a	1.58		26.70	3.22	87.9	n/a	0.10		n/a	0.4	
Dec	n/a	3.94		19.20	6.15	68.0	n/a	0.08		n/a	0.7	
Total												
Average		3.99		20.76	6.46	62.8		0.16			0.32	
Minimum												
Maximum		12.23		30.90	17.18	93.6		0.90			0.80	
Criteria												

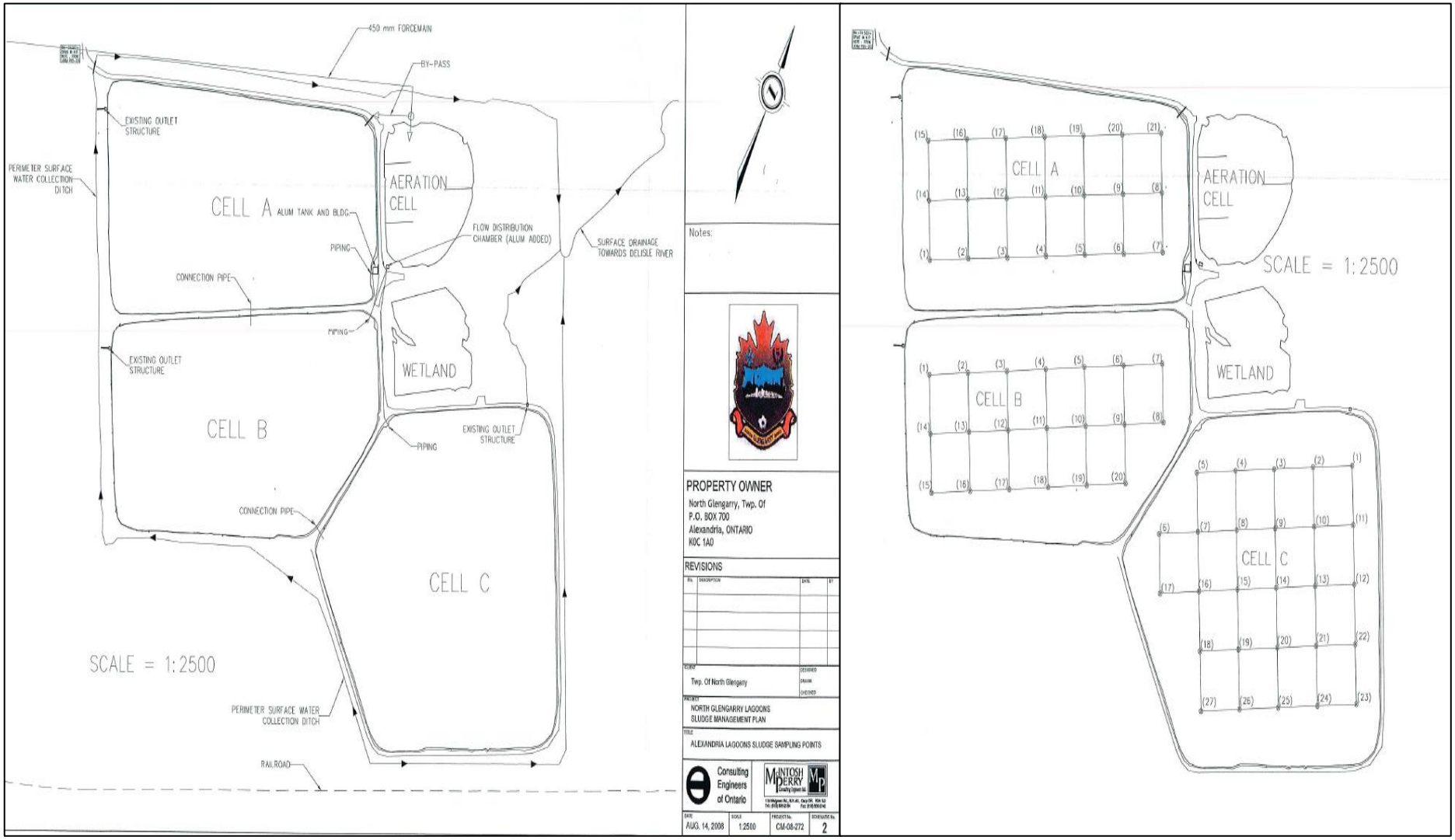
NORTH GLENGARRY WATER WORKS

WASTEWATER TREATMENT PERFORMANCE RESULTS

2022

MONTH	Hydrogen Sulphide			E. coli			pH			Temp	Cl_2
	Average Raw H_2S (mg/L)	Average Effluent H_2S (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	0.05		n/a	5.28		7.20	7.87	8.94	7.33	0.00
Feb	n/a	n/a		n/a	2.14		7.02	7.36	7.67	3.80	0.00
Mar	n/a	n/a		n/a	5.57		7.08	7.40	7.70	4.69	0.00
Apr	n/a	n/a		n/a	6.62		7.29	8.01	8.57	7.60	0.00
May	n/a	n/a		n/a	3.56		7.39	7.98	8.72	16.05	0.00
Jun	n/a	n/a		n/a	1.32		7.43	7.68	8.40	20.36	0.00
Jul	n/a	n/a		n/a	1.00		7.35	7.63	8.24	23.18	0.00
Aug	n/a	n/a		n/a	1.00		7.35	7.43	7.55	22.92	0.00
Sep	n/a	n/a		n/a	1.78		7.24	7.63	7.84	17.88	0.00
Oct	n/a	n/a		n/a	1.00		7.20	7.68	8.16	11.63	0.00
Nov	n/a	n/a		n/a	1.00		7.49	7.76	8.25	7.42	0.00
Dec	n/a	n/a		n/a	1.00		7.33	7.66	7.90	3.08	0.00
Total											
Average		0.05			2.0			7.62		13.06	0.00
Minimum							7.02				
Maximum		0.05			6.6				8.68	26.80	0.00
Criteria					***200***		***6.0***		***9.5***		***0.02***

Sludge Monitoring Points Identification



Sludge Sampling Point Volume Index

Cell A- Sample Point Sludge Volume m³

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total Sludge Volume (m³)	Warning Trigger	Sludge Volume %
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	864	634	655	902	1667	793	21660		41.3
11-Nov-22	787	742	1142	865	1264	2047	3710	2548	770	466	871	162	446	724	1190	1173	922	1520	1258	1560	1941	26104		49.8

Cell B- Sample Point Sludge Volume m³

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total Sludge Volume (m³)	Warning Trigger	Sludge Volume %
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
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	1985	2390	1580	911	1019	1593	1871	1743	2246	2173	3547	50921	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	3959	4047	4244	2717	2288	1316	1114	1175	810	1236	1152	1367	2549	2303	2963	4718	46625	Total Sludge Volume High	91.5
04-Nov-22	2349	512	928	2892	4296	4518	4563	1078	1377	1377	1175	1073	567	1236	2010	1727	1509	2050	1467	1789	38493	Total Sludge Volume High	75.5

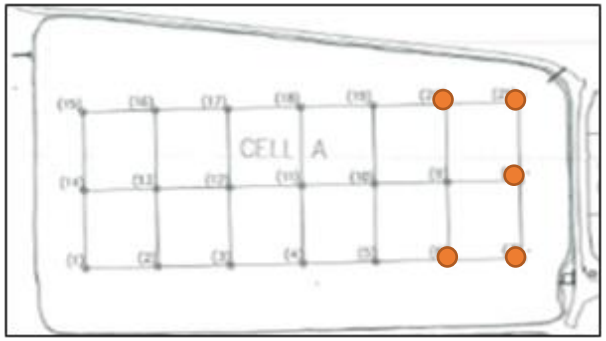
Cell C- Sample Point Sludge Volume m³

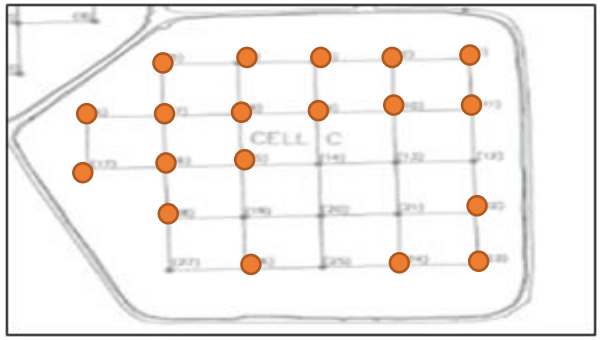
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	Total Sludge Volume (m³)	Warning Trigger	Sludge Volume %
17-Sep-09	311	837	615	913	1425	679	770	567	668	608	615	432	709	344	405	446	402	594	446	506	608	362	305	352	798	602	1172	16488		24.9
11-May-10	467	419	196	554	1344	113	608	203	506	1013	329	324	304	203	101	304	709	350	203	405	101	213	457	146	285	410	533	10797		16.3
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	14288		21.6
12-Dec-11	840	921	1397	1107	1479	747	1681	1114	446	506	373	540	405	446	344	405	1181	594	506	506	506	1171	457	439	342	465	959	19877		30.1
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	17420		26.3
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	34805		52.6
04-Nov-15	2085	2037	1761	3266	4517	2309	2187	1073	668	668	703	1123	446	446	142	648	1347	944	668	668	648	1107	1586	1084	1054	876	1491	35549		53.7
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	37120		56.1
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	31156		47.1
01-Jun-17	1494	1339	1649	1218	2258	1879	972	1296	871	567	1713	1577	972	770	466	871	898	1503	365	567	972	1235	1616	1113	1082	766	1527	31553		47.7
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	36961		55.9
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	32756		49.5
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	57706	Total Sludge Volume High	87.2
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	61595	Total Sludge Volume High	93.1
28-Oct-20	3361	3041	3046	3819	4248	2105	2187	1377	1276	871	1603	713	1377	466	830	1681	1181	1573	1215	972	871	702	1128	1318	1367	1176	1349	44854	Total Sludge Volume High	67.8
11-Nov-22	3516	3990	3940	4373	4248	2784	2086	1580	1883	1478	2262	1577	851	851	1377	2086	3142	2727	1175	972	972	2086	2073	1816	1054	2681	2024	59602	Total Sludge Volume High	90.1

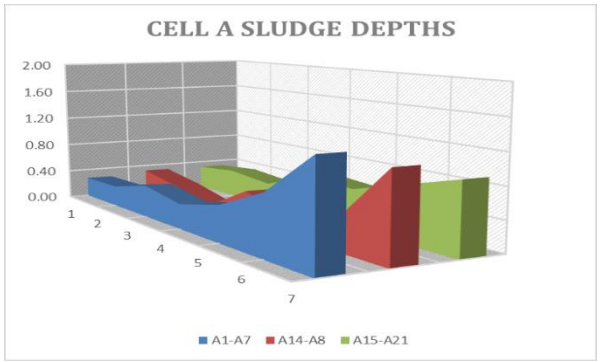
Note: if a Sample Point Volume or the Total Sludge Volume is underlined, this signifies that the volume of sludge in that section is high and action might be required to obtain a uniform distribution.

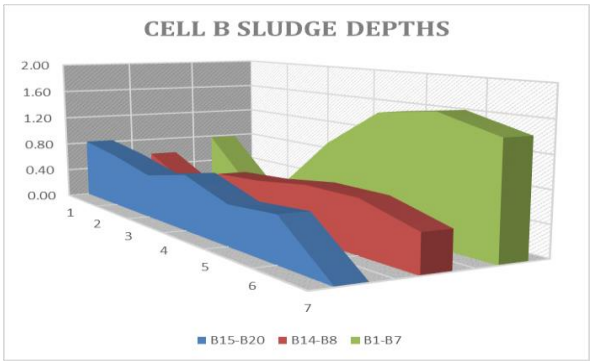
Sludge Volume Profile

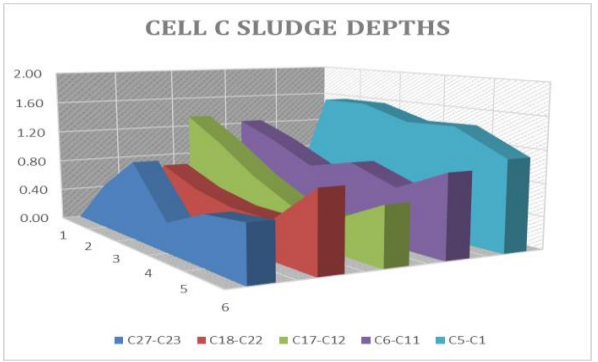
Cell A	Cell B	Cell C
• Last depth reading: November 11, 2022 • Cell volume calculated to be 49.8% • Cell sludge volume increased by 8.5% from 2020 values • 5 locations exceeded trigger levels • Highest volumes located in north-east corner of cell	• Last depth reading: November 4, 2022 • Cell volume calculated to be 75.5% • Cell sludge volume reduced 16% from 2020 values • 9 locations exceeded trigger levels • Highest volume located in north-east corner of cell	• Last depth reading: November 11, 2022 • Cell volume calculated to be 90.1% • Cell sludge volume increased 8.2% from 2020 values • 20 locations exceeded trigger levels • Highest volume located in north side, west corner and south-east corner of cell











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: 2022			
Date	Location	Type (1)	Start Time	Duration	Volume	Disinfect (2)	Reason Code (3)	Sample Results			
dd-mmm-yyyy				Hrs	m^3			BOD_5 (mg/L)	SS (mg/L)	TP (mg/L)	E. Coli (mg/L)
20-Mar-2022	MH160 & MH170	P	13:45	119.5	4.95	N	5	11.1	27.3	0.4	n/r

Type (1)	
P: Primary	*the discharge of raw sewage subject to no treatment*
S: Secondary	*excludes grit removal and/or chlorination*
	the discharge of sewage that has undergone solids removal at the primary clairifiers but bypassed the secondary treatment process

Disinfect (2)
Y: Yes
N: No
U: Unknown

Reason Code (3)
1: Heavy Precipitation
2: Snow Melt
3: Equipment Failure
4: Equipment Maintenance
5: Sewer Problems
6: Power Failure
7: Exceed Design
8: Other

Comments Area for Pumping Stations and Plant Bypasses:
-Overflow way initially through to be caused by degraded manhole structure but was later found to be caused by partially blocked sewer main. Once obstruction was removed, the overflow stopped. Manhole structure was repaired in June 2022.

2.0- Pumping Station and Plant Bypass Monthly Summary

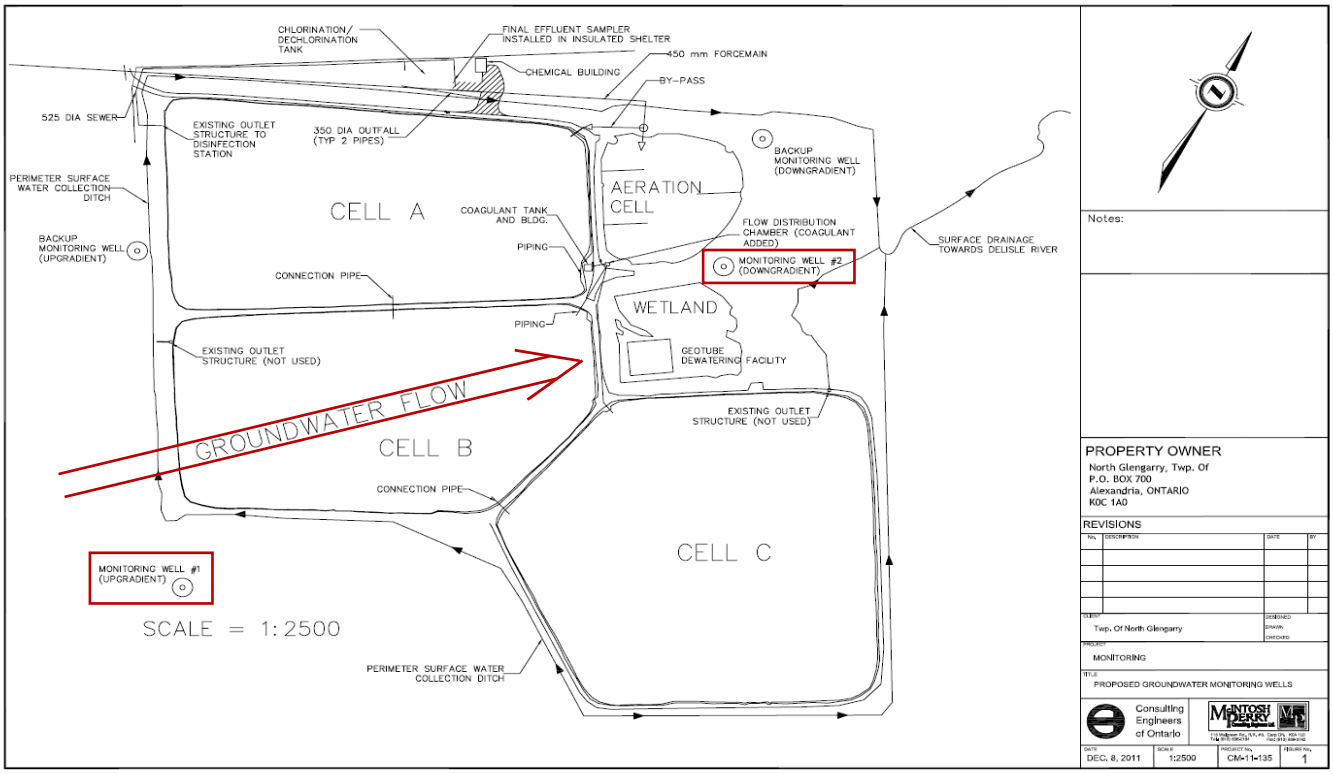
Facility Name: Alexandria WWTP						
Month	Primary Bypass			Secondary Bypass		
	No. of Days (days)	Duration (hours)	Volume (m^3)	No. of Days (days)	Duration (hours)	Volume ($1000m^3$)
January	0			0		
February	0			0		
March	5	119.5	4.95	0		
April	0			0		
May	0			0		
June	0			0		
July	0			0		
August	0			0		
September	0			0		
October	0			0		
November	0			0		
December	0			0		
Total	5	119.5	4.95	0	0	0

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

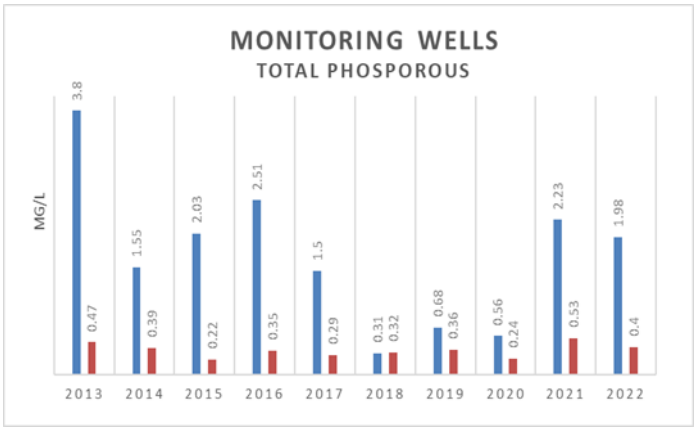
**AADF(m^3/d) = 3,184*

$$\frac{\text{Volume of Bypass as \% of AADF*}}{\text{Daily Flow}} = 0.00043$$

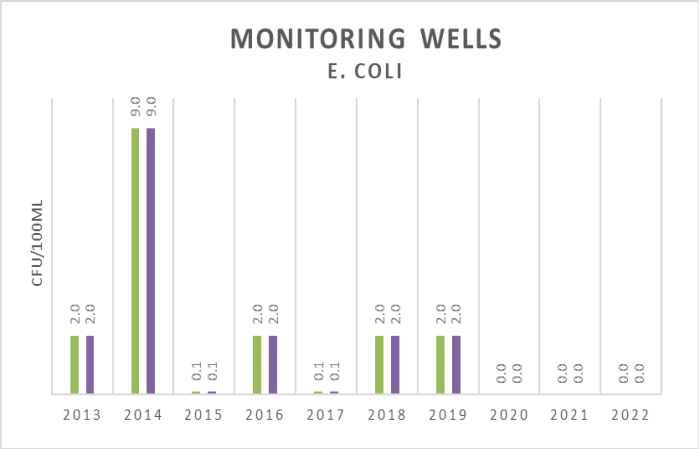
Alexandria Monitoring Well Location



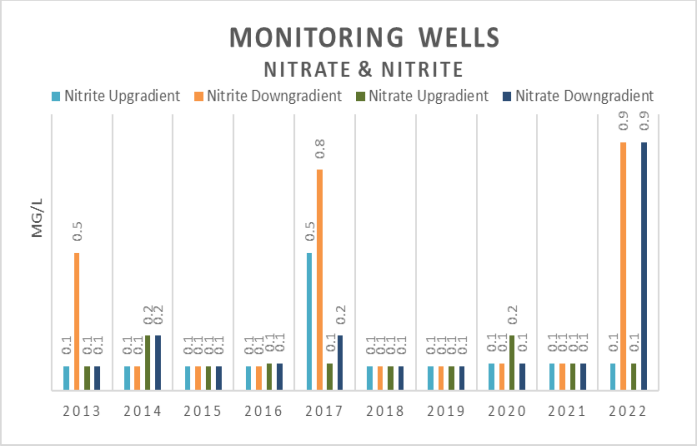
Alexandria Monitoring Sampling Results



Total Phosphorous down gradient 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.

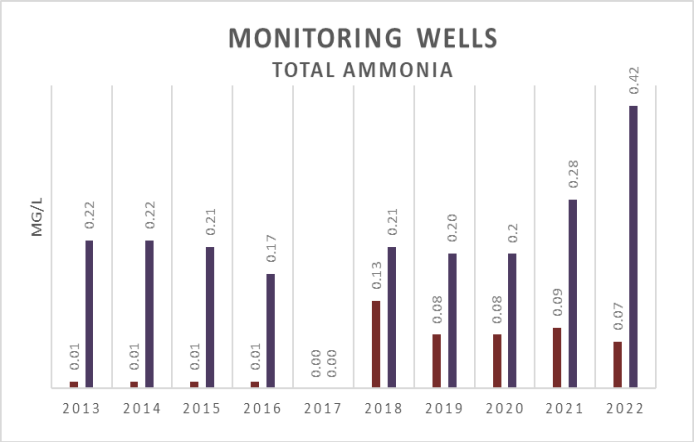


E. coli results downgradient and upgradient appear to be negligible, apart from an elevated sample in 2014. All results have been less than 2, *(input as 2.0),* non-detectable *(input as 0.1)* or zero.



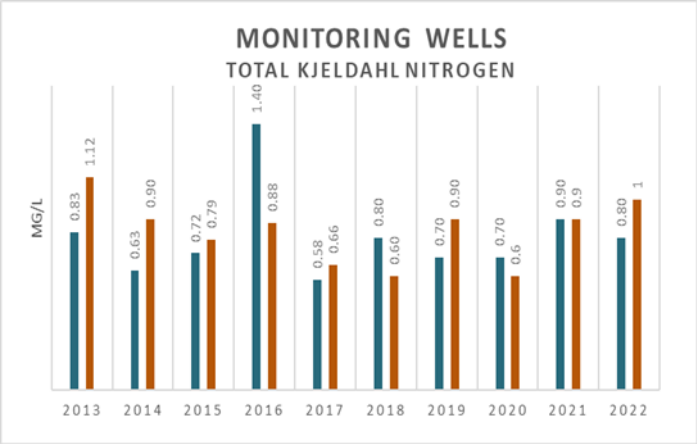
Nitrite & Nitrate samples have remained minimal in nature in most samples results. Increased nitrites levels were observed in 2013, 2017, and 2022 while increased nitrate levels were observed in 2014, 2017, 2020, and 2022. Please note all 2022 results were less than 1 *(input at 0.9 mg/L).*

Based on sample history there appears to be little to no impact from the lagoon system.



Nitrogen (Total Ammonia) upgradient samples have been observed lower than the downgradient samples, with all results gradually increasing over time.

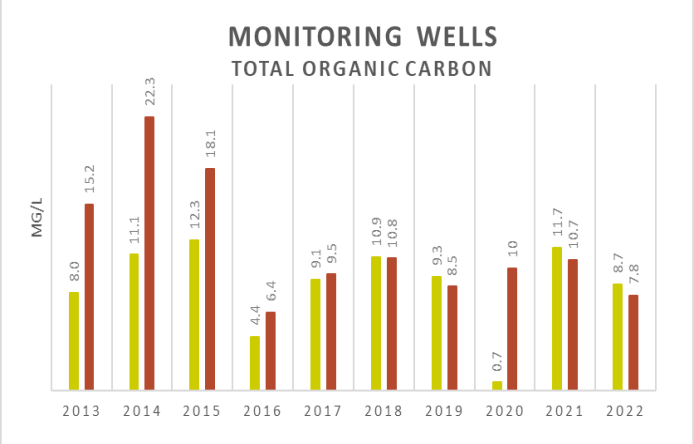
The sampling results indicate possible influence, but impact would be minimal based on results. It is also worth noting surrounding area is agricultural, which may also be a source of nitrogen.



As historical trending has displayed intermittent increases in both upstream and downstream samples, with all sample results below 1.5mg/L.

The TKN downstream values from 2022 are slightly elevated from the upstream results and slightly increased from the previous year, which may indicate some influence from the sewage lagoon.

Once again it is also worth noting the surrounding area are agricultural, which may also be a source of nitrogen.



TOC sampling results since 2016 have been found to be consistently lower than the initial sampling results. The current results downstream value is no different. It was also found to be lower than the upstream sample.

The annual reading appears to fluctuate over the last few years, but based on results since 2016, it would not appear to have an impact from the lagoon system.

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

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