

# Township of North Glengarry

## Alexandria Wastewater System

### 2018 Annual Report

#### Contents

1. Performance Assessment
2. Groundwater Monitoring
3. Operational Problem Summary
4. Maintenance Summary
5. Effluent Quality Control and Assurance
6. Flow Measurement and Equipment Calibration
7. Effluent Objectives
8. Sludge Accumulation
9. Complaints
10. By-pass, Overflow, Spill or Abnormal Discharge Event
11. Other
  - EOS 2000 summary
    - i. Equipment Summary
    - ii. Monitoring
    - iii. Results Summary
    - iv. Recommended Actions

**Appendix A: Wastewater Treatment Works Performance Report**

**Appendix B: Sludge Monitoring Report**

**Appendix C: Annual By-Pass Report**

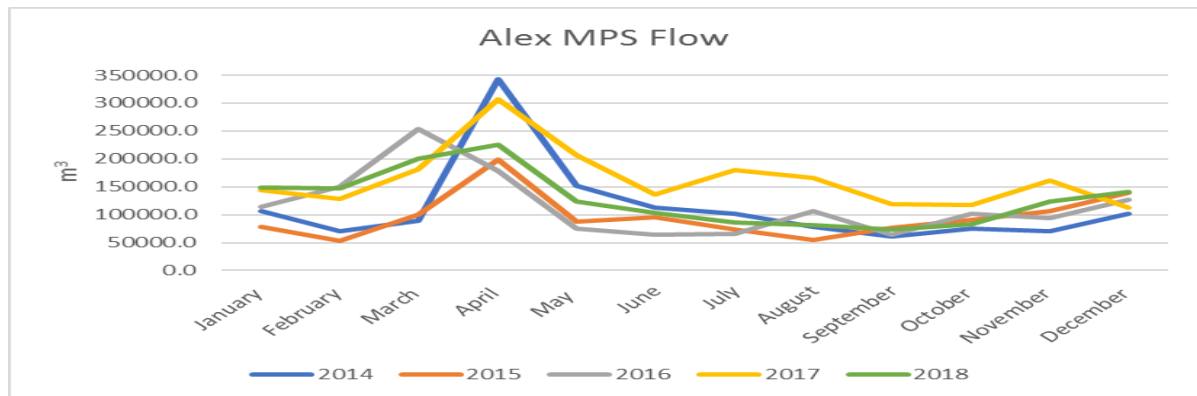
**Appendix D: Monitoring Well Report**

## 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 system is comprised of a collection system and sewage treatment facility. The wastewater treatment facility is classified as a continual discharging system consisting of an aerated lagoon, followed by 3 facultative lagoon cells, and the effluent sewage is disinfected and dechlorinated prior to discharge into the receiving stream.

During this calendar year 941,018L of leachate was hauled over 102 loads between April 27 and May 18 from the Alexandria Landfill and was introduced into the influent flow of the Alexandria Main Station. All quantities are included in the system total flows, as flow measurement is on effluent side of the pumping station. The flows into the station were within normally observed ranges, during the first few months of 2018 flows were slightly elevated, similar to flows observed in 2016/2017, however after April/May flows returned to normally observed values.



The system operations were adequate throughout most of 2018 and mostly produced effluent that met the Federal Effluent Limits and the Provincial Environmental Compliance Approval Limits, with the exception to the following exceedances: CBOD<sub>5</sub> in January, February, March and the first quarter report; TP in January, February, March, April and the first quarter report; and total chlorine in April. The observed parameter elevation for CBOD<sub>5</sub> and TP were caused by on-going trends observed under ice cover, assumed to be related to lack of oxygen. Once ice cover is opened all parameters return to normally observed values below provincial and federal limits. The third aerator was re-installed just prior to ice cover in November 2018 to try to address this on-going issue.

Refer to Table 1 for annual average concentration and section G for monthly sampling results. Appendix A summarizes influent and effluent flows, as well as raw influent and treated effluent sampling results.

Table 1: 7(1) of the ECA states effluent limits are as follows:

Effluent Parameter	Average Concentration Limit	2018 Average Concentration
CBOD <sub>5</sub>	30mg/L	20.3 mg/L
TSS	40 mg/L	19.2 mg/L
TP	0.5 mg/L	0.41 mg/L
Total Chlorine Residual	0.02 mg/L	0.01 mg/L
pH (maintained inclusive at all time)	6.0-9.5	7.55
E. Coli (geometric mean density)	<200 organisms/100 mL	14.0/100mL

## B. Groundwater Monitoring

*Summary and interpretation of all ground water monitoring data*

A groundwater monitoring plan was prepared by McIntosh & Perry in 2012 and submitted to the MOE, as per the report, the Township had the 2 wells installed on March 5, 2013. Samples for background counts were taken on March 6, 2013. Please find below the summary of the background samples and the samples taken in 2018. Samples are to continue to be sampled annually in March.

Refer to Table 2 for background and current year sampling results and Appendix D for a full sampling summary.

Table 2: Results from March 06, 2018 sampling:

Parameter	Monitoring Well #1		Monitoring Well #2	
	Background results (March 6, 2013)	2018 Sampling Results	Background results (March 6, 2013)	2018 Sampling Results
TOC	8 mg/L	11 mg/L	15.2 mg/L	10.8 mg/L
TP	3.8 mg/L	0.31 mg/L	0.47 mg/L	0.32 mg/L
TKN	0.83 mg/L	0.80 mg/L	1.12 mg/L	0.60 mg/L
Nitrogen	< 0.01 mg/L	0.13 mg/L	0.22 mg/L	0.21 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	< 2/100 mL	<2 cfu/100 mL	< 2/100 mL

## C. Operational Problems

*Description of any operating problems encountered, and corrective actions taken*

### Collection System:

- 17 sewer lateral back-ups. 15 determined to be on owner side, no action taken; 4 determined to be on Township property, construction was performed to repair damaged lateral.
- Alarm relay at Centre St overflow damaged. Unit shut down until repair was made in Spring.
- Leroux Pumping Station
  - transformer failure, unit replaced, temporary unit supplied by electrician until new unit was installed.
- Bishop Pumping Station
  - on-going grease build-up in wet well. Floats manually cleansed by operational staff, triggered by run observed run times or observed build up. damage to external hydro service wires caused power outage at station discovered by operational staff. Station placed on stand-by power until Hydro repaired lines.
  - pump operation issue caused by blown internal breaker, no alarm triggered event found due to reported sewage back-up
- Sandfield Pumping Station
  - on-going issued with P2 run time caused by debris in impeller. Pump sent in and repaired, and Xyleme brought on-to site on several occasions to repair pump. Issue still on-going and intermittent, operational staff pull pump to remove debris from impeller triggered by long pump run times or amperage spikes during testing.
  - pressure sensor malfunction causing station upset. Station placed on floats when unit was removed and sent for repair. Unit re-installed and secured to limit movement.
  - nuisance alarms caused by defective float. Float replaced
- Main Pumping Station
  - water infiltration from creek during high water events. Unable to prevent entry at this time, operational staff log notes when observed.
  - nuisance alarms caused by defective float. Float replaced
  - operational issues on wall-mounted gas alarms. Hetek brought in on multiple occasions to repair and replace parts.
  - Transfer switch failure due to internal breaker damage. During major storm events or power failures manual transfer was performed by electricians. Whole switch was removed and replaced.

### Treatment System:

- Alexandria Lagoons
  - east aerator failed multiple times. Unclear as to cause, operational staff re-started units.
  - issue with utility power, found to be faulty transformer, unit replaced by Hydro. Stand-by generator used to maintain chemical dosing and disinfection building
  - multiple nuisance odor reports

## D. Maintenance

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

### Collection System:

- Sewer-Matic contracted to perform minor spot repairs in the collection system. 42 repairs in total were completed.

- Repair to MHA 730 due to riser degradation
- Pumping Station cleaned: Feb 15 & Dec 18 (Bishop, Leroux, Sandfield)
- Installation of new sewage pump at Sandfield Station to replace P1, due to defective temperature probe.
- Main Pumping Station cleaned: Feb 14
- Annual generator maintenance completed by Gen Rep

#### Treatment System:

- minor repairs/part replacements to chlorine and dechlor pumps
- installation of new coagulant lines
- microbe addition in Cell B and aeration cell from May until November
- Installation of east aerator
- Coagulant tank cleaned, due to hard buildup in bottom of tank. Unable to fully remove sediment. To re-schedule for 2019

### **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. 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 were completed by St- Laurent Instrumentation between October 2018 and December 2018. Calibrations were performed on all detection units (pumping station level indicators and chemical tank level indicators), hour meters/counters and flow sensing devices (magmeter, miltronics, etc).

### **G. Effluent Objectives**

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

Most parameters were well below the MOE effluent guidelines and also met the MOE effluent design objectives. As previously described exceedances were observed in January, February, March and April.

The annual average daily flow for 2018 is calculated to be 4227 m<sup>3</sup>/day, and the maximum daily flow for the year was reported to be 14,629m<sup>3</sup>/day. This represents 131 % of the total rated capacity for this facility, which is out of compliance for the rated capacity of this facility. Please refer to the chart below and to Appendix A for a full summary of flows, for the Alexandria Sewage Treatment Works.

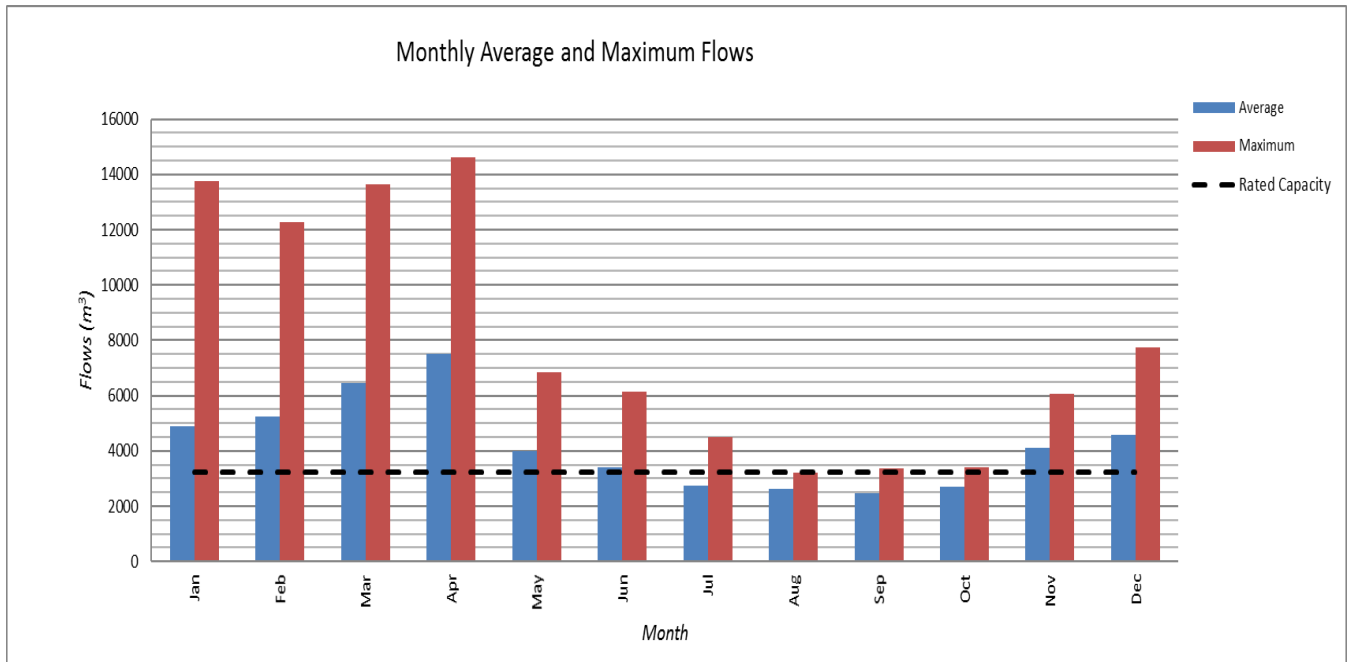
There were no reports made in regard to floating or settleable solids within the wastewater effluent. There were also no reports made that the effluent wastewater contained oil or any

other substance that created a visible film, sheen, foam or discolouration to the receiving waters.

Refer to table 3 for the monthly sampling results summary; refer to the chart titled Monthly Average and Maximum Flow for a monthly summary and comparison of all influent flows and finally to Appendix A for a full summary of flows, raw and treated effluent quality analysis for the Alexandria Sewage Treatment Works.

Table 3: 6(1) of the ECA states effluent objectives and 7(1-3) of the ECA stated the effluent limits are as follows:

	Effluent Parameters					
	CBOD <sub>5</sub>	TSS	TP	Total Chlorine Residual	pH (maintained inclusive at all time)	E. Coli (geometric mean density)
Concentration Objective	25mg/L	25 mg/L	0.4 mg/L	non-detect	6.0 - 9.5	< 150 organisms/100 mL
Concentration Limits	30 mg/L	40 mg/L	0.5 mg/L	0.2 mg/L	6.0 - 9.5	< 200 organisms/100mL
January	<b>37.1</b>	36.5	<b>0.66</b>	0.01	7.34	106.2
February	<b>52.3</b>	39.3	<b>0.74</b>	0.01	7.46	20.1
March	<b>42.5</b>	36.6	<b>0.67</b>	0.01	7.31	13.0
April	25.4	22.8	<b>0.51</b>	<b>0.06</b>	7.74	9.4
May	3.0	8.6	0.24	0.02	7.66	8.3
June	3.0	4.5	0.14	0.01	7.56	10.0
July	3.0	4.0	0.12	0.00	7.38	6.7
August	3.0	3.8	0.10	0.01	7.39	7.2
September	3.0	3.2	0.08	0.01	7.42	10.0
October	3.5	5.0	0.16	0.00	7.78	4.5
November	4.2	8.8	0.28	0.01	7.80	5.2
December	9.6	13.0	0.46	0.01	7.91	50.0



## 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 from MacIntosh Perry Consulting Engineers Ltd was put into place in 2008. This plan was a means for the Township to pro-actively measure and monitor sludge accumulation within the lagoons, to put high level triggers in place and to aid in monitoring process effectiveness. The sludge levels were only measured once in 2018, on June 07, 2018. The results of these measurements indicated 4 of 21 locations in Cell A, 17 of 20 locations in Cell B, and 5 of 27 locations in Cell C were found to have elevated sludge levels and Cell B was noted to have a high total sludge volume, but the total volume had decreased from previously observed value. See Appendix B for a full summary.

## I. Complaints

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

There were between 20-25 received complaints from homeowners, the majority of these complaints concerned sewer lateral backups. In the most cases, the issues were on the homeowner's side resulting in private contracted services. In cases where the issue was found to be on township side, through video inspection, services were repaired, or arrangements were made to repair. Other complaint included odor, from residential dwellings or from lagoon aeration cell. Odors from the aeration cell were observed between June-September, generally during the early evening and into the night. The Township have been trying to address this issue over last few years, a third aerator was re-installed into the aeration cell late 2018 to help increase oxygen and promote more aerobic conditions; and a



microbe dosing program was also utilized to promote aerobic digestion, unfortunately results from this program has shown minimal results.

### **J. Bypass, Overflow, spill, abnormal discharge events**

*Summary of all bypass, spill or abnormal discharge event*

There was 1 primary bypass reported in 2018. Bypasses were due to heavy rains and high sewage levels at Main pumping station. The bypass was reported as soon as possible after incident discovery and a spill report form was completed sent to all required authorities upon incident completion. Please refer to Bypass Summary report for full summary. Total annual volume for this bypass was estimated to be 1m<sup>3</sup>.

### **K. Other**

*Any other information the District Manager requires from time to time*

## **EOS 2000**

### **A. Equipment Summary**

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

The unit has been installed in Cell C for the duration of this reporting period. No reported issues during this reporting period.

### **B. Monitoring**

*Summary of all monitoring data (pH, BOD, TSS, Ammonia, TP, Sludge depth, Dissolved Oxygen)*

See Appendix A

### **C. Results Summary**

*An interpretation of all monitoring data (raw data, graphs, trend analysis and statistical analysis)*

See Appendix A

### **D. Recommended Actions**

*Recommendations regarding any changes to the monitoring program or operational changes of the EOS-2000 unit*

No changes to the monitoring program or operational changes are suggested or required.



# Appendix A

## NORTH GLENGARRY WATER WORKS WASTEWATER TREATMENT WORKS PERFORMANCE RESULTS

Municipality: North Glengarry

Year: 2018

Project: Alexandria STP

Receiving Stream: Delisle River

Description: 1 Pumping Station, 1 Aerated Cell, 3 Facultative Cells  
Continuous Discharge with Phosphorous Removal

Design Capacity: 3237 m<sup>3</sup>/day

MONTH	Flows			Biochemical O <sub>2</sub> Demand			Suspended Solids			Phosphorus		
	Total Flows (m <sup>3</sup> )	Average Daily Flow (m <sup>3</sup> )	Maximum Daily Flow (m <sup>3</sup> )	Average Raw CBOD <sub>5</sub> (mg/L)	Average Effluent CBOD <sub>5</sub> (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	149,274	4,887	13,740	149.5	37.1	75.2	113.0	36.5	67.7	1.76	0.66	62.3
Feb	147,069	5,252	12,280	126.0	52.3	58.5	72.0	39.3	45.4	1.65	0.74	55.4
Mar	199,922	6,449	13,660	136.7	42.5	68.9	54.0	36.6	32.2	1.36	0.67	50.5
Apr	225,333	7,511	14,629	106.5	25.4	76.1	137.0	22.8	83.4	1.88	0.51	72.8
May	123,646	3,989	6,841	159.5	3.0	98.1	91.0	8.6	90.5	1.84	0.24	87.1
Jun	102,545	3,418	6,130	513.0	3.0	99.4	148.0	4.5	97.0	2.87	0.14	95.0
Jul	85,515	2,759	4,492	280.5	3.0	98.9	160.0	4.0	97.5	3.13	0.12	96.2
Aug	81,162	2,618	3,230	390.0	3.0	99.2	268.0	3.8	98.6	4.59	0.10	97.8
Sep	73,821	2,461	3,363	271.0	3.0	98.9	300.0	3.2	98.9	3.45	0.08	97.8
Oct	83,622	2,697	3,402	323.5	3.5	98.9	94.0	5.0	94.7	1.76	0.16	90.7
Nov	123,812	4,127	6,060	152.0	4.2	97.2	196.0	8.8	95.5	2.31	0.28	87.8
Dec	141,371	4,560	7,727	153.0	9.6	93.7	172.5	13.0	92.5	1.91	0.46	76.1
<b>Total</b>	1,537,092											
<b>Average</b>		4227		230.1	15.8	89	150.5	15.5	83	2.37	0.35	81
<b>Maximum</b>			14629	513	52.28571	99	300.0	39.28571	99	4.59	0.7357143	98
<b>Criteria</b>		3237			30			40			0.50	

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	10.78		15.85	17.20	-8.5	n/a	0.09		n/a	0.09	
Feb	n/a	9.08		15.30	15.48	-1.1	n/a	0.09		n/a	0.09	
Mar	n/a	6.79		10.67	12.26	-14.9	n/a	0.09		n/a	0.09	
Apr	n/a	4.35		12.70	6.60	48.0	n/a	0.09		n/a	0.09	
May	n/a	5.14		17.65	7.34	58.4	n/a	0.22		n/a	0.26	
Jun	n/a	4.05		19.80	6.60	66.7	n/a	0.20		n/a	0.43	
Jul	n/a	2.77		27.50	4.50	83.6	n/a	0.80		n/a	0.93	
Aug	n/a	1.20		36.40	9.60	73.6	n/a	0.46		n/a	1.20	
Sep	n/a	4.13		23.95	6.00	74.9	n/a	0.17		n/a	0.78	
Oct	n/a	8.97		19.40	28.20	-45.4	n/a	0.20		n/a	0.35	
Nov	n/a	11.68		20.50	18.58	9.4	n/a	0.17		n/a	0.50	
Dec	n/a	9.56		15.50	14.58	6.0	n/a	0.09		n/a	0.20	
<b>Total</b>												
<b>Average</b>		6.54		19.60	12.24	29		0.22			0.42	
<b>Maximum</b>		11.68		36.4	28.2	84		0.8			1.2	
<b>Criteria</b>												

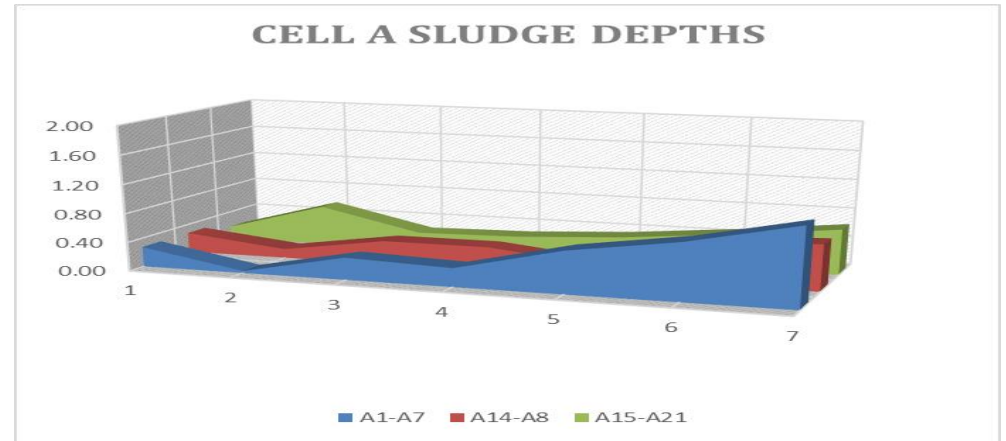
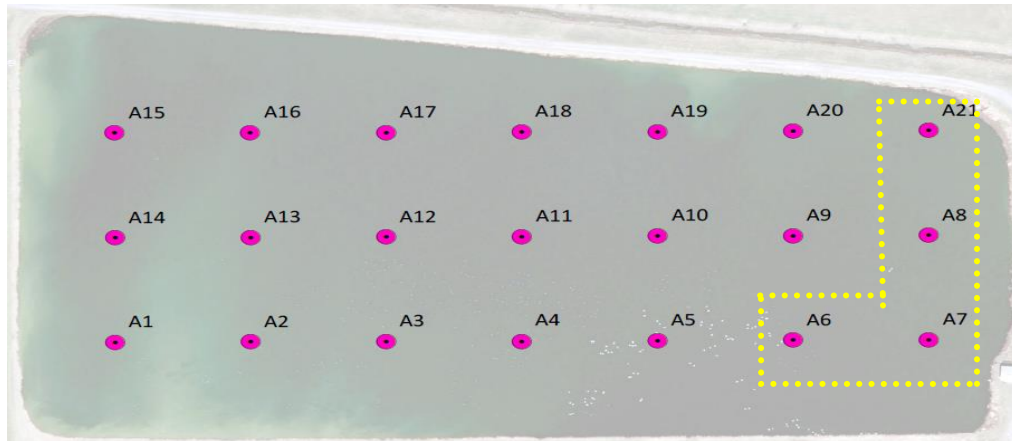
**NORTH GLENGARRY WATER WORKS  
WASTEWATER TREATMENT PERFORMANCE RESULTS  
2018**

MONTH	Hydrogen Sulphide			E. coli			pH	Temp	Cl <sub>2</sub>
	Average Raw H <sub>2</sub> S (mg/L)	Average Effluent H <sub>2</sub> S (mg/L)	Percent Removal %	Average Raw E.coli cts/100ml	Average Effluent E.coli cts/100ml	Percent Removal %	Average Effluent pH	Average Effluent Temp °C	Average Effluent Cl <sub>2</sub> mg/L
Jan	n/a	0.10		n/a	106		7.34	4.0	0.01
Feb	n/a	0.15		n/a	20		7.46	2.0	0.01
Mar	n/a	0.18		n/a	13		7.31	9.9	0.01
Apr	n/a	0.09		n/a	9		7.74	5.9	0.06
May	n/a	0.02		n/a	8		7.66	18.0	0.02
Jun	n/a	0.01		n/a	10		7.56	20.6	0.01
Jul	n/a	0.01		n/a	7		7.38	24.7	0.00
Aug	n/a	0.03		n/a	7		7.39	23.6	0.01
Sep	n/a	0.03		n/a	10		7.42	19.0	0.01
Oct	n/a	0.01		n/a	4		7.78	9.7	0.00
Nov	n/a	0.02		n/a	5		7.80	3.2	0.01
Dec	n/a	0.10		n/a	50		7.91	5.0	0.01
<b>Total</b>									
<b>Average</b>		0.06			12		7.62	13.06	0.01
<b>Maximum</b>		0.176			106.2159		8.68	26.80	0.06
<b>Criteria</b>					200		6.0 - 9.5		0.02

# Appendix B

## Cell A

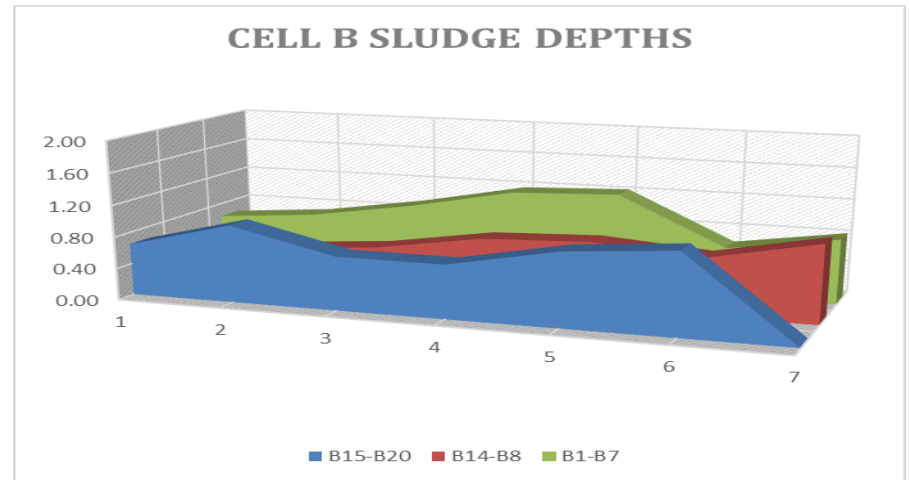
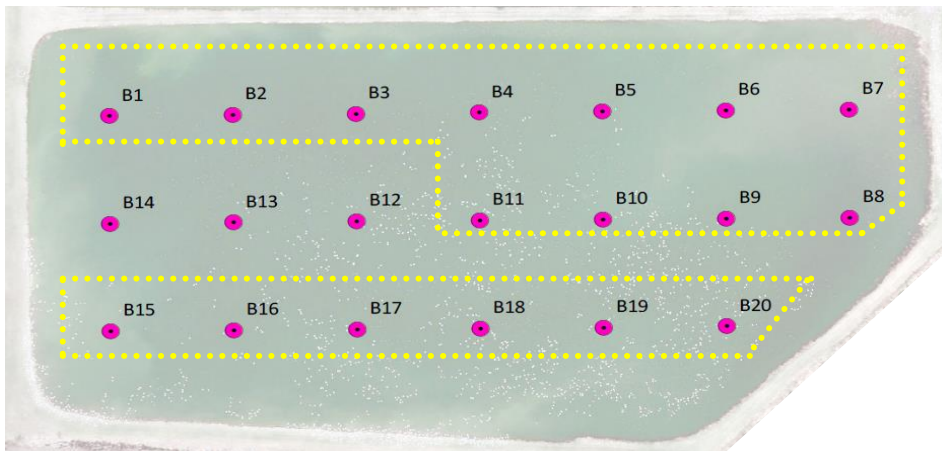
Date	Cell A- Sample Point Sludge Volume m <sup>3</sup>																					Total Sludge Volume (m <sup>3</sup> )	Warning Trigger	Sludge Volume %
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
17-Sep-09	1224	318	584	524	1106	656	1116	902	911	608	608	405	608	565	1413	1235	576	1049	593	214	730	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



- Sludge depths completed June 7
- Cell A currently at 40.4% of allowable volume
- 4 points were over high-level trigger
- Higher elevation of sludge build-up located in north-east corner

# Cell B

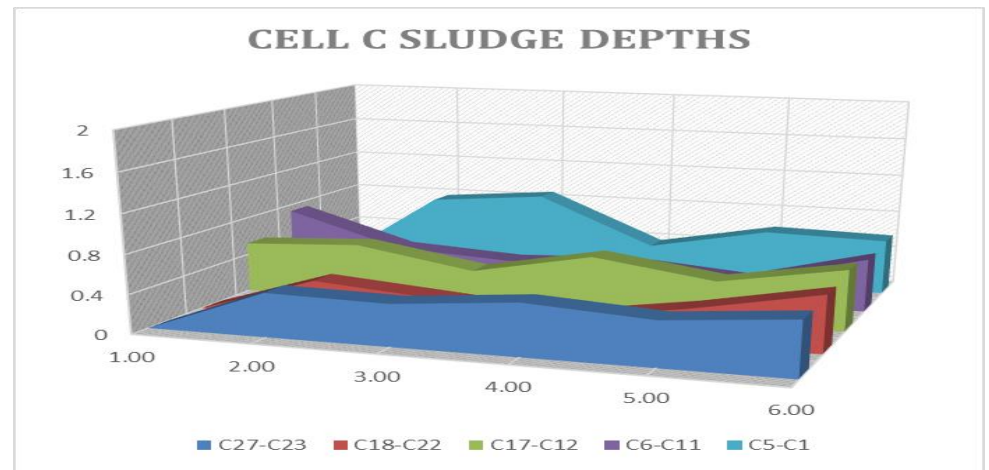
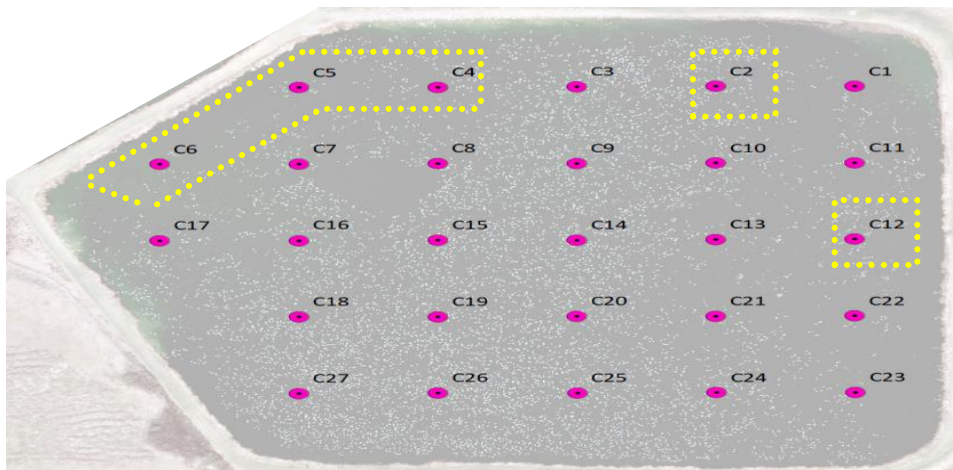
Date	Cell B- Sample Point Sludge Volume m <sup>3</sup>																				Total Sludge Volume (m <sup>3</sup> )	Warning Trigger	Sludge Volume %
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
17-Sep-09	753	995	844	1123	1264	1663	4850	2717	1438	1742	608	810	608	933	368	720	780	1067	846	1850	25978		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



- Sludge depths completed June 7
- Cell A currently at 80.8% of allowable volume
- 17 points were over high-level trigger
- Higher elevation of sludge build-up located in north, south and from central to east end of the cell

# Cell C

Date	Cell C- Sample Point Sludge Volume m <sup>3</sup>																											Total Sludge Volume (m <sup>3</sup> )	Warning Trigger	Sludge Volume %
	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	506	1171	457	439	342	465	959	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-16	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	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	567	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



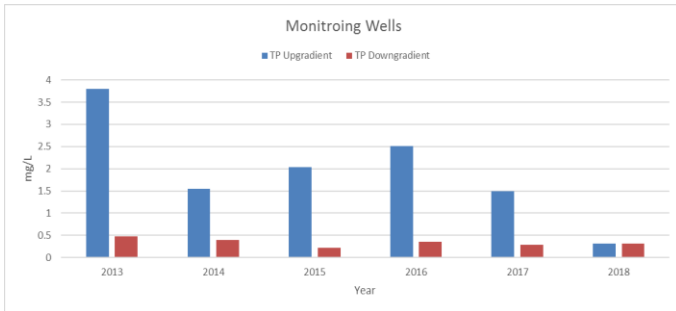
- Sludge depths completed June 7
- Cell A currently at 35.6% of allowable volume
- 5 points were over high-level trigger
- Higher elevation of sludge build-up located in north-east corner



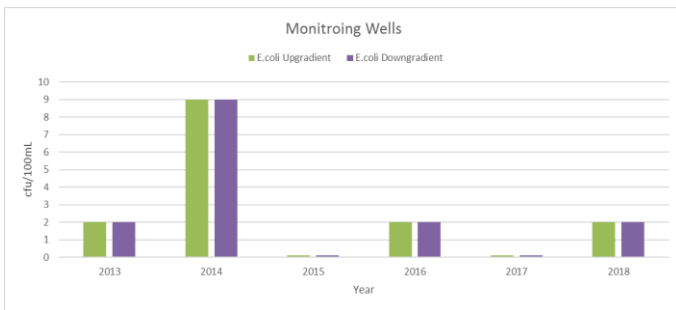




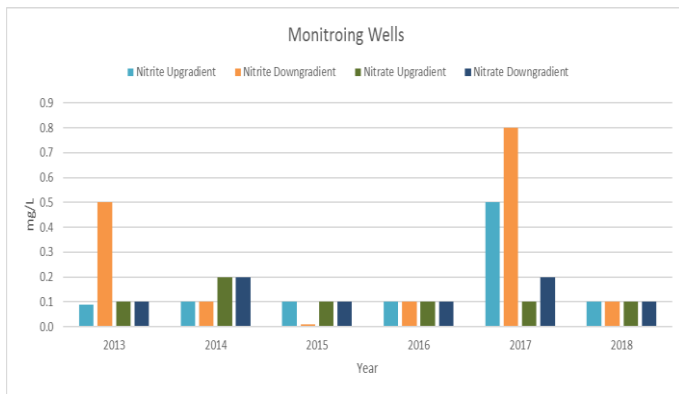
## Alexandria Monitoring Wells Sampling



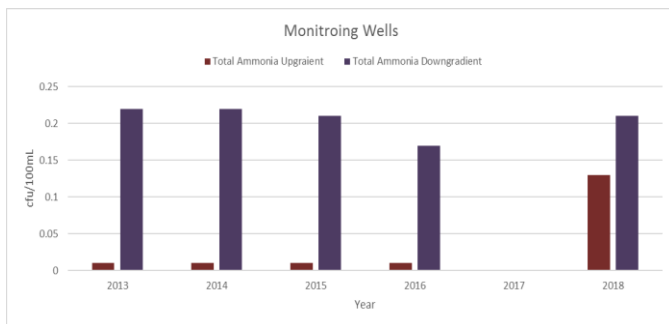
Total Phosphorous downgradient appears to be significantly lower than the upgradient results. It is worth noting that the sampling 2018 results are significantly lower than historically observed.



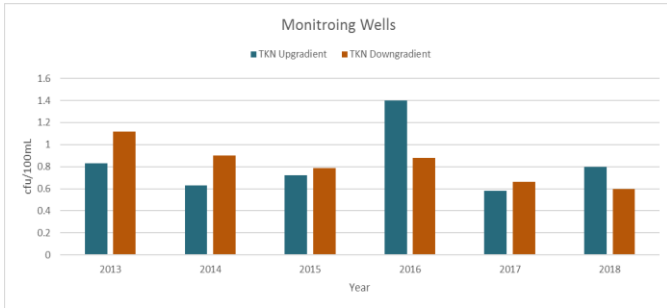
E. coli results downgradient and upgradient appear to be marginal in nature, apart from an elevated sample in 2014. All results have been non-detect (represented by a reading of 0.1) or < 2, (represented by a reading of 1.99).



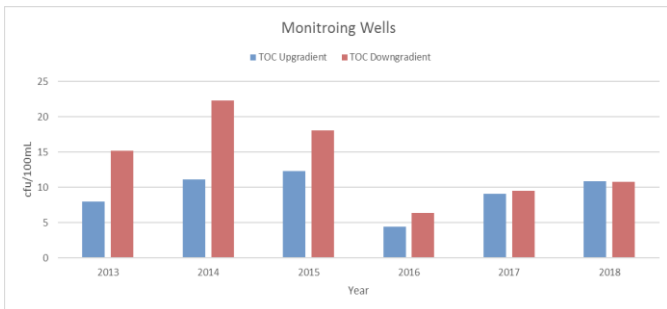
Nitrite/Nitrate samples have been marginal in nature, with most samples results indicating < 0.1 (represented by 0.09). Downgradient nitrite readings were elevated in 2013, however in 2017 both the upgradient and downgradient results were elevated. Nitrate results were similar, although it is noticed that the downgradient and upgradient results increased in tandem, except in 2017 the downgradient was slightly higher.



Nitrogen (Total Ammonia) samples have been marginal in value, but all downgradient results are significantly higher than the upgradient samples. It is worth noting that due to operational error the total ammonia parameter was removed from the chain of custody in 2017, so no value was reported.



TKN values are slightly higher in the downgradient samples, with the exception in 2016 and 2018. Overall the samples downgradient are decreasing over time



TOC values were initially observed to be significantly higher in the downgradient well, but since 2016 the values have been roughly the same or marginally higher than the upgradient well values.