

# Alexandria Wastewater System

## 2019 Annual Report

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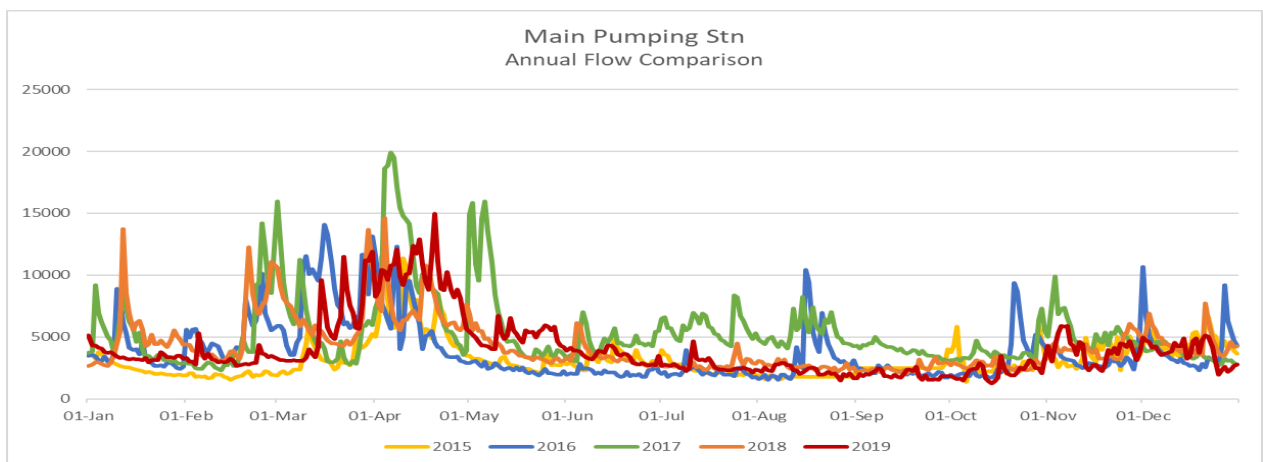
## A. Performance Assessment

*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 comprised of a sewage collection system and a wastewater lagoon treatment facility. The system is categorized as a continuously discharge class 2 facility. The collection system includes 22.9kms of sewer mains containing approximately 1585 service connections, 2.1kms of force mains, 3 sanitary sewage lift stations and 1 pumping station. The wastewater lagoon treatment facility consists of an aeration cell, with coagulant addition for phosphorus removal, followed by 3 facultative lagoons cells that run-in series towards a disinfection and dechlorination chamber that discharges to the Delisle River system. The lagoon effluent sewage is disinfected by sodium hypochlorite and dechlorinated with sodium bisulfate prior to discharge into the receiver.

During the 2019 calendar year 1,453,856m<sup>3</sup> of untreated sewage was directed to the Alexandria Lagoon system, based on the metered totals from the main pumping station. It should be mentioned that during the last quarter of 2019 flow metering discrepancies were noted, with metering potentially under reading values intermittently. See Figure 1 below for a 5-year annual flow comparison. Included in the total untreated sewage flows were 4,997m<sup>3</sup> of untreated landfill leachate and 5,746m<sup>3</sup> of creek water. The untreated leachate was hauled from the Alexandria Landfill leachate pond by Axel Automotive Inc. between April 29 and May 24, 2019. The leachate was introduced into the influent flow of the east well of the Alexandria Main Station and volumes were estimated based on truck capacities and number of trips. The creek water was observed back flowing into the wet well from the by-pass channel during spring peak flows/snow melt. The by-pass meter was used to estimate the total volume.

Figure 1: 5 Year Main Station Flow Comparison



The wastewater lagoon treatment system operated well for the most part of 2019 and produced an annual average effluent concentration below the annual Environmental Compliance Approval limits. Refer to Table 1 below for all annual average concentration values. Limit exceedances were noted between January through April, please refer to section G for more details on effluent sampling

quality, all issued were noted under ice cover as per previous trending observations. Appendix A summarizes flows, raw influent and treated effluent results.

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

Effluent Parameter	Average Concentration Limit	2019 Average Concentration
CBOD <sub>5</sub>	30 mg/L	18.9 mg/L
TSS	40 mg/L	24.3 mg/L
TP	0.5 mg/L	0.44 mg/L
Total Chlorine Residual	0.02 mg/L	0.01 mg/L
pH (maintained inclusive at all times)	6.0-9.5	7.53
E. Coli (geometric mean density)	<200 organisms/100 mL	4.1/100mL

## 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 then titled MOE. As per the report, the Township had 2 monitoring wells installed on March 5, 2013 and samples for background counts were taken on March 6, 2013. Please find below the summary of the background samples and the samples taken in 2019. Samples are to continue to be sampled annually in March.

Table 2: Results from March 14, 2019 sampling:

Parameter	Monitoring Well #1		Monitoring Well #2	
	Background results	2019 Sampling Results	Background Results	2019 Sampling Results
TOC	8 mg/L	9.3 mg/L	15.2 mg/L	8.5 mg/L
TP	3.8 mg/L	0.68 mg/L	0.47 mg/L	0.36 mg/L
TKN	0.83 mg/L	0.7 mg/L	1.12 mg/L	0.90 mg/L
Nitrogen	< 0.01 mg/L	0.08 mg/L	0.22 mg/L	0.20 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 Problem Summary

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

### Collection System:

- Excessive grease build-up in sanitary lift stations causing pump operation issues. Stations or floats were cleaned to return pumping operations.
- Debris in wastewater impeding pump operations or check valve operations. Units taken out of service and debris removed or repairs prior to being placed back in service.
- Excessive flows during spring thaw, with a large amount of infiltration noted at Bishop pumping station and at the main pumping station.
- Issues noted with flow metering, meter found to be under reading, unit was re-calibrated multiple times, but issues continue to re-occur intermittently.
- Marginal number of residential sewer back-ups, most issues were on owners' side and caused by root penetration or lateral degradation.
- Rodents found in electrical panel. Damaged wiring repaired by electrician and pest control was brought in monthly to vulnerable areas.

### Treatment System:

- Aeration by-pass isolation gate found to be leaking into Cell A. Divers used to install a plug in the by-pass piping located in Cell A.
- Out of compliance for CBOD, TSS and TP from January until April. Historical trending observed when lagoons systems are under ice cover. Primary design of lagoon upgrades was completed and submitted for ministry approval. Township is actively seeking funding solution to ensure proposed upgrades are completed in a timely manner.
- Environment Canada Officers on-site and tested for acute lethality, testing failed. Increased sampling was completed and MacIntosh Perry were retained to perform system analysis. Report was sent to Officer, but no response was ever received.
- Complaints for nuisance odors were observed during summer months.
- Elevated levels cobalt, copper, zinc and toluene were found in PWQO testing completed in April and November.
- Aerator operation issues caused by debris build up on impellers
- Issues noted with chemical addition found to be caused by crystallization of chemical in discharge piping. System piping cleaned or replaced as required.

## D. Maintenance Summary

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

### Collection System:

- Relined section of sanitary sewer main due to observed damage during CCTV field investigation.
- Lift Station cleaning (Jan, Apr, Aug, Oct, Nov)
- Pumping Station cleaning (Oct)
- Repair check valves at Leroux and Bishop station due to wear/tear
- Replacement of defective equipment such as check valve, breakers, and chain blocks.
- Sewage pump from Main Pumping Station sent out for refurbishment.
- Monthly Pumping Station pest control inspections
- Annual chain block and lifting device inspections (Feb)
- Annual gas analyzer calibrations (Oct)
- Annual Lift Station Level Monitor calibrations (Nov)

**Treatment System:**

- Trapper retained to remove increased numbers of muskrats from nearby ditch areas prior to becoming nuisance
- Minor repairs/part replacement to chlorination and dechlor system
- Replacement of damaged entry gate
- Repair to coagulant lines to prevent sewage backflow into Alum building
- Lagoon flow adjustments to ensure freeboard was maintained during higher influent flows
- Annual sludge measurements completed by operational staff (Oct)
- Annual Lift Station Level Monitor calibrations (Nov)
- Annual fire extinguishers inspections (Dec)

**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 and Equipment Calibration**

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

Annual calibrations were completed by St- Laurent Instrumentation between October 2019 and December 2019. 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*

All parameters between April and December were well below all Provincial MECP effluent guidelines, the Provincial MECP effluent design objectives and the Federal effluent sewage regulations limits. Between January and April, the following parameters were found to have exceeded the provincial and federal limits, CBOD5, TSS and TP. Table 3 shows a summary of the provincial sampling summary and Table 4 shows the federal sampling summary. Please refer to Appendix 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:

	Provincial Effluent Parameters					
	CBOD <sub>5</sub>	TSS	TP	Total Chlorine Residual	pH (maintained inclusive at all time)	E. Coli (geometric mean density)
	mg/L	mg/L	mg/L	mg/L		organisms/100 mL
<b>Concentration Objective</b>	<b>25</b>	<b>25</b>	<b>0.4</b>	<b>non-detect</b>	<b>6.0 - 9.5</b>	<b>&lt; 150</b>
<b>Concentration Limits</b>	<b>30</b>	<b>40</b>	<b>0.5</b>	<b>0.2</b>	<b>6.0 - 9.5</b>	<b>&lt; 200</b>
January	24.3	47.0	0.71	0.01	7.46	10.7
February	47.0	47.1	0.83	0.01	7.11	6.7
March	53.2	36.7	0.81	0.01	7.25	6.5
April	16.0	25.7	0.42	0.01	7.44	5.3
May	7.4	26.0	0.20	0.01	8.08	2.0
June	5.2	4.5	0.18	0.01	7.59	2.0
July	3.2	4.4	0.17	0.01	7.57	2.0
August	3.0	5.5	0.18	0.01	7.67	1.3
September	3.2	3.7	0.15	0.01	7.68	0.9
October	3.4	7.0	0.16	0.01	7.75	0.5
November	5.3	13.5	0.27	0.01	7.87	5.5
December	22.4	29.3	0.59	0.01	7.28	35.1
Annual	18.8	24.3	0.44	0.01	7.53	4.1

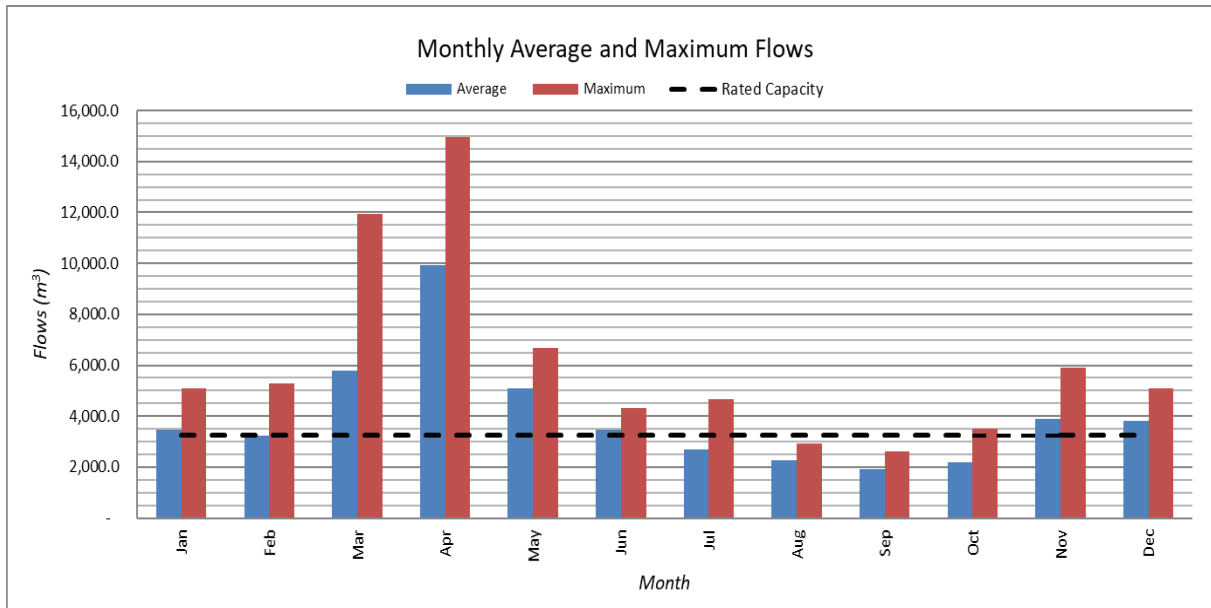
Table 4: Pat 1: Authorization to Deposit as per Wastewater System Effluent Regulations limits are as follows:

	Federal Effluent Parameters			
	CBOD <sub>5</sub>	TSS	Un-ionized Ammonia	Total Flows
	mg/L	mg/L	mg/L	m <sup>3</sup>
<b>Concentration Limit</b>	<b>25</b>	<b>25</b>	<b>1.25</b>	<b>n/r</b>
January - March	40.1	44.1	0.2	332,950
April - June	10.6	20.5	0.11	625,066
July - September	3.1	4.5	0.10	166,530
October - December	12.2	12.2	0.84	419,147

The annual average daily flow for 2019 was calculated to be 3,982 m<sup>3</sup>/day, and the maximum daily flow for the year was reported to be 14,966 m<sup>3</sup>/day. This represents 123% of the total rated capacity for this facility, which is out of compliance for the rated capacity of this facility. Please refer

to Figure 2 below and to Appendix A for a full summary of flows, for the Alexandria Sewage Treatment Works

Figure 2: Comparison of Monthly Average and Maximum Influent Lagoon Flows



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 discoloration to the receiving waters.

## 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 put into place in 2008. The sludge levels in Cells C were measured on October 28, 2019 and the levels in Cells A and B were measured on October 29, 2019. Cell A is divided into 21 locations, Cell B into 20 locations and Cell C into 27 locations, of these locations the following number of measurements were found to have exceeded the elevated sludge warning levels within the cells, 4 locations in Cell A, 19 locations in Cell B and 17 locations in Cell C. It was also found that the total sludge levels increased in all cells with Cell C noting the highest increase at 32 % and exceeding the total sludge volume for the first time since the sludge management plan was put into place. Cell B maintained an elevated total sludge volume as previously observed and increased 12% from the previous year.

## I. Complaints

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

There were just over a dozen received complaints from homeowners, the majority of these complaints were in regard to sewage back-ups into private property. In 43% of the cases, the issues were on the homeowner's side resulting in private contracted services. In 36% of the cases the

laterals were inspected by CCTV and services were repaired by the township or arrangements were made for future repair by township. All other complaints were in regard to ground water infiltration or nuisance order complaints.

## J. Bypass, Overflow, Spill, Abnormal Discharge Events

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

There were 2 primary bypasses reported in 2019. Bypasses were due to heavy precipitation and/or pump failure. All bypasses were reported as soon as possible to the MOE through Spills Action Center; also spill report forms were completed for each incident and sent to Spills Action Center upon incident completion. Actions were taken to try to minimize the amount of sewage bypassed in each event. The total annual volume for bypasses was estimated to be 803.5m<sup>3</sup>, with the main pumping station metered contribution of 792 m<sup>3</sup>, and the estimated Bishop Station contribution was 11.5m<sup>3</sup>. Please refer to Bypass Summary report for full summary.

## 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 was not installed throughout this reporting period.

#### B. Monitoring

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

Not applicable as unit was not installed throughout this reporting period.

#### C. Results Summary

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

Not applicable as unit was not installed throughout this reporting period.

#### D. Recommended Actions

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

No actions or changes required at this time.





# Appendix A

## NORTH GLENGARRY WATER WORKS WASTEWATER TREATMENT PERFORMANCE RESULTS 2019

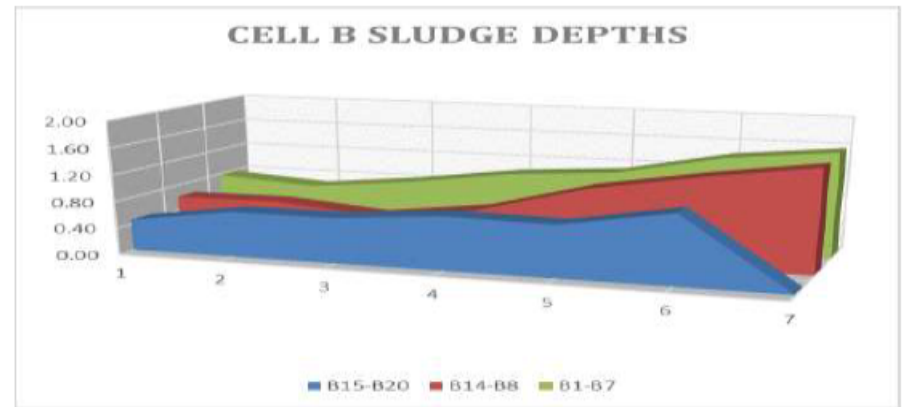
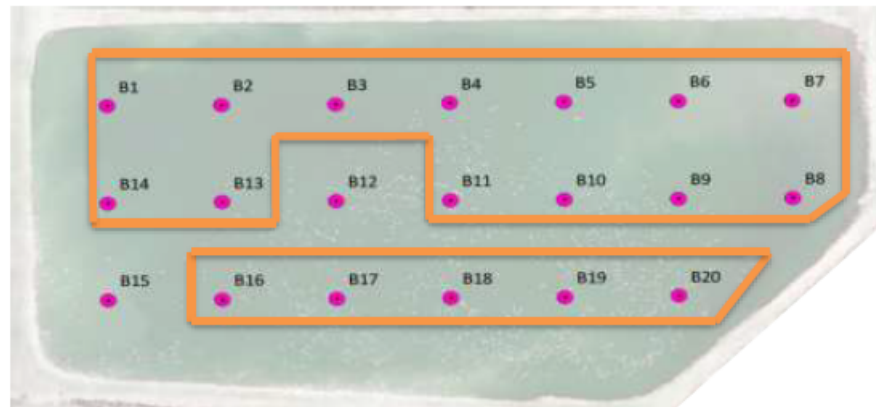
MONTH	Hydrogen Sulphide			E. coli			pH	Temp	Cl <sub>2</sub>
	Average Raw H <sub>2</sub> S (mg/L)	Average Effluent H <sub>2</sub> S (mg/L)	Percent Removal %	Average Raw E.coli cts/100ml	Average Effluent E.coli cts/100ml	Percent Removal %	Average Effluent pH	Average Effluent Temp °C	Average Effluent Cl <sub>2</sub> mg/L
Jan	n/a	0.26		n/a	10.7		7.46	3.80	0.01
Feb	n/a	0.52		n/a	6.7		7.11	1.87	0.01
Mar	n/a	0.67		n/a	6.5		7.25	2.23	0.01
Apr	n/a	0.15		n/a	5.3		7.44	5.63	0.01
May	n/a	0.02		n/a	2.0		8.08	13.02	0.01
Jun	n/a	0.02		n/a	2.0		7.59	19.83	0.01
Jul	n/a	0.04		n/a	2.0		7.57	24.52	0.01
Aug	n/a	0.01		n/a	1.3		7.67	22.70	0.01
Sep	n/a	0.01		n/a	0.9		7.68	18.30	0.01
Oct	n/a	0.04		n/a	0.5		7.75	11.46	0.01
Nov	n/a	0.07		n/a	5.5		7.87	3.75	0.01
Dec	n/a	0.12		n/a	35.1		7.28	4.40	0.01
<b>Total</b>									
<b>Average</b>		0.16			3.4		7.62	13.06	0.01
<b>Maximum</b>		0.67			35.1		8.68	26.80	0.01
<b>Criteria</b>					200		6.0 - 9.5		0.02



# Appendix B

## 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
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
00-Jan-00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0
00-Jan-00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0

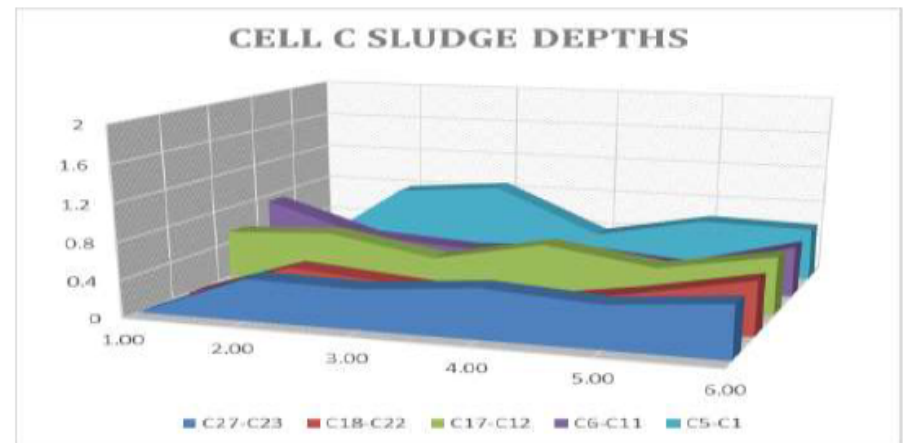
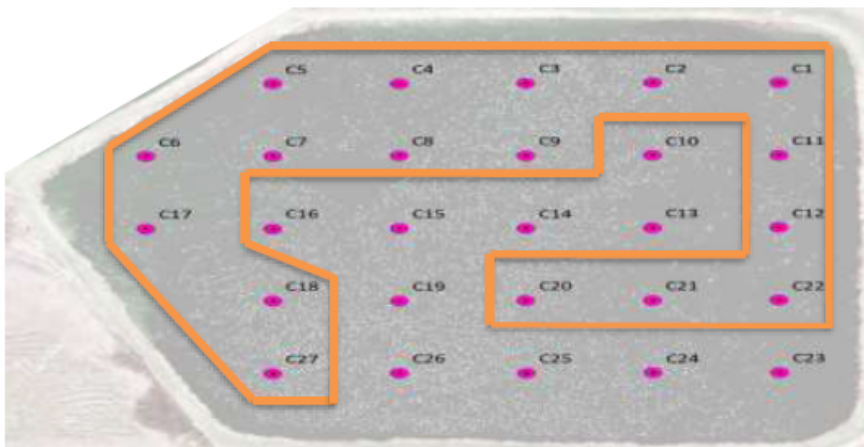


- Sludge depths completed October 29, 2019
- Cell B currently at 92.6% of allowable volume and exceeds the total sludge volume trigger, this value is an increase of 11.8% from previous reading
- 19 points were over high-level trigger
- Higher elevation of sludge build-up located in north side of the cell and through part of the south side of the cell. Highest elevations are from the center to east end of the cell

# Appendix B

## 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-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	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
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
00-Jan-00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0
00-Jan-00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.0



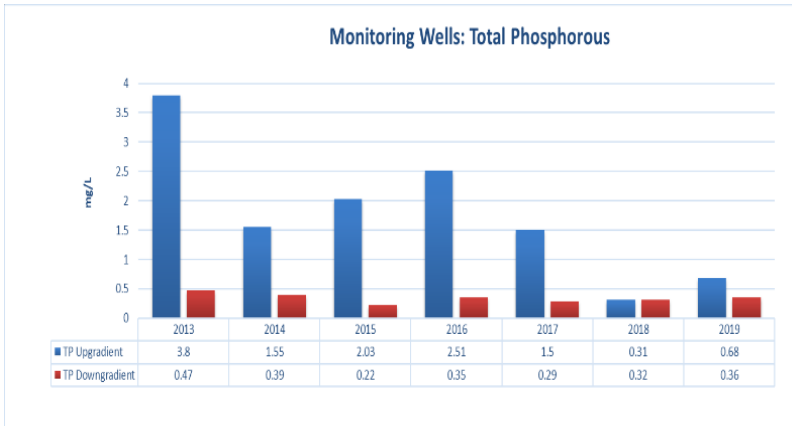
- Sludge depths completed October 28, 2019
- Cell C currently at 67.3% of allowable volume and exceeds the total sludge volume trigger, this value is an increase of 31.7% from previous values
- 17 points were over high-level trigger
- Higher elevation of sludge build-up located in north, east and west side of the cell, with the highest elevation be located on the north side.



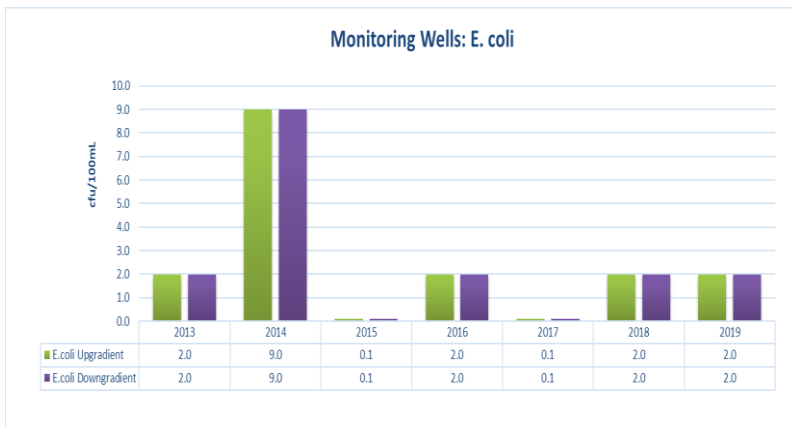


# Appendix D

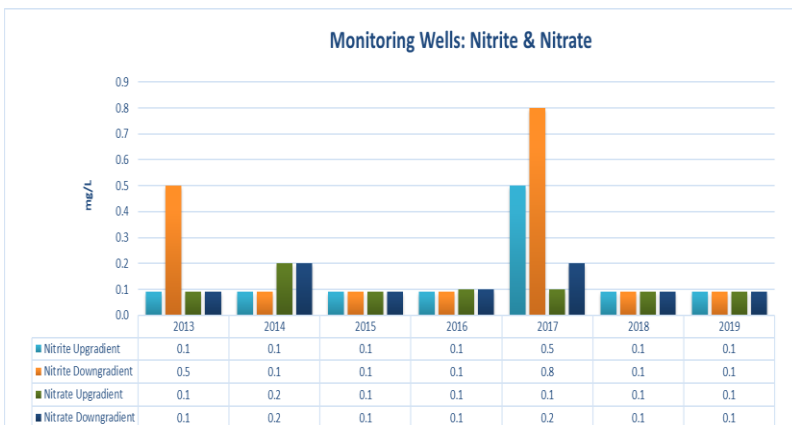
## Alexandria Monitoring Wells Sampling



Total Phosphorous downgradient appears to be significantly lower than the upgradient results. It is worth noting that the sampling 2019 results are significantly lower than historically observed, but slightly increased over 2018 values.



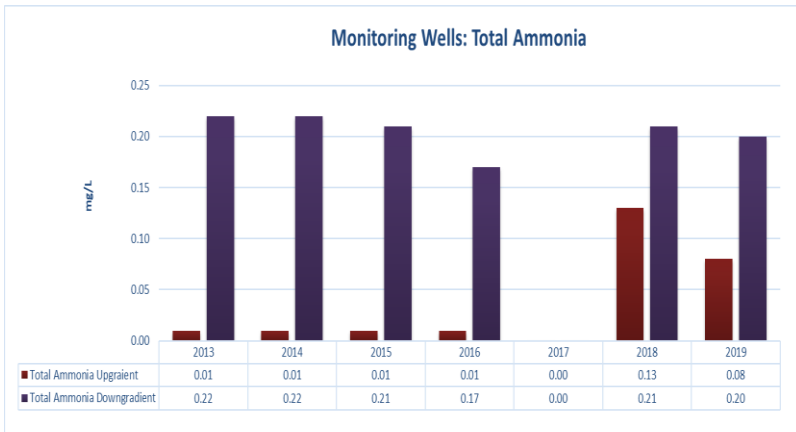
E. coli results downgradient and upgradient appear to be minimal, apart from an elevated sample in 2014. All results have been non-detect (represented by a reading of 0.1) or < 2, (represented by a reading of 2.0).



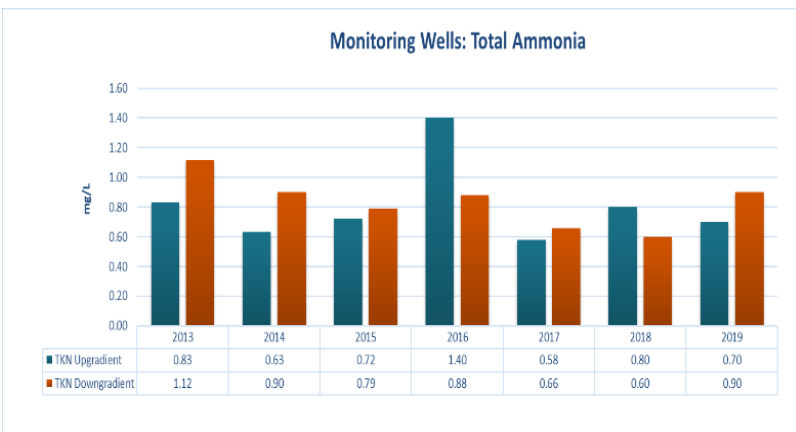
Nitrite/Nitrate samples have been minimal in nature, with most samples results indicating < 0.1mg/L. Increased levels for nitrites were visible in 2013 and 2017, while for nitrates increased levels were noted in 2014 and 2017. Current trending does not indicate any potential issues to note at this time.



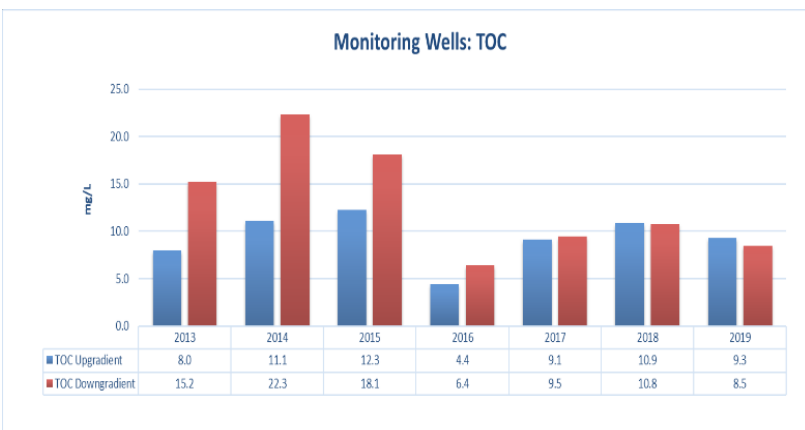
# Appendix D



Nitrogen (Total Ammonia) samples have been marginal in nature, 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.



As per historical trending, the TKN values from 2019 are slightly higher in the downgradient samples, with exception to 2016 and 2018 values. Overall the samples downgradient were decreasing over time but the 2019 values show a 0.3mg/L increase from 2018.



TOC values were initially observed to be significantly higher in the downgradient well, but since 2018 the values have been roughly the same or marginally higher than the upgradient well values. The 2019 values have decreased from 2018 values.