



March 20, 2019
Municipality of West Perth
169 St. David Street
Mitchell, Ontario
N0K 1N0

ATTENTION: **Mr. Jeff Brick**
 CAO
REFERENCE: **Municipality of West Perth**
 2018 Annual Wastewater Report

Please find enclosed the 2018 Annual Wastewater Report for the Town of Mitchell Wastewater Treatment Plant. The report is prepared in accordance with the criteria outlined in the Environmental Compliance Approval #6954-B6YMGQ for the reporting period of January 1, 2018 to December 31, 2018. The report includes the following;

- Section A: Summary and interpretation of all monitoring data and a review of the historical trend of the characteristics and flow rates;
- Section B: Summary and interpretation of final effluent monitoring data;
- Section C: Summary of deviations from the 2018 monitoring schedule and reasons and a schedule for 2019;
- Section D: Summary of operating issues encountered and corrective actions taken;
- Section E: Summary of repairs and maintenance activities;
- Section F: Summary of effluent quality assurance;
- Section G: Summary of calibration and maintenance carried out on monitoring equipment;
- Section H: Summary of efforts made to achieve design objectives;
- Section I: A tabulation of generated sludge, locations of sludge disposal and anticipated volumes for the next reporting period;
- Section J: Summary of complaints received, and actions taken to address the complaints;

- Section K: Summary of all Bypasses, Overflows, spills or abnormal discharge events;
- Section L: Summary of all Notice of Modifications to Sewage Works completed;
- Section M: Summary of efforts made to achieve conformance with Procedure F-5-1;
- Section N: Changes or updates to the schedule for the completion of construction and commissioning operation of major process(es)/equipment groups in the Proposed Works

On behalf of the municipality, a copy of this report has been sent to Mr. Stephen Dunn of the Ministry of Environment, Conservation and Parks London District Office.

Yours very truly,

Municipality of West Perth

Environmental Services

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A. Summary and interpretation of all Influent, Imported Sewage and Processed Organic Waste monitoring data and a review of the historical trend of the characteristics and flow rates;

The Mitchell Wastewater Treatment Plant (MWTP) receives wastewater from residential properties, small businesses and industrial facilities through the collection system. The two largest wastewater producers are a dairy production facility and poultry processing facility. Environmental Services can measure discharge volumes of both facilities independently.

The annual average influent flow to the MWTP was approximately 4.645 MLD, which represents approximately 64% of the design capacity for the treatment facility (average day design flow of 7.2 MLD). The maximum daily flow of 26.472 MLD occurred in the month of February. Both the average and maximum flows for 2018 were greater than in 2017 (Average: 0.329 MLD, Maximum: 9.651MLD).

The MWTP was able to treat the average daily flows. Peak flows were diverted and temporarily stored in the peak overflow cell and pumped back into the treatment plant when incoming flow returned to normal.

The MWTP has an on-site receiving station that is designed to accept imported liquid waste. Accepted waste is pumped and metered to the MWTP during periods of low loading. There was only one source of waste that the receiving station accepted in 2018.

Table 1 shows the monthly average characteristics of waste entering the MWTP, while Table 2 shows the monthly average characteristics of the imported waste.

2018 Influent	BOD5 (mg/L)	TKN (mg/L)	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)
January	256.8	23.6	6.5	176.2
February	242.5	20.8	5.5	136.5
March	242.5	27.0	11.5	300.6
April	244.0	28.2	8.1	188.1
May	275.0	23.3	16.5	212.4
June	372.5	30.3	15.6	241.3
July	414.0	27.8	14.0	310.6
August	432.5	35.0	16.0	306.4
September	572.5	44.0	18.9	265.3
October	674.0	44.6	22.3	278.0
November	565.0	41.5	13.9	258.6
December	767.5	37.8	14.1	277.0

Table 1: Summary of 2018 influent concentrations

2018 Imported Waste	BOD₅ (mg/L)	TKN (mg/L)	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)
January	1200	66	30	140
February	N/A	N/A	N/A	N/A
March	4110	133.5	26	7245
April	920	49	75.5	870
May	2200	210	160	3200
June	N/A	N/A	N/A	N/A
July	190	110	71	550
August	670	34	20	150
September	550	93	31	1000
October	815	120.5	252.5	11790
November	N/A	N/A	N/A	N/A
December	N/A	N/A	N/A	N/A

Table 2: Summary of 2018 imported waste influent characteristics

2018 Influent	Average Monthly Influent (m ³)
January	6262
February	6501
March	4453
April	6712
May	4343
June	3461
July	3485
August	3555
September	3338
October	3736
November	4966
December	4907

Table 3: The average monthly volume of all influent to the MWTP in 2018.

The following graphs display the average monthly concentrations of specified parameters of influent to the MWTP for 2017 and 2018:

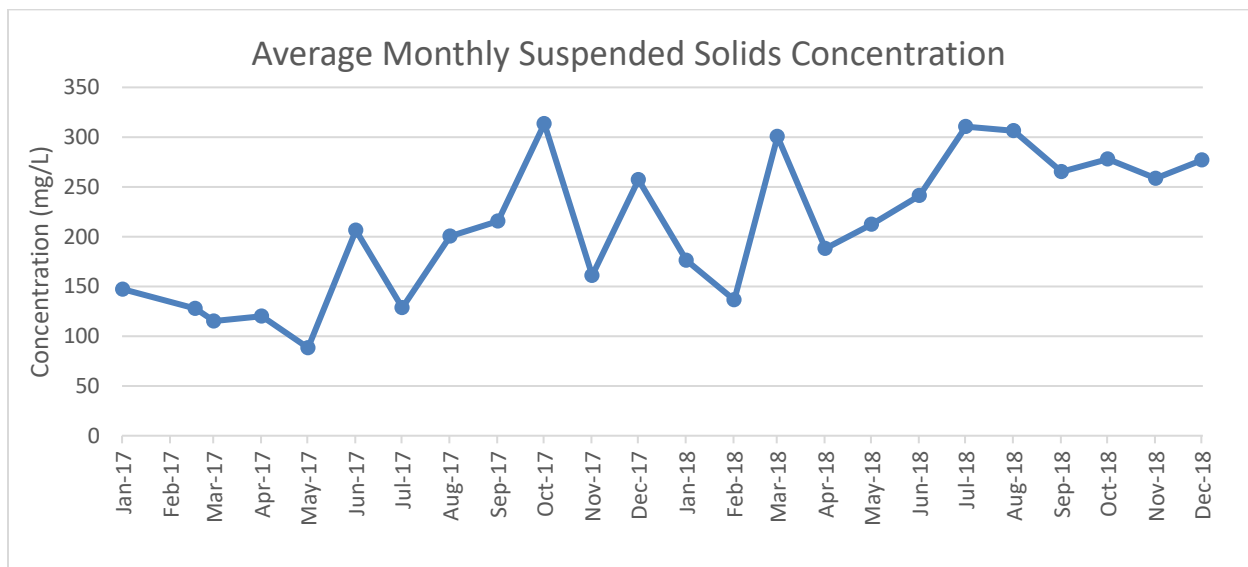


Figure 1: The historical trend of suspended solids concentration from January 2017 - December 2018.

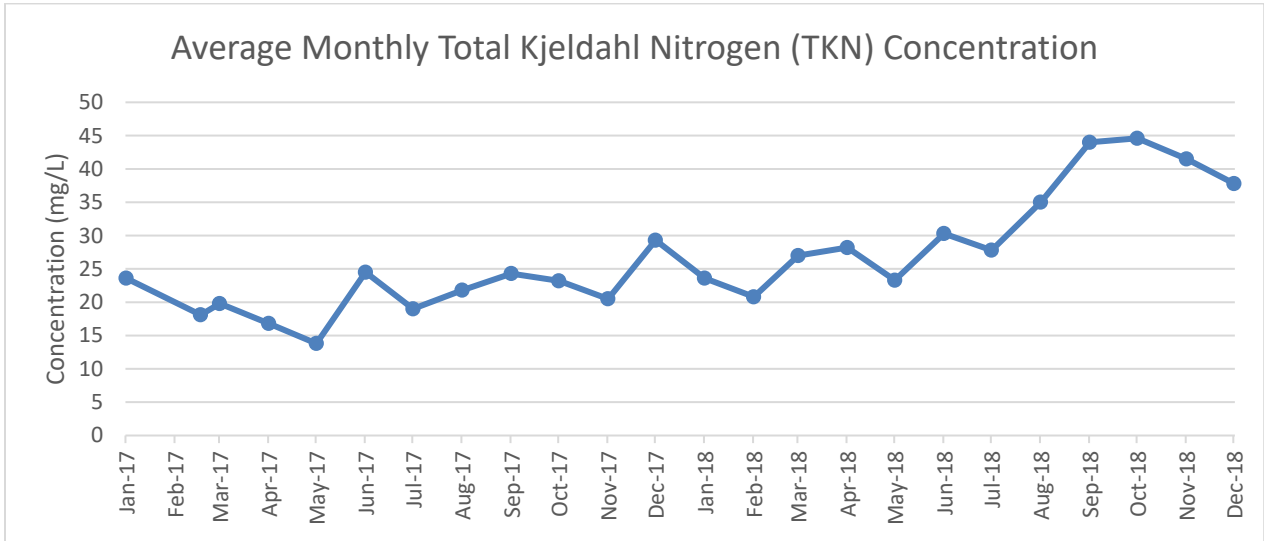


Figure 2: The historical trend of total kjeldahl nitrogen concentration from January 2017 - December 2018.

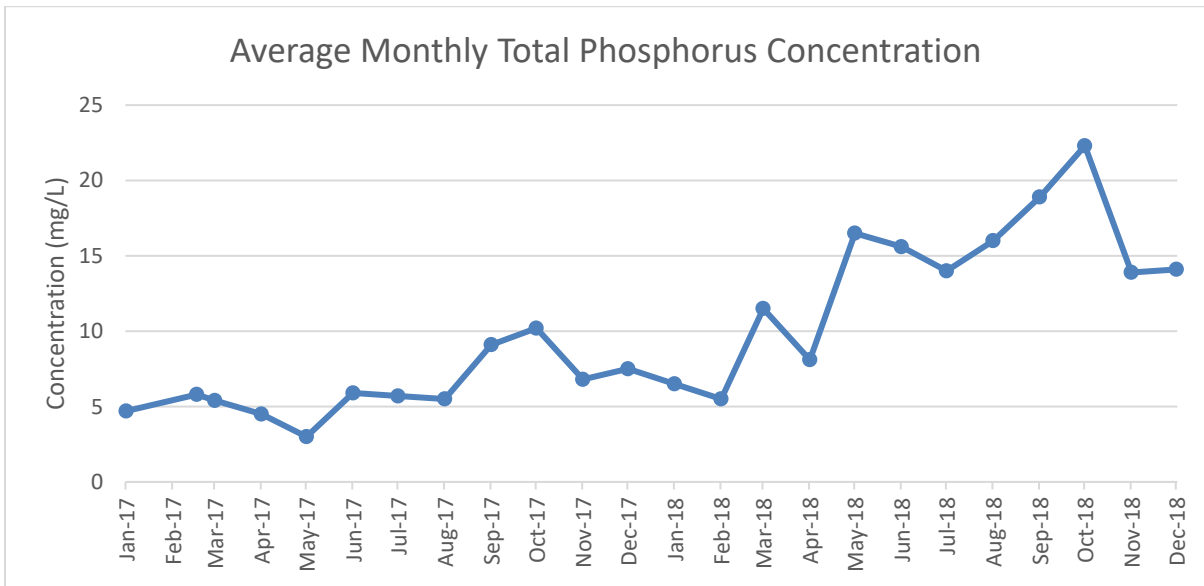


Figure 3: The historical trend of total phosphorus concentration from January 2017 - December 2018.

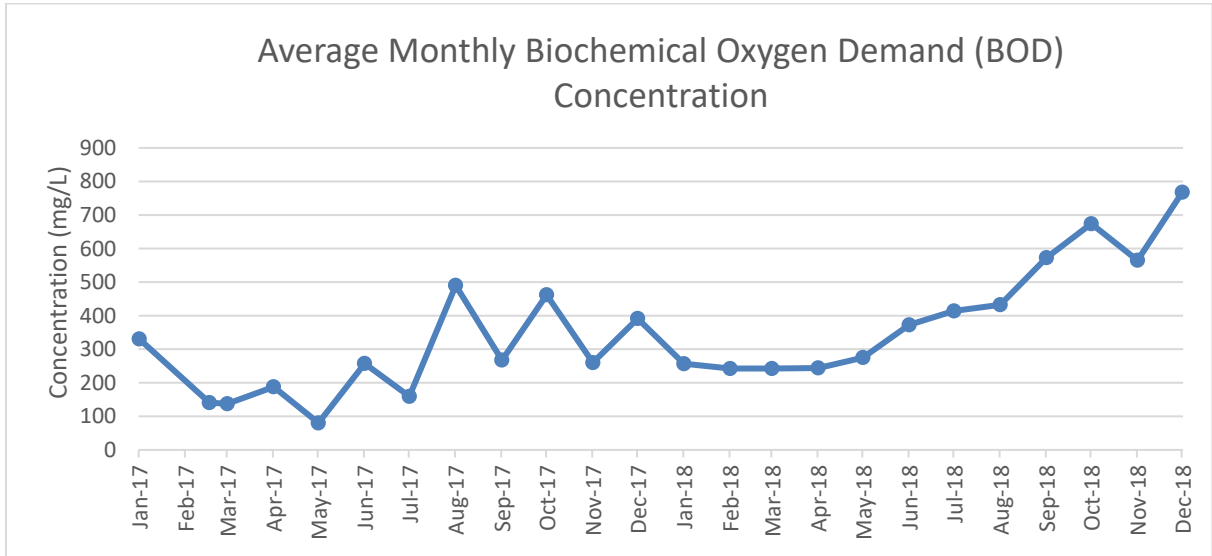


Figure 4: The historical trend of biochemical oxygen demand concentration from January 2017 - December 2018.

The following graphs show the flow rates of influent and imported waste to the MWTP in 2017 and 2018:

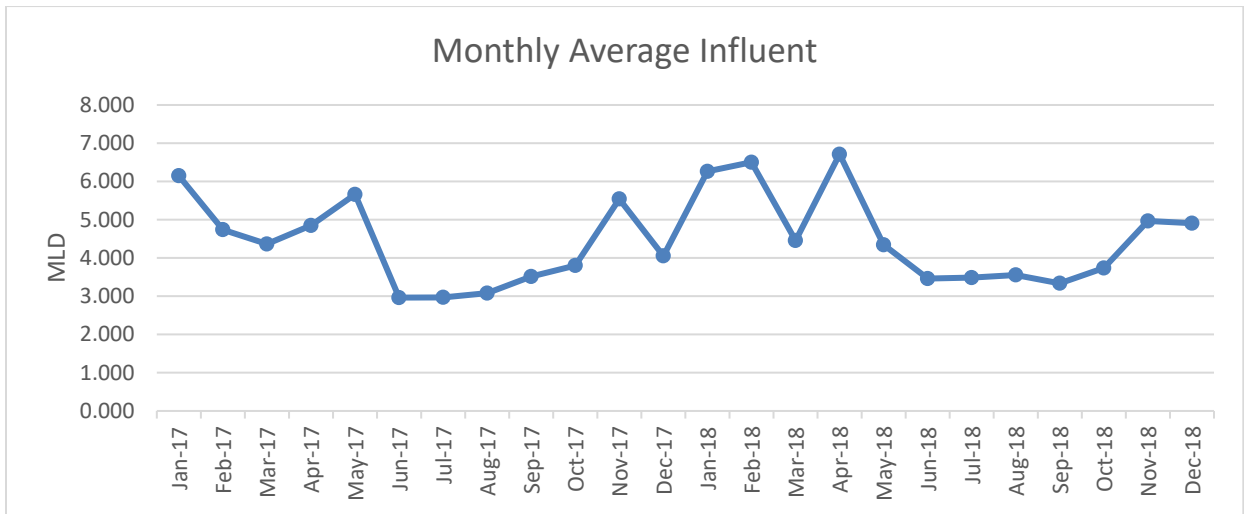


Figure 5: The historical trend of monthly average influent to the MWTP from January 2017 – December 2018.

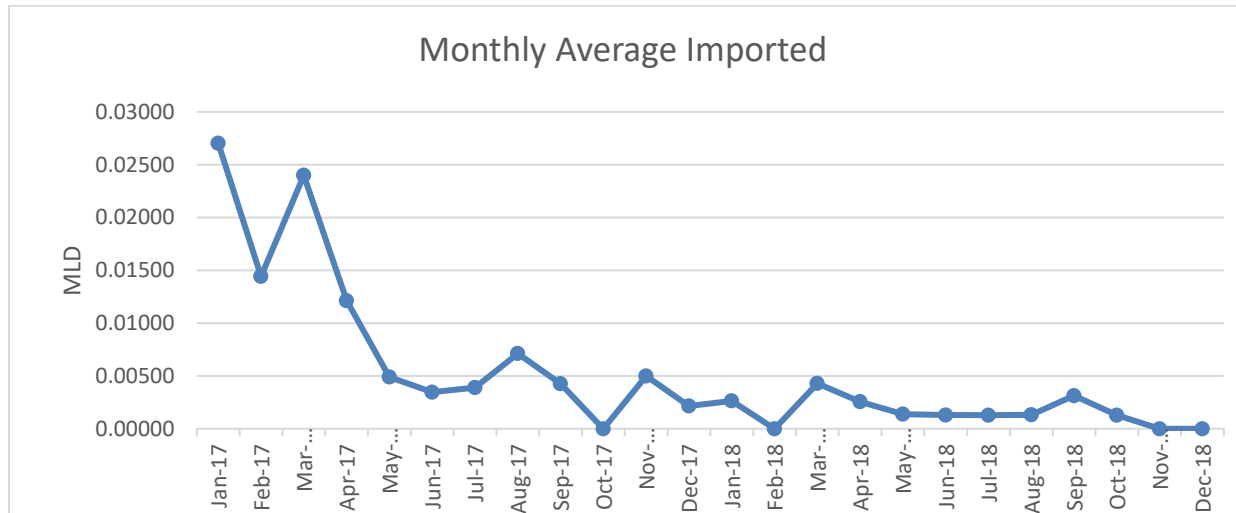


Figure 6: The historical trend of monthly average imported waste to the MWTP from January 2017 - December 2018.

B. Summary and interpretation of final effluent monitoring data:

The following tables and graphs compare the effluent concentrations in 2018 to compliance limits and design objectives stated in the Environmental Compliance Approval (ECA):

Effluent Parameter	Annual Average Concentration	Concentration Limit	
		Dec 1 – Apr 30	May 1 – Nov 30
CBOD₅	0.10 mg/L	15.0 mg/L	10.0 mg/L
Total Suspended Solids	2.80 mg/L	15.0 mg/L	10.0 mg/L
Total Phosphorus	0.21 mg/L	1.0 mg/L	0.5 mg/L
Total Ammonia Nitrogen	0.21 mg/L	5.0 mg/L	3.0 mg/L
E.Coli	7.0 CFU / 100 mL	200 CFU/ 100 mL using MPN Method Mar 15 to Oct 31	
pH	7.17	Between 6.0-9.5 inclusive	
Unionized Ammonia	0.002 mg/L	0.1 mg/L	

Table 4: 2018 annual average effluent concentrations compared to the design limits for specified periods.

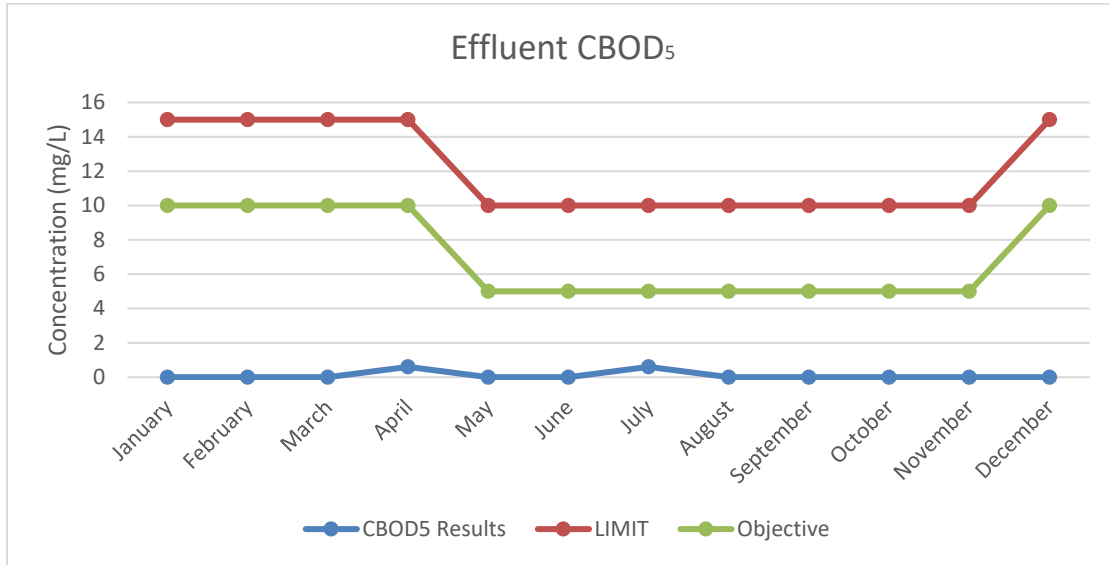


Figure 7: Comparison of the 2018 monthly average concentrations of effluent CBOD₅ to design objectives and compliance limits.

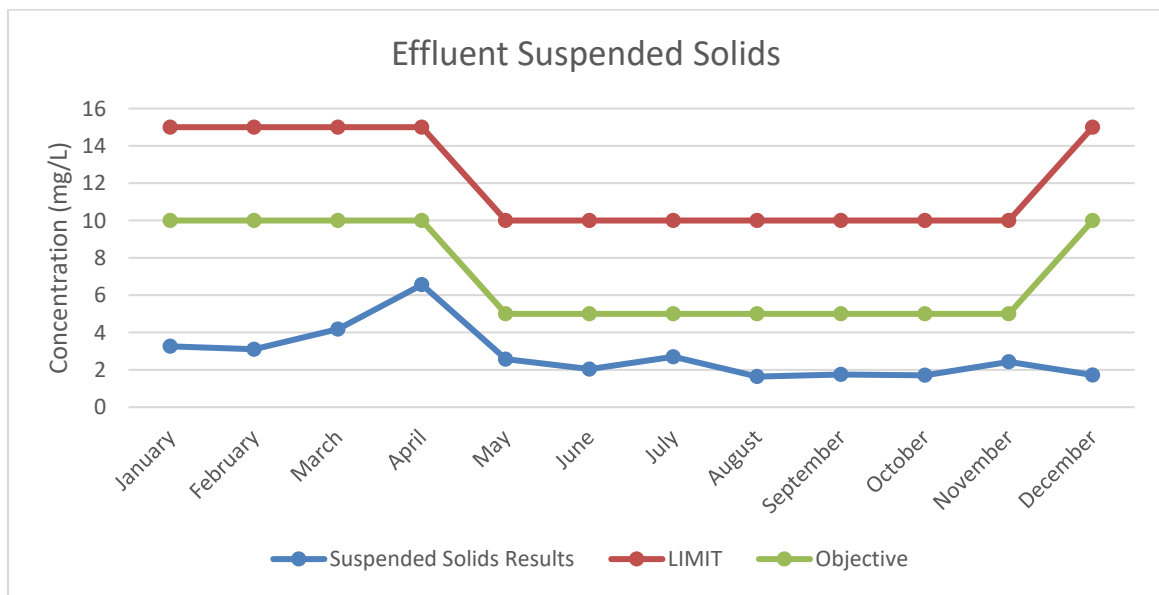


Figure 8: Comparison of the 2018 monthly average concentrations of effluent suspended solids to design objectives and compliance limits.

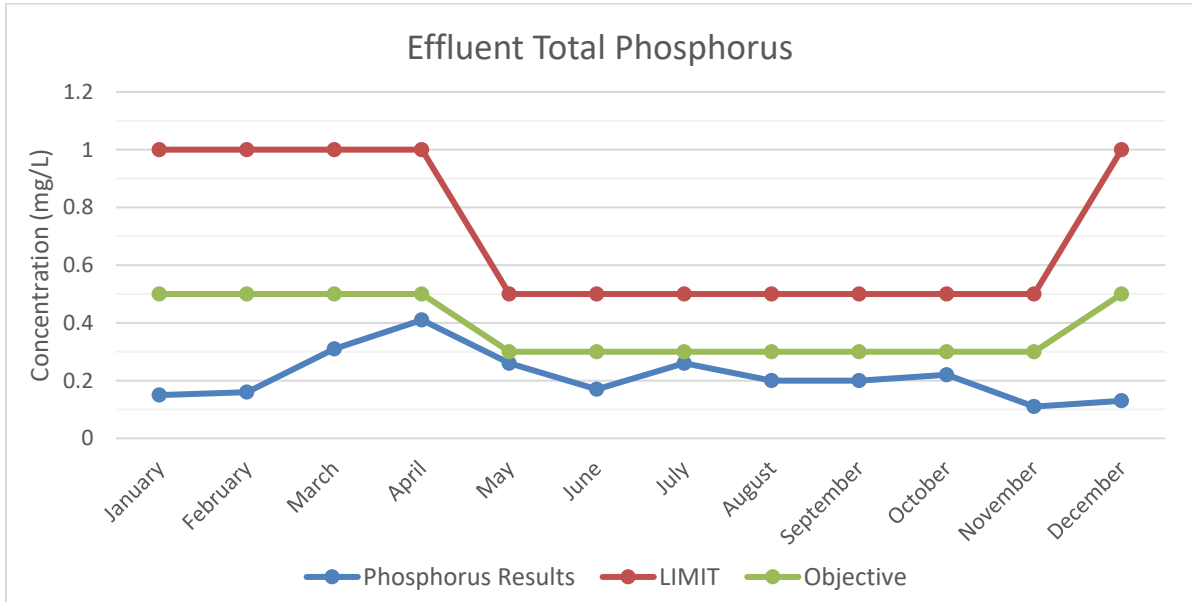


Figure 9: Comparison of the 2018 monthly average concentrations of effluent total phosphorus to design objectives and compliance limits.

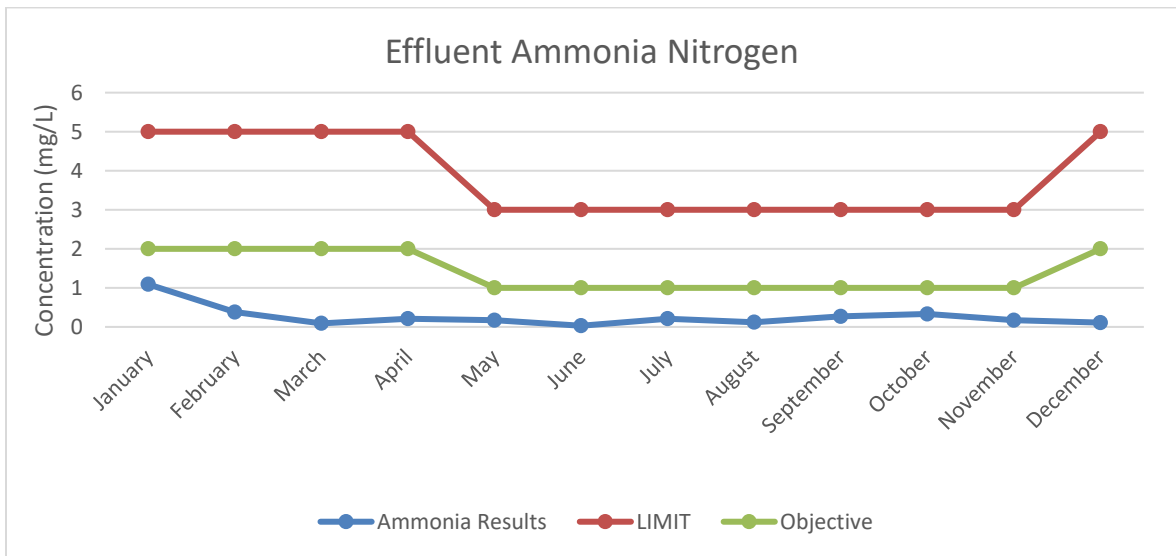


Figure 10: Comparison of the 2018 monthly average concentrations of effluent ammonia nitrogen to design objectives and compliance limits.

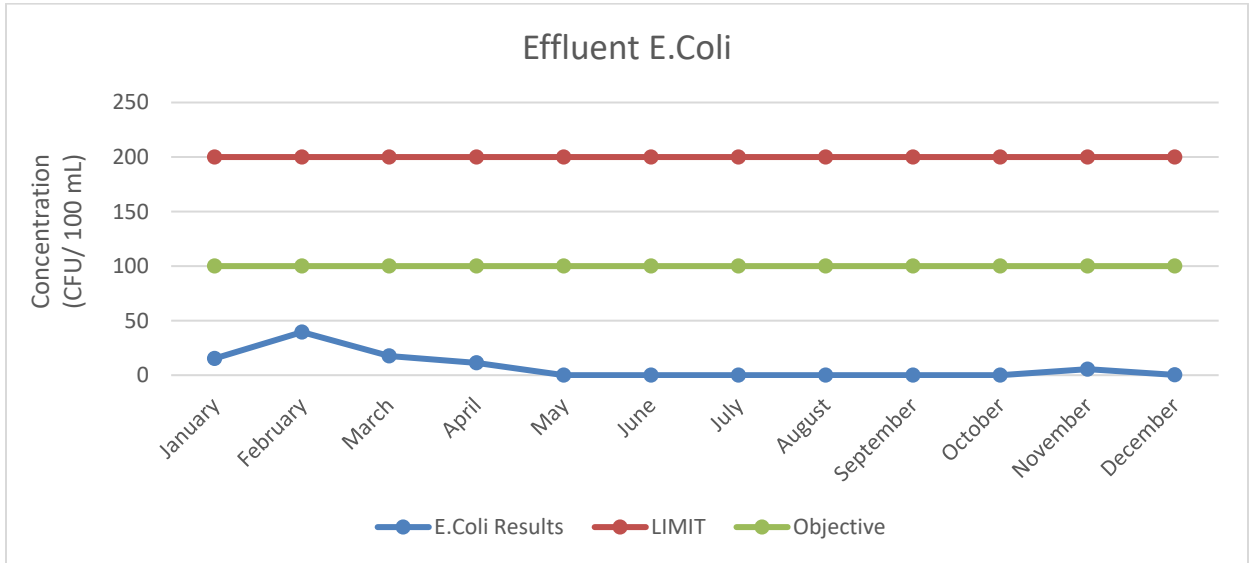


Figure 11: Comparison of the 2018 monthly average concentrations of effluent E.Coli to design objectives and compliance limits.

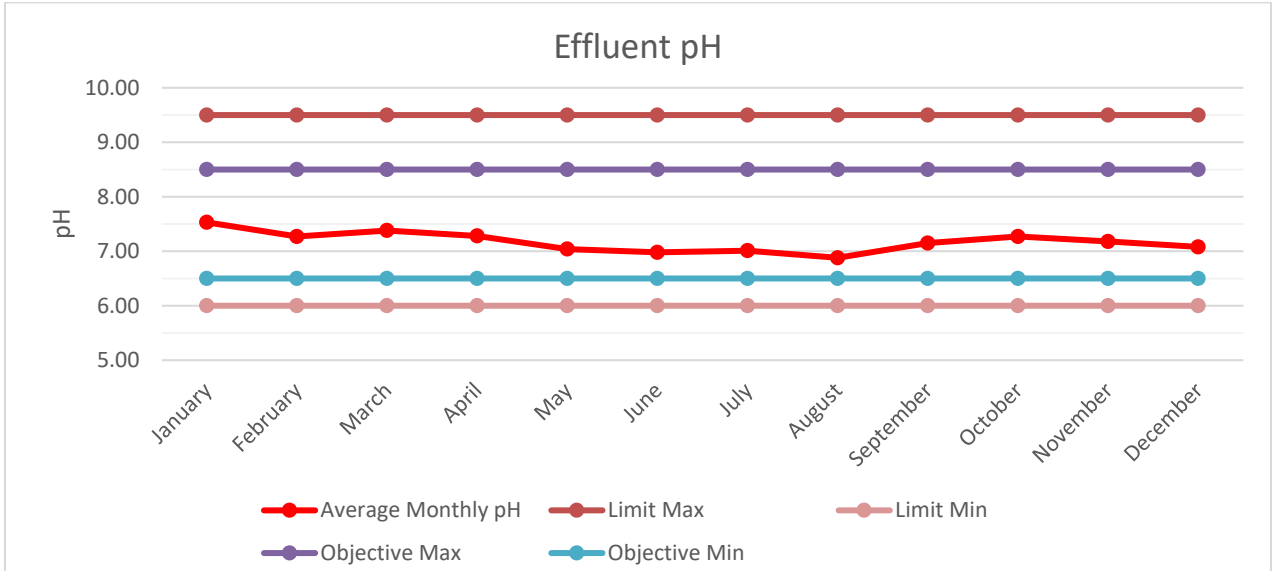


Figure 12: Comparison of the 2018 monthly average effluent pH to design objectives and compliance limits.

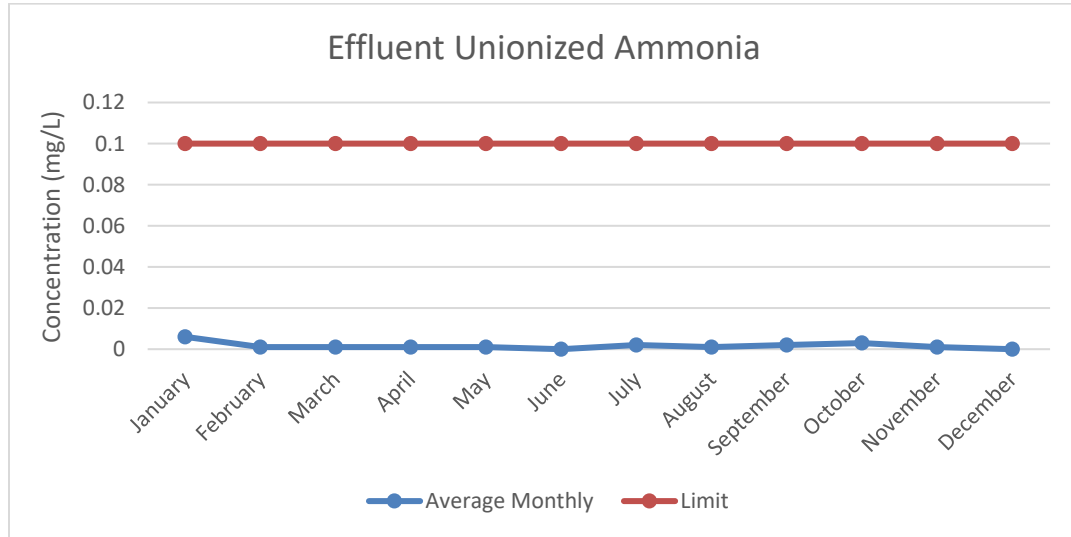


Figure 13: Comparison of the 2018 monthly average concentrations of effluent unionized ammonia to design objectives and compliance limits.

The following table shows the estimated effluent flow rates for the reporting period:

Month	Average Daily Flow (MLD)	Total Flow (MI)
January	6.164	191.082
February	6.380	178.645
March	4.342	134.609
April	6.620	198.610
May	4.223	130.908
June	3.340	100.202
July	3.364	104.274
August	3.439	106.606
September	3.181	95.429
October	3.551	110.072
November	4.809	144.275
December	4.729	146.608

Table 5: Estimated effluent flow rates for 2018.

The following table compares the annual average daily effluent loading to the limit set out by the ECA:

Effluent Parameter	Loading (kg/day)	Loading Limit (kg/day)	
		Dec 1 – Apr 30	May 1 – Nov 30
CBOD₅	0.51	108	72
Total Suspended Solids	14.11	108	72
Total Phosphorus	1.00	7.2	3.6
Total Ammonia Nitrogen	1.38	36	21.6

Table 6: Comparison of effluent loading to limits for specified periods.

The calculated removal efficiencies achieved at the MWTP for the main effluent parameters are highlighted as follows:

- CBOD₅ removal efficiency was 99.98%
- Suspended solids removal efficiency was 98.86%
- Total Phosphorus removal efficiency was 98.45%

C. Summary of deviations from the 2018 monitoring schedule and reasons and a schedule for 2019;

There were no deviations from the 2018 schedule. Below is a copy of the 2019 schedule;
2019

JANUARY						
S	M	T	W	T	F	S
		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	28	29	30	31		

FEBRUARY						
S	M	T	W	T	F	S
					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	28		

MARCH						
S	M	T	W	T	F	S
					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	28	29	30
31						

APRIL						
S	M	T	W	T	F	S
	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
28	29	30				

MAY						
S	M	T	W	T	F	S
			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	28	29	30	31	

JUNE						
S	M	T	W	T	F	S
						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	28	29
30						

JULY						
S	M	T	W	T	F	S
	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
28	29	30	31			

AUGUST						
S	M	T	W	T	F	S
					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	28	29	30
31						

SEPTEMBER						
S	M	T	W	T	F	S
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	28
29	30					

OCTOBER						
S	M	T	W	T	F	S
			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	28	29	30	31	

NOVEMBER						
S	M	T	W	T	F	S
					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	28	29	30

DECEMBER						
S	M	T	W	T	F	S
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	28
29	30	31				

Weekly Compliance Samples
Quarlety Sludge Samples

Monthly Sludge Samples
* Acute Toxicity

D. Summary of operating issues encountered and corrective actions taken;

In February of 2018, the works experienced high flows due to a significant snow melt event. Both James Street and Herbert Street Sewage Pumping Stations (SPS) were operating at maximum capacity. Environmental Services contacted a licensed waste hauler to move wastewater from the wet well at Herbert Street SPS to the overflow cell at the MWTP. Staff later discovered that a large amount of ground and rain water had been infiltrating the collection system and therefore was taking up significant capacity. A manhole inspection and maintenance program was implemented.

Throughout the year, influent high in biochemical oxygen demand (BOD) entered the MWTP. The elevated BOD loading made it difficult to maintain effluent quality objectives, and significantly increased the volume of biosolids produced.

In September bulking sludge caused poor settling in the clarifiers. Operators increased the dissolved oxygen concentration in the aeration process which resolved the issue.

E. Summary of repairs and maintenance activities;

Megamation is the computerized maintenance management system used to schedule the maintenance activities at the treatment plant and pumping stations. The operators can generate preventive maintenance and corrective work orders; as well as document work performed and issue work order history reports.

A highlight of the major maintenance carried out for 2018 is outlined below:

- The raw sewage pumps at both Hebert and James Street SPS were inspected and maintained by the operators.
- The Herbert Street SPS, James Street SPS and MTWP diesel generators received their annual service in early 2018. They were also inspected and ran monthly.
- Annual greasing and oil changes were completed on all blowers. Vibration readings are taken annually.
- All submersible pumps were inspected.
- Aerobic Digesters #1 and #2 (including the headers and piping) were cleaned, inspected and serviced by the operators in the spring and fall.
- The air lift piping on all the filter air lifts were pulled and inspected.

- The UV system was monitored daily by the operators in 2018 for proper intensity. The lenses were cleaned monthly and the bulbs were replaced as needed.
- Outside contractors inspected the gas detectors, diesel generators, chain falls, beams, flow meters and lab equipment.
- On-site Pump#1 repaired.
- Broken sand washers in sand filters #2 and #3 were replaced.
- The ladder of Digester 1 was replaced.
- A new level transducer was installed at Herbert Street SPS.
- The air dryer was repaired at the MWTP.
- Aeration Cell 4 was drained and inspected.
- The pump rails were replaced for Herbert Street SPS Pump 1.
- The pump rails replaced for Decant Pump 1.
- Filter return Pump 2 was repaired.
- A new Dissolved Oxygen probe and controller was installed at the MWTP.
- The Alum system was flushed and inspected.
- The fire valve knob for generator at the MWTP was replaced.

F. Summary of effluent quality assurance:

A 24hr-composite sampler (AquaCell), located downstream of the UV channel collects the effluent sample. A 100 mL sample is collected every 50 minutes. Once a week, samples are sent to Maxxam Analytics in Mississauga, Ontario.

Samples sent to Maxxam Analytics are delivered in coolers with enough ice packs to ensure the samples stay cool. A Chain of Custody accompanies the samples. Not only does the Chain of Custody document when and where the samples were taken, it also communicates the desired type of analysis to be performed and ensures that only authorized persons handled the samples prior to analysis.

Maxxam Analytics is accredited by various organizations including the Ministry of Environment, Conservation and Parks and is also ISO/IEC 17025 accredited. A Certificate of Analysis is sent with each laboratory result.

G. Summary of calibration and maintenance carried out on monitoring equipment;

Copies of the calibration reports for the return activated sludge, waste activated sludge, filter backwash water and influent flow meters are filed at the MWTP Office. The flow meters are calibrated annually by a qualified third party.

Portable dissolved oxygen probes and meters are cleaned after every use. They are calibrated annually by a qualified third party.

The pH meter is calibrated once a month by operators as per manufacturer's instructions.

H. Summary of efforts made to achieve the design objectives;

In 2018 the MWTP received wastewater high in BOD loading from a processing facility. To meet the objectives set out in the ECA, the concentration of dissolved oxygen had to be increased. The alum dosage was also increased to reduce phosphorus levels.

Operators continue to conduct maintenance on equipment and weekly in-house labs to ensure that the MWTP is operating efficiently to meet design objectives.

I. A tabulation of generated sludge, locations of sludge disposal and anticipated volumes for the next reporting period;

In 2018, approximately 48,882m³ of sludge was generated. The MWTP produced 14,320m³ more than in 2017. The increase can be attributed to increased flows and suspended solids loading from a processing plant. Based on current loadings, we expect a similar amount of sludge generation in 2019.

Digested sludge from the MWTP and biosolids from the storage lagoon is removed by a licensed waste hauler.

Biosolids are applied to sites approved by OMAFRA/MECP for land application.

The summary of the biosolids applied during 2018 are as follows:

YEAR	LAND APPLICATION SITE NUMBER	SLUDGE APPLIED TO LAND/ M3
2018	NASM Plan Number 22792	3279.7
	NASM Plan Number 22791	1753.9
	NASM Plan Number 22791	1293.3

Table 7: Summary of 2018 biosolids.

J. Summary of complaints received, and actions taken to address the complaints;

A total of two complaints regarding wastewater were received in 2018.

A resident used the *Report a Problem* tool on the Municipality of West Perth's website to report an odor coming from the Mitchell Wastewater Treatment Plant. Environmental Services responded to the complaint explaining that operating procedures combined with weather conditions could have attributed to more odors than usual. Environmental Services strives to limit the plants operational impact on the community as much as possible.

The second complaint received was from a property owner who called saying that that there was water in the basement as the floor drain was backing up. At the time of the call, there were no other complaints of backups in the area. The resident had called in a plumber who snaked the drain approximately 40 ft of the line but still could not clear the blockage. Staff attended the home, snaked the line and cleared the blockage.

K. Summary of all bypasses, Overflows, spills or abnormal discharge events;

A construction contractor hit the poultry processing forcemain twice. In both instances the forcemain was repaired and remediation efforts were made. Both spills were reported to the Ministry's Spills Action Center.

L. Summary of all Notice of Modifications to Sewage Works completed including a report on status of implementation of all modification;

There were no *Notice of Modifications to Sewage Works* completed in 2018.

M. Summary of efforts made to achieve conformance with Procedure F-5-1;

Operators conduct routine maintenance on equipment and weekly in-house labs to ensure that the MWTP is operating efficiently to meet design objectives.

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

There have been no significant changes or updates to the Proposed Works. The secondary clarifier remains in the design process.