MUNICIPALITY OF
BRIGHTON

2017 WASTEWATER POLLUTION CONTROL PLANT ANNUAL REPORT

Environmental Compliance Approval No 6166-AJJTGW

March, 2018

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1.0 INTRODUCTION

The Municipality of Brighton is pleased to present its Annual Performance Report for wastewater treatment for the operating period of January 1 to December 31, 2017.

Brighton's Water Pollution Control Plant (WPCP) services a population of approximately 6,500 people or 3,263 homes and businesses, as well as Presqu'ile Provincial Park. The WPCP is classified as a Class 1 treatment facility that operates under amended Environmental Compliance Approval (ECA) Number 6166-AJJTGW, issued by the Ontario Ministry of the Environment and Climate Change (MOECC) March 20, 2017.

This report has been prepared in accordance with Section 10.5 of the ECA. This ECA includes Limited Operational Flexibility (LOF) provisions to allow expedited changes to the treatment operation, subject to final MOECC approvals and conditions.

The WPCP is located at 100 County Road 64. Wastewater collected from the serviced area of the Municipality passes through four treatment components at the WPCP, in the order listed below:

1) A 0.7-hectare aerated cell (Lagoon #1) with two mechanical surface aerators, and two aspirating aerators.
2) A chemical mixing chamber where ferric chloride is added.
3) A 5.44-hectare waste stabilization pond (Lagoon #2) with three baffles.
4) A two-celled constructed wetland having a total surface area of 6.2 hectares.

The effluent from the constructed wetland is discharged continuously into a natural wetland that borders Presqu'ile Bay, which is located off the northeast shore of Lake Ontario.

2.0 WASTEWATER FLOWS

The ECA stipulates that the rated flow capacity of the WPCP is a yearly average of 4,600 m^3/day. The average flow for 2017 was 4,040 m^3/day, which represents 87.8% of the rated flow capacity. The highest average flows occurred in May at a flow of 8,384 m^3/day. The lowest average flows occurred in September at 2,088 m^3/day.

It should be stressed that 2017 was a wet year for precipitation, particularly during spring though to early summer. More importantly though, was water levels in Lake Ontario. In May and June, 2017 water levels in Lake Ontario peaked at record levels. This high lake level caused the groundwater level along the lake shore area to rise in a similar fashion and undoubtedly greatly increased flows into basement weeping tiles, causing a very large increase in sump pump flows being discharged to the sanitary sewer system. As well, the high ground water would increase the amount of water pressure bearing on the buried sewer system, increasing the infiltration into the sewer system through cracks in manholes and pipe joints.

These increases in sewage flows in 2017 were almost entirely clean groundwater or rainwater. Flows in the sewer system dropped significantly, beginning in August, as lake levels receded. According to the Monthly Water Level Bulletin (http://www.tides-marees.gc.ca/C&A/bulletin-eng.html), water levels in Lake Ontario peaked in May and June 2017, with a decline of approximately one metre over the summer and fall. Sewage flows also decreased steadily during the same period and sewage flows returned to average flow levels (3,000 m^3/day or less) by August. Average sewage flows remained below 3,000 m^3/day for the balance of the year (other than November when average sewage flows increased with wet weather to approximately 3,700 m^3/day).

It is unlikely that water levels will return to record levels in Lake Ontario and thus average sewage flows are also expected to remain below 3,000 m^3/day, especially when combined with ongoing leak repairs in the sewer system.

The maximum daily flow for the year was 18,052 m^3 on May 6, 2017. The lowest daily flow was 1,580 m^3 on September 20, 2017. There were no exceedances of the rated flow capacity of the WPCP in 2017, even though we had record high water levels in Lake Ontario, which caused extra high flows to the WPCP due to infiltration from Lake Ontario. **Table I,** below, summarizes sewage flows in 2017.

Table I – Monthly Wastewater Flows to WPCP

Month	Total Flow (m^3)	Avg. Flow (m^3/day)	Percent of the rated capacity (%)
January	112,226	3,620	79%
February	92,753	3,313	72%
March	118,181	3,812	83%
April	163,513	5,450	118%
May	259,905	8,384	182%
June	182,965	6,099	133%
July	129,650	4,182	91%
August	83,585	2,696	59%
September	62,627	2,088	45%
October	76,107	2,455	53%
November	110,777	3,693	80%
December	83,197	2,684	58%
Annual	**1,475,486**	**4,040**	**87.8%**

2.1 Flow Interpretation

The variations in the flow of wastewater received at the WPCP are caused by infiltration and inflow to the collection system, as a result of local precipitation events, fluctuations in groundwater elevations and snow melt.

In 2015, 2016, and 2017 sewer repair work was completed by Sewer Technologies which has reduced infiltration. Due to extreme conditions in 2017, (very high precipitation and very high lake levels), flows were greatly increased above normal. It is likely average sewage flows would have been significantly higher if sewer repairs had not been completed.

2.2 Raw Sewage Quality

As per the ECA, raw sewage samples are to be collected and analyzed for select parameters once per month. However, for 2017, raw sewage samples were collected weekly as part of an intensive study of the WPCP to better assess ammonia.

Table II as follows summarizes raw wastewater quality for 2017. For all months, results for all samples collected within a month were averaged to determine raw sewage quality values provided in **Table II**.

TABLE II - MONTHLY RAW INFLUENT TO WPCP

YEAR	CBOD5	TSS	TOTAL PHOSPHOROUS	TKN	AMMONIA NITROGEN
2017	Raw Sewage (mg/L)	Raw Sewage (mg/L)	Raw Sewage (mg/L)	Raw Sewage (mg/L)	Raw Sewage (mg/L)
January	98.1	106.0	3.52	31.0	27.7
February	99.8	127.3	3.67	33.3	24.7
March	99.5	140.5	3.01	24.6	17.1
April	58.5	124.3	2.67	24.6	18.8
May	30.5	97.0	2.18	19.6	15.2
June	60.4	141.5	3.47	31.6	25.2
July	58.9	147.3	3.47	32.8	26.7
August	20.2	48.6	1.59	15.3	13.9
September	29.6	69.0	2.07	19.4	15.1
October	23.0	40.8	1.62	14.9	12.9
November	23.0	97.8	1.62	27.7	10.6
December	97.1	217.6	5.9	42.4	12.9
Yearly Average	**83.8**	**142.2**	**4.3**	**36.5**	**29.9**

3.0 WASTEWATER EFFLUENT QUALITY

Section 7 of the ECA lists monthly average limits for the levels of four parameters in the effluent from the waste stabilization pond. The parameters are: five-day carbonaceous biochemical oxygen demand (CBOD5), total suspended solids (TSS), total phosphorus (TP), and ammonia plus ammonium nitrogen (ammonia).

Section 9 of the ECA outlines the frequency that the parameters must be tested for and lists an additional six parameters that must be tested: total Kjeldahl nitrogen, nitrate nitrogen, nitrite nitrogen, temperature and E. Coli.

In 2017, the effluent quality met the limits for the parameters tested, except for ammonia nitrogen from July to October inclusive and December (**Table III**).

Table III – Monthly Average Waste Stabilization Pond Effluent Quality

Parameter	CBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	Ammonia Nitrogen (mg/L)	E. Coli (cfu/100 mL)	pH
Effluent Limit (mg/L)	30	40	1.0	(May-Oct 14 mg/l) Nov-Apr 17 mg/l)	No Limit Specified	6.0-9.5
January	13.0	18.8	0.34	16.6	900	7.5
February	4.3	12.5	0.23	14.7	360	7.5
March	4.0	10.5	0.26	13.1	160	7.7
April	3.0	12.5	0.29	11.5	3700	7.9
May	2.6	12.4	0.31	8.4	5300	7.9
June	2.0	6.5	0.18	12.6	80	7.8
July	1.8	4.0	0.18	**14.6**	60	7.9
August	1.0	3.2	0.21	**18.9**	24	7.8
September	1.3	3.0	0.26	**22.0**	60	7.9
October	1.2	3.4	0.21	**24.2**	10	7.9
November	1.5	6.0	0.22	16.9	1880	7.8
December	2.0	5.8	0.27	**18.7**	20	7.7

Section 7 of the ECA also lists effluent loading limits for CBOD5, TSS, TP and Ammonia Nitrogen. The effluent from the waste stabilization pond met the effluent loading limits for all required parameters other than ammonia limits highlighted below in **Table IV**.

Table IV – Monthly Average Waste Stabilization Pond Effluent Load

	CBOD5 (kg/d)	TSS (kg/d)	TP (kg/d)	Ammonia Nitrogen (kg/d)
ECA Limit	138 kg/d	184 kg/d	4.6 kd/d	May-Oct 64.4 kg/d Nov-Apr 78.2 kg/d
January	47.1	68.1	1.2	56.8
February	14.1	41.4	0.7	50.3
March	15.2	40.0	1.0	44.9
April	16.4	68.1	1.6	39.3
May	21.8	104.0	2.6	36.3
June	12.2	39.6	1.1	54.6
July	7.3	16.7	0.8	63.2
August	2.7	8.6	0.6	**81.9**
September	2.6	6.3	0.5	**95.1**
October	2.9	8.3	0.5	**104.5**
November (2016)*	5.5	22.2	0.8	71.4*
December (2016)*	5.4	15.4	0.7	**79.0***

*The last two months of the previous year are used for this calculation (seasonal) as per MOECC.

4.0 CONSTRUCTED WETLAND EFFLUENT QUALITY

Section 6 of the ECA lists monthly average objectives for the levels of six parameters in the constructed wetland effluent (CBOD, TSS, TP, Ammonia Nitrogen, E. Coli and pH).

Section 9 of the ECA outlines the frequency that the parameters must be tested and lists an additional three parameters that must be tested: nitrate nitrogen, nitrite nitrogen and temperature.

In 2017, the effluent quality met the limits for the parameters tested, with the exceptions of ammonia nitrogen for January and from June to December inclusive, and E-coli in January, April, August, September and December. See **Table V**.

Table V – Monthly Average Constructed Wetland Effluent Quality Objectives

Parameter	CBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	Ammonia Nitrogen (mg/L)	E. Coli (cfu/200 mL)	pH
Effluent Objective (mg/L)	15	15	0.8	(May-Oct 10 mg/l) Nov-Apr 15 mg/l)	200	6.0-9.5
January	3.6	6.2	0.16	**18.0**	400	7.8
February	2.0	4.0	0.12	14.7	20	7.7
March	2.0	3.3	0.09	13.1	14	7.8
April	2.8	4.6	0.16	10.1	40	7.8
May	1.6	5	0.52	6.5	380	7.8
June	1.5	5.8	0.47	**11.9**	200	7.9
July	1.8	4.0	0.26	**12.4**	100	7.7
August	1.2	4.0	0.29	**16.9**	254	7.6
September	2.3	3.9	0.44	**20.0**	1200	7.6
October	1.2	5.0	0.30	**21.3**	140	7.6
November	1.5	3.0	0.10	**16.4**	120	7.9
December	1.0	5.0	0.15	**17.5**	2500	7.8

5.0 OVERVIEW OF SUCCESS AND ADEQUACY OF WORKS

For the most part, the WPCP is successfully treating the effluent for the key effluent parameters with the exception of ammonia nitrogen. As per **Table III**, there were exceedances of ammonia nitrogen for five of the twelve months in 2017.

Table VI summarizes overall treatment efficiency of the lagoon system, based on effluent quality from the wetland portion of the treatment works compared to the raw sewage quality.

Table VI – Overall Efficiency of WPCP Sewage Works System

Date	CBOD5 (%)	TSS (%)	TP (%)	Ammonia Nitrogen (%)
January	96.3	94.2	95.5	35.3
February	98.0	96.9	95.6	40.6
March	97.8	97.7	97.0	23.6
April	95.3	96.3	99.8	46.5
May	94.8	94.8	76.1	57.2
June	97.5	95.9	86.4	52.7
July	97.0	97.3	92.4	53.3
August	94.1	91.8	81.6	**-21.9***
September	92.4	94.4	79.0	**-32.0***
October	94.8	87.7	81.3	**-64.8***
November	93.5	96.9	93.7	**-55.2***
December	99.0	97.7	97.5	**-35.8***
Average	**95.7%**	**95.1%**	**89.7%**	**8.3%**

* Indicates a production of Ammonia Nitrogen

6.0 OPERATING PROBLEMS AND CORRECTIVE ACTIONS

The following table summarizes main mechanical problems experienced in 2017 and the corrective actions taken.

Table VII – Summary of Operating Problems and Corrective Actions

LOCATION	PROBLEM	CORRECTIVE ACTION
Lagoon	New Chemical Tank	replaced December 2017
Lagoon	New Outside Containment	ferric containment. 95% completed by Dec. 2017
Liftstation	Liftstation debris (twice yearly maintenance)	Quinte Sewer clean wetwell
Liftstation	Pumps (2) at liftstation complete rebuild	pumps repairs
Lagoon and Liftstation	electrical panels	clean contacts on switches
Lagoon	Material build up around aeration pond	Cleaned once by contractor, second time inhouse.
Aerated cell	Debris on aerators	cleaned aerators twice
Loyalist Drive	Lateral cleaning twice a year	3 homes on one service
Liftstation	Degreaser Pump	Install new pump
Liftstation	debris in pumps	open and remove debris
Lagoon	chemical valves	replace valves (2)
Lagoon	Chemical Pump	replace diaphragm (maintenance)
Lagoon	Outside water stand	replace old parts
Lagoon	chemical line	worn out parts - replaced
Liftstation	Wetwell Lights	replace with LED
Lagoon	Outside light	Replace with LED

7.0 SUMMARY OF MAINTENANCE

The following is an abbreviated summary of normal maintenance completed at the lagoon system and sewage pumping stations.

Table VIII – Summary of Maintenance

DATE	NAME OF EQUIPMENT MAINTAINED	ACTION
Weekly	pH meter / DO	Calibration (in-house)
Quarterly	Flash mixer/ Aerators/Pumps	Grease/check oil
February yearly maint. or when required	Chemical Pump 1&2/ flush quarterly	Flushed and clean, replace Diaphragms
April Yearly	Constructed wetland	Trapping of muskrats
April yearly	OCMIII, MultiRanger, Siemens Magmeter, LUT400	Calibration
Spring	wetland levels	Water levels lowered
Spring, summer and fall	Aerators	Removed debris
Summer	Constructed wetland	Water levels raised
Spring	ferric system cleaned	Flushed lines, clean pumps
November	wetland levels	Water levels raised
Spring and Fall	Constructed wetland	Trapping of muskrats

8.0 EFFLUENT QUALITY ASSURANCE AND CONTROL

Wastewater exiting the aeration pond passes through a chemical dosing chamber. Ferric Chloride is the coagulant used to precipitate soluble phosphorus. It also aids in the settling of other substances and odour control. The dosing system operates twenty-four hours a day, seven days a week. The system is checked and logged daily by a wastewater operator.

Samples are collected by a trained wastewater operator, following the applicable MOECC guidelines. All collected wastewater samples are sent weekly to an accredited laboratory for analysis. The results of the water samples are analyzed weekly by Brighton staff. A result showing non-compliance with the required wastewater quality stated in the ECA is reported to the MOECC, as required by the ECA.

9.0 SUMMARY OF CALIBRATION AND MAINTENANCE ON MONITORING EQUIPMENT

Table IX – Dates of Equipment Calibration

DATE OF CALIBRATION Or Maintenance	EQUIPMENT CALIBRATED/Maint.	COMPANY PERFORMING CALIBRRATION/Maint.
April 2017 Yearly	Flow monitors/ Mag Meters	Franklin/MeasureMax
December 2017 Yearly	DO meter/ DR2800/	Hach Technician
Weekly	Do/pH meters	In-house

10.0 EFFORTS AND RESULTS TO MEET EFFLUENT OBJECTIVES

In May of 2015, Brighton retained the engineering and wastewater operations firm of GSS Engineering Consultants Ltd. (GSS) to assist with operation of the lagoon system.

With the assistance of GSS, the Municipality of Brighton has implemented a number of interim efforts under the LOF process of the ECA to potentially improve performance of the lagoon treatment system.

Four aerators are provided in the aerated cell. Total aerator power is approximately 60 kW. While total energy available in the aerated cell is relatively low (3.3 W/m^3 based on total volume of 18,000 m^3), all four (4) aerators, when running together, will suspend a significant amount of solids in the aerated cell. MOECC design guidelines recommends mixing energy of 15-25 W/m^3 to fully suspend mixed liquor, suspended solids.

In the early spring of 2016, the aerators were equipped with simple timers to allow all the aerators to operate at the same time and then turn off. The intent was to allow periods of settling during the aerator "off" period, to slowly build volatile suspended solids (VSS) in the aerated cell to achieve nitrification.

However, simple on/off operation of the aerators was not successful in increasing VSS levels in the aerated cell. It was then proposed to combine the on/off aerator operation with manual "decanting" of the top layer of effluent from the aerated cell when the aerators were off. This would assumedly retain solids within the aerated cell and allow VSS to build to levels that would support nitrification.

A Notice of Modification (Notification Number 7) for trial decanting, combined with on/off aeration, was submitted to MOECC in August, 2017. This notice is included in **Appendix A.**

This modification was approved under the LOF conditions of the current ECA. The decant trial started on September 25, 2017. After approximately 8 weeks of trial, the manual decant process was terminated on November 29, 2017. At that time, the aerators were returned to their normal on/off cycle program. The following summarizes the results of the decant trial.

Method

Based on preliminary evaluations, the simplest method to achieve manual decanting was to:

- Manually turn off all aerators at approximately 7 am
- Wait one half to one hour to allow settling of solids in the aerated cell
- Manually lift the first 6 inch stop log to release the first "batch" of clear decant
- After approximately 1 additional hour, manually remove the 2nd stop log to release a second batch of clear decant
- Overall, such draining of decant lowered water levels in the aeration cell by approximately 12 inches (300 mm).
- At approximately 2 pm, reinstall both stop logs and then turn on all aerators. The aerated cell would slowly refill
- Allow aerators to run from 2 pm to approximately 7 am. Then repeat the decant process.

The operators completed regular measurement of dissolved oxygen in the aerated cell. Generally, the 6 hour decant period (8 am to 2 pm) resulted in falling dissolved oxygen levels in the aerated cell, but oxygen levels normally did not fall below 1 mg/l. Once the aerators were restarted, there was sometimes a temporary, further sag in oxygen levels before oxygen levels rebounded to 4 to 6 mg/l.

Normally, once the aerated cell was decanted for 6 hours, the remaining storage depth of approximately 12 inches (300 mm) was sufficient to store the incoming sewage flow until the next morning, without overtopping the stop logs.

Results – Retention of VSS and Removal of Ammonia

Decanting, as noted above, began in late September 2017. The hoped-for result would be that VSS in the aerated cell would increase to at least 400 mg/l and potentially as high as 600 mg/l. Levels of VSS this high would provide the total mass of VSS in the aerated cell necessary to achieve nitrification.

However, higher levels of VSS were not achieved. VSS levels in the aerated cell, when fully mixed using the available aerators, normally remained below 200 mg/l. Also, no additional removal of ammonia was achieved. While levels of ammonia in the aerated cell typically reduced 50% from levels in the incoming raw sewage, no additional removal of ammonia was achieved by the decanting process compared to the normal aeration process in the aeration cell.

Overall, ammonia levels in the aerated cell effluent remained high (normally greater than 14 mg/l) throughout the decant trial period. There was some formation of nitrite and nitrate in the cell (evidence of some nitrification) but levels of nitrate remained low (typically below 1 mg/l) and were not appreciably higher than levels of nitrate formation seen before the decant trial. Table 1 also shows average levels of nitrite and nitrate in the aerated cell.

To assist development of nitrifying bacteria in the aerated cell, loads of activated sludge from the Frankfort sewage plant were imported weekly and discharged into the aerated cell. Sludge was imported between September 27 and October 25, 2017. The Frankford sewage plant is an activated sludge plant that provides nitrification.

As above, however, formation of nitrite/nitrates, and a buildup of VSS, did not occur at significant levels. Seeding with nitrifying sludge did not appear to improve ammonia removal.

Other Results

Other than ammonia, decanting appeared to improve the quality of effluent being discharged from the aeration cell to the large downstream lagoon (facultative lagoon). A key benefit was that relatively high clarity effluent, with few solids, was discharged to the downstream facultative lagoon.

Average values of solids in the aerated cell decant in October, 2017, were 55 mg/l. However, this is based on an average of 5 weekly samples. Four of the samples had solids levels between 20 and 28 mg/l. However, the 5th sample (October 18) had an outlier value of 180 mg/l which significantly affected the monthly average value. For November 2017, the average value of decant solids was 39 mg/l.

These levels of suspended solids (55 and 39 mg/l) were much lower than previous months where decanting was not practiced. Values of suspended solids in the aerated cell effluent for the months of January, 2017 to September, 2017 averaged 135 mg/l.

BOD appeared to be further reduced in the aerated cell during the decanting trials. Values of CBOD in the decant were 11 mg/l in October and 13 mg/l in November. Compared to average values of incoming raw sewage BOD (average values of 76 mg/l in October and November) removal of BOD in the aeration cell was approximately 84%.
An initial concern with the decant trial was whether effective dosing of ferric chloride to the "slug" release of decant could be achieved. Ferric chloride is added to the aerated cell effluent to remove phosphorus. During this trial, the operators would manually turn up the ferric pumps just before the stop logs were removed, and then turn down the pumps once the logs were reinstalled in the afternoon.

However, phosphorus levels at the compliance point (discharge from the lagoon) were very low and averaged 0.21 and 0.22 mg/l, respectively, for October and November, 2017. Therefore, the initial concern of ferric dosing proved not to be a problem.

Overall, effluent quality from the lagoon was excellent in 2017 (other than ammonia) and approached or exceeded tertiary quality levels for CBOD, Suspended Solids and Total Phosphorous for numerous months.

While high flows very likely diluted pollutants in the treated effluent during 2017, sewage flows had returned to more normal levels by the time the decant trial began (i.e. less than 3,000 m^3/day during September, October and just under 3,700 m^3/day for November of 2017).

Summary

The decant process did not achieve the main objective of building VSS levels in the aerated cell and treating ammonia. While limited nitrification occurs in the aerated cell (based on observed but low levels of nitrite and nitrate), it would appear that the available bacterial mass is not sufficient to allow a long enough "sludge age" to develop which would support significant populations of nitrifying bacteria.

Import of nitrifying sludge from the nearby Frankford STP did not significantly improve the level of nitrification in the aerated cell.

While significant reduction of ammonia was not achieved, it is recommended that an automatic decant system for the aeration cell, in concert with on/off blower operation, be seriously considered for the following reasons:

- The decanting process significantly reduced the sludge solids discharged to the downstream facultative lagoon. This would significantly reduce sludge accumulation in the lagoon.

- Reducing sludge loads to the lagoon should improve lagoon effluent quality.

- Reduction of sludge loadings would defer the very expensive and disruptive process to remove sludge from the lagoon.

- Reduced suspended solids in the decant may allow ferric dosing levels to be decreased, as the ferric may become more available (i.e. used more efficiently) for phosphorus removal. This would result in chemical cost savings.

- Decanting appears to improve BOD removal in the aerated cell. Combined with less CBOD, less sludge, and potentially less phosphorus levels in the lagoon, the chance of disruptive algae blooms in the lagoon may reduce.

- While lagoon effluent results were excellent for much of 2017 (other than ammonia), the decanting process did not appear to effect effluent quality in the lagoon. Rather, it appeared that decanting from the aerated cell improved the quality of lagoon effluent for CBOD, TSS and TP.

If an automatic decant system was installed, it would simplify the decanting procedure. Multiple decants each day (say four times per day) would avoid any overflow of mixed, aerated effluent (containing high levels of solids) to the downstream lagoon.

If an automatic decanting system was installed, the existing timer system for the aerators would likely suffice. The only upgrade that could be considered is automatic, higher dosing of ferric chloride during the decant periods.

11.0 Ammonium Nitrogen

Removal of ammonia nitrogen has been a long-standing issue for the Brighton WPCP. LOF provisions under previously issued Notices were undertaken largely to improve removal of ammonia nitrogen in the lagoon system.

In 2017, efforts to improve ammonia removal focused on operation of the aerators on timers in conjunction with manual decanting of the aerated cell. These measures were intended to build levels of VSS and increase sludge age in the aerated cell to promote development of nitrifying bacteria.

Efforts to reduce ammonia have continued at the same time a Class EA was being completed to determine the best long term treatment alternative. Previous testing by Enviro Sim (2016) indicated that the raw sewage is treatable (for significant ammonia removal) if proper treatment, with an established mass of nitrifying bacteria, is available.

11.1 Total Phosphorus

As per **Table III**, there was no exceedance of the TP limit of 1.0 mg/l in 2017.

Jar testing of the coagulant dosage was completed during the first three months of 2017 to optimize dosing levels of ferric chloride under cold water conditions.

Levels of TP in wetland effluent remained below the Objective level of 0.8 mg/l for all months.

11.2 CBOD and Suspended Solids

Levels of CBOD and Suspended solids remained below the compliance limit and objective limits for all months in 2017.

12.0 BIOSOLIDS MANAGEMENT

No sludge was removed during 2017.

13.0 SUMMARY OF COMPLAINTS

The Municipality received no complaints in 2017

14.0 SUMMARY OF BY-PASSES, SPILLS AND ABNORMAL DISCHARGES

There were no sewage by-passes, spills or abnormal discharges during this reporting period.

15.0 SUMMARY OF SEWER WORK COMPLETED

Between 2010 and 2017, the Municipality completed significant maintenance of the sanitary sewer system. This work included flushing and TV inspection and progressed to major repairs of sewers and manholes to reduce infiltration.

At the end of 2014, Sewer Technologies completed a priority sewer repair list with the most important problems rated at 5, and the least important problems rated at 1. The repair work has been carried out in 2015, 2016, 2017 and will continue into 2018.

In seven years, the Municipality has spent approximately $700,000 on the collection system infrastructure. As noted, average flows have been reduced by approximately 500 cubic meter per day.

This lower flow has increased the remaining treatment capacity, potential reduced pollutant loadings on the environment, reduced run time of pumping equipment and reduced energy usage for pumping raw sewage.

In 2018, the Municipality plans to invest a further $150,000 on flushing, CCTV and repairs, after which all of the Municipality's sewer will have been completed. Smoke testing is also planned to find direct inflow sources such as sump pumps and down spouts etc.

16.0 RAINBOW TROUT TOXICITY TESTING

Since spring of 2015, Brighton has submitted quarterly samples of final effluent from the constructed wetlands to a toxicity laboratory in Guelph, Ontario (Aquatox Testing and Consulting Ltd.) for LC 50 testing using young rainbow trout.

All tests completed in 2017 had zero mortalities. Sampling and testing have been done in accordance with Environment Canada requirements.

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APPENDIX A

NOTICE OF MODIFICATIONS
SUBMITTED TO MOECC UNDER LOF PROCESS – 2017

Ontario
Ministry of
the Environment

Notice of Modification to Sewage Works

1.1 RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA AND SEND A COPY TO THE WATER SUPERVISOR (FOR MUNICIPAL SYSTEMS) OR DISTRICT MANAGER (FOR INDUSTRIAL SYSTEMS)

Part 1 - Environmental Compliance Approval (ECA) with Limited Operational Flexibility
(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)

ECA Owner	ECA number	Issuance Dat	Notice number (mm/dd/yy)
Municipality of Brighton	3081-9XQNZK	07/07/15	7

Part 2 - Description of the modifications as part of the Limited Operational Flexibility
(Attach a detailed description of the sewage works)

Previously, Brighton installed timers on the existing four aerators in the aerated cell of the sewage treatment works. On/off cycling of the aerators was attempted to retain biological solids in the aerated cell, to increase sludge age and promote formation and retention of nitrifying bacteria. This notice seeks to augment aeration timers by allowing removal of existing stop logs (two, 6" tall stop logs) in the morning to "decant" clarified water from the aerated cell when the aerators are off. Once the boards are reinstalled later in the same day, all aerators would be returned to operation.

Description shall include:

1. A detail description above of the modifications and/or operations to the sewage works (e.g. sewage work component, locatlon, size, equipment type/model, material, process name, etc.)
2. An assessment of t he anticipated environmental effects
3. Updated versions of, or amendments to. all relevant mechanical documents required by this ECA that are affected by the modifications as applicable, e.g. site plan, design brief, drawings, emergency and spill prevention plan, etc.

Part 3 - Declaration by Professional Engineer

I hereby declare that I have verified the scope and technical aspects of this modification and confirm that he design:

1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice the Province of Ontario;
2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA;
3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate

Name(Print)	PEO License Number
Jeff Graham, P. Eng	90222860
Signature	Date (mm/dd/yy)
	08/25/2017
Name of Employer	
GSS Engineering Consutants Ltd.	

Part 4 -Declaration by Owner

I hereby declare that:

1. I am authorized by the Owner to complete this Declaration;
2. The Owner consents to the modifications; and
3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA.
4. The Owner has fulfilled all applicable requirements of the *Environmental Assessment Act*.

I hereby declare that to the best of my knowledge, information and belief the information contained in this form Is complete and accurate

Name of Owner Representative (Print)	Owner representative's title (Print)
Bill Watson, P. Eng.	CAO
Owner Representative's Signature	Date (mm/dd/yy)
	08/25/2017