Municipality of Brighton

Staff Report

Meeting Date:	02 Apr 2024
To:	Mayor and Members of Council
Prepared By:	Leslie Whiteman
Reviewed By:	Bob Casselman
Department:	Public Works and Infrastructure
Subject/Title:	2023 Wastewater Pollution Control Plant and Lift Station Annual Report

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Recommendation:
That Council receive the staff report dated April 2, 2024, regarding "The 2023 Wastewater Pollution Control Plant and Lift Station Annual Report" as information.

Background/Purpose:
The Municipality of Brighton's Wastewater Pollution Control Plant (WPCP) operates under the Environmental Compliance Approval (ECA) #7701-CDNKQA and our Lift Station - Collection System operates under the Environmental Compliance Approval (ECA) #A-500-1122249878. Section 11 of the ECA requires the submission of an annual performance report to the Ministry of Environment, Conservation and Parks (MECP).

Analysis/Comments:
The attached "2023 Wastewater Pollution Control Plant and Lift Station Annual Report" will be submitted to the MECP as per the ECA requirements. Continued infrastructure improvements and replacements should reduce load amounts on our infrastructure in the future.

Legal/Legislative:
Annual reporting to the MECP is a stipulated requirement of the present ECA.

Financial Implications:
No issues or concerns are offered regarding significant financial implications at this point in time. The Environmental Services division, and in particular our wastewater operators and staff, continue to review the delivery model and will be conducting an internal review to identify any training considerations that may be needed in order to ensure that our processes, procedures and methodologies remain both fully compliant and financially efficient.

Strategic Plan Alignment:
• Infrastructure

Additional Strategic Plan Information:
The staff information report is consistent with Council's Strategic Plan Objective: "Repair and maintain critical infrastructure ensuring both fiscal and environmental sustainability".

MUNICIPALITY OF
BRIGHTON

2023

Wastewater Pollution Control Plant and Liftstation Annual Report

Environmental Compliance Approval
7701-CDNKQA
A-500-1122249878
March 22, 2024

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1.0 Introduction

The Municipality of Brighton is pleased to present its Annual Performance Report for the Brighton Water Pollution Control Plant (WPCP) governed by ECA 7701-CDNKQA issued on April 21, 2022, and the Harbour Street Sewage Pumping Station governed by ECA number A-500-1122249878 issued on August 25, 2021, for the operating period of January 1 to December 31, 2023.

Brighton's Water Pollution Control Plant (WPCP) services a population of approximately 7,000, as well as Presqu'ile Provincial Park. The Wastewater Collection System (WWCS) is designated as a Class II subsystem; the Water Pollution Control Plant (WPCP) is designated as a Class I subsystem.

This report has been prepared in accordance with Condition 11(4) of the WPCP ECA, and Condition 8(3) of the Harbour Street Sewage Pumping Station. Each of the ECA's includes Limited Operational Flexibility (LOF) provisions to allow expedited changes to the treatment operation, subject to final MECP approvals and conditions.

The WPCP is located at 100 County Road 64, and the Harbour Street Sewage Pumping Station is located at 7 Harbour Street. Wastewater collected from the serviced area of the Municipality passes through the Sewage Pumping Station, with force-mains delivering raw sewage to the Lagoon system. A second gravity feed also discharges to the Brighton WPCP. The Lagoon system is comprised of four treatment components in the order listed below:

1) A 0.7-hectare aerated cell (Lagoon #1) with two mechanical surface aerators (15hp), and five aspirating aerators (three 10hp, and two 25hp).
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 provincially significant natural wetland that borders Presqu'ile Bay, which is located off the northeast shore of Lake Ontario.

2.0 Wastewater Flows and Raw Sewage Quality

The WPCP has a Rated Capacity of 4,600 m^3/day. For purposes of monitoring and reporting Raw Influent flows, the Aeration Pond Effluent flow meter is referenced in Table I below. The Annual Average Daily Flow is calculated at 3,159 m^3/day, accounting for an average 69% of the Rated Capacity. Throughout the Reporting Period, the highest daily flow recorded was in March at 9,722 m^3/day. The lowest daily flow occurred in October at 950 m^3/day.

Table I Summary of Aeration PondEffluent flows in 2023.

It should be noted that in 2023 substantial rainfall and mild temperatures in the winter months contributed to higher-than-normal flows. The Municipality of Brighton is continuing to identify and repair areas with excess inflow and infiltration.

Table I
Monthly Wastewater Flows to Stabilization Pond in 2023

Month	Total Flow (m^3)	Average Daily Flow (m^3/day)	Percent of the rated capacity (%)
January	134,976	4,354	95%
February	113,450	4,052	88%
March	143,258	4,621	100%
April	132,363	4,412	96%
May	116,838	3,769	82%
June	76,981	2,566	56%
July	86,731	2,798	61%
August	87,293	2,816	61%
September	59,369	1,979	43%
October	56,231	1,814	39%
November	58,089	1,936	42%
December	86,399	2,787	61%
Annual	**1,151,978**	**3,159**	**69%**

2.1 Flow Interpretation

The variations in the flow of wastewater received at the WPCP are likely caused by Inflow and Infiltration (possible sump pumps and rain events) to the collection system, because of local precipitation events, fluctuations in groundwater elevations and snowmelt. Flow values identified above are from the Aeration Pond Effluent. This meter would capture gravity and force-main influent flows.

Sewer repair work, and CCTV work, was started in late 2023 to help in identifying and repairing sections with excess inflow and infiltration. From 2019 to 2023 inspections of sanitary works in new subdivisions were completed before assumption or as part of the inspection of new building structures. These inspections and CCTV work have had a positive impact on the sanitary system. There are surges in flows when rain events happen, this suggests that sump pumps are attached to the sanitary system. When road reconstruction happens, it is suggested that storm lines be upgraded to handle sump pumps on that street. This would reduce flows to the sanitary system and increase reserved capacity. Further work will be carried out in 2024 that will have the entire system reviewed along with sewer repairs that should further reduce infiltration sources.

2.2 Raw Sewage Quality

As per the ECA, raw sewage samples are to be collected and analyzed for select parameters normally once per month. However, for 2023, raw sewage samples were collected weekly as part of an intensive study of the WPCP to better assess ammonia treatment.

Table II as follows, summarizes raw wastewater quality for 2023. Weekly raw sewage samples provide better data for managing operation of the aerated cell. Results for all samples collected within a month were averaged to determine raw sewage quality values provided in **Table II**.

Raw sewage samples are collected just upstream of the WCPC aeration pond in the sanitary sewer collection system. Since the upgrade of the pumping station has been completed, Raw Samples are grabbed and analyzed weekly, as a combination of both pumped and gravity relayed sewage.

Table II
Monthly Raw Sewage Quality In 2023

2023	BOD5 (mg/L)	TSS (mg/L)	Total Phosphorus (mg/L)	TKN (mg/L)	Ammonia Nitrogen (mg/L)
January	120	129	2.29	27.8	22.3
February	170	151	3.61	33.8	24.0
March	111	142	2.70	27.0	21.0
April	119	104	2.65	31.3	21.3
May	96	190	2.52	25.8	21.3
June	101	216	3.83	35.8	31.5
July	116	120	3.48	35.9	32.7
August	255	183	3.82	37.5	33.3
September	248	293	6.15	55.2	43.7
October	206	217	5.38	50.1	46.4
November	206	181	4.17	43.4	38.9
December	151	157	3.16	30.1	26.6
Average	**158.3**	**173.6**	**3.64**	**36.1**	**30.25**

3.0 Wastewater Effluent Quality

Schedule C of the ECA identifies Final Effluent Compliance Limits for sample location downstream of the Stabilization Lagoon and upstream of the Constructed wetland. Effluent design objectives are identified in Schedule B.

Schedule D of the ECA identifies Monitoring parameters for both Influent and Final Effluent monitoring. Table III below outlines Final Effluent flows throughout the Reporting Period. The facility operated at 67% of the Rated Capacity throughout the Reporting Period, with an Annual Average Daily Flow of 3,069 m^3/day.

Table III
2023 monthly Final Effluent flows to Constructed Wetland

Month	Total Flow (m^3)	Avg. Flow (m^3/day)	Peak Monthly Flow (m^3/day)	Percent of the rated capacity (%)
January	139,361	4,496	8,533	98
February	113,172	4,042	7,601	88
March	146,097	4,713	8,352	102
April	130,185	4,340	8,667	94
May	111,180	3,393	6,672	86
June	70,775	2,359	4,347	49
July	82,733	2,669	4,684	51
August	84,767	2,734	3,872	59
September	51,643	1,721	2,790	37
October	50,790	1,638	2,281	35
November	57,060	1,902	3,193	41
December	87,327	2,817	4,071	61
Annual	**1,123,265**	**3,069**		**67%**

4.0 Overview of Success And Adequacy of Works

For the most part, the WPCP is successfully treating the effluent for all effluent parameters apart from TAN. As per Table IV, there were exceedances of TAN for five months in 2023.

For E-coli, there is no active disinfection in the treatment process and the influence of wildlife contributes to higher E-coli values.

Table IV summarizes effluent quality for the Stabilization Lagoon. Effluent Objectives and Limits are also captured in the table. For CBOD5 and TSS, compliance is based on an Annual Average Effluent Concentration; all other parameters have a Monthly Average Effluent Concentration Limit. In 2023, the effluent quality did not meet the Objectives for Total Suspended Solids (TSS) in February, and April. The facility did not meet Effluent Tan Limits May, June, July, August and September. As mentioned in previous Performance Reports, the facility is not able to consistently facilitate the nitrification process. Best efforts were made to modify operating strategies for nitrification to occur, however during cold water temperatures in the winter, and ammonia bleed-out from sludge deposits in the Stabilization Lagoon, Objectives and Limits were not consistently achieved.

Note: Blue text on Table IV denotes months that did not achieve Objective Limits. Red text on Table IV were months that did not achieve Compliance Limits.

Table IV
Monthly Average Waste Stabilization Pond Effluent Quality – 2023

Parameter	CBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	TAN (mg/L)	TKN	E-coli (mg/L)	Temp	pH	Nitrate (mg/L)	Nitrite (mg/L)
Effluent Objectives (mg/L)	15.0	15.0	0.8	May 1-Oct 31: 10.0 Nov 1-Apr 30: 15.0	No objective	200 cfu/100mL		6.5-9.0	No objective	No objective
Effluent Limit (mg/L)	30	40	1.0	May-Oct 31:14.0 Nov 1-Apr 30: 17.0	No Limit	No Limit	No Limit	6.0-9.5	No Limit	No Limit
January	6	7	0.20	11.9	12.3	1000	3.2	7.6	0.13	0.94
February	17	24	0.24	13.1	14.7	10400	4.1	7.7	0.09	0.55
March	11	14	0.23	12.9	13.8	196	4.2	7.7	0.11	0.46
April	15	20	0.21	10.2	14.0	2120	9.8	8.0	0.08	0.53
May	6	8	0.30	17.1	19.6	300	16.0	7.9	0.04	0.07
June	4	5	0.31	23.8	24.9	1000	21.1	7.7	0.08	0.06
July	4	4	0.33	16.0	16.9	4	24.7	7.7	0.59	0.18
August	3	4	0.42	14.8	15.2	10	21.8	7.8	0.29	0.09
September	4	4	0.43	17.4	18.1	38	21.4	7.8	0.20	0.24
October	2	3	0.22	14.0	15.0	30	13.2	7.7	0.24	1.19
November	3	3	0.26	14.1	17.1	154	6.0	7.6	0.12	1.49
December	6	6	0.29	17.9	18.9	198	4.0	7.5	0.06	1.37
Average	**7**	**9**	**0.29**	**15.3**	**16.7**	**1288**	**12.5**	**7.7**	**0.2**	**0.59**

Table V provides Stabilization Pond effluent loading results. For CBOD5 and TSS, compliance is based on an Annual Average Daily Effluent Loading; all other parameters have a Monthly Average Loading Limit. The effluent from the Lagoon met the effluent loading limits for all required parameters. **Table V** also estimates sludge generation rates in the waste stabilization pond.

Table V
Monthly Average Waste Stabilization Pond Effluent Load – 2023

	CBOD5 (kg/d)	TSS (kg/d)	TP (kg/d)	TAN (kg/d)	Sludge Generated Approximately**
ECA Limit	138 kg/d	184 kg/d	4.6 kg/d	May-Oct 64.4 kg/d Nov-Apr 78.2 kg/d	(m3/month) Based on Sludge Yield of 2.8 l/ m3
January	25.3	31.3	0.88	51.8	377.9
February	68.9	97.2	0.95	53.0	317.7
March	52.0	65.9	1.07	59.6	401.1
April	66.2	88.2	0.93	44.9	370.6
May	23.4	30.2	1.12	64.6	327.1
June	10.3	12.2	0.79	61.1	215.5
July	11.9	11.9	0.93	44.7	242.8
August	7.9	11.8	1.18	41.6	244.4
September	6.9	7.4	0.85	34.4	166.2
October	3.6	5.8	0.40	25.4	157.4
November	5.8	5.8	0.50	27.3	162.6
December	16.7	15.3	0.81	49.9	241.9
Average	**24.9**	**31.9**	**0.87**	**46.5**	**268.8**

**Sludge generated is based on an estimated sludge yield of 2.8 Litres of sludge per cubic meter of wastewater treated. Sludge yield at 2.8L/m^3 based on 5% total solids in sludge blanket on bottom of stabilization lagoon. The ECA does not limit sludge production rates.

Table VI
Overall Efficiency of WPCP Sewage Works System - 2023

Date	CBOD5 (%)	TSS (%)	TP (%)	Ammonia Nitrogen (%)
January	96.7	98.1	96.0	50.1
February	96.3	96.9	97.9	49.1
March	97.1	97.9	97.3	43.2
April	97.1	96.9	97.2	57.9
May	95.6	93.1	93.3	39.1
June	96.0	96.9	83.1	44.8
July	96.5	96.7	77.2	53.3
August	97.6	98.4	78.4	63.1
September	98.6	98.7	90.0	66.0
October	98.5	99.0	97.0	76.2
November	97.9	98.8	98.3	74.1
December	97.3	98.1	96.5	56.1
Average	**97.1**	**97.4**	**91.8**	**56.1**

5.0 Operating Issues and Corrective Actions

Table VII Summary of mechanical problems and corrective actions in 2023.

Table VII
Summary of Operating Issues and Corrective Actions

Location	Issue	Corrective Action
Lagoon	Ammonia	Retained engineer for new treatment plant design
Ferric pump head replacement	Lagoon	Replace pump head cartridge x 3, normal wear.
Liftstation	Liftstation debris (twice yearly maintenance)	Quinte Sewer clean wetwell
Aerated cell	Debris on aerators	cleaned aerators maintenance
Loyalist Drive	Lateral cleaning twice a year	3 homes on one service, reconstruction of loyalist drive in July resolved this issue
Lagoon, Wetland, Park	Calibrations and Inspection	Yearly
Liftstation	Onsite Inspection JL Richards	Pump upgrade
WPCP	Hoist Inspection	3 at Liftstation (one for Park)
Liftstation	Pump replacement	Upgrade to Liftstation
Collection System	Inflow and infiltration	Clean and inspect portion of Collection system to optimize capacity and reduce I&I

6.0 Summary Of Maintenance

Table VIII summarizes 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)
Yearly	Jar Testing for Ferric Dosing	Garrett Speck, FanChem/PVS Benson
Quarterly	Flash mixer/ Aerators/Pumps	Grease/check oil
Yearly	Sludge Depth Measured	Sonar Mapping
Quarterly maintenance	Watson Marlow QDos	replace heads when required (usual 3 to 4 months)
Yearly	Siemens Magmeter, LUT400	Calibration
Equipment Calibration	Flow monitoring devises at Lagoon, liftstation, Wetlands and Presqu'ile Park	Calibration
Liftstation	Liftstation debris (quarterly maintenance)	Quinte Sewer clean wetwell
Spring (yearly)	wetland levels	Water levels lowered
Spring, summer, and fall (yearly)	Aerators	Repairs or Removed debris
Summer (yearly)	Constructed wetland	Water levels Lowered
Weekly	Berm	Repair/Maintenance
November (yearly)	wetland levels	Water levels raised

7.0 Effluent Quality Assurance and Control

Wastewater exiting the aeration pond passes through a chemical dosing chamber (also called the Cell). Ferric Chloride is a coagulant used to remove phosphorus and help with flocculation of solids. It also aids in the settling of other substances and odour control. The dosing system operates twenty-four (24) hours a day, seven (7) days a week and is measured to dose exact amounts of ferric chloride for optimal performance. The system is checked and logged daily by a wastewater operator.

Raw sewage and effluent samples are collected by a trained wastewater operator, following the applicable MECP guidelines. All collected wastewater samples are sent weekly to an accredited laboratory for analysis. The results of the raw sewage and effluent sampling results are analyzed weekly by the Municipality of Brighton staff. Results showing non-compliance with the required wastewater limit or objective, as stated in the ECA, is reported to the MECP in accordance with the ECA.

8.0 Summary of Calibration and Maintenance on Monitoring Equipment

Table IX – Equipment Calibration

Date of Calibration or Maintenance	Equipment Calibrated/ Maintenance	Company Performing Calibration/Maintenance
Yearly	Flow monitors/ Mag Meters	Franklin/Siemens
Yearly	*DO meter/ DO Probes/ DR3900	Hach Technician
Weekly	*DO probe/pH meters	In-house

*DO stands for Dissolved Oxygen

8.1 Calibration reports for flow metering and analysis equipment as follows.

Certificate of Instrument Performance
Certificat de Conformité

Company Name / Nom de la Compagnie : MUNICIPALITY OF BRIGHTON

Account Number / No. de compte : 40170999

Certification Number / Numéro du Certificat : WO-01461959

Part Number / No. de pièce : LPV440.99.00012	db aa DR3900 SPECTROPHOTOMETER WITH RFID
Serial Number / No. de série : 1834843	
External Reference / Référence externe :	

Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, verified with standards and now meets new product specifications.

Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.

Certified by / Certifié par :

SK

Suresh Kurup

Certification Date / Date de certification :

11/16/2023

Certificate of Instrument Performance
Certificat de Conformité

Company Name / Nom de la Compagnie : MUNICIPALITY OF BRIGHTON

Account Number / No. de compte : 40170999

Certification Number / Numéro du Certificat : WO-01461959

Part Number / No. de pièce : HQ30D	oo HQ30d FLEXI PORTABLE METER
Serial Number / No. de série : 131100096249	
External Reference / Référence externe : DO	

Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, verified with standards and now meets new product specifications.

Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.

Certified by / Certifié par :

SK

Suresh Kurup

Certification Date / Date de certification :

11/16/2023

FRANKLIN EMPIRE

CALIBRATION REPORT

TAG NO.:	Lagoon
REPORT NO.:	230906
DATE:	06-Sep-23

SITE:	Brighton Waste Water	DATE:	September 6, 2023
PROCESS AREA:	Effluent flow from main settling ponds.		
INSTR. TAG:	Lagoon	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans LUT 440 & XRS-5C	REPORT NO.:	230906
SERIAL No.:	PBD/E4090499		
INSTR. RANGE:	0 to 1250 m³/hr		

PRIMARY DEVICE:	18" Parshall Flume	
MAX FLOW:	1250	m³/hr
MAX HEAD:	48.50	cm
CONSTANT:	3809.5	
EXPONENT:	1.540	

Output:	mA	Flow
Zero:	4	0.00
Max:	20	1250.0

Figure of Merit: 90 %
Confidence: 34
Echo Strength: 95 dB
Noise Average: -5 dB

OCM Flow Table

Head Applied (cm)	Head Displayed (cm)	Error (%)	Calculated Flow (m³/hr)	Flow Displayed (m³/hr)	Error (%)	Calculated mA Output	Measured mA Output	Error (%)
0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
10.00	9.96	-0.40	109.9	109.4	-0.43	5.41	5.38	-0.49
19.00	18.99	-0.05	295.2	295.0	-0.08	7.78	7.77	-0.11
30.00	30.05	0.17	596.5	598.0	0.25	11.64	11.67	0.29
40.00	39.96	-0.10	929.1	927.0	-0.22	15.89	15.85	-0.26
48.50		#DIV/0!	1250.0		#DIV/0!	20.00		#DIV/0!

Totalizer As Found	721856.81	m³
Totalizer As Left	721900.87	m³
Zero As Found	76.71000	cm
Zero As Left	76.71000	cm
Change in Zero	0.00000	cm

Comments

AS FOUND: PASS **AS LEFT:** PASS **CERTIFIED BY:** Mike Humphries

CALIBRATION REPORT

TAG NO.:	Marsh
REPORT NO.:	230906
DATE:	06-Sep-23

SITE:	Brighton Waste Water	DATE:	September 6, 2023
PROCESS AREA:	Effluent flow to filter ponds.		
INSTR. TAG:	Marsh	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans LUT 440 & XRS-5C	REPORT NO.:	230906
SERIAL No.:	PBD/LO160029		
INSTR. RANGE:	0 to 6730 m³/day		

PRIMARY DEVICE:	2 X 90° V-Notch Weirs	
MAX FLOW:	6730	m³/day
MAX HEAD:	24.00	cm
CONSTANT:	4968.7	
EXPONENT:	2.500	

Output:	mA	Flow
Zero:	4	0.00
Max:	20	6730.0

Figure of Merit: 88 %
Confidence: 16
Echo Strength: 83 dB
Noise Average: -4 dB

OCM Flow Table

Head Applied (cm)	Head Displayed (cm)	Error (%)	Calculated Flow (m³/hr)	Flow Displayed (m³/hr)	Error (%)	Calculated mA Output	Measured mA Output	Error (%)
0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
6.00	5.99	-0.17	210.3	209.50	-0.39	4.50	4.50	0.00
12.00	11.94	-0.50	1189.7	1183.00	-0.57	6.83	6.80	-0.42
18.00	18.04	0.22	3278.4	3267.00	-0.35	11.79	11.82	0.22
24.00	23.93	-0.29	6730.0	6711.00	-0.28	20.00	19.95	-0.25
		0.00	0.0		0.00	4.00		#DIV/0!

Totalizer As Found	3211836.43	m³
Totalizer As Left	3211856.76	m³
Zero As Found	71.58000	cm
Zero As Left	71.58000	cm
Change in Zero	0.00000	cm

Comments

AS FOUND: PASS **AS LEFT:** PASS **CERTIFIED BY:** Mike Humphries

The Municipality of Brighton
2023 Wastewater Annual

FRANKLIN EMPIRE

CALIBRATION REPORT

TAG NO.:	North
REPORT NO.:	230906
DATE:	06-Sep-23

SITE:	Brighton Waste Water	DATE:	September 6, 2023
PROCESS AREA:	Final Effluent from North Filter Pond		
INSTR. TAG:	North	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans LUT 440 & XRS-5C	REPORT NO.:	230906
SERIAL No.:	PBD/M3060437		
INSTR. RANGE:	0 to 20894.4 m³/day		

PRIMARY DEVICE:	Rectangular Weir	
MAX FLOW:	20894.4	m³/day
MAX HEAD:	40.00	cm
CONSTANT:	3441.35	
EXPONENT:	1.500	

Output:	mA	Flow
Zero:	4	0.00
Max:	20	20894.4

Figure of Merit: 86 %
Confidence: 32
Echo Strength: 86 dB
Noise Average: 10 dB

OCM Flow Table

Head Applied (cm)	Head Displayed (cm)	Error (%)	Calculated Flow (m³/hr)	Flow Displayed (m³/hr)	Error (%)	Calculated mA Output	Measured mA Output	Error (%)
0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
10.00	10.03	0.30	2611.8	2620	0.31	6.00	6.02	0.33
20.00	19.93	-0.35	7387.3	7355	-0.44	9.66	9.63	-0.28
30.00	29.92	-0.27	13571.3	13545	-0.19	14.39	14.37	-0.16
40.00	39.96	-0.10	20894.4	20860	-0.16	20.00	19.97	-0.15
		0.00	0.0		0.00	4.00		#DIV/0!

Totalizer As Found	1106828.4	m³
Totalizer As Left	1106955.67	m³
Zero As Found	158.30000	cm
Zero As Left	158.30000	cm
Change in Zero	0.00000	cm

Comments

AS FOUND: PASS **AS LEFT:** PASS **CERTIFIED BY:** Mike Humphries

The Municipality of Brighton
2023 Wastewater Annual

FRANKLIN EMPIRE

CALIBRATION REPORT

TAG NO.:	South
REPORT NO.:	230906
DATE:	06-Sep-23

SITE:	Brighton Waste Water	DATE:	September 6, 2023
PROCESS AREA:	Final Effluent from South Filter Pond		
INSTR. TAG:	South	TECHNICIAN:	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans LUT 440 & XRS-5C	REPORT NO.:	230906
SERIAL No.:	PBD/L8270365		
INSTR. RANGE:	0 to 20894.4 m³/day		

PRIMARY DEVICE:	Rectangular Weir	
MAX FLOW:	20894.4	m³/day
MAX HEAD:	40.00	cm
CONSTANT:	3441.35	
EXPONENT:	1.500	

Output:	mA	Flow
Zero:	4	0.00
Max:	20	20894.4

Figure of Merit: 90 %
Confidence: 33
Echo Strength: 89 dB
Noise Average: -3 dB

OCM Flow Table

Head Applied (cm)	Head Displayed (cm)	Error (%)	Calculated Flow (m³/hr)	Flow Displayed (m³/hr)	Error (%)	Calculated mA Output	Measured mA Output	Error (%)
0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
10.00	10.03	0.30	2611.8	2619	0.27	6.00	6.02	0.33
20.00	19.91	-0.45	7387.3	7360	-0.37	9.66	9.61	-0.49
30.00	30.06	0.20	13571.3	13603	0.23	14.39	14.43	0.26
40.00	40.09	0.22	20894.4	20934	0.19	20.00	20.04	0.20
		0.00	0.0		0.00	4.00		#DIV/0!

Totalizer As Found	1288865.74	m³
Totalizer As Left	1288969.56	m³
Zero As Found	159.16000	cm
Zero As Left	159.16000	cm
Change in Zero	0.00000	cm

Comments

AS FOUND: PASS **AS LEFT:** PASS **CERTIFIED BY:** Mike Humphries

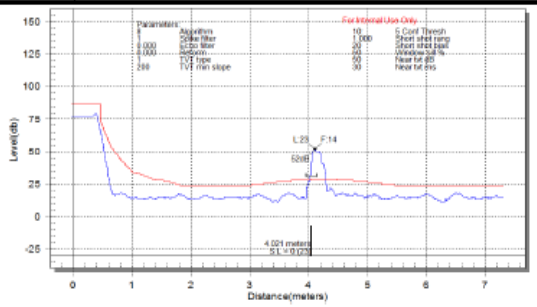
Harbour St SPS

FRANKLIN EMPIRE	CALIBRATION REPORT	Report No.: 230906 LIT-101201
		Date: 06-Sep-23

SITE:	Harbour St SPS	**SERVICE DATE:**	September 6, 2023
PROCESS AREA:	Wet Well Level		
INSTR. TAG:	LIT-101201	**TECHNICIAN:**	Mike Humphries
MANUFACTURER:	Siemens		
MODEL:	Sitrans Multiranger 200 HMI	**JOB REFERENCE:**	230906
SERIAL No.:			
TRANSDUCER:	XPS-15		

Measured Distance: (m)	MR200 Reading (m)	(Error) Calculated	Output Type or EGU:	(Signal) mA	(Process) m
			Min:	4.00	0.00
0.00	0.00	0.00%	Max:	20.00	5.80

Main Parameters	
P001	1 (Level)
P002	1 (Liquids)
P003	2 (1.0m/min)
P004	104 (XPS-15)
P005	1 (units-m)
P006	6.10 m (Empty)
P007	5.80 cm (Span)
Confidence	23
Full Parameter list available	



Calibration Equipment			
Type:	DMM	Laser Distance Meter	Tape Measure
Manufacturer:	Fluke	Fluke	Stanley
Model:	Model 87	424D	5m/25ft
Serial No.:	94140067		
Last Cal. Date:	March 16, 2023		

Test Level (Sim)	MR200 Level	Error %	mA Expected	Fluke mA	Error %	PLC mA
0.0		0.00%	4.00		-100.00%	
1.5		-100.00%	8.00		-100.00%	
2.9		-100.00%	12.00		-100.00%	
4.4		-100.00%	16.00		-100.00%	
5.8		-100.00%	20.00		-100.00%	

Comments: Meter has a good strong echo.

Relay #6 set to LOE

AS FOUND: PASS **AS LEFT:** PASS

CERTIFIED BY: Mike Humphries

SIEMENS MAGFLO® Verification Certificate

Customer:

Name	Brighton, Town of
Address	35 Alice Street
	Brighton, ON
	K0K 1H0
Phone	613-475-3453
Email	

MAGFLO® Identification:

TAG No./Name	0
Sensor Code No.	7ME652
Sensor Serial No.	122202H091
Transmitter Code No.	7ME691
Transmitter Serial No.	401730N041
Location	Presqu'ile

Results:

Verification file name or No.		Presqu'ile Flow
Transmitter		Passed
Sensor	Insulation	Passed
	Magnetic Circuit	Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.804mA	0.49%	0.500kHz	0.501kHz	0.24%
1.0m/s	5.600mA	5.605mA	0.31%	1.000kHz	1.002kHz	0.23%
3.0m/s	8.800mA	8.804mA	0.09%	3.000kHz	3.003kHz	0.11%
	Current Output 4-20mA			Frequency Output 0-10kHz		

Transmitter Settings:

Basic	Qmax.	2000.00 l /min
	Flow Direction	Positive
	Low flow Cut-off	3.00%
	Empty Pipe	ON
Output	Current Output	OFF
	Time Constant	N/A
	Relay Output	Error Level
	Digital Output	Pulse
	Frequency Range	N/A
	Time Constant	N/A
	Volume/pulse	0.99999953 US G/p
	Pulse width	0.066 sec.
	Pulse polarity	Positiv
Totalizer 1 value before test		118001.7265625 m³
Totalizer 1 value after test		118001.7578125 m³
Totalizer 2 value before test		4.6906147 m³
Totalizer 2 value after test		4.6906209 m³
Operating time in days		4434

Sensor Details:

Size	DN 150 6 IN
Cal. Factor	15.6641264
Correction Factor	1.0
Excitation Freq.	7.5Hz

Verificator Details (083F5060)

Serial No.	001113N039
Device No.	91738
Software Version	1.40
PC-Software Version	5.00
Cal. date	2022.12.29
ReCal. date	2023.12.29

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2023.09.06 Mike Humphries

SIEMENS MAGFLO® Verification Certificate

Customer:

Name	Brighton, Town of
Address	35 Alice Street
	Brighton, ON
	K0K 1H0
Phone	613-475-3453
Email	

MAGFLO® Identification:

TAG No./Name	0
Sensor Code No.	7ME652
Sensor Serial No.	PBD-P3034515
Transmitter Code No.	7ME69202CA301AA0
Transmitter Serial No.	N1P6295123
Location	Harbour St SPS

Results:

Verification file name or No.		FIT-101105
Transmitter		Passed
Sensor	Insulation	Passed
	Magnetic Circuit	Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.802mA	0.25%	0.500kHz	0.501kHz	0.14%
1.0m/s	5.600mA	5.602mA	0.13%	1.000kHz	1.001kHz	0.09%
3.0m/s	8.800mA	8.804mA	0.08%	3.000kHz	3.003kHz	0.08%
	Current Output 4-20mA			Frequency Output 0-10kHz		

Transmitter Settings:

Basic	Qmax.	300.000 l/s
	Flow Direction	Positive
	Low flow Cut-off	1.50%
	Empty Pipe	ON
Output	Current Output	ON (4-20mA)
	Time Constant	5.0 Sec.
	Relay Output	Error Level
	Digital Output	OFF
	Frequency Range	N/A
	Time Constant	N/A
	Volume/pulse	0.0 US G/p
	Pulse width	0.066 sec.
	Pulse polarity	Positiv
Totalizer 1 value before test		270398.5 m³
Totalizer 1 value after test		270398.59375 m³
Totalizer 2 value before test		19.90870476 m³
Totalizer 2 value after test		19.90909386 m³
Operating time in days		196

Sensor Details:

Size	DN 300 12 IN
Cal. Factor	62.78400421
Correction Factor	1.0
Excitation Freq.	3.75Hz

Verificator Details (083F5060)

Serial No.	001113N039
Device No.	91738
Software Version	1.40
PC-Software Version	5.00
Cal. date	2022.12.29
ReCal. date	2023.12.29

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2023.09.06 Mike Humphries

SIEMENS MAGFLO® Verification Certificate

Customer:

Name	Brighton, Town of
Address	35 Alice Street
	Brighton, ON
	K0K 1H0
Phone	613-475-3453
Email	

MAGFLO® Identification:

TAG No./Name	0
Sensor Code No.	7ME652
Sensor Serial No.	PBD-P3044519
Transmitter Code No.	7ME69202CA301AA0
Transmitter Serial No.	N1P6295121
Location	Harbour St SPS

Results:

Verification file name or No.		FIT-101205
Transmitter		Passed
Sensor	Insulation	Passed
	Magnetic Circuit	Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.802mA	0.25%	0.500kHz	0.501kHz	0.11%
1.0m/s	5.600mA	5.602mA	0.10%	1.000kHz	1.000kHz	0.04%
3.0m/s	8.800mA	8.805mA	0.11%	3.000kHz	3.003kHz	0.10%
	Current Output 4-20mA			Frequency Output 0-10kHz		

Transmitter Settings:

Basic	Qmax.	300.000 l/s
	Flow Direction	Positive
	Low flow Cut-off	1.50%
	Empty Pipe	ON
Output	Current Output	ON (4-20mA)
	Time Constant	5.0 Sec.
	Relay Output	Error Level
	Digital Output	OFF
	Frequency Range	N/A
	Time Constant	N/A
	Volume/pulse	0.0 m³/p
	Pulse width	0.066 sec.
	Pulse polarity	Positiv
Totalizer 1 value before test		227128.765625 m³
Totalizer 1 value after test		227128.875 m³
Totalizer 2 value before test		24.01012611 m³
Totalizer 2 value after test		24.01021385 m³
Operating time in days		196

Sensor Details:

Size	DN 350 14 IN
Cal. Factor	85.31098938
Correction Factor	1.0
Excitation Freq.	3.75Hz

Verificator Details (083F5060)

Serial No.	001113N039
Device No.	91738
Software Version	1.40
PC-Software Version	5.00
Cal. date	2022.12.29
ReCal. date	2023.12.29

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.

Verification is traceable to National and International Standards.

Date and signature

2023.09.06 Mike Humphries

9.0 Efforts and Results to Meet Effluent Objectives

The Municipality of Brighton has implemented several interim efforts under the Limited Operational Flexibility (LOF) process of the ECA to improve performance of the lagoon treatment system.

Since 2015, five aerators have been added to the aerated cell. Total aeration power now provided is 110 Horsepower (approx. 83 Kilowatts). Of the five new aerators, three of the new aerators (10 hp each) were added to the aerated cell in late June 2020.

While total energy "density" available in the aerated cell is relatively low (3.3 Watts/m^3) based on total volume of 18,000 m^3), all seven (7) aerators, when running together, have proven to be fairly successful in suspending a significant number of solids in the aerated cell (Note the MECP recommendation for full suspension of solids is 15-25 Watts/m^3). However, one of the issues that the Municipality of Brighton staff run into is a washout of biomass when flows are higher than normal, a biomass can take from 5 to 6 weeks to establish in a perfect environment, so when a washout occurs this system takes time to re-establish.

For several years, on/off aerator operation combined with manual "**decanting**" of the surface layer of effluent from the aerated cell when the aerators were off has been practiced. This would assumedly retain solids within the aerated cell and allow Volatile Suspended Solids (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 MECP in August 2017. A renewal of the decanting process was again requested in 2019 (Notification Number 8). Notification Number 8 is included in **Appendix A.**

Notification Number 8 was subsequently approved by the MECP under the LOF conditions of the current ECA. Decanting was completed in 2018 (and then again in 2019, 2020, 2021, 2022, 2023) by the following manual decanting method:

Decanting 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 hour 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, decanting lowered water levels in the aeration cell byapproximately 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 for daily decanting.

The operators completed regular measurement of dissolved oxygen in the aerated cell. Generally, the 4 hour decant period depending on dissolved oxygen (8 am to 12 pm) resulted in falling dissolved oxygen levels in the aerated cell, but oxygen levels do not normally 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 above 3 mg/l.

The surface area of the aerated cell is approximately 6,000 m^2. Therefore, the volume contained in the top 0.3 m of the cell is approximately 1,800 m^3. Therefore, given a fill time of 17 hours (2 pm to 7 am), the stop logs would not normally start overflowing before 7 am of the next day if incoming sewage flows were less than 106 m^3/hour (or 2,500 m^3/day).

Normally, once the aerated cell was decanted for 4 hours or shorter, 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. Additionally, there are times the aerators will run continuously due to DO levels and more adequate mixing.

Results – Retention of VSS and Removal of Ammonia

Decanting was completed on a sporadic basis during the early months of 2023 but generally full-time aeration (and normal overflow of the aeration cell to the lagoon) was practiced during the summer of 2023.

Other Results

Other than TAN, decanting beginning in January 2023 appeared to improve, or at least maintain, the high quality of effluent being discharged from the downstream Stabilization Lagoon. Values of CBOD, TSS and TP were often at very low levels consistent with tertiary treatment.

Summary

The decanting process, combined with on/off operation of the aerators, appears capable of building relatively high levels of VSS (but not as necessary as we originally thought) in the aeration cell. The addition of 3 aerators in June 2020 demonstrated that this additional mixing energy was sufficient to suspend high levels of VSS (greater than 400 mg/l) in the aeration cell.

These higher levels of VSS were coinciding with very good ammonia removal rates but in 2023 even with low levels of VSS the system still responded. However, the ability of the extra mixing energy to maintain high levels of VSS appeared to decrease when water temperatures in the aerated cell declined below 10 degrees Celsius. Added aeration also tends to lower the temperature of the aeration pond quicker than it used to. It is recommended that continued experimentation with various combinations of on/off aerator operation (either manually or by timers) coupled with decanting, be continued during 2024.

At this time, it is our assumption that the reason the 110 hp total, combined aerator energy did not keep VSS levels above 400 mg/l in the late fall was due to the increased viscosity of water under cold conditions. Therefore, additional aerators for late fall and winter use could provide the additional mixing energy required to keep enough VSS in suspension to achieve a VSS concentration of at least 400 mg/l and preferably higher (500 to 600 mg/l).

However, additional aerators would likely increase the rate of heat loss from the aerated cell and therefore drive down effluent temperatures.

10.0 Total Ammonium Nitrogen

Removal of TAN 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.

Beginning in 2018, efforts to improve TAN 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. In 2023, the Municipality of Brighton continues with decanting and fine tuning of the aeration pond. More critically, the additional 30 horsepower provided by the three additional aerators in June 2020 proved very successful in achieving higher concentrations of VSSbut in 2023 also showed the system could also work with low VSS.

In the summer of 2023, the Municipality hired an engineering firm to begin the design for a conventional type, extended aeration treatment plant, including headworks, aeration tanks, clarifiers and disinfection. The Municipality through the design of an upgraded WWTF is committed to rectifying the long standing issue with TAN. Currently the design process is at 15% completion and the municipality is working closely with the MECP to ensure that design and construction will be followed through to full completion.

10.1 Total Phosphorus (TP)

As per **Table III**, there was no exceedance in 2023 of the TP limits of 1.0 mg/l for the lagoon.

10.2 CBOD and Suspended Solids

Levels of CBOD and suspended solids remained below the compliance limits for all months in 2023 and achieved compliance with the Annual Average Effluent Concentrations and Loadings. In February, March and April, the facility did not meet the effluent Objectives established for Total Suspended Solids but was able to meet them for all other parameters.

11.0 Biosolids Management

No Bio-solids were removed in 2023 but the municipality underwent an elaborate and extensive sludge mapping program to help identify existing sludge levels throughout the aeration pond and stabilization lagoon.

A significant volume of sludge (14,152 cubic meters) was removed from the stabilization lagoon between August and September of 2022 with land application.
That which follows is an estimate of sludge generated in the lagoon system in 2023, and the volume of sludge removed from the treatment works.

The volume of sludge generated, and stored in the lagoon (stabilization pond) is estimated as follows:

- Total sewage flow in 2023 – 1,123,265 m^3
- Assume starting sludge yield of 3.5 l/m^3 (as per Table 16-1 of Design Guidelines for Sewage Works – MOE, 2008)
- Above sludge yield is for conventional activated sludge plants with anaerobic treatment and with phosphorus removal. Sludge yield in Table 16-1 is based on average solids content of 4%.
- Some consolidation of sludge will occur over time in stabilization lagoon. Assume sludge thickening from 4% to 5% will occur. Therefore, sludge yield will be slightly less, or 0.8 X 3.5 l/m^3 = 2.8 l/m^3.
- Therefore, total sludge production in 2023 is estimated to be 3,145m^3 .

Net sludge generated in 2023 is summarized as follows:

Total Sewage Flow in 2023	**Sludge Yield**	**Total Sludge Generated**	**Average Sludge Depth in Lagoon**	**Sludge Removed**	**Net Sludge Added to Lagoon in 2022**
1,123,265m^3	2.8 l/m^3	3,145m^3	0.058 m	0 m^3	2,862m^3 *

Note – average sludge depth in lagoon above is extra sludge depth produced in lagoon in current year and based on approximate lagoon area of 54,400 m^2.

As above, new sludge deposited in lagoon in 2023 was approximately 3,145m^3.

12.0 Summary of Complaints

The Municipality of Brighton received no complaints in 2023.

13.0 Summary of By-Passes, Spills and Abnormal Discharges

There was no by-pass, sewage spill or abnormal discharge in 2023.

14.0 Summary of Sewer Work Completed

In Late 2023, the Municipality of Brighton continued to identify, clean, and repair a portion of the sewer collection system to ensure reduced I&I issues and obtain efficiency in the collection system. The Municipality is committed to continue this work throughout 2024.

Reducing inflow and infiltration to the system reduced potential overloading on the Lagoon and the receiving environment, reducing run time of pumping equipment and reduced energy usage for pumping sewage. One of the main issues is sump pumps which are illegally tied into the sanitary system which causes a surge to the pumping station and the lagoon. Treating clear water is costly and takes up reserved capacity of the sanitary system.

The Municipality of Brighton plans to invest further funding for sewer repairs in attempts to remove more inflow and infiltration to the sanitary system.

15.0 Rainbow Trout Toxicity Testing

The Municipality of Brighton has submitted samples of final effluent from the Lagoon to a toxicity laboratory in Guelph, Ontario (Aquatox Testing and Consulting Ltd.) for testing using young rainbow trout.

All tests completed in 2023 have passed toxicity testing. Sampling and testing have been done in accordance with Environment Canada requirements.

Appendix A

Notice of Modifications Submitted To Mecp Under Lof Process – 2018

Ontario

Ministry of the Environment

Notice of Modification to Sewage Works

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 Date (mm/dd/yy)	Notice number
Municipality of Brighton	3081-9XQNZK	07/07/15	8

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 nitrifiying 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, location, size, equipment type/model, material, process name, etc.)
2. An assessment of the anticipated environmental effects
3. Updated versions of, or amendments to, all relevant technical 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 the design:
1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in 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)
	06/21/2018
Name of Employer	
GSS Engineering Consultants 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 modification; 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)
Mr. Keith Lee	Wastewater Supervisor
Owner Representative's Signature	Date (mm/dd/yy)
	06/21/2018

EAB Form August 20, 2013

The Municipality of Brighton
2023 Wastewater Annual

Prepared by: Adam Walraven - Wastewater ORO

Municipality of Brighton
Report done on available data provided.