



**2012 WASTEWATER POLLUTION CONTROL
PLANT ANNUAL REPORT**

Certificate of Approval No 3560-8A8LEY
Sewage Works No. 110000953

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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, 2012. Brighton's Water Pollution Control Plant (WPCP) services a population of approximately 6,300 people, as well as Presqu'île Provincial Park. The WPCP is classified as a Class 1 treatment facility that operates under Certificate of Approval (CofA) Number 3560-8A8LEY, issued by the Ontario Ministry of the Environment (MOE). This report is presented in accordance with Section 10.6 of the CofA.

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 lagoon (Lagoon #1) with two mechanical surface aerators,
- 2) A chemical mixing chamber where alum 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'île Bay, which is located off the northeast shore of Lake Ontario.

2.0 WASTEWATER FLOWS

The CofA stipulates that the rated flow capacity of the WPCP is an average of 4,600 m³/day. The average flow for 2012 was 3,181 m³/day, which represents 69% of the rated flow capacity. The highest average flows occurred in January, February and March. The lowest average flows occurred in April, July and August. The highest monthly flow rate occurred in January and the lowest monthly flow rate occurred in July. The maximum daily flow for the year was 9,282 m³ on January 7th. The lowest daily flow was 1,605 m³ on May 16th. There was not an exceedance of the rated flow capacity of the WPCP in 2012.

Table I – Monthly Wastewater Flows to WPCP

Month	Total Flow (m³)	Avg. Flow (m³/day)	Percent of the rated capacity (%)
January	128,967	4,160	90
February	109,982	3,792	82
March	118,220	3,814	83
April	85,002	2,833	62
May	91,872	2,964	64
June	91,107	3,037	66
July	83,066	2,680	58
August	88,202	2,845	62
September	99,949	3,332	72
October	82,832	2,672	58
November	82,425	2,748	60
December	102,160	3,295	72
Annual	1,163,784	3,181	69

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 ground water elevations and snow melt.

3.0 WASTEWATER EFFLUENT QUALITY

Section 7 of the CofA lists monthly average limits for the levels of six 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), ammonia plus ammonium nitrogen (ammonia), Escherichia coliform bacteria (E. Coli), and pH. Section 9 of the CofA 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 2012, the effluent quality met the limits for the parameters tested, with the exception of E. Coli in February, March and December and ammonia from May to December inclusive (Table II).

Table II – Monthly Average Waste Stabilization Pond Effluent Quality

Parameter	CBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	Ammonia (mg/L)	E. Coli (cfu/100 mL)	pH
Effluent Limit (mg/L)	30	40	1.0	(May-Oct 14 Nov-Apr 17)	200	6.0- 9.5
January	13	21	0.39	10.0	140	7.9
February	8	18	0.44	10.9	2600	8.0
March	10	29	0.43	11.2	1400	8.1
April	5	4	0.25	15.7	<20	7.9
May	6	6	0.54	22.3	<20	7.9
June	2	5	0.32	26.6	20	8.0
July	4	10	0.24	20.7	4	7.9
August	2	6	0.22	17.4	6	8.1
September	<2	14	0.14	17.0	20	7.7
October	2	6	0.23	17.4	40	7.9
November	<2	6	0.27	21.5	64	7.7
December	4	14	0.45	19.0	280	7.8

Section 7 of the CofA also lists effluent loading limits for CBOD5, TSS, TP and Ammonia. The effluent from the waste stabilization pond met the effluent loading limits for all required parameters except for ammonia in May and June (Table III).

Table III – Monthly Average Waste Stabilization Pond Effluent Load

	CBOD5 (kg/d)	TSS (kg/d)	TP (kg/d)	Ammonia (kg/d)
CofA Limit	138	184	4.6	May-Oct 64.4 Nov-Apr 78.2
January	52.42	86.53	1.61	41.77
February	31.29	66.37	1.66	41.29
March	39.41	109.64	1.63	42.58
April	13.22	10.63	0.72	44.39
May	18.97	17.78	1.61	66.21
June	6.07	15.18	0.97	80.78
July	11.39	25.46	0.64	55.48
August	5.69	16.79	0.63	49.57
September	0.00	46.65	0.45	56.70
October	5.34	14.96	0.62	46.60
November	0.00	15.11	0.74	58.94
December	13.18	46.13	1.47	62.61

4.0 CONSTRUCTED WETLAND EFFLUENT QUALITY

Section 6 of the CofA lists monthly average objectives for the levels of six parameters in the constructed wetland effluent. It is the same six parameters that are listed for the waste stabilization pond. Section 9 of the CofA 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 2012, the effluent quality met the limits for the parameters tested, with the exception of ammonia from May to November (Table III).

Table IV – Monthly Average Constructed Wetland Effluent Quality

Parameter	CBOD5 (mg/L)	TSS (mg/L)	TP (mg/L)	Ammonia (mg/L)	E. Coli (cfu/100 mL)	pH
Effluent Objective (mg/L)	15	15	0.8	(May-Oct 10 Nov-Apr 15)	200	6.0- 9.5
January	7	12	0.24	8.9	20	7.9
February	5	8	0.19	10.3	100	8.1
March	5	12	0.24	8.8	180	8.1
April	2	4	0.16	9.0	<20	7.9
May	4	7	0.34	16.0	<20	7.9
June	1	4	0.14	19.8	20	7.7
July	3	8	0.14	17.2	32	7.7
August	3	3	0.19	13.0	106	7.8
September	1	4	0.13	15.4	200	7.6
October	2	7	0.27	14.0	184	7.7
November	2	9	0.16	19.6	130	7.7
December	2	5	0.22	15.0	12	7.9

5.0 OVERVIEW OF SUCCESS AND ADEQUACY OF WORKS

The WPCP is successfully treating the effluent for five of the six required parameters (Table V). The WPCP is not successfully treating ammonia. Analysis of the data shows that the waste stabilization pond is producing ammonia during May, June and July, adding to the level of ammonia that passes into the waste pond from the aeration pond. The most likely source of ammonia is the decomposition of organic matter within the waste stabilization pond.

Table V – Overall Efficiency of WPCP Sewage Works System

Date	CBOD5 (%)	TSS (%)	TP (%)	Ammonia (%)
January	69.17	82.29	87.92	31.38
February	92.42	94.22	89.81	63.90
March	94.95	90.43	86.18	nd
April	98.52	97.59	89.78	nd
May	91.76	94.43	90.39	40.07
June	98.41	96.08	95.62	36.90
July	95.00	92.45	96.28	44.97
August	96.73	98.36	94.96	54.02
September	100.00	97.56	96.03	57.50
October	97.44	91.86	93.88	51.12
November	100.00	93.36	91.53	39.13
December	98.61	97.94	85.14	65.85
Average	94.4	93.9	91.5	48.5

6.0 OPERATING PROBLEMS AND CORRECTIVE ACTIONS

Table VI – Summary of Operating Problems and Corrective Actions

DATE	PROBLEM	CORRECTIVE ACTION
December 17, 2012	Upon morning inspection, noticed south aerator shut down	Pushed reset button and aerator started without incident

7.0 SUMMARY OF MAINTENANCE

Table VII – Summary of Maintenance

DATE	NAME OF EQUIPMENT MAINTAINED	ACTION
Monthly	Aerators	Grease/check oil
Monthly	Flash mixer	Grease/check oil
February 27	Alum Pump 2	Replaced hose
March 4	OCMIII	Blown motherboard, fixed March 8, 2012
Spring	Constructed wetland	Water levels lowered
March 29, May 15	Aerators	Removed debris
May 14	Alum Pump 1	Replaced diaphragm
June 4- Oct. 10	Alum Pump 1	Sent for repairs
Summer	Constructed wetland	Water levels raised
Aug/Sept.	Facultative lagoon	200 dry metric tonnes of biosolids removed from north end of lagoon Water levels were lowered to accommodate biosolids removal equipment and raised following completion of the work
Oct. 17	Alum system	Installed pressure gauge
Fall	Facultative lagoon berms	Clearing of brush
Nov. 21/22	OCMIII Wetland	Blown motherboard, reset
Nov. 14- Dec. 2	Constructed wetland	Trapping of muskrats

8.0 EFFLUENT QUALITY ASSURANCE AND CONTROL

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

Water samples are collected by a trained wastewater operator, following the applicable MOE guidelines. All collected water 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 CofA is reported to the MOE, as required by the CofA.

9.0 SUMMARY OF CALIBRATION AND MAINTENANCE ON MONITORING EQUIPMENT

Table VIII – Dates of Equipment Calibration

DATE OF CALIBRATION	EQUIPMENT CALIBRATED	COMPANY PERFORMING CALIBRATION
May 14, Sept. 19	Flow monitors	MeasureMax
May 14, Sept. 19	Mag Meters	MeasureMax
Monthly	pH meters	In-house

10.0 EFFORTS AND RESULTS TO MEET EFFLUENT OBJECTIVES

See Section 8.0 regarding total phosphorus control.

In March, municipal council approved an action plan, presented by AECOM, to assist in the management of ammonia in the effluent from the WPCP. The first part of the action plan was to remove a portion of biosolids from the waste stabilization pond. In August and September, 200 dry metric tonnes of biosolids were removed from the north end of the waste stabilization pond. Ammonia levels in the waste stabilization pond effluent did decrease and were lower than the previous year in the months following the biosolids removal. However, the ammonia levels were still higher than the level permitted in the CofA. Therefore, the Municipality is planning to remove approximately 19,000 m³ of biosolids from the WPCP in 2013.

11.0 BIOSOLIDS MANAGEMENT

In August and September, 200 dry metric tonnes of biosolids were removed from the north end of the waste stabilization pond. The biosolids were placed into drying beds (CofA A710120) on the WPCP property. The biosolids will be stored in the drying beds until they are suitable for disposal, as per applicable legislation.

The Municipality is planning to remove approximately 19,000 m³ of biosolids from the WPCP in 2013. The preferred method of disposal is land application, however sampling and analysis results of the material will determine the ultimate disposal method.

12.0 SUMMARY OF COMPLAINTS

Three complaints were received in August regarding potential odour from the WPCP. The complaints were investigated, and the source of the odour was coming from the decomposition of organic material that had washed up on the shore in Presqu'île Park.

13.0 SUMMARY OF BY-PASSES, SPILLS AND ABNORMAL DISCHARGES

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