

# Municipality of



## WASTEWATER POLLUTION CONTROL PLANT

### ANNUAL REPORT

2005

MINISTRY OF ENVIRONMENT - CERTIFICATE OF APPROVAL NUMBER 3-0521-00-006  
SEWAGE WORKS NUMBER 11000953

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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, 2005.

Brighton's Water Pollution Control Plant services a population of approximately 5,600 consisting of 2,400 residential and 170 commercial accounts. The Ontario Environmental Training Consortium Certification Office (OETC) classifies the Water Pollution Control Plant as Wastewater Treatment Class 1 facility and Wastewater Collection Class 2 collection system.

The Brighton Wastewater Pollution Control Plant operates under Certificate of Approval number 3-0521-99-006 issued by the Ministry of Environment.

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### CONTROL DOCUMENT INFORMATION

Type of Control Document	Number	Issue Date	Effluent Monitoring Requirements (Yes/No)	Effluent Reporting Requirements (Yes/No)
C of A Sewage Works	3-0521-99-006	7/09/99	YES	YES
C of A Sludge Drying Beds	3-0381-96-006	8/01/96	N/A	N/A
C of A Composting Site	A710120	2/05/97	N/A	N/A

There were no biosolids pumped to the drying beds during this reporting period and no material was utilized or removed from the composting site.

## 2.0 CONTACT INFORMATION

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### 3.0 WASTEWATER TREATMENT PLANT DESCRIPTION & TREATMENT PROCESS

The sewage works in Brighton consists of:

- a 0.7 hectare aerated lagoon (lagoon #1) with two mechanical surface aerators. The effluent from the aeration lagoon passes through a chemical mixing chamber where alum is added before entering the waste stabilization pond;
- a 5.44 hectare waste stabilization pond (lagoon #2) is a facultative lagoon where wastewater stabilization is carried out by a combination of aerobic, anaerobic and facultative bacteria.
- a constructed wetland having a surface area of 6.2 hectare, located south of the existing waste stabilization pond consisting of Wetland Cell #1 (north cell) and Wetland Cell #2 (south cell) with alternating deep zones and vegetative terraces. The effluent from the constructed wetlands is continuous and discharges to a natural wetland that borders Presqu'ile Bay located off the northeast shore of Lake Ontario;
- a 2-cell drying bed to service the existing sewage treatment lagoons; sludge that accumulates in the lagoons may be periodically pumped to drying beds.

The hydraulic capacity of the sewage works has been re-rated at 4,600 m<sup>3</sup>/day since the constructed wetlands were incorporated to the treatment system in the summer of 2000. Approximately 35% of the sanitary sewage from the Brighton collection system flows by gravity to the aerated lagoon; the remainder of the flow (65%) was collected at the Harbour Street Sewage Pumping Station where it is pumped through a forcemain to the WPCP. The pumping station is equipped with three dry well centrifugal pumps that pump wastewater through a forcemain to the aerated lagoon. *A standby diesel generator is on-site (replaced in September of 2005) at the pumping station to provide electricity to the pumps during power outage events.*

Brighton's wastewater treatment system is a simple low-tech approach based on purifying the wastewater through biological activity in a lagoon-based system. Raw wastewater enters the aerated lagoon (lagoon #1) where it is mixed and oxygenated. The added oxygen from aeration allows aerobic microorganisms to reduce organic matter and nutrients, and reduces odour potential in the wastewater. The effluent from the aerated lagoon then passes through a mixing chamber where Alum (Aluminum Sulfate) is added. Alum is a flocculent used in wastewater ponds to precipitate soluble phosphorus and aids in the settling of many other substances. The effluent then flows to the waste stabilization pond (lagoon #2) where the bound solids settle to the bottom and the organic portions are decomposed through microbial action. Dissolved materials such as nitrogen and phosphorous are used by green algae in the pond for cell growth. The effluent from the waste stabilization pond then enters the constructed wetland for final polishing where the water is further filtered and cleansed. The natural processes occurring in the lagoons and wetland system produce a good quality effluent that is monitored regularly by licensed operators. Treatment performance from lagoon-based systems is susceptible to low temperature conditions and associated negative effects on biological treatment performance. Ammonia removal rates and microbial growth typically decrease with lower temperatures. The Certificate of Approval provides changes in concentration limits for Ammonia in the waste stabilization pond and constructed wetlands from October to April to provide allowances for cold temperatures that result in lower nitrification rates.

Monthly Municipal Utility Monitoring Program reports are forwarded to the Ministry of Environment. Analyses are taken in both the influent (raw sewage) and the effluent at the lagoon and wetlands to determine the amount of treatment achieved. The results must comply with MOE guidelines and Certificate of Approval effluent concentration limits and objectives.

#### 4.0 COMPLIANCE WITH TERMS AND CONDITIONS OF CERTIFICATE OF APPROVAL

##### 4.1 Performance

##### 4.1.1 *Wastewater Flow to the WPCP*

*Certificate of Approval 2.(a)* The Owner shall ensure that the flow of sewage into the sewage treatment works does not exceed the average daily flow of 4,600 m<sup>3</sup>/day for a period of any twelve (12) consecutive calendar months.

The average daily flow for 2005 was 3,012 m<sup>3</sup>/day, which represents 66% of the average day design capacity of 4,600 m<sup>3</sup>/day. The maximum annual daily flow for 2005 occurred on April 9, 2005 where heavy precipitation contributed to a peak flow of 9,835 m<sup>3</sup>/day. Peak monthly flow of 137,108 m<sup>3</sup> occurred in April due to precipitation that month. Annual flow of sewage to the WPCP was 1,103,699 in 2005 with approximately 65% of the wastewater entered via the pumping station and 35% flowing by gravity from the remainder of the sanitary collection system.

**Table I – Monthly Sewage In-flow to Treatment Plant**

Date	Total Flow m <sup>3</sup>	Avg. Flow m <sup>3</sup> /Day	Max. Day Flow m <sup>3</sup>	% (Avg.Day/Design Capacity)
JAN	120,016	3,871	5,726	84%
FEB	91,820	3,279	5,750	71%
MAR	93,266	3,009	3,344	65%
APR	137,108	4,570	8,675	99%
MAY	90,800	2,929	3,976	65%
JUN	70,223	2,341	2,660	51%
JUL	68,654	2,215	2,667	48%
AUG	60,800	1,961	2,338	43%
SEP	76,665	2,256	3,329	56%
OCT	89,040	2,872	3,581	62%
NOV	102,228	3,409	2,764	74%
DEC	103,019	3,434	5,343	75%
ANNUAL	1,103,699	3,012	4179	67%

Volume of influent of wastewater to lagoon #2 measured 1,103,669 m<sup>3</sup> See Table II.

Average per capita daily wastewater flow from Brighton WWTP was approximately 0.54 m<sup>3</sup>/capita in 2005, which includes domestic, industrial and commercial contributions as well as infiltration and inflow. (Based on a population of 5,600 and an average daily flow of 3,012 m<sup>3</sup>/day.)

The total flow of wastewater to the treatment plant in 2004 was 1,293,211 m<sup>3</sup>, flows in 2005 were approximately 17% lower due to decreased precipitation throughout the year and possibly due to the new watering meter system and inspection program to eliminate illegal sump pump hook-ups.

**Table II- Annual Flows to the WPCP**

Date	2005	2004	2003	2002	2001
JAN	120,016	99,348	72,557	94,250	82,240
FEB	91,820	72,900	68,753	98,823	91,182
MAR	93,266	139,521	121,860	122,051	135,398
APR	137,108	137,429	120,487	124,897	107,771
MAY	90,800	107,407	125,924	141,812	84,351
JUN	70,223	91,458	100,143	100,415	79,140
JUL	68,654	99,697	74,838	87,723	65,486
AUG	60,800	113,708	71,274	73,113	63,175
SEP	76,665	110,785	68,544	64,857	63,126
OCT	89,040	80,535	81,242	62,360	74,976
NOV	102,228	90,949	109,618	76,973	73,319
DEC	103,019	149,474	123,796	75,444	92,549
ANNUAL	1,103,699	1,293,211	1,139,036	1,122,718	1,012,713

#### 4.1.2 Waste Stabilization Pond Effluent Quality

*Certificate of Approval 2.(b)* The owner shall design, construct and/or operate the sewage treatment works such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the waste stabilization pond:

**Table III – C of A Waste Stabilization Pond Effluent Parameters**

Effluent Parameters	Concentration in Effluent	Loading in Effluent
CBOD <sub>5</sub>	30.0 mg/L	138.0 kg./day
Suspended Solids	40.0 mg/L	184.0 kg./day
Ammonia & Ammonium Nitrogen (May 1 to Oct. 30) <sup>1</sup> (Nov. 1 to Apr. 30) <sup>2</sup>	<b>14.0 mg/L<sup>1</sup></b> 17.0 mg/L <sup>2</sup>	<b>64.4 kg./day<sup>1</sup></b> 78.2 kg./day <sup>2</sup>
Total Phosphorus	1.0 mg/L	4.6 kg./day

### **Waste Stabilization Pond Effluent Summary:**

- The Biological Oxygen Demand is the amount of oxygen used by micro-organisms as they decompose organic matter in the effluent sample for five days. High BOD in effluent means a large quantity of oxygen was needed to break down the organic matter and identifies a large amount of organic matter in the effluent indicating inadequate treatment. The CBOD<sub>5</sub> average concentration from the waste stabilization pond effluent in 2005 was 12.2mg/L; the CofA limit is 30.0 mg/L CBOD<sub>5</sub> based on the average concentration of all samples taken.
- Total Suspended Solids in effluent are composed of settleable solids and nonsettleable solids depending on the size, shape and weight of the solid particles; large sized particles tend to settle more rapidly and are largely removed in the waste stabilization pond. Suspended Solids concentration limit from the waste stabilization pond effluent is 40.0 mg/L. The annual average of Total Suspended Solids was 12.78 from the waste stabilization pond.
- Total Phosphorus (TP) refers to the amount of phosphorus in a sample. Excess TP stimulates algae and weed growth that may cause fluctuations in dissolved oxygen in the receiving waters. Total Phosphorus limits for the waste stabilization pond is based on the monthly average concentration of the parameter; the CofA limit is 1.0 mg/L TP. Monthly average concentration of Total Phosphorus in 2005 ranged from 0.11-1.08 mg/L.
- C of A limits for Ammonia change from May to October at 14.0 mg/L and Nov.-Apr. at 17.0 mg/L. Non-compliance with respect to concentrations of (Ammonia + Ammonium) Nitrogen in the effluent is deemed to have occurred when the *'monthly average'* concentration of the parameter listed in Table III is exceeded in any calendar month. Ammonia concentrations from May to October ranged from 8.90-16.80 mg/L; and from 8.00-12.28 mg/L in November to April.

#### 4.1.3 *Wetland Effluent Quality*

**Certificate of Approval 5.(a)** the Owner shall use best effort to operate the sewage treatment works with the objective that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from constructed wetland:

**Table IV – C of A Constructed Wetland Effluent Objectives**

<b>Constructed Wetland Effluent Parameter</b>	<b>Concentration</b>
CBOD <sub>5</sub>	15.0 mg/L
Suspended Solids	15.0 mg/L
Ammonia + Ammonium Nitrogen (May 1 to October 30) <sup>1</sup>	10.0 mg/L <sup>1</sup>
(November 1 to April 30) <sup>2</sup>	15.0 mg/L <sup>2</sup>
Total Phosphorus	0.80 mg/L



### **Wetland Effluent Summary:**

- The average concentration of CBOD<sub>5</sub> from the constructed wetland effluent in 2005 was 6.60 mg/L; the C of A objective is 15.0 mg/L CBOD<sub>5</sub> based on the average concentration of all samples taken.
- Suspended Solids concentration limit from the constructed wetland effluent is 15.0 mg/L. The annual average concentration of Total Suspended Solids was 8.29 mg/L from the constructed wetland based on the average concentration of all samples taken.
- Total Phosphorus limits for the constructed wetland is based on the monthly average concentration of the parameter; the CofA limit is 0.80 mg/L. Monthly average concentrations of Total Phosphorus in 2005 ranged from 0.15-0.60 mg/L.
- Limits for Ammonia change from May to October at 10.0 mg/L and Nov.-Apr. at 15.0 mg/L. Non-compliance with respect to concentrations of (Ammonia + Ammonium) Nitrogen in the effluent is deemed to have occurred when the *'monthly average'* concentration of the parameter listed in Table IV is exceeded in any calendar month. Ammonia concentrations from May to October ranged from 8.72 – 10.85 mg/L; and from 2.67 – 10.97 mg/L from November to April.
- There were no exceedances as defined in the Certificate of Approval of any of the parameters with respect to concentration from the constructed wetland effluent.
- Lack of sunlight, plant production, decreased temperatures and ice cover in winter months directly affects treatment capability of a natural treatment process by limiting dissolved oxygen concentrations which may contribute to elevated food to microorganism ratio (F:M) conditions. Algae and plants consume nitrogen and phosphorus in the wastewater; lack of this activity in winter months limits the reduction of Ammonia and Phosphorus in the final effluent.

**Certificate of Approval (5.)(b)** states that the geometric mean density of E. Coli should not exceed 200 organisms per 100 ml. for any calendar month. E. coli are sampled once a month from the waste stabilization pond basis as per C of A. See **Tables V and VI representing the weekly lab results of the Waste Stabilization Pond and Wetland Effluent including monthly E. Coli** results. E. Coli levels were above 200 organisms per 100 ml on four occasions in the lagoon and four occasions in the wetland. See Tables V & VI

#### **4.2 Monitoring and Recording**

**Certificate of Approval 4.(a)** Annual calibration of flow measuring devices was performed on September 27, 2005.

**Certificate of Approval 4.(b)(c)(d)** – Table VII demonstrates compliance with frequency of sampling of raw sewage, waste stabilization pond effluent and wetland effluent.

#### **4.3 Operation and Maintenance**

WASTE POND EFFLUENT-2005				Table V							
DATE	CBOD <sub>5</sub>	TSS	T.P.	T.P.	Ammonia	Ammonia	TKN	Nitrite (N)	Nitrate (N)	pH	E. Coli
C of A	30 mg/L	40 mg/L		1.0 mg/L	(May-Oct)14	Monthly	mg/L	mg/L	mg/L		200/100ml/mo
CBOD results <2 recorded as 1.0			weekly	Monthly Avg.	Nov-Apr 17	Average					
04-Jan	11.00	22.00	0.91		7.00		13.00	<0.05	0.93	7.8	>400
11-Jan	8.00	16.00	0.62		9.30		11.00	<0.05	0.40	7.8	
18-Jan	10.00	19.00	0.70		13.10		19.00	0.40	0.50	7.8	
25-Jan	8.00	12.00	0.61	0.71	10.90	10.08	12.00	0.70	0.20	7.6	
01-Feb	13.00	17.00	0.86		11.90		15.00	<0.1	<0.1	7.7	24700
08-Feb	12.00	27.00	1.06		9.70		16.00	<0.1	<0.1	7.7	
15-Feb	11.00	21.00	1.40		13.60		14.00	<0.1	<0.1	7.7	
22-Feb	16.00	23.00	1.08	1.08	10.30	11.38	12.00	0.40	0.90	7.6	
28-Feb			1.01							7.7	
01-Mar	10.00	21.00	0.89		10.50		13.00	0.30	<0.1	7.6	16300
08-Mar	12.00	18.00	0.13		11.10		12.00	<0.1	0.20	7.8	
15-Mar	10.00	38.00	0.50		10.70		12.00	0.40	0.20	7.8	
22-Mar	14.00	39.00	0.36		9.10		11.00	0.50	0.50	8.2	
29-Mar	8.00	46.00	0.46	0.47	7.10	9.70	11.00	0.40	0.30	8.0	
05-Apr	20.00	32.00	0.51		10.90		16.00	0.07	0.38	8.4	200
12-Apr	4.00	7.00	0.21		6.70		9.00	0.07	0.83	7.8	
19-Apr	6.00	19.00	0.19		6.90		11.00	0.15	0.58	8.0	
26-Apr	10.00	18.00	0.40	0.33	7.50	8.00	11.00	0.13	0.38	8.1	
03-May	8.00	29.00	0.33		6.00		9.00	0.20	1.04		<100
10-May	8.00	61.00	0.39		5.40		7.00	<0.05	<0.05		
17-May	2.00	6.00	0.44		8.30		10.00	<0.05	0.37	7.5	
24-May	2.00	8.00	0.49		10.70		13.00	<0.05	0.67	7.6	
31-May	1.00	7.00	0.51	0.43	15.60	9.20	17.00	<0.05	<0.05		
07-Jun	3.00	4.00	0.42		8.90		15.00	<0.05	<0.05	7.8	<100
14-Jun	2.00	6.00	0.30		10.80		17.00	<0.05	<0.05	8.0	
21-Jun	2.00	16.00	0.27		17.90		17.00	1.61	0.34	7.9	
28-Jun	8.00	57.00	0.43	0.36	10.90	12.13	13.00	<0.05	0.35		
06-Jul	5.00	4.00	0.31		16.80		18.00	<0.05	0.84	7.8	300
12-Jul	2.00	10.00	0.18		17.70		19.00	0.12	0.57	8.0	
19-Jul	2.00	5.00	0.10		13.40		15.00	0.09	<0.05	7.8	
26-Jul	4.00	8.00	0.17	0.19	14.40	15.58	16.00	0.27	<0.05	8.1	
02-Aug	60.00	5.00	0.11		10.40		11.00	0.39	0.07	8.0	<100
09-Aug	<2	5.00	0.16		11.90		14.00	0.33	0.13	7.8	
16-Aug	3.00	5.00	0.17		0.81		7.00	6.30	0.50	7.6	
23-Aug	3.00	14.00	0.26		10.80		12.00	<0.1	0.70	7.6	
30-Aug	<2	5	0.32	0.18	10.8	8.48	15	<0.1	<0.1	7.8	
06-Sep	<2	7.00	0.20		12.10		16.00	0.40	0.10	7.8	100
13-Sep	<2	4.00	0.14		9.80		9.00	0.20	0.40	7.8	
20-Sep	<2	7.00	0.10		12.50		13.00	<0.1	0.10	7.8	
27-Sep	<2	5.00	1.01	0.36	10.60	11.25	14.00	<0.1	<0.1	7.9	
04-Oct	<2	<2	0.14		10.90		14.00	<0.1	0.10	7.9	100
11-Oct	<2	<2	0.26		11.10		15.00	<0.1	0.20	7.6	
18-Oct	2.00	3.00	0.13		12.20		15.00	0.40	0.20	7.9	
25-Oct	3.00	7.00	0.16	0.17	11.40	11.40	14.00	0.20	0.80	7.6	
01-Nov	5.00	<2	0.37		12.40		15.00	<0.1	0.40	7.7	<100
08-Nov	<2	3.00	0.28		12.10		16.00	<0.1	0.50	7.6	
15-Nov	<2	5.00	0.21		13.60		14.00	<0.1	0.80	7.9	
22-Nov	<2	7.00	0.50		12.40		14.00	<0.1	0.90	7.9	
29-Nov	<2	6.00	0.26	0.32	10.90	12.28	15.00	<0.1	0.90	7.9	
06-Dec	2.00	4.00	0.28		11.10		17.00	<0.1	1.20	8.1	100
13-Dec	2.00	2.00	0.26		11.20		13.00	<0.1	0.90	7.9	
20-Dec	4.00	4.00	0.35		12.50		14.00	<0.1	0.60	8.2	
27-Dec	3.00	9.00	0.71	0.40	13.00	11.95	16.00	<0.1	0.30	8.0	
Average	7.98	14.76	0.43		10.92		13.60	0.61	0.51	7.8	

<b>WETLAND FINAL EFFLUENT</b>				<b>Table VI</b>							
DATE	CBOD <sub>5</sub>	TSS	TP	TP Month	Ammonia(N)	NH <sub>3</sub> Month	TKN	Nitrite	Nitrate	pH	E. Coli
BOD <2mg/L recorded as 1.0			weekly	Average		Average		(N)	(N)		
04-Jan	10.00	12.00	0.46		7.60		10.00	<0.05	1.00	7.9	
11-Jan	4.00	5.00	0.32		9.00		10.00	<0.05	0.64	7.9	
18-Jan	4.00	13.00	0.31		12.50		13.10	0.50	0.90	7.8	
25-Jan	6.00	18.00	0.38	0.37	9.80	9.73	12.00	<0.1	0.10	7.6	
01-Feb	7.00	11.00	0.41		10.70		14.00	<0.1	0.10	7.4	5400
08-Feb	5.00	13.00	0.51		8.40		14.00	<0.1	0.20	7.7	
15-Feb	9.00	9.00	0.68		11.00		12.00	<0.1	0.20	7.8	
22-Feb	13.00	18.00	0.78	0.60	9.30	9.85	12.00	0.30	0.40	7.6	
01-Mar	6.00	9.00	0.58		11.10		13.00	<0.1	<0.1	7.5	1100
08-Mar	6.00	10.00	0.08		10.90		14.00	<0.1	0.10	7.6	
15-Mar	6.00	14.00	0.32		10.50		14.00	0.40	0.30	7.8	
22-Mar	11.00	32.00	0.31		7.20		10.00	0.50	0.80	8.1	
29-Mar	8.00	14.00	0.20	0.30	3.90	8.72	9.00	0.30	0.30	8.1	
05-Apr	9.00	4.00	0.20		9.90		11.00	<0.05	0.25	7.8	<100
12-Apr	2.00	1.00	0.13		5.60		8.00	<0.05	<0.05	7.8	
19-Apr	4.00	1.00	0.12		2.49		10.00	<0.05	0.10	7.8	
26-Apr	7.00	8.00	0.09	0.14	1.99	5.00	5.00	<0.05	0.23	7.9	
03-May	7.00	9.00	0.06		1.57		3.00	<0.05	0.58	7.6	<100
10-May	2.00	5.00	0.33		0.60		2.00	<0.05	<0.05	7.9	
17-May	1.00	7.00	0.17		0.79		2.00	<0.05	0.37	7.5	
24-May	2.00	8.00	0.24		3.80		5.00	<0.05	0.67	7.6	
31-May	1.00	6.00	0.36	0.23	6.40	2.63	7.60	<0.05	<0.05	7.6	
07-Jun	<2	2.00	0.32		5.90		7.00	<0.05	<0.05	7.4	100
14-Jun	4.00	6.00	0.43		6.90		17.00	<0.05	0.58	7.5	
21-Jun	3.00	12.00	0.34		16.90		16.00	<0.05	<0.05	7.7	
28-Jun	5.00	19.00	0.30	0.35	11.10	10.20	13.00	<0.05	0.53	7.6	
06-Jul	6.00	17.00	0.40		9.40		11.00	<0.05	0.86	7.7	300
12-Jul	6.00	17.00	0.36		14.40		14.00	<0.05	0.86	7.4	
19-Jul	4.00	17.00	0.38		12.50		14.00	<0.05	0.83	7.6	
26-Jul	3.00	17.00	0.44	0.40	14.30	12.65	16.00	<0.05	0.99	7.4	
02-Aug	8.00	10.00	0.28		10.90		12.00	<0.05	<0.05	7.5	500
09-Aug	3.00	11.00	0.03		10.80		14.00	<0.05	0.76	7.5	
16-Aug	4.00	24.00	0.50		<0.05		10.00	7.50	0.80	7.6	
23-Aug	3.00	13.00	0.46		7.90		9.00	<0.1	0.90	7.8	
30-Aug	<2	9.00	0.41	0.34	7.90	9.38	12.00	<0.1	0.90	7.7	
06-Sep	17.00	6.00	0.35		9.30		14.00	<0.1	0.90	7.8	200
13-Sep	<2	21.00	0.32		11.30		12.00	<0.1	0.20	7.9	
20-Sep	<2	6.00	0.30		10.00		11.00	<0.1	<0.1	8.1	
27-Sep	<2	8.00	0.24	0.30	7.80	9.60	10.00	<0.1	<0.1	7.9	
04-Oct	<2	4.00	0.23		8.20		12.00	<0.1	<0.1	7.6	200
11-Oct	<2	2.00	0.23		8.30		12.00	<0.1	<0.1	7.9	
18-Oct	2.00	<2	0.12		10.60		14.00	<0.1	<0.1	7.6	
25-Oct	2.00	8.00	0.09	0.17	9.20	9.08	14.00	<0.10	0.20	7.7	
01-Nov	7.00	<2	0.14		10.90		13.00	<0.1	0.20	7.5	<100
08-Nov	<2	11.00	0.09		7.60		12.00	<0.1	0.30	7.0	
15-Nov	<2	3.00	0.14		11.60		12.00	<0.1	0.60	7.9	
22-Nov	<2	4.00	0.21		7.00		12.00	<0.1	1.50	7.8	
29-Nov	<2	6.00	0.16	0.15	7.50	8.92	11.00	<0.1	1.20	8.2	
06-Dec	<2	<2	0.14		10.00		12.00	<0.1	2.00	8.1	
13-Dec	<2	4.00	0.18		9.10		12.00	<0.1	1.40	7.8	
20-Dec	<2	5.00	0.25		10.90		14.00	<0.1	0.50	8.3	
27-Dec	<2	6.00	0.44	0.25	13.40	10.85	14.00	<0.1	0.30	7.9	
Average	5.59	10.10	0.29				11.28			7.7	
CofA obj.	15.00	15.00	0.8		(May-Oct)10					200/100ml/mo	
					(Nov-Apr)15						

Certificate of Analysis 4.(b) Samples of raw sewage shall be collected at locations acceptable to the District Manager and analyzed for at least parameters 1 to 4 at the indicated minimum frequencies; parameters 5 to 8 are taken in order to analyze system performance.

	<b>Raw Sewage Parameter</b>	<b>Type of Sample</b>	<b>Minimum Frequency</b>	<b>Total # of Samples</b>
1	CBOD <sup>5</sup>	grab	monthly	12
2	Suspended Solids	grab	monthly	12
3	Total Phosphorus	grab	monthly	12
4	Total Kjeldahl Nitrogen	grab	monthly	12
5	Ammonia (N)	grab	monthly	12
6	Nitrite (N)	grab	monthly	12
7	Nitrate (N)	grab	monthly	12

Certificate of Analysis 4.(c) Samples of effluent from the waste stabilization pond shall be collected at locations acceptable to the District Manager and analysed for at least the following parameters(1-10) at the indicated minimum frequencies.

	<b>Waste Stabilization Pond Effluent Parameter</b>	<b>Type of Sample</b>	<b>Minimum Frequency</b>	<b>Total # of Samples</b>
1	CBOD5	grab	weekly	52
2	Suspended Solids	grab	weekly	52
3	Total Phosphorus	grab	weekly	52
4	Total Kjeldahl Nitrogen	grab	weekly	52
5	Ammonia (N)	grab	weekly	52
6	Nitrite (N)	grab	weekly	52
7	Nitrate (N)	grab	weekly	52
8	pH	grab	weekly	52
9	Temperature	grab	weekly	52
10	E. Coli	grab	monthly	12

Certificate of Analysis 4.(d) Samples of effluent from the constructed wetland shall be collected at locations acceptable to the District Manager and analysed for at least the following parameters (1-9) at the indicated minimum frequencies. E. Coli is sampled to comply with C. of A. objective 5.(b).

	<b>Constructed Wetland Effluent Parameter</b>	<b>Type of Sample</b>	<b>Minimum Frequency</b>	<b>Total # of Samples</b>
1	CBOD5	grab	weekly	52
2	Suspended Solids	grab	weekly	52
3	Total Phosphorus	grab	weekly	52
4	Total Kjeldahl Nitrogen	grab	weekly	52
5	Ammonia (N)	grab	weekly	52
6	Nitrite (N)	grab	weekly	52
7	Nitrate (N)	grab	weekly	52
8	pH	grab	weekly	52
9	Temperature	grab	weekly	52
10	E. Coli	grab	monthly	12

**Certificate of Approval (5.)(c)** stipulates that the Owner shall endeavour to operate the sewage treatment works such that the effluent will not contain any oil or other substance in amounts sufficient to create a visible film or sheen on the surface of the receiving waters and shall be essentially free of any floating material.

Occasional foaming was present where wastewater cascades over weirs or from outfalls; this appears to occur on a seasonal basis.

**Certificate of Approval 6.(a)** refers to proper maintenance of related equipment and appurtenances to operate sewage works, including funding for operator training.

In September of this year we replaced the stand-by Generator at the Harbour Street Pumping Station

An Operations and Maintenance Manual is in place at the Sewage Works. Continuing education for operators is promoted by the municipality for wastewater treatment and collection as well as health, safety, and technical related courses.

**Certificate of Approval 7.(c)** Flows through the Brighton Wastewater Treatment lagoons and wetlands are continuous.

**Certificate of Approval 7.(d)(i) Summary of all monitoring data including an overview of the sewage treatment program.**

*See Chart 1* for – Sewage Treatment Plant Performance - demonstrates efficiency of each stage of the Brighton WPCP treatment system.

**Certificate of Approval 7.(d)(ii) Interpretation of all monitoring and analytical data and comparison to the final effluent quality and quantity.**

*Chart 1* Brighton WPCP Performance Summary details results and efficiency of the sewage treatment performance demonstrating pollutant removal rates from raw sewage concentrations through to final effluent for CBOD<sub>5</sub>, Suspended Solids, Total Phosphorus, TKN and Ammonia.

*Chart 1* demonstrates the success of Brighton's WPCP natural treatment process, which includes:

- 93.0% CBOD<sub>5</sub> removal
- 94.9% removal of Suspended Solids
- 93.7% removal of Phosphorus
- 68.5% removal of Nitrogen
- 66.5% removal of Ammonia.

**Certificate of Approval 7.(d)(iii) Summary of any final effluent quality assurance or control measures undertaken during the reporting period.**

- Additional sampling of the waste stabilization pond for total suspended solids was carried out in October during the dredging period of the biosolids removal project. The effluent maintained normal concentrations below 4 mg/L TSS during the dredging operation.

Chart 1

Month	Flows			CBOD5				Suspended Solids				Total Phosphorous				Nitrogen (TKN)				Ammonia					
	Total Flow m <sup>3</sup>	Average Day m <sup>3</sup> /D	Maximum Day m <sup>3</sup> /D	Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)	Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)	Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)	Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)	Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)		
Jan.	120,016	3,871	5,726	72.00	15.00	9.25	6.00	160.00	44.00	17.25	12.00	2.80	1.37	0.71	0.37	21.00	12.00	13.75	11.30	16.00	5.80	10.10	10.10	9.70	
Feb.	91,820	3,279	5,750	312.00	34.00	13.00	8.50	360.00	62.00	22.00	12.75	7.20	2.28	1.08	0.60	40.00	18.00	14.25	13.00	23.20	12.50	11.38	11.38	9.85	
Mar.	93,266	3,009	3,344	54.00	25.00	10.80	7.40	74.00	80.00	32.40	15.80	3.00	3.02	0.47	0.30	30.00	17.00	11.80	12.00	22.40	12.10	9.70	9.70	8.72	
Apr.	137,108	4,570	8,675	78.00	17.00	10.00	5.50	66.00	25.00	19.00	3.50	2.00	1.05	0.33	0.14	18.00	10.00	11.75	8.50	11.10	6.60	8.00	8.00	5.00	
May	90,800	2,929	3,976	66.00	20.00	4.20	2.60	128.00	49.00	22.20	7.00	2.90	1.88	0.43	0.23	20.00	14.00	11.20	3.90	19.20	12.40	9.20	9.20	2.67	
June	70,223	2,341	2,660	66.00	44.00	3.00	<2	192.00	128.00	4.00	2.00	5.30	4.40	0.42	0.32	52.00	40.00	15.00	7.00	29.00	18.80	8.90	8.90	5.90	
July	68,654	2,215	2,677	60.00	13.00	5.00	6.00	154.00	106.00	4.00	17.00	6.30	3.60	0.31	0.40	50.00	40.00	18.00	11.00	36.00	19.70	16.80	16.80	9.40	
Aug.	60,800	1,961	2,338	114.00	18.00	22.00	8.00	170.00	110.00	5.00	10.00	8.20	4.00	0.11	0.28	30.00	24.00	11.00	12.00	22.00	16.20	10.40	10.40	10.90	
Sept.	76,665	2,256	3,329	108.00	5.00	<2	17.00	242.00	162.00	7.00	6.00	6.60	3.20	0.20	0.35	56.00	30.00	16.00	14.00	37.00	16.10	12.10	12.10	9.30	
Oct.	89,040	2,872	3,581	72.00	12.00	<2	<2	188.00	100.00	<2	4.00	5.00	2.50	0.14	0.23	40.00	20.00	14.00	12.00	36.00	11.20	10.90	10.90	8.20	
Nov.	102,288	3,409	2,764	90.00	17.00	2.20	3.00	112.00	42.00	3.00	5.20	5.10	2.12	0.32	0.15	30.00	17.00	14.80	12.00	22.50	11.10	12.28	12.28	8.92	
Dec.	103,319	3,434	5,343	42.00	8.00	4.50	2.00	96.00	104.00	4.75	4.25	3.30	1.64	0.40	0.25	25.00	20.00	15.00	13.00	22.00	9.00	11.95	11.95	10.85	
Total	1,103,999																								
Average	92,000	3,012		94.50	19.00	8.40	6.60	161.83	84.33	12.78	8.29	4.81	2.59	0.41	0.30	34.33	20.17	13.88	10.81	24.70	12.63	10.98	10.98	8.28	
C. of A. Limit/Obj.		4,600				30.0	15.0			40.0	15.0			1.00	0.80							14.0 (S) 17.0 (W)	10.0 (S) 15.0 (W)	10.0 (S) 15.0 (W)	10.0 (S) 15.0 (W)
% Efficient					79.9%	91.1%	93.0%		47.9%	92.1%	94.9%		46.2%	91.5%	93.7%		41.3%	59.6%	68.5%		48.9%	55.6%	66.5%	66.5%	

**Certificate of Approval 7.(d)(iv) Summary of maintenance carried out on major structure, equipment, apparatus, mechanism forming part of the works.****➤ Biosolids Utilization Program**

The Municipality's Biosolids Land Application Program for Lagoon 2 commenced on October 14<sup>th</sup>, 2004, and continued until wet weather shut down operations on November 9<sup>th</sup>, 2004. The program resumed on June 28<sup>th</sup>, 2005, and was completed on July 21<sup>st</sup>. The removal operations on Lagoon 1 began on July 29<sup>th</sup> and were completed on October 17<sup>th</sup>, 2005. Terratec Environmental hauled and spread approximately 8,746 cubic metres of liquid biosolids from Lagoon 2 and 9,726 cubic metres from Lagoon 1. The biosolids were applied to 136.8 hectares of agricultural land, on 8 different fields owned by five local farmers. The final cost of the contract was \$ 393,370.00, which was funded from the Sanitary Sewer charges and reserve funds.

**Certificate of Approval 7.(d)(v) Summary of any environmental or operating problems encountered and mitigative measures taken.**

- Although there are no combined sanitary and storm sewers in Brighton, the collection system is susceptible to higher flows with heavy precipitation events. Investigation of potential incorrect sump pump connections in the community was commenced in 2005 to ensure that the discharge from sump pumps are not connected to the sanitary sewer system.
- Muskrat damage to the constructed wetlands have reduced plant growth in the vegetated zones. Seasonal trapping is being conducted to control muskrat population. This will become a yearly on going situation due to the natural conditions for muskrats.

**Certificate of Approval 7.(d)(vi) Summary of alterations, extensions or replacements in the process or operation of the works which are considered for implementation over the next reporting period.****Certificate of Approval 7.(d)(iv) Summary of calibration and maintenance procedures conducted on all monitoring equipment.**

Milltronics performed annual calibration of flow meters at the Brighton WPCP on September 27<sup>th</sup> 2005.

**4.4 Reporting – Non-Compliance**

**Certificate of Approval 7.(b)** There were two non-compliance issues in this reporting period. One was in the month February when we had a higher reading of Phosphorus due to the Alum supply pipes had frozen causing a blockage. The incident was reported to the MOE verbally and by letter, the exceedance is averaged by the month, the limit is 1.00 mg/l and our limit was 1.08mg/l.

The second non-compliance incident was in July when the level of Ammonia in the wetland effluent exceeded our objective of level of 14.0 mg/l, with a recording of 16.80 mg/l. At that time we were in the process of dredging biosolids from the lagoon. The sampling result was reported to the MOE verbally and in writing.

## **5.0 CONCLUSION**

The Brighton Water Pollution Control Plant has been successful in treating the wastewater utilizing the lagoons and wetlands through natural treatment processes. The final quality of the effluent may be influenced by a majority of environmental factors such as climate or wildlife. Enhanced performance is exhibited during warmer months when nutrients are absorbed from the growth of vegetation and bacteria are most active. Wastewater effluent from the wastewater pollution control plant (WPCP) is tested at Caduceon Environmental Labs, a certified lab, on a weekly basis as per Certificate of Approval. Aside from the minor exceedence of the phosphorus level in February and the ammonia level in the wetland in July, the effluent quality from the lagoon and wetland site to Presqu'ile Bay has met and/or exceeded the contaminant limits and objectives set under the terms and conditions of the Certificate of Approval. Brighton is dedicated to achieving continuous improvement of its wastewater treatment system and being environmentally responsible to the quality of its receiving waters.



- Biosolids lab results:

Parameter	Date Tested		MOE Compost Guidelines	Agrl. Land Max. Limits	Agrl. Land Targets
	May 21, 2003	June 24, 2004			
Arsenic	1 mg/kg	2 mg/kg	10 mg/kg	170 mg/kg	35 mg/kg
Cadmium	1.0 mg/kg	<1 mg/kg	3 mg/kg	34 mg/kg	4 mg/kg
Chromium	108 mg/kg	168 mg/kg	50 mg/kg	2800 mg/kg	530 mg/kg
Cobalt	4 mg/kg	<1 mg/kg	25 mg/kg	340 mg/kg	77 mg/kg
Lead	<5 mg/kg	19 mg/kg	150 mg/kg	1100 mg/kg	220 mg/kg
Mercury	0.294 mg/kg	0.388 mg/kg	0.15 mg/kg	11 mg/kg	1.4 mg/kg
Molybdenum	1 mg/kg	<1 mg/kg	2 mg/kg	94 mg/kg	1.2 mg/kg
Nickel	22 mg/kg	40 mg/kg	60 mg/kg	420 mg/kg	80 mg/kg
Selenium	0.7 mg/kg	0.9 mg/kg	2 mg/kg	34 mg/kg	6 mg/kg
Zinc	113 mg/kg	237 mg/kg	500 mg/kg	4200 mg/kg	840 mg/kg
Copper	313 mg/kg	609 mg/kg	60 mg/kg	1700 mg/kg	380 mg/kg
pH	7.56				

## Lagoon #2 – Facultative Lagoon

Parameter	Date Tested		MOE Compost Guidelines	Agrl. Land Max. Limits	Agrl. Land Targets
	May 21, 2003	June 24, 2004			
Arsenic	1 mg/kg	2 mg/kg	10 mg/kg	170 mg/kg	35 mg/kg
Cadmium	1.0 mg/kg	<1 mg/kg	3 mg/kg	34 mg/kg	4 mg/kg
Chromium	108 mg/kg	168 mg/kg	50 mg/kg	2800 mg/kg	530 mg/kg
Cobalt	4 mg/kg	<1 mg/kg	25 mg/kg	340 mg/kg	77 mg/kg
Lead	<5 mg/kg	19 mg/kg	150 mg/kg	1100 mg/kg	220 mg/kg
Mercury	0.294 mg/kg	0.388 mg/kg	0.15 mg/kg	11 mg/kg	1.4 mg/kg
Molybdenum	1 mg/kg	<1 mg/kg	2 mg/kg	94 mg/kg	1.2 mg/kg
Nickel	22 mg/kg	40 mg/kg	60 mg/kg	420 mg/kg	80 mg/kg
Selenium	0.7 mg/kg	0.9 mg/kg	2 mg/kg	34 mg/kg	6 mg/kg
Zinc	113 mg/kg	237 mg/kg	500 mg/kg	4200 mg/kg	840 mg/kg
Copper	313 mg/kg	609 mg/kg	60 mg/kg	1700 mg/kg	380 mg/kg
pH	7.56				