



**2009 WASTEWATER POLLUTION CONTROL
PLANT ANNUAL REPORT**

Certificate of Approval No. 3-0521-00-006
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, 2009.

- Brighton's Water Pollution Control Plant services a population of approximately 6,297 consisting of 2,800 residential and commercial accounts including Presqu'ile Park. The Ontario Water Wastewater Certification Office 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.

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'île 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 m³/day since the constructed wetlands were incorporated to the treatment system in the summer of 2000. Approximately 40% of the sanitary sewage from the Brighton collection system flows by gravity to the aerated lagoon; the remainder of the flow (60%) 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 at the pumping station to provide electricity to the pumps during power outage events.

Brighton's wastewater treatment system is a 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 phosphorus 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.

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 m³/day for a period of any twelve (12) consecutive calendar months.

The average daily flow for 2009 was 3,662 m³/day, which represents 79.6% of the average day design capacity of 4,600 m³/day. The maximum annual daily flow for 2009 occurred on April 4, 2009 where heavy precipitation contributed to a peak flow of 12,298 m³/day. Peak monthly flow of 160,693 m³ occurred in April due to heavy precipitation that month. Annual flow of sewage to the WPCP was 1,335,923 m³ in 2009 with approximately 60% of the wastewater entered via the pumping station and 40% flowing by gravity from the remainder of the sanitary collection system.

Table I – Monthly Sewage In-flow to Treatment Plant

Date	Total Flow m3	Avg. Flow m3/day	Max. Day Flow m3	% Avg Day/Design Cap
January	99,491	3,209	5,390	70%
February	111,628	3,987	10,510	87%
March	147,025	4,743	8,136	103%
April	160,693	5,356	12,298	116%
May	132,309	4,268	7,620	93%
June	93,962	3,132	4,251	68%
July	91,162	2,941	4,569	64%
August	83,029	2,678	3,774	58%
September	76,566	2,552	4,435	55%
October	103,296	3,332	5,566	72%
November	102,340	3,411	4,971	74%
December	134,422	4,336	6,921	78%
Annual	1,335,923	3,662		

Volume of influent of wastewater to lagoon #2 measured 1,335,923 m³ See Table II.

Average per capita daily wastewater flow to Brighton WWTP was approximately 0.58 m³/capita in 2009, which includes domestic, industrial and commercial contributions as well as infiltration and inflow. (Based on a population of 6,297 and an average daily flow of 3,662 m³/day.) The population number includes an estimated 182 persons to account for the seasonal population of Presqu'île Provincial Park.

The total flow of wastewater to the treatment plant in 2008 was 1,319,697 m³; flows in 2009 were approximately 1.2% higher.

Table II- Annual Flows to the WPCP

Date	2009	2008	2007	2006	2005
January	99,491	112,038	140,264	135,919	120,016
February	111,628	103,034	78,345	116,375	91,820
March	147,025	149,246	120,276	108,727	93,266
April	160,693	186,347	148,787	123,600	137,108
May	132,309	125,367	113,879	107,899	90,800
June	93,962	91,382	84,874	92,457	70,223
July	91,162	88,538	78,451	96,755	68,654
August	83,029	89,577	72,287	78,674	60,800
September	76,566	76,298	67,372	85,449	76,665
October	103,296	77,068	70,893	145,412	89,040
November	102,340	84,512	73,350	143,914	102,228
December	134,422	136,290	86,621	153,616	103,019
Annual	1,335,923	1,319,697	1,135,399	1,388,797	1,103,699

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 (Lagoon #2):

Table III – C of A Waste Stabilization Pond Effluent Parameters

Effluent Parameters	Concentration in Effluent	Loading in Effluent
CBOD ₅	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) ¹ (Nov. 1 to Apr. 30) ²	14.0 mg/L¹ 17.0 mg/L ²	64.4 kg./day¹ 78.2 kg./day ²
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 CBOD₅ average concentration from the waste stabilization pond effluent in 2009 was 3.53 mg/L; the C of A limit is 30.0 mg/L CBOD₅ 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 7.78 mg/l 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 C of A limit is 1.0 mg/L TP. Monthly average concentration of Total Phosphorus in 2009 ranged from 0.07 – 0.52 mg/L.
- The C of A limits for Ammonia are 14.0 mg/L from May to October and 17.0 mg/L from November to April. 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 averaged 6.65 mg/L; and averaged 6.69 mg/L in November to April.

A summary of the Lagoon Loading is provided in Table VII.

A summary of the overall performance of the wastewater system is provided in Table IX. It is noted that there were no exceedances in 2009.

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

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

Table V lists the weekly lab results of the Waste Stabilization Pond.

Wetland Effluent Summary:

- The average concentration of CBOD₅ from the constructed wetland effluent in 2009 was 2.37 mg/L; the C of A objective is 15.0 mg/L CBOD₅ 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 5.92 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 C of A limit is 0.80 mg/L. Monthly average concentrations of Total Phosphorus in 2009 ranged from 0.08-0.14 mg/L.
- Limits for Ammonia from the constructed wetland are 10.0 mg/L from May to October and 15.0 mg/L from November to April. 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 averaged 4.85 mg/L; and averaged 6.95 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, coon tail weed 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 results. *E. Coli* levels were above 200 organisms per 100 ml on four occasions in the lagoon and two occasions in the wetland.

Table VI lists the weekly lab results of the Constructed Wetland Effluent including monthly *E. Coli*

4.2 Monitoring and Recording

Certificate of Approval 4.(a) Annual calibration of flow measuring devices was performed on October 19, 2009.

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

4.3 **Operations and Maintenance**

Operations:

Operation now includes an inspection and flushing program at the Presqu'ile Park lift station. Regular inspection and flushing aids in preventing blockages, flooding, and any anaerobic activity that may occur in the forcemain. This ensures a far more consistent and stable influent from the park.

A new alarm system has been installed at the Harbour St. lift station. This system continuously monitors various equipment and processes, and can provide notification to operators when something is not functioning correctly.

Additionally, wastewater operators will continue to attend courses and workshops in order to further their education and remain current on all industry regulations and best practices.

Maintenance:

A regular maintenance schedule is in place in order to service many components of our system. Scheduled maintenance is key in keeping equipment properly serviced while minimizing breakdowns.

Where feasible, building and facility maintenance is conducted by wastewater operators. This allows operators to stay "hands on" with all aspects of the system, and helps reduce operating costs.

Environmental/Operating Problems:

There were no environmental or operating problems in the 2009 reporting period.

Table V

WASTE POND EFFLUENT-2009											
DATE	CBOD ₅	TSS	T.P.	T.P.	Ammonia	Ammonia	TKN	Nitrite (N)	Nitrate (N)	E. Coli	Temperature
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	Celsius
CBOD results <2 recorded as 1.0			weekly	Monthly Avg.	(Nov-Apr) 17	Average					
6-Jan	2.00	5.00	0.11		7.10		12.00	0.40	1.00	760	
13-Jan	5.00	5.00	0.16		6.30		11.00	0.60	0.70		
20-Jan	7.00	16.00	0.50		12.80		15.00	0.40	0.40		
27-Jan	3.00	11.00	0.40		10.90		16.00	0.40	0.70		
	4.25	9.25		0.29		9.28	13.5	0.45	0.70		0.0
3-Feb	7.00	22.00	0.79		13.90		16.00	0.10	0.20	4000	
10-Feb	9.00	26.00	0.74		10.70		14.00	0.10	0.10		
17-Feb	4.00	11.00	0.33		6.40		10.00	0.50	1.90		
24-Feb	4.00	12.00	0.23		6.60		12.00	0.40	1.50		
	6.00	17.75		0.52		9.40	13.00		0.93		3.1
3-Mar	8.00	22.00	0.65		8.50		13.00	0.50	1.40	2800	
10-Mar	7.00	18.00	0.38		6.80		9.00	0.50	1.20		
17-Mar	5.00	12.00	0.19		3.30		4.00	0.40	1.70		
24-Mar	6.00	12.00	0.24		4.70		7.00	0.50	0.90		
31-Mar	3.00	8.00	0.13		4.10		5.00	0.50	0.90		
	5.80	14.40		0.37		5.83	7.60		1.22		5.2
7-Apr	3.00	14.00	0.31		4.30		9.00	0.40	1.30	380	
14-Apr	3.00	10.00	0.15		2.60		8.00	0.40	1.80		
21-Apr	4.00	10.00	0.18		5.50		6.00	0.50	1.30		
28-Apr	8.00	14.00	0.31		4.30		10.00	0.50	0.80		
	4.50	12.00		0.24		4.18	8.25		1.30		0.0
5-May	17.00	22.00	0.31		3.40		10.00	0.60	0.60	20	
12-May	2.00	4.00	0.11		5.10		11.00	0.40	0.30		
19-May	2.00	6.00	0.17		7.70		12.00	0.40	0.20		
26-May	2.00	6.00	0.29		7.00		14.00	0.10	0.20		
	5.75	9.50		0.22		5.80	11.75		0.33		0
2-Jun	2.00	10.00	0.23		10.20		14.00	0.10	0.20	20	
9-Jun	2.00	6.00	0.39		8.90		15.00	0.10	0.10		
16-Jun	2.00	2.00	0.31		9.50		18.00	0.10	0.10		
23-Jun	2.00	2.00	0.20		9.20		16.00	0.80	0.10		
30-Jun	4.00	4.00	0.19		5.80		12.00	0.50	0.10		
	2.40	4.80		0.28		8.72	15.00		0.12		0.0
7-Jul	2.00	4.00	0.12		6.90		13.00	0.50	0.10	20	
14-Jul	2.00	4.00	0.12		3.20		13.00	0.80	0.10		
21-Jul	2.00	6.00	0.18		7.10		15.00	0.10	0.10		
28-Jul	2.00	4.00	0.15		5.20		11.00	0.80	0.10		
	2.00	4.50		0.14		5.17	13.00		0.10		0.0
4-Aug	2.00	6.00	0.09		4.40		9.00	1.00	0.20	20	
11-Aug	2.00	2.00	0.11		6.00		9.00	0.50	0.10		
18-Aug	2.00	5.00	0.1		5.40		8.00	0.70	0.20		
25-Aug	2.00	2.00	0.08		6.00		9.00	1.10	0.10		
	2.00	3.75		0.10		5.45	8.75		0.15		23.15
1-Sep	2.00	2.00	0.06		8.50		10.00	2.00	0.60	40	
8-Sep	2.00	3.00	0.04		1.80		7.00	1.90	1.60		
15-Sep	2.00	4.00	0.07		2.10		6.00	1.70	1.30		
22-Sep	2.00	2.00	0.12		3.90		6.00	1.60	2.10		
29-Sep	2.00	4.00	0.08		6.90		9.00	0.60	1.40		
	2.00	3.00		0.07		4.64	7.60		1.40		0
6-Oct	2.00	2.00	0.05		7.30		12.00	0.8	1.6	20	
13-Oct	2.00	2	0.05		8.10		11.00	0.70	1.30		
20-Oct	2.00	6.00	0.23		8.30		13.00	1.10	2.40		
27-Oct	2.00	3.00	0.06		15.00		16.00	1.00	1.10		
	2.00	3.25		0.10		9.68	13.00		1.60		0.0
3-Nov	2.00	2.00	0.20		14.40		15.00	1.10	0.50	40	
10-Nov	2.00	2.00	0.13		13.80		13	1.00	0.40		
17-Nov	2	2.00	0.04		11.30		11.00	0.10	0.50		
24-Nov	2.00	6.00	0.14		13.50		14.00	0.40	0.70		
	2.00	3.00		0.13		13.25	13.25		0.53		0
1-Dec	2.00	7.00	0.23		12.40		14.00	0.40	0.70	240	
8-Dec	2.0	6.0	0.2		11.8		13.0	0.4	0.8		
15-Dec	2.00	8.00	0.29		10.10		15.00	0.40	1.00		
22-Dec	2.00	2.00	0.15		10.30		12.00	0.40	1.00		
29-Dec	10.00	18.00	0.85		13.20		15.00	0.40	0.70		
	3.60	8.20		0.35		11.56	13.80		0.84		
Average	3.52	7.77	0.23	0.23	7.74	7.74	11.47	0.61	0.77		5

Table VI

WETLAND FINAL EFFLUENT											
DATE	CBOD ₅	TSS	TP	TP Month	Ammonia(N)	NH ₃ Month	TKN	Nitrite	Nitrate	E. Coli	Temp.
BOD <2mg/L recorded as	1.0	weekly	Average	Average	Average	Average		(N)	(N)		
6-Jan	2.00	7.00	0.09		9.50		12.00	0.30	0.50	80	
13-Jan	2.00	2.00	0.13		7.40		11.00	0.30	0.30		
20-Jan	5.00	12.00	0.28		9.30		13.00	0.10	0.10		
27-Jan	6.00	6.00	0.23		13.70		15.00	0.10	0.20		
	3.75	6.75	0.18	0.18		9.98	12.75	0.20	0.28		
3-Feb	4.00	12.00	0.39		13.40		16.00	0.10	2.00	2120	
10-Feb	6.00	10.00	0.47		10.80		16.00	0.10	0.20		
17-Feb	3.00	6.00	0.25		9.60		11.00	0.60	1.20		
24-Feb	2.00	7.00	0.21		8.00		13.00	0.40	0.70		
3	3.75	8.75	0.33	0.33		10.45	14.00	0.30	1.03		
3-Mar	3.00	16.00	0.36		8.50		14.00	0.40	0.70	1140	
10-Mar	4.00	6.00	0.22		8.70		10.00	0.40	0.80		
17-Mar	3.00	10.00	0.09		4.20		4.00	0.30	1.10		
24-Mar	2.00	4.00	0.09		5.10		4.20	0.40	1.00		
31-Mar	2.00	4.00	0.03		3.30		3.00	0.10	0.50		
4	2.80	8.00		0.16		5.96	7.04				
7-Apr	2.00	4.00	0.09		3.50		6.00	0.10	0.90	40	
14-Apr	2.00	3.00	0.05		0.80		5.00	0.30	1.50		
21-Apr	2.00	2.00	0.08		0.70		1.90	0.10	0.90		
28-Apr	2.00	2.00	0.26		1.60		3.00	0.40	0.60		
	2.00	2.75		0.12		1.65	3.98				
5-May	2.00	6.00	0.07		0.70		3.00	0.50	0.60	20	
12-May	2	6	0.06		2.70		5.00	0.40	0.40		
19-May	2.00	10.00	0.15		2.60		7.00	0.10	0.20		
26-May	2.00	6.00	0.29		4.00		10.00	0.10	0.10		
	2.00	7.00	0.14	0.14		2.50	6.25				
2-Jun	2.00	20.00	0.23		10.80		13.00	0.10	0.10	20	
9-Jun	2.00	8.00	0.17		6.00		11.00	0.10	0.10		
16-Jun	2.00	4.00	0.14		8.60		0.10	0.10			
23-Jun	2.00	6.00	0.14		7.00		11.00	0.40	0.10		
28-Jun	2.00	4.00	0.12		5.00		9.80	0.50	0.10		
	2.00	8.40	0.16	0.17		7.48	8.98				
7-Jul	2.00	6.00	0.06		6.30		10.00	0.60	0.10	140	
14-Jul	2.00	10.00	0.04		1.40	7.00	7.00	0.80	0.20		
21-Jul	2.00	8.00	0.09		4.00		8.00	0.10	0.10		
28-Jul	2.00	6.00	0.12		3.50		8.00	0.10	0.10		
	2.00	7.50	0.08	0.08		3.80	8.25				
4-Aug	2.00	8.00	0.08		3.00		8.00	0.10	0.10	260	
11-Aug	3.00	8.00	0.08		3.00		7.00	0.10	0.10		
18-Aug	2.00	8.00	0.10		5.1		6.00	0.10	0.10		
25-Aug	2.00	5.00	0.13		4.00		6.00	0.10	0.10		
	2.25	7.25	0.10	0.10		3.78	6.75				
1-Sep	2.00	4.00	0.10		4.60		8.00	0.10	0.10	100	
8-Sep	2.00	4.00	0.08		3.00		6.00	0.10	0.10		
15-Sep	2.00	3.00	0.11		3.80		5.00	0.10	0.10		
22-Sep	2.00	4.00	0.10		2.90		5.00	0.10	0.10		
29-Sep	2.00	10.00	0.10		4.20		6.00	0.10	0.10		
	2.00	5.00	0.10	0.10		3.58	6.00				
6-Oct	2.00	6.00	0.07		6.20		10.00	0.10	0.10	80	
13-Oct	2.00	6.00	0.21		6.80		9.00	0.10	0.10		
20-Oct	2.00	4.00	0.11		6.50		13.00	1.00	0.60		
27-Oct	2.00	2.00	0.06		10.30		14.00	0.90	0.40		
	2.00	4.50	0.11	0.11		7.45	11.50				
3-Nov	2.00	2.00	0.11		13.30		14.00	1.00	0.30	40	
10-Nov	2.00	2.00	0.05		11.40		11.00	0.10	0.30		
17-Nov	2.00	2.00	0.04		10.10		11.00	0.10	0.30		
24-Nov	2.00	3.00	0.06		10.50		11.00	0.30	0.60		
	2.00	2.25	0.07	0.07		11.33	11.75				
1-Dec	2.00	2.00	0.04		9.40		8.00	0.40	0.90	20	
8-Dec	2.00	3.00	0.11		11.00		12.00	0.40	1.20		
15-Dec	2.00	2.00	0.08		9.90		14.00	0.30	1.00		
22-Dec	2.00	2.00	0.10		11.10		12.00	0.60	1.10		
29-Dec	2.00	5.00	0.24		11.30		13.00	0.40	0.80		
	2.00	2.80	0.11	0.08		10.35	11.80				
		5.97	0.14	0.14							
CofA obj.	15.00	15.00	0.8		(May-Oct)14mg/l					200/100ml/mo	200/100ml/mo
					(Nov-Apr)17mg/l						

Table VII
Lagoon Loading

	Total	Average	Average	Loading	Average	Loading	Average	Loading	Average	Loading	Average	Loading
	Flow (m ³)	Flow m ³ /day	CBOD mg/L	BOD kg/day	S.S. mg/L	S.S. kg/day	NH ₃ mg/L	NH ₃ kg/day	TKN mg/L	TKN kg/day	T.Phos mg/L	T.Phos kg/day
JAN	99,491	3,209	4.25	13.64	9.25	29.69	9.28	29.77	13.50	43.33	0.29	0.94
FEB	111,628	3,987	6.00	23.92	17.75	70.76	9.40	37.48	13.00	51.83	0.52	2.08
MAR	147,025	4,743	5.80	27.51	14.40	68.30	5.83	27.63	7.60	36.04	0.37	1.73
APR	160,693	5,356	4.50	24.10	12.00	64.28	4.18	22.36	8.25	44.19	0.24	1.27
MAY	132,309	4,268	5.75	24.54	9.50	40.55	5.80	24.75	11.75	50.15	0.22	0.94
JUN	93,962	3,132	2.40	7.52	4.80	15.03	8.72	27.31	15.00	46.98	0.28	0.88
JUL	91,162	2,941	2.00	5.88	4.50	13.23	5.17	15.19	13.00	38.23	0.14	0.42
AUG	83,029	2,678	2.00	5.36	3.75	10.04	5.45	14.60	8.75	23.44	0.10	0.25
SEP	76,566	2,552	2.00	5.10	3.00	7.66	4.64	11.84	7.60	19.40	0.07	0.19
OCT	103,296	3,332	2.00	6.66	3.25	10.83	9.68	32.24	13.00	43.32	0.10	0.32
NOV	102,340	3,411	2.00	6.82	3.00	10.23	13.25	45.20	13.25	45.20	0.13	0.43
DEC	134,422	4,336	3.60	15.61	8.20	35.56	11.56	50.13	13.80	59.84	0.35	1.53
Total Annual	1,335,923											
Avg. Annual	111,327	3,662	3.53	13.89	7.78	31.35	6.58	20.99	11.54	41.83	0.23	0.92
Min	76,566						8.91	35.43			0.07	
Max	160,693										0.52	
CofA Limit		4,600	30.00	138.00	40.00	184.00	May-Oct. 14.0 ¹	May-Oct. 64.4 ¹			1.00	4.60
							Nov.-Apr. 17.0 ²	Nov.-Apr. 78.2 ²				

Table VIII

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.

	Raw Sewage Parameter	Type of Sample	Minimum Frequency	Total # of Samples
1	CBOD ⁵	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 analyzed for at least the following parameters(1-10) at the indicated minimum frequencies.

	Waste Stabilization Pond Effluent Parameter	Type of Sample	Minimum Frequency	Total # of Samples
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 analyzed 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).

	Constructed Wetland Effluent Parameter	Type of Sample	Minimum Frequency	Total # of Samples
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 endeavor 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 December of this year we upgraded the warning (monitoring) at the Harbour Street Pumping Station, to include the pumps individually and compressors, generator (when on), high water levels in the wetwell, and high water in the drywell.

We have computers to monitor the flows at both the liftstation and Lagoon, the lagoon computer is tied into the flow reader to provide up to date flows. At the lift station the operator inputs day to day information and flows.

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.

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

Table IX 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 CBOD₅, Suspended Solids, Total Phosphorus, TKN and Ammonia.

Table IX also demonstrates the success of Brighton's WPCP natural treatment process, which includes:

- 93.3% CBOD₅ removal
- 93.3% removal of Suspended Solids
- 95.3% removal of Phosphorus
- 65.3% removal of Nitrogen
- 63.9% removal of Ammonia

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

Table IX

Month	Flows			Maximum Day m ³ /D	CBOD5				Suspended Solids			
	Total Flow m ³	Average Day m ³ /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)
Jan.	99,491	3,209	5,390	24.00	10.00	4.25	3.75	88.00	88.00	9.25	6.75	
Feb.	111,628	3,987	10,510	18.00	12.00	6.00	3.75	72.00	84.00	17.75	8.75	
Mar.	147,025	4,743	8,136	30.00	12.00	5.80	2.80	56.00	64.00	14.40	8.00	
Apr.	160,693	5,356	12,298	18.00	3.00	4.50	2.00	34.00	64.00	12.00	2.75	
May	132,309	4,268	7,620	39.00	18.00	5.75	2.00	72.00	80.00	9.50	7.00	
June	93,962	3,132	4,251	45.00	18.00	2.40	2.00	96.00	106.00	4.80	8.40	
July	91,162	2,941	4,569	9.00	18.00	2.00	2.00	125.00	126.00	4.50	7.50	
Aug.	83,029	2,678	3,774	105.00	9.00	2.00	2.25	160.00	114.00	3.75	7.25	
Sept.	76,566	2,552	4,435	12.00	6.00	2.00	2.00	48.00	170.00	3.00	5.00	
Oct.	103,296	3,332	5,566	27.00	9.00	2.00	2.00	90.00	72.00	3.25	4.50	
Nov.	102,340	3,411	4,971	30.00	24.00	2.00	2.00	84.00	42.00	3.00	2.25	
Dec.	134,422	4,336	6,921	72.00	15.00	3.60	2.00	130.00	72.00	8.20	2.80	
Total	1,335,923	43,946									5.97	
Average	111,327	3,662		35.75	12.83	3.53	2.38	87.92	90.17	7.78	5.92	
C. of A. Limits		4,600				30.0	15.0			40.0	15.0	
% Efficient					64.1%	90.1%	93.3%		-2.6%	91.1%	93.3%	
					*Lag2 =lagoon 2	*Wet=Wetland						

Month	Total Phosphorous				TKN				Ammonia				Temp
	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.	2.20	1.08	0.29	0.18	25.00	15.00	13.50	12.75	15.90	11.80	9.28	9.98	0.00
Feb.	3.10	2.90	0.52	0.33	25.00	17.00	13.00	8.75	16.10	10.00	9.40	10.45	3.13
Mar.	2.00	1.70	0.37	0.16	18.00	14.00	7.60	7.04	4.90	5.20	5.83	5.96	5.24
Apr.	1.10	0.95	0.24	0.16	6.00	7.00	8.25	2.75	1.90	1.30	4.18	1.65	0.00
May	3.30	1.76	0.22	0.14	20.00	13.00	11.75	6.25	12.30	4.30	5.80	2.50	0.00
June	2.50	1.80	0.28	0.17	30.00	20.00	15.00	8.98	14.60	7.10	8.72	7.48	0.00
July	1.80	3.10	0.14	0.08	30.00	21.00	13.00	13.00	35.60	15.90	5.17	3.80	0.00
Aug.	5.20	3.00	0.10	0.10	31.00	18.00	8.75	8.00	34.80	9.80	5.45	3.78	23.15
Sept.	2.10	2.90	0.07	0.10	18.00	22.00	7.60	6.00	10.30	13.80	4.64	3.58	0.00
Oct.	2.90	2.70	0.10	0.11	20.00	20.00	13.00	11.50	15.50	9.30	9.68	7.45	0.00
Nov.	4.00	2.60	0.13	0.07	40.00	30.00	13.25	11.75	24.90	12.50	13.25	11.33	0.00
Dec.	5.40	2.70	0.35	0.08	50.00	20.00	13.80	11.80	30.00	10.90	11.56	10.35	0.00
Total													
Average	2.97	2.27	0.23	0.14	26.08	18.08	11.54	9.05	18.07	9.33	7.74	6.52	
C. of A. Limits			1.00	0.80							14.0(S)17.0(W)	10.0(S)15.0(W)	
% Efficient		23.6%	92.1%	95.3%		30.7%	55.8%	65.3%		48.4%	57.1%	63.9%	
													11.33 max 1.65 fmin

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

- In December a new alarm monitoring system was installed at the liftstation.
- This year we dropped the level of the water in the wetland to allow for new grow naturally, with good success.

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. This is a result of infiltration of stormwater into the collection system and suspected illegal connections of sump pump discharges.
- Muskrat damage to the constructed wetlands has reduced plant growth in the vegetated zones. Seasonal trapping is being conducted to control muskrat population. This has become an annual 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 October 19, 2009.

4.4 Reporting – Non-Compliance

- **Certificate of Approval 7.(b)** There were no non-compliance issues in this reporting period.

4.6 Future Action Plan

In 2009, Municipal staff have successfully made operational changes to the septage handling system that appear to have addressed the high ammonia concentrations that were noted in 2008. While these steps have provided a short term solution, it is clear based on observation by staff and consultants that the biosolids accumulation in Lagoon #2 is reaching a potentially critical level that may negatively impact the water quality of the lagoon effluent and may once again result in non-compliance. Biosolids management must be addressed in the near future before it becomes a significant issue.

While the ammonia exceedence panic of 2008 is no longer pushing Brighton to expand their WPCP in the near term and the \$6M expenditure delayed, it is inevitable that added treatment capability will be required at some point in the future. Analyzing the performance of 2010 and subsequent years will be important to determining if the extremely good performance of 2009 was an anomaly or if it will become the norm.

Brighton Council has accepted the following recommendations from our Consultants to move forward proactively:

- Communicate to the MOE of the revised action plan that includes:
 - Continued vigilance through routine monitoring
 - Regular data review
 - Regular correspondence with the MOE
 - Providing increased treatment efficiency if and when required
- Design and construct a biosolids storage area in Lagoon #2 and remove biosolids
- Continue to monitor funding opportunities and prepare applications
- Finalize the preliminary design that has been started for the MBR modification so that the Municipality is closer to being “shovel ready” when funding does become available.

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. 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.