

# CITY OF KELOWNA

## 2007 ANNUAL REPORT

### ❖ Wastewater Treatment Facility (PE 12211)

### ❖ Tradewaste Treatment Plant (PE 01434)

### ❖ Residuals management (PE 11687)

#### 1.) EXECUTIVE SUMMARY

The City of Kelowna Wastewater Treatment Facility treated a total of 12,586 Million litres in 2007. Again, our Facility produced excellent results. The daily Total Nitrogen average was 4.88 ppm, compared to the 2006 average daily of 4.92 ppm. Daily Total Phosphorus average was 0.20 ppm in 2007, compared to 0.21 ppm in 2006. The average Cake Solids produced at the Facility was 18.1% compared to 17.9% in 2006. We operated with a skilled staff that included a Level 4 Supervisor, three Level 3 Operators, nine Level 2 Operators, one millwright / operator, two Instrumentation / Electrical technicians and two Laboratory staff.

Efforts continued with our Water Efficiency program as we pursued the City's goals of reducing both Water consumption and Sewer flows. The Utility has a comprehensive infrastructure replacement program to repair and replace old mains which may be allowing infiltration in the sewer system. In addition, we continue to utilize source control measures through the Sewer Use bylaw, which limits substances and sewage strengths allowed into our Sewer system

The Brandt's Creek Tradewaste Treatment Plant generally met the Ministry Permit levels. This was achieved by quickly reacting to the variable loads that arrive from the Industries, and diverting the effluent to the City sewer system, which leads to the WWTF, when the results approached the Permit levels. The City and the Industries have been attempting to reach an Agreement to construct a new Treatment Facility but financial limitations of the Industries have prevented them from proceeding.

The quantities of product received and leaving our Wastewater Treatment Facility (WWTF) and Tradewaste Treatment Plant (BCTWTP) are shown below, and the detailed data records are contained in Appendix 1 and Appendix 2, respectively.

<u>Item</u>	<u>2007 Quantities</u>	<u>Units</u>
WWTF Biosolids to Regional Site	<b>19,389</b>	Metric Tonnes
WWTF Scum to Regional	<b>12,7791</b>	Litres
WWTF Total Influent Flow	<b>12,586</b>	Million Litres
WWTF Total Daily Average Influent	<b>34.5</b>	Million Litres
BCTWTP Biosolids for Land Application	<b>16.6</b>	Million Litres
BCTWTP Total Influent Flow	<b>340.4</b>	Million Litres
BCTWTP Effluent to Creek	<b>19.6</b>	Million Litres
BCTWTP Estimated Effluent to sewer	<b>320.8</b>	Million Litres

## **2.) TECHNOLOGY & EFFICIENCY IMPROVEMENTS**

The City of Kelowna will soon be improving and expanding its Treatment Facility to accommodate more flow and improve the effectiveness and efficiency of the current process. This will include new process methods as well as the possible retrofit of existing equipment. In conjunction with the Plant expansion, Energy efficiency initiatives will be investigated such as options that will reduce our use of natural gas and electricity and reduce our carbon “footprint”. In addition, we hope to establish reasonable conditions for effluent re-use to allow us to offer it to our “neighbours” to use for their irrigation.

As a result of the investigation work performed in preparing the pre-design for the Plant expansion, consideration is being given to install and operate a UV system that will provide 3-log treatment (99.9% effectiveness) in neutralizing all the protozoa such as Cryptosporidium and Giardia that leaves our facility in the effluent.

In 2007 the Water Sustainability Action Plan (WSAP) was implemented by the City of Kelowna. The 5 year plan aims to reduce total water consumption by 15%. In addition to the ongoing customer education programs, the WSAP's initiatives also include: demand-side management programs, addition of water conservation to development approvals, effective full cost pricing, use of efficient fixtures, and minimization of the water system leakage. The City now charges residential water use by increasing-block rate billing. The main reason for employing the increasing-block rate structure is to encourage conservation by the customers. Water Smart continued to offer free leak inspections and irrigation and landscape audits. As in past years, doorknockers were handed out to the top 10% of residential high water users. The pilot projects in 2007 included the use of drought tolerant grass, compost tea application, and the soil amendment program. Adding Waterlok, a mineral-based water retention product, to soil was also assessed. Water Smart started auditing the irrigation systems in City parks on the principle of “distribution uniformity”. The audit will continue in 2008 and results will be used by the Parks Division to adjust their watering practices to reduce cost and conserve water.

## **3.) SEWER BYLAW MONITORING & ENFORCEMENT**

The City of Kelowna wastewater source control program oversees sanitary sewer monitoring and discharge compliance and permitting under the Sanitary Sewer/Storm Drain Regulation Bylaw No. 6618-90. Fourteen temporary waste discharge permits were issued in 2007. Six continuous waste discharge permits remained active through 2007. Sewer pH monitoring has been increased with the addition of ten pH loggers located at strategic points in of the collection system.

## **4.) INFILTRATION & INFLOW**

The City Wastewater Utility has an on-going program to replace the damaged and leaking pipes in our Sewer system. The Sewer Utility has incorporated into our rates, and budgets annually, a substantial amount of money to repair and replace the worst sewer mains in our system. In 2007 the Utility budgeted approximately \$870,000 to replace old sewer mains. The City of Kelowna uses the WRc rating system to evaluate our existing pipes and establish our sewer main replacement schedule, and coordinates the work with the other Utility companies and Road improvement projects.

To better evaluate existing sewer mains, and to troubleshoot sewer problems, the City budgeted \$85,000 to purchase a new sewer inspection CCTV system to obtain real-time video of our sewers.

## **5.) TREATMENT PLANT IMPROVEMENTS**

- Completed the pre-design work for WWTF expansion.
- Commenced 40% design review for the WWTF expansion.
- Commenced Siemens control system upgrade proposal.
- Completed RAS line replacement (NEW RAS BUILDING)
- Primary piping, addition of a clear spool piece for sludge monitoring.

## 6.) RESIDUALS MANAGEMENT

The City of Kelowna and the City of Vernon have a joint agreement for operation of the Ogogrow Production Facility located at 551 Commonage Road in Vernon BC. The successful biosolids recycling program completed the first full year of operation at this location in 2007.

About 19,400 tonnes of biosolids produced at the Kelowna wastewater treatment plant and 7100 tonnes from the Vernon plant were beneficially reused in the production of the compost product known as Ogogrow™. Approximately 30,000 cubic meters of Ogogrow™ (about 10,000 tonnes) were sold generating revenue of \$466,669.82. Ogogrow™ is in high demand by orchardists, landscapers and home gardeners.

The process used for the stabilization of biosolids is the Extended Aerated Static Pile Composting Method. Compost is aerated for a period of about 18 days, where naturally occurring aerobic bacteria generate elevated pile temperatures that destroy pathogens. All compost processed meets the minimum temperature requirement of 55 degrees Celsius for at least three days to achieve pathogen destruction. Composted biosolids are then placed on a secondary aeration system for 14 days then cured for a minimum of ninety days. Compost is screened to one half inch to produce the final product. Each 500 cubic yard batch is tested for *Salmonella* and Fecal Coliform bacteria prior to sale or giveaway, with upper acceptable limits of 0.75 mpn/g *Salmonella*, and 1000 mpn/g Fecal Coliform. Furthermore, Ogogrow™ is tested at regular intervals for metals, nutrients, and other parameters, which are either required by regulation, or deemed to be important information for the end user. Temperature and testing records are kept on file for three years and are available for inspection at the Regional Compost Facility. The Ogogrow™ compost test results continue to meet Organic Matter Recycling Regulation limits and are shown in the following table:

### Ogogrow Test Results 2007

Constituent	test # 1	test # 2	test # 3	test # 4	test # 5	test # 6	Test Average	OMRR	
Arsenic	3	6	6	6	7.7	2.9	5.3	13	
Cadmium	0.8	0.9	0.9	0.8	0.9	0.6	0.8	3	
Calcium	na	na	14000	12000	8900	15000	12475	na	
Chromium	21	21	22	18	24	13	19.8	210	
Cobalt	2.7	3.1	3.2	3.2	3.6	2.1	3.0	34	
Copper	270	310	320	350	320	240	302	400	
Mercury	0.61	1.1	0.84	0.71	0.85	0.54	0.86	2	
Molybdenum	3.2	4.6	4.2	4.6	3.8	3.6	4.0	5	
Nickel	11	11	12	11	12	7.3	11	62	
Lead	18	21	22	18	25	12	19	150	
Selenium	<2	2.4	2.5	2.1	2.2	1.6	2	2	
Zinc	230	270	270	240	290	190	248	500	
PCB's	Two tests per year; none detected								2
Total Potassium %	0.47	0.47	0.5	0.44	0.43	0.36	0.4	na	
Total Phosphorus %	1.1	1.1	0.97	1.03	1.4	1.3	1.2	na	
Total Nitrogen %	2.64	2.72	2.76	2.97	2.59	3.12	2.8	na	
Organic Matter %	77.5	78	75.8	75.4	78.2	80.1	77.5	na	
Moisture %	56.6	48.3	51.9	53.3	61.5	60.8	55.4	35%-60%	
Total Solids	43.4	51.7	48.1	46.7	38.5	39.2	44.6	na	
Conductivity (Ms/cm)	1.9	1.8	1.8	2.2	1.6	2.3	1.9	na	
pH	7.8	7.2	7.5	7.9	6.5	7.6	7.4	na	
Foreign Matter %	<1	<1	<1	<1	<1	<1	<1	<1%	
Ammonia mg/kg as NH3	2900	3100	2800	6200	3700	5700	4067	na	
C/N Ratio	17	16.2	16.5	14.8	18	14.9	16.2	15-35	

Results are expressed on a dry weight basis unless otherwise indicated.

Results are the average of tests taken throughout the year.

# APPENDIX 1

## City of Kelowna

### WASTEWATER TREATMENT FACILITY

Year End Report - Water and Wastewater Division*																							
Kelowna Wastewater Treatment Facility - ME #12211 - 2007																							
Date	Influent Flow		7 Day Comp Total P				Final Effluent Composite										Effluent Grab				Landfill Leachate Pumped to sewer m3/day		
	Total	Avg	Avg	Total	Total P	Total N Daily Est.	24 hour composite										BOD	Solids	pH			Coliform	
							Ortho P		Total P	NO3	NHS	TKN	Org N	Total N	min	max			Total	Fecal			
							Avg	Total														mg/L	kg/day
ML	ML/day	mg/L	kg/day	kg	mg/L	mg/L	kg/day	kg	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Jan	1,018.5	32.9	0.28	9.27	287.3	5.24	0.07	2.29	70.8	0.19	3.18	0.31	2.08	1.74	5.39	4.5	1.6	6.60	6.70	0.5	0.0	27	
Feb	938.5	33.5	0.25	8.32	232.9	5.20	0.07	2.49	69.8	0.18	2.76	0.78	2.49	1.66	4.53	2.0	1.7	6.63	6.74	3.0	0.3	56	
Mar	1,054.9	34.0	0.26	8.70	269.8	4.13	0.10	3.51	08.8	0.17	1.89	0.73	2.20	1.51	4.25	2.7	1.1	6.62	6.71	2.8	0.2	96	
Apr	1,036.1	34.5	0.25	8.88	266.5	5.06	0.08	2.74	82.2	0.18	3.46	0.16	1.61	1.44	5.23	4.0	1.1	6.59	6.67	1.3	0.8	97	
May	1,054.1	34.0	0.24	7.73	239.6	4.74	0.09	2.91	90.2	0.17	3.28	0.07	1.49	1.40	4.54	2.0	1.5	6.53	6.63	3.8	0.0	82	
Jun	1,056.3	35.2	0.24	8.38	251.3	4.90	0.08	2.80	83.9	0.26	3.41	0.08	1.49	1.41	4.87	1.2	1.1	6.42	6.55	0.8	0.0	93	
Jul	1,138.7	36.7	0.16	5.65	175.3	4.28	0.04	1.50	46.6	0.12	2.92	0.07	1.34	1.28	4.20	2.7	0.8	6.41	6.58	0.5	0.0	87	
Aug	1,108.0	35.7	0.12	4.13	127.9	4.93	0.04	1.49	46.1	0.12	3.24	0.29	1.90	1.41	4.85	1.9	0.7	6.42	6.58	0.8	0.0	80	
Sep	1,064.6	35.5	0.14	5.10	153.1	4.84	0.05	1.69	50.8	0.14	3.18	0.23	1.69	1.44	4.74	2.0	1.1	6.41	6.59	1.3	0.3	55	
Oct	1,095.7	35.3	0.14	4.92	152.5	5.28	0.05	1.93	59.8	0.15	3.66	0.29	1.63	1.33	5.22	3.1	1.2	6.41	6.57	4.5	0.8	124	
Nov	1,003.2	33.4	0.17	5.45	163.5	5.45	0.06	1.85	55.6	0.14	3.77	0.26	1.70	1.43	5.44	3.5	0.9	6.41	6.57	4.4	0.5	72	
Dec	1,017.8	32.8	0.12	3.85	119.3	4.59	0.06	1.95	60.5	0.12	2.80	0.26	1.77	1.53	4.79	4.2	1.4	6.42	6.58	1.0	0.7	79	
2007	12,588	34.6	0.20	6.68	2,498	4.88	0.07	2.28	826.1	0.18	3.18	0.28	1.77	1.48	4.84	2.8	1.2	6.48	6.82	2.1	0.3	79	

Raw Influent Monthly Averages - 2007 *										
Date	Raw Influent Grab				Raw Influent Composite					
	pH		NO3	NHS	Total N	Ortho P	Total P	BOD		
	min	max	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
Jan	6.99	7.83	1.25	23.6	50.5	4.14	8.70	342		
Feb	7.14	7.91	0.65	25.8	45.3	4.12	6.88	477		
Mar	7.09	7.84	1.03	22.9	43.5	3.92	7.57			
Apr	7.01	7.88	2.30	16.9	33.5	3.81	6.35	293		
May	6.92	7.78	3.12	13.8	38.9	4.15	5.84	614		
Jun	6.83	7.59	3.28	14.9	33.5	4.19	6.95	189		
Jul	6.74	7.47	1.80	14.7	32.2	3.88	6.52	560		
Aug	6.70	7.47	1.41	20.2	47.5	4.03	8.79	495		
Sep	6.73	7.54	1.63	21.5	51.1	3.84	7.65	278		
Oct	6.69	7.41	1.34	22.6	45.3	4.06	8.11	467		
Nov	6.86	7.71	2.11	17.8	40.4	4.08	7.56	320		
Dec	6.96	7.70	1.85	18.7	47.7	4.23	7.10	396		
2007	6.88	7.68	1.80	18.48	42.6	4.03	7.30	388		

Dewatered Sludge for Composting (Average of two tests) - 2007 *																	
Total Solids	Moisture Content	Volatile Solids	TKN Dry	TKN Wet	PCB's	Potassium	Arsenic	Cadmium	Chromium	Cobalt	Copper	Mercury	Molybdenum	Nickel	Lead	Selenium	Zinc
g/L	%	g/L	g/kg	g/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
170	83.1	140	72.9	12.4	0.05	8400	1.5	1.05	24.3	4.14	605	1.0	8.2	17.9	16.8	4.6	385

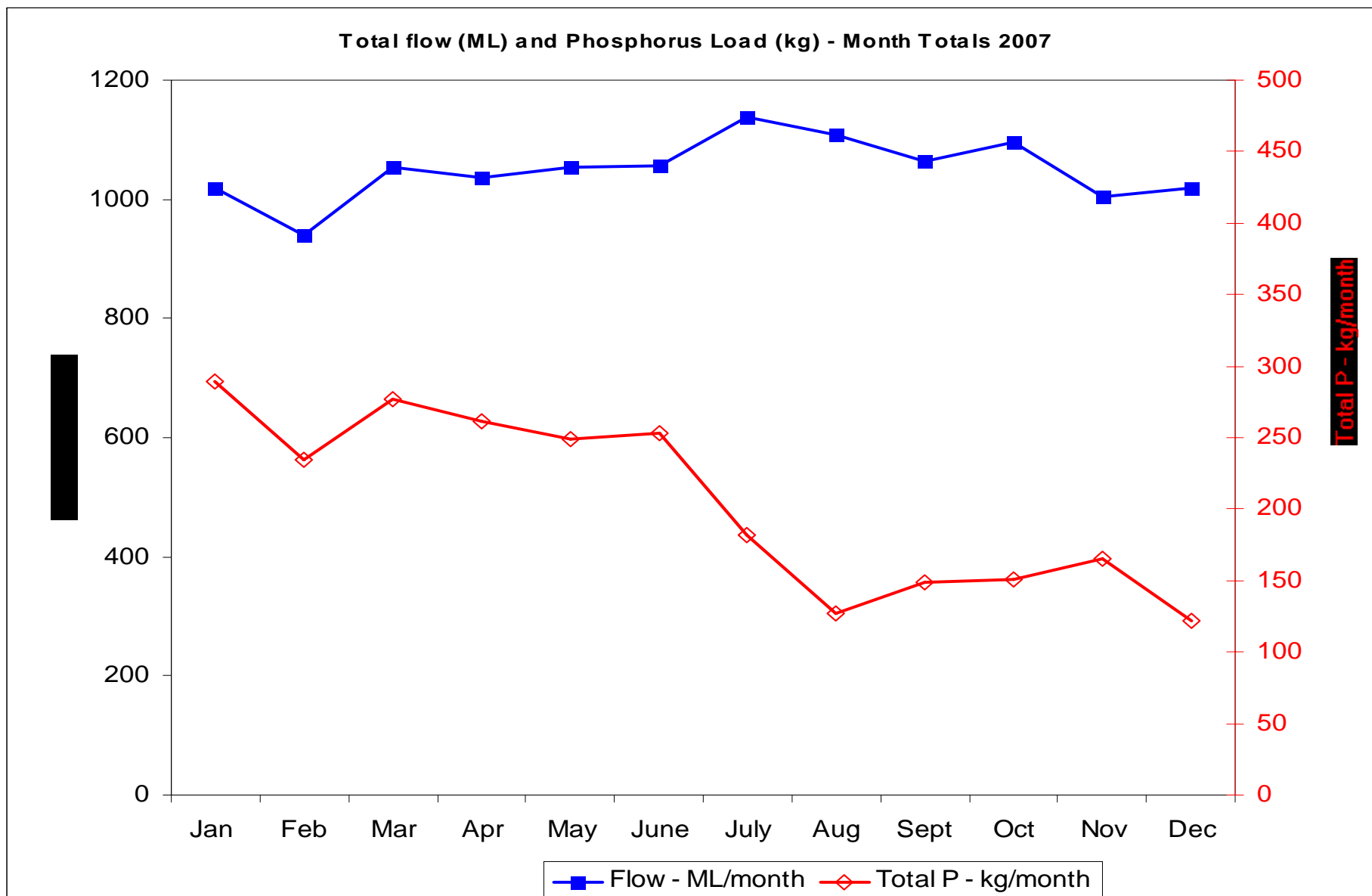
\* Raw data is available in the Ministry of Environment Environmental Monitoring System (EMS) database or by contacting the City Of Kelowna Wastewater Treatment Facility directly.

**APPENDIX 2**  
**City of Kelowna**  
**BRANDT'S CREEK TRADEWASTE TREATMENT PLANT**

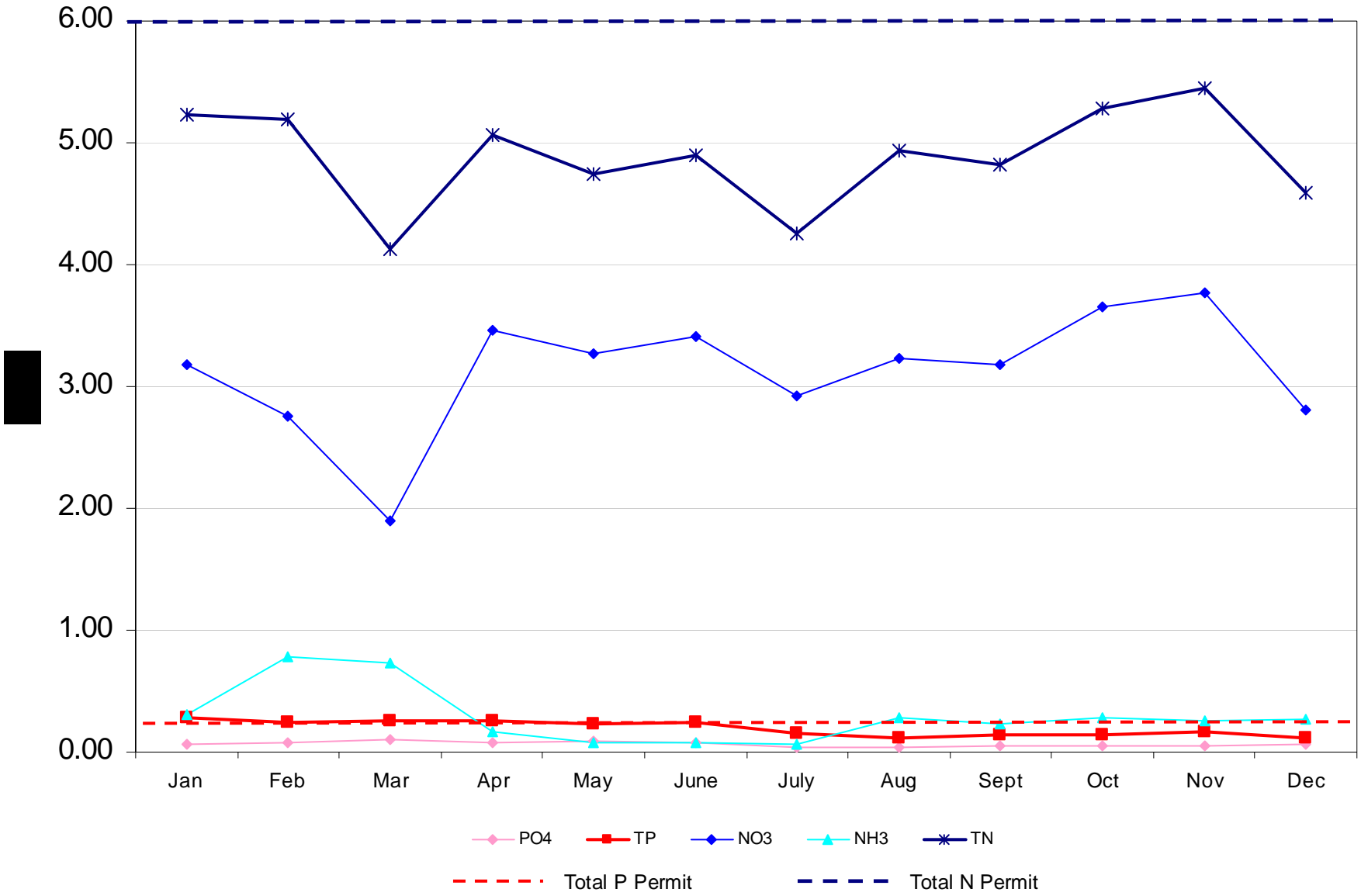
Year End Report - Water and Wastewater Division *																		
Brandt's Creek Tradewaste Treatment Plant - ME #01434 - 2007																		
Date	Effluent Flow			Final Effluent Composite														
				Estimates				Auto Analyzer							BOD	COD	Solids	
	Total P			Total N	Ortho P			Total P	NO3	NH3	TKN	Total N						
	Avg	Avg	Total		Avg	Avg	Total						Avg	Avg	Total	mg/L	mg/L	mg/L
L x 100	L x 100	Days to Creek	mg/L	kg/d	kg/mo	mg/L	mg/L	kg/d	kg/mo	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Jan	0		0	0.00	0.00	0.0	0.00			0.0								
Feb	0		0	0.00	0.00	0.0	0.00			0.0								
Mar	0		0	0.00	0.00	0.0	0.00			0.0								
Apr	35609	7122	5	1.17	0.85	4.2	2.14	0.33	0.24	1.2	1.42	0.63	0.00	1.52	1.91	6.9	43	14.7
May	12840	4260	3	1.39	0.60	1.8	1.95	0.06	0.04	0.1	1.47	0.32	0.00	1.63	1.80		38	31.1
Jun	670	670	1	7.76	0.52	0.5	32.53	4.15	0.26	0.3	7.76	24.38	0.29	6.15	27.60	18.0	103	74.0
Jul	0		0	0.00	0.00	0.0	0.00			0.0								
Aug	59035	4920	12	1.46	0.69	8.3	4.35	0.20	0.06	1.0	1.59	0.32	0.06	1.32	1.50	2.9	25	17.7
Sep	7040	3520	2	2.06	0.73	1.5	2.86	0.18	0.06	0.1	2.08	0.97	0.06	1.87	3.53	2.7	32	22.6
Oct	42800	5350	8	1.20	0.64	5.1	1.87	0.44	0.23	1.9	1.16	0.53	0.04	1.34	1.63		26	17.0
Nov	37500	1974	19	0.46	0.10	2.0	1.49	0.06	0.01	0.3	0.47	0.34	0.06	1.18	1.70	2.3	27	12.8
Dec	0		0	0.00	0.00	0.0	0.00			0.0								
2007	195494	3910	50	1.16	0.47	23.4	2.36	0.27	0.10	4.8	1.62	0.90	0.06	1.82	3.53	6.6	30	17.6

\* Raw data is available in the Ministry of Environment Environmental Monitoring System (EMS) database or by contacting the City Of Kelowna Wastewater Treatment Facility directly.

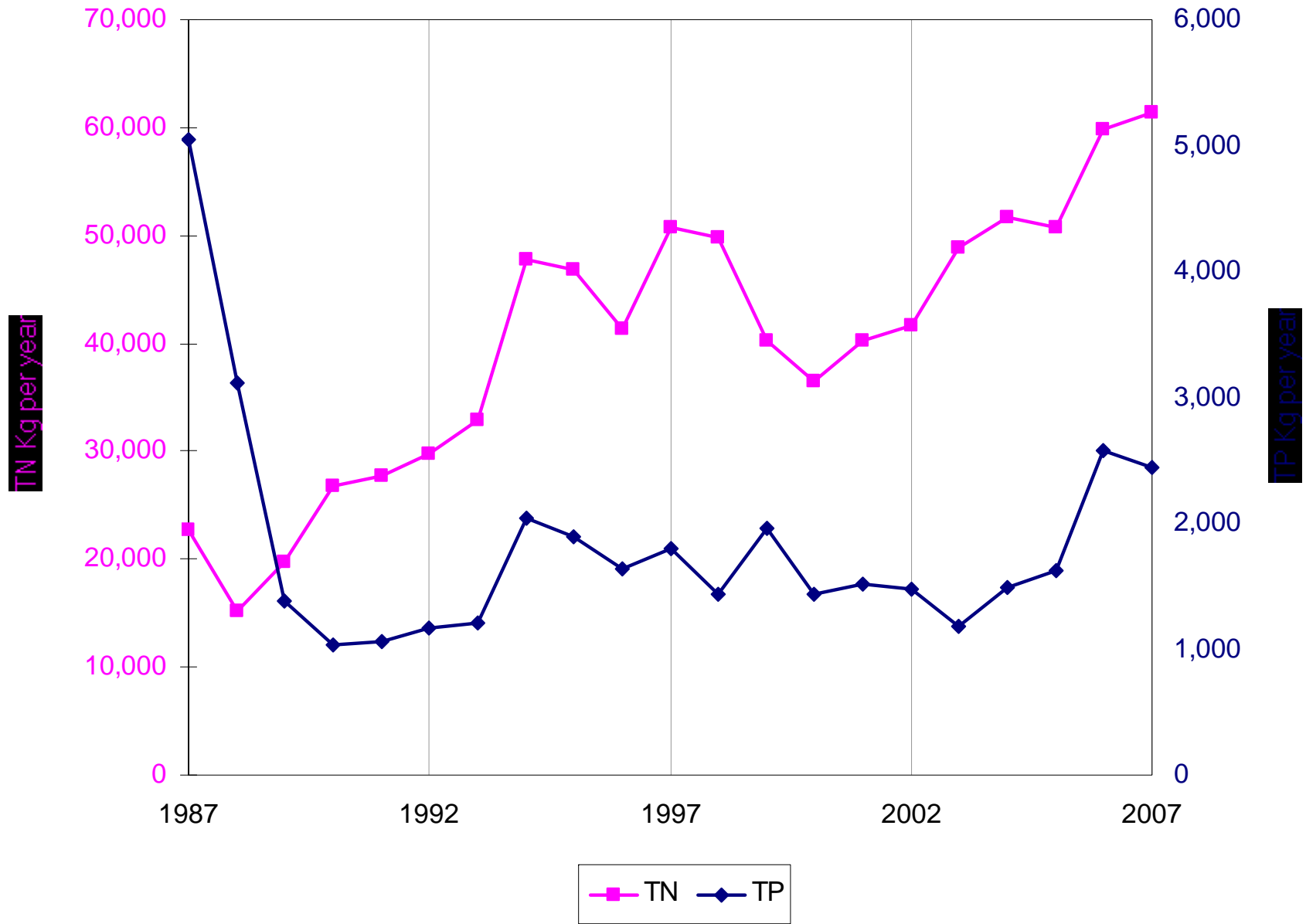
APPENDIX 3  
City of Kelowna  
WASTEWATER TREATMENT FACILITY TRENDS



WWTF Effluent Nutrients - Month Averages 2007



Kelowna WWTF Total P & N



WWTF Influent Flows - Year Average of Daily flow

