Public Works
P. O. Box 1614, 21 Reeve St., Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

Dear Sir:

RE: 2013 Year-End Report, Woodstock Wastewater Treatment Plant (WWTP)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) # 5950-7XQKXS.

I trust this report fulfills the intent of the ECA annual reporting requirements. If there are any questions, please contact me.

Yours truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Background

Oxford County owns and operates nine wastewater treatment plants (WWTPs) within the County: namely, Woodstock WWTP, Ingersoll WWTP, Tillsonburg WWTP, Thamesford WWTP, Drumbo sequencing batch reactor (SBR), Norwich Lagoons, Plattsville Lagoons, Tavistock Lagoons, and Mount Elgin recirculating sand filter (RSF).

Oxford County is centrally located in Southwestern Ontario (Figure 1) and in 1975 was restructured from 18 municipalities to its current 8. The County was given ownership of all municipal water and wastewater systems as part of the restructuring; however, from 1975 to 2000 the operations were subcontracted to the area municipalities and local Public Utility Commissions (PUCs). In 2000, Oxford County took over direct management and operations of all of the water and wastewater systems. Currently, Woodstock and Tillsonburg water distribution and wastewater collection systems are operated under Service Agreements with the respective municipality.

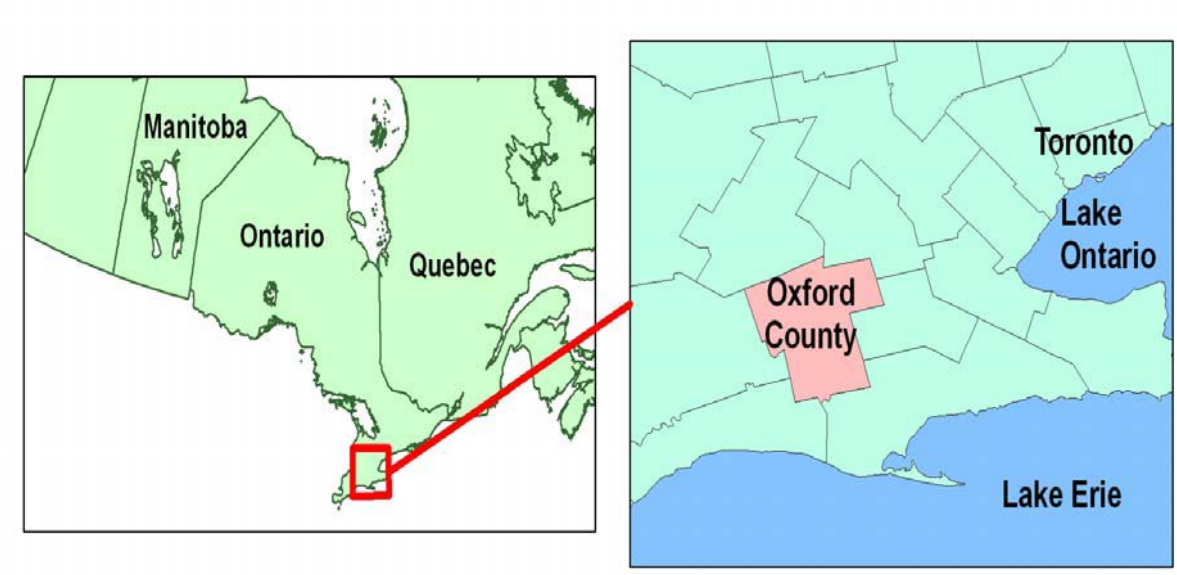


Figure 1 – Location of Oxford County

Treatment Plant Description

The Woodstock WWTP provides wastewater treatment for residential, commercial and industrial users in the City of Woodstock and for the communities of Embro and Innerkip. It also provides treatment for septic tank waste, hauled waste, holding tank waste, and landfill leachate from within Oxford County. In 2009, the plant completed a hydraulic capacity upgrade increasing the plant capacity from 25,000 m^3 per day to the current approved average daily flow capacity of 33,000 m^3/d, with a peak flow capacity of 66,000 m^3/d.

The Woodstock WWTP (Figure 2) is a conventional activated sludge system consisting of primary and secondary treatment, with an outfall pipe to the Thames River. The facility adds ferrous chloride into the reactors for phosphorous removal; sodium hypochlorite is added seasonally for disinfection along with sodium bisulfite for de-chlorination. The facility provided effective wastewater treatment in 2013, with an average flow for the plant of 23,827 m^3/day which represents 72% of the design capacity of 33,000 m^3/day. The total flow for 2013 was 8,697,150 m^3.

Figure 2 – Woodstock WWTP Aerial Photo

Plant Effluent Compliance Criteria

Facility - Woodstock Wastewater Treatment Plant
Design Capacity - 33,000 m^3 / day
Average Daily Flow - 23,827 m^3 / day (2013)
Receiving Area - Thames River
Classification - WWT – IV
ECA- #5950-7XQKXS

Effluent Parameter	Monthly Average Concentration (milligrams per litre unless otherwise indicated)	Monthly Average Loading (kilograms per day unless otherwise indicated)
Column 1	Column 2	Column 3
$CBOD_5$		
- May 01 to November 30	15.0	495
- December 01 to April 30	20.0	660
Total Suspended Solids	15.0	495
Total Phosphorus	0.75	25.0
Total Ammonia Nitrogen (Ammonia Nitrogen + Ammonium Nitrogen)		
- May 01 to November 30	3.0	99
- December 01 to April 30	5.0	165
Total Chlorine Residual Note 1	less than 0.05	-
E. Coli Note 1	200 counts/100 mL (monthly *Geometric Mean Density)*	-
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

Note 1 Between May 01 to October 31.

Sampling Procedure

Wastewater samples are collected on a weekly basis. Raw sewage samples are collected where the sewer trunks combine before entering the sewage works. A composite sampler collects samples over a 24-hour period. Following primary treatment, a second 24-hour composite sample is collected.

A final effluent 24-hour composite sample is collected following secondary treatment, disinfection and de-chlorination but prior to the effluent discharge to the Thames River. Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance, except for pH, DO, chlorine residual and temperature, which are field collected. All in-house testing is done for process control and is not included in this report.

Flows

The total flow treated in 2013 was 8,697,150 m^3. The daily average flow was 23,827 m^3/day which represents 72% of the Woodstock WWTP's rated capacity of 33,000 m^3/d.

Raw Sewage Quality

The annual average raw sewage BOD_5 concentration to the plant was 132 mg/L, which represents an average loading of 3145 kg/day. The average $CBOD_5$ concentration was 95 mg/L (or 2264 kg/day of loading). The average total suspended solids concentration was 196 mg/L (or 4670 kg/day of loading). Average nitrogen levels, as TKN were 21.6 mg/L (or a loading of 515 kg/day). Total phosphorus was 3 mg/L, which represents a loading of 72 kg/day.

Plant Performance & Effluent

Detailed analytical data of annual and monthly averages are summarized later in this report in Exhibit 1.

Over the reporting period, the annual average effluent $CBOD_5$ concentration was 2.4 mg/L (or an equivalent 97.5% reduction). The total suspended solids average was 4.6 mg/L, which represents a 97.7% reduction. Ammonia averaged 0.12 mg/L (or a 99.2% reduction). Total phosphorus average was 0.22 mg/L, which represents a 92.7% reduction.

On a weekly basis (minimum), the operator measures pH of both the influent and effluent streams. There was no single pH result outside the discharge limits of 6-9.5 in 2013.

Staff tests Total Residual Chlorine (TRC) in the treated effluent on a daily basis; well in excess of the required weekly testing frequency: on a daily basis. The monthly average results at all times met the Monthly Average TRC limit and were less than 0.05 mg/L and, therefore, were in compliance. The Federal Government's P2 target for TRC of 0.02 mg/L was met in August and October with the other months during the disinfection period achieving 0.03 mg/L (disinfection from May through to October 2013).

There was no reported non-compliant event for the Woodstock Wastewater Treatment Plant for any discharge parameter in 2013 as all effluent discharge criteria were met.

Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the plant's ECA were met at the Woodstock WWTP in 2013.

Overflows, Bypassing, Upset and Abnormal Conditions

There were no bypasses or overflows from the Woodstock WWTP in 2013 and there were no upset conditions noted during the year.

There was a spill of approximately 17 m3 of wastewater from the Embro portion of the collection system on June 2, 2013 at the Odour Control Facility. This was due to a fault in the programming that resulted in a high pressure condition that caused PVC pipe to fail inside the Odour Control Building. The pipe was replaced with stainless steel and changes were made to the logistics programming.

There was another spill of approximately 1.5 m3 of wastewater from the Embro portion of the collection system on October 18, 2013 at the Odour Control Facility. This was also due to a high pressure condition when a valve was in the manual closed position after maintenance work. This caused another section of PVC pipe to fail inside the Odour Control Building.

On August 1, 2013 there was an overflow of approximately 0.5 m3 of wastewater from the Trillium Woods sewage pumping station as a result of unusual high flows received during a major rain storm, likely due to a temporary illegal discharge of storm water to the sanitary sewer from a construction site. In addition the standby pump failed to start however given the excessive flows, an overflow would have likely still occurred. The City of Woodstock was notified to monitor for evidence of illegal storm water connections and the pump fault was repaired.

There was a spill of 2-5 m3 of wastewater from the Innerkip portion of the collection system on December 23, 2013. This was a result of a broken pipe inside the Innerkip Main sewage pumping station building. The PVC pipe was replaced with stainless steel.

These events were reported to the MOE at the time they occurred.

In addition, the two odour control facilities downstream of Embro and Innerkip forcemains experienced operational challenges in 2013. System modifications are currently underway. MOE is aware of these issues.

Maintenance and Calibration

The operating and maintenance staff at the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept on-site at the plant. The plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

Calibration of flow meters is conducted yearly by R&R Instrumentation. The records are kept on-site at the plant.

Biosolids 2013

Discussion:

Biosolids are anaerobically digested and dewatered at the Woodstock WWTP using two Alfa Laval Centrifuges. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, appended.

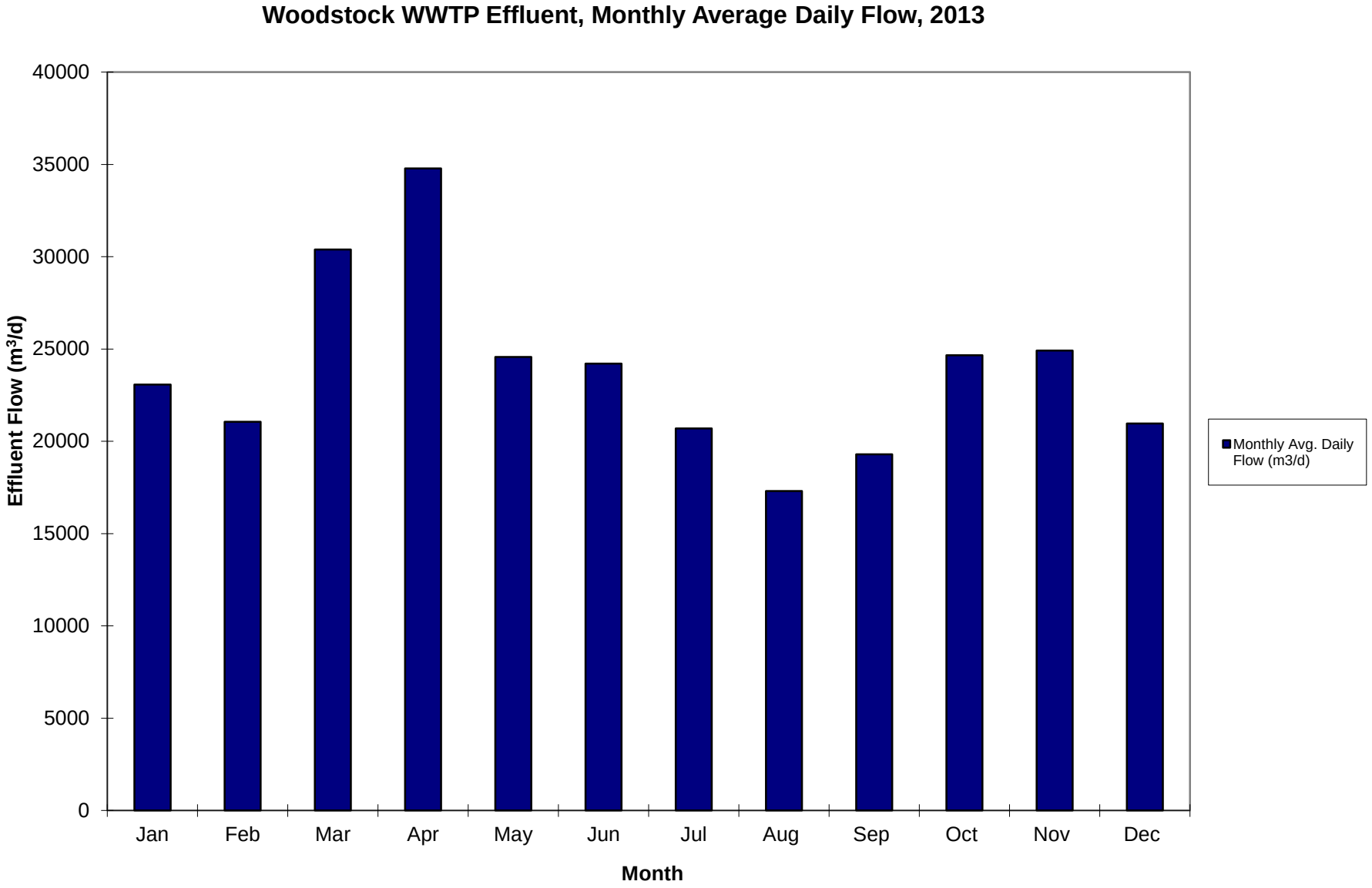
Haulers Report

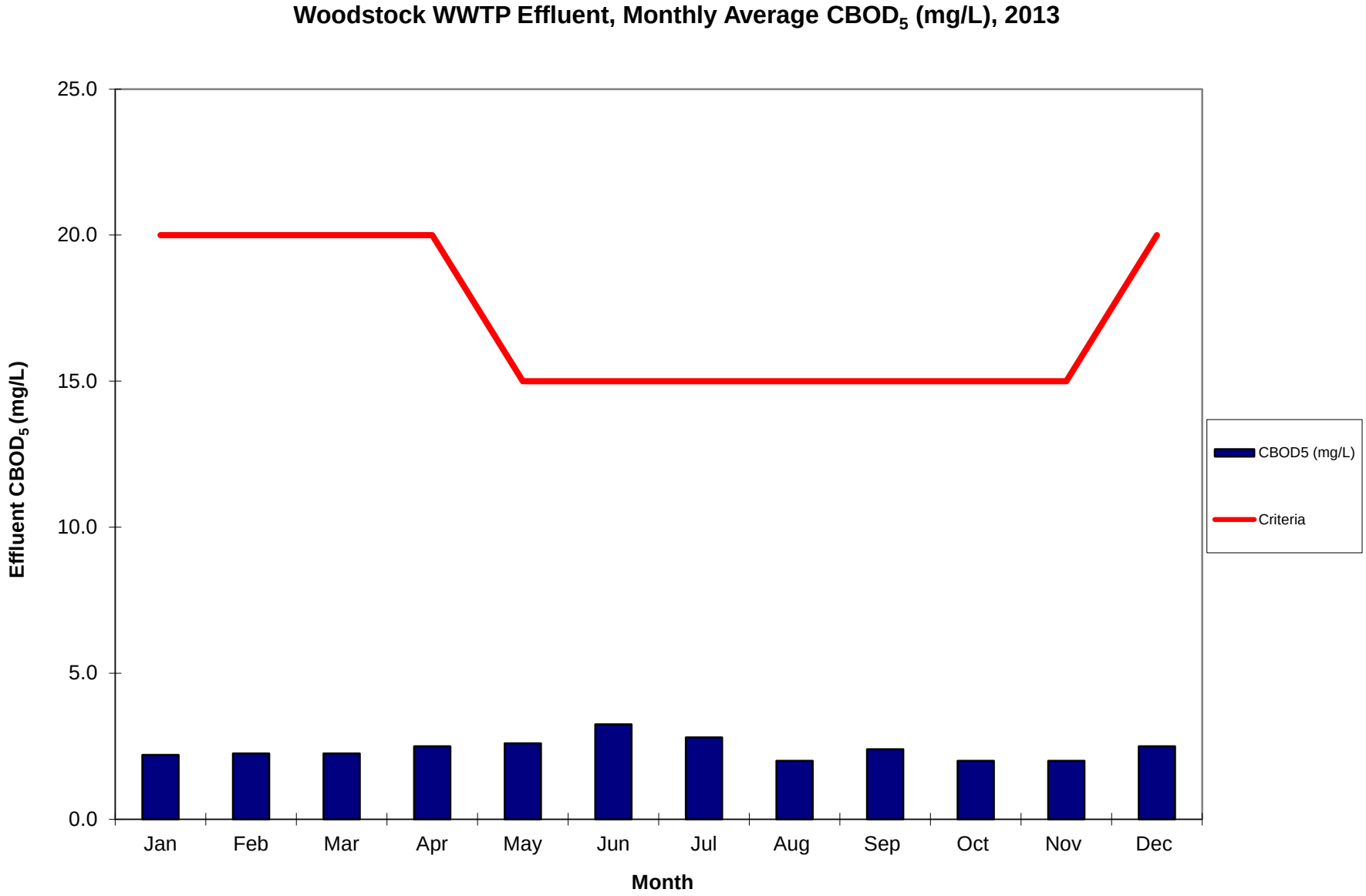
Exhibit 2 is a summary table for incoming septic haulers showing volumes of hauled waste.

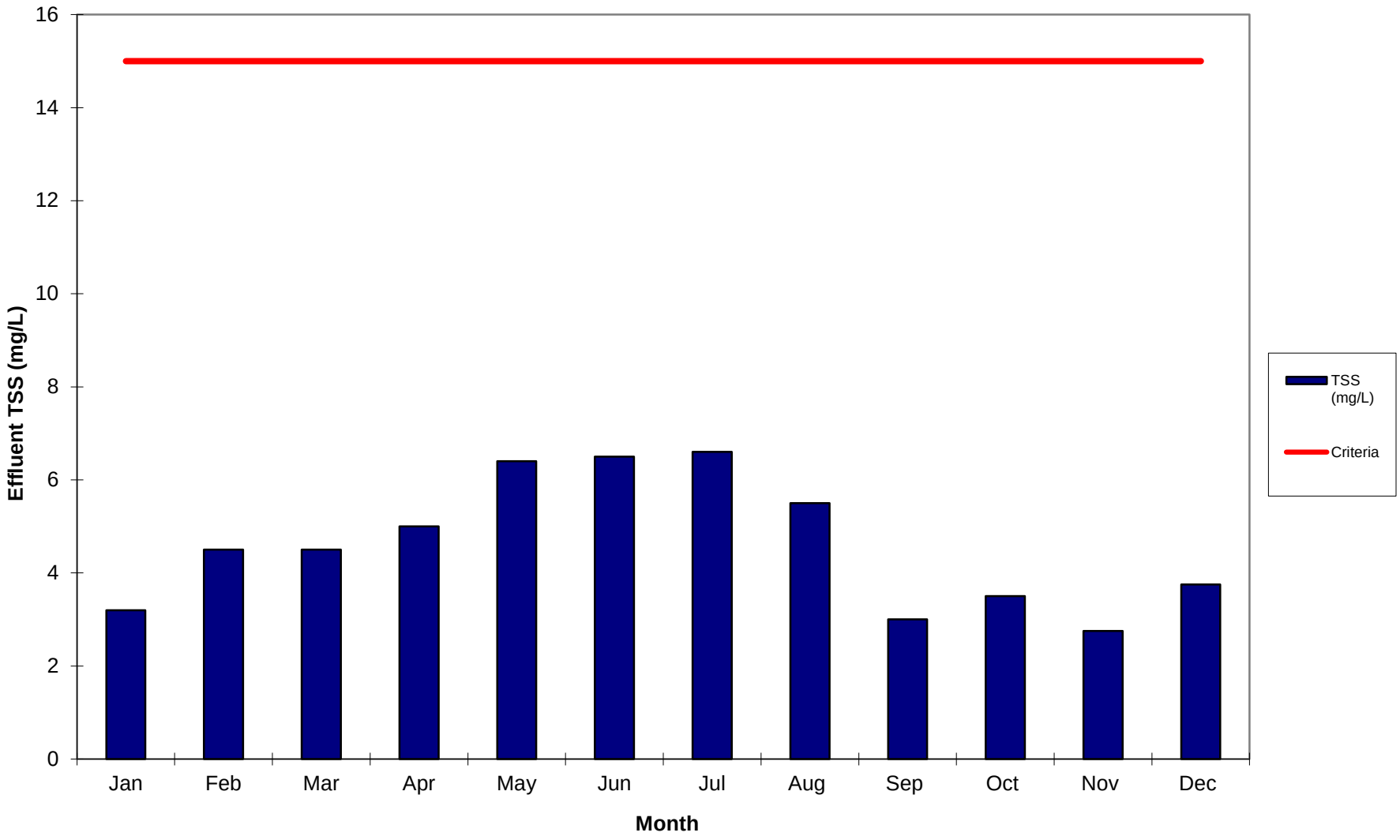
Summary

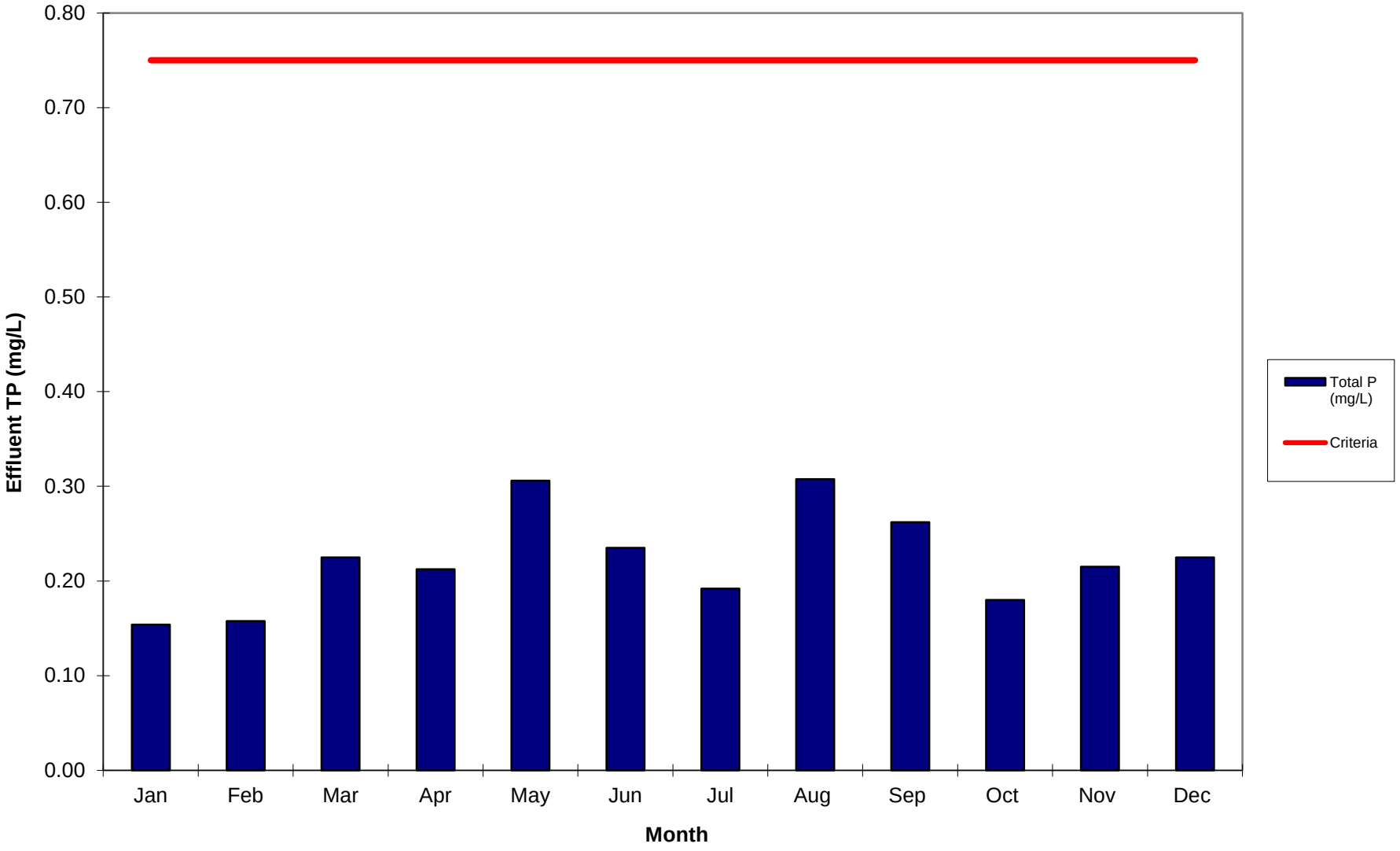
The Woodstock WWTP operated within its design flow criteria and met all effluent discharge quality limits in 2013.

Exhibit 1

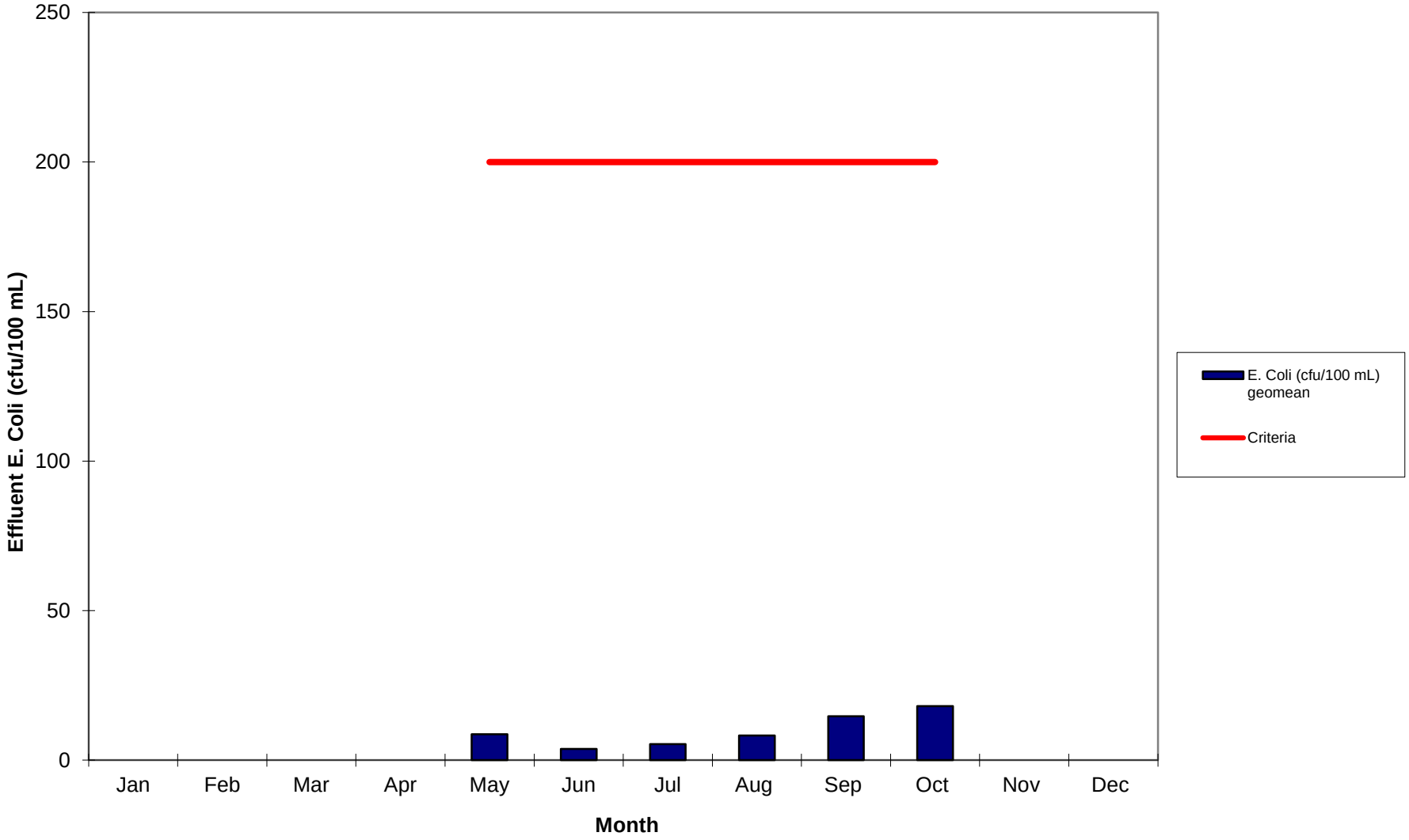

Woodstock WWTP Effluent, Monthly Average Daily Flow, 2013
Effluent Flow (m3/d)
40000
35000
30000
25000
20000
15000
10000
5000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Monthly Avg. Daily Flow (m3/d)

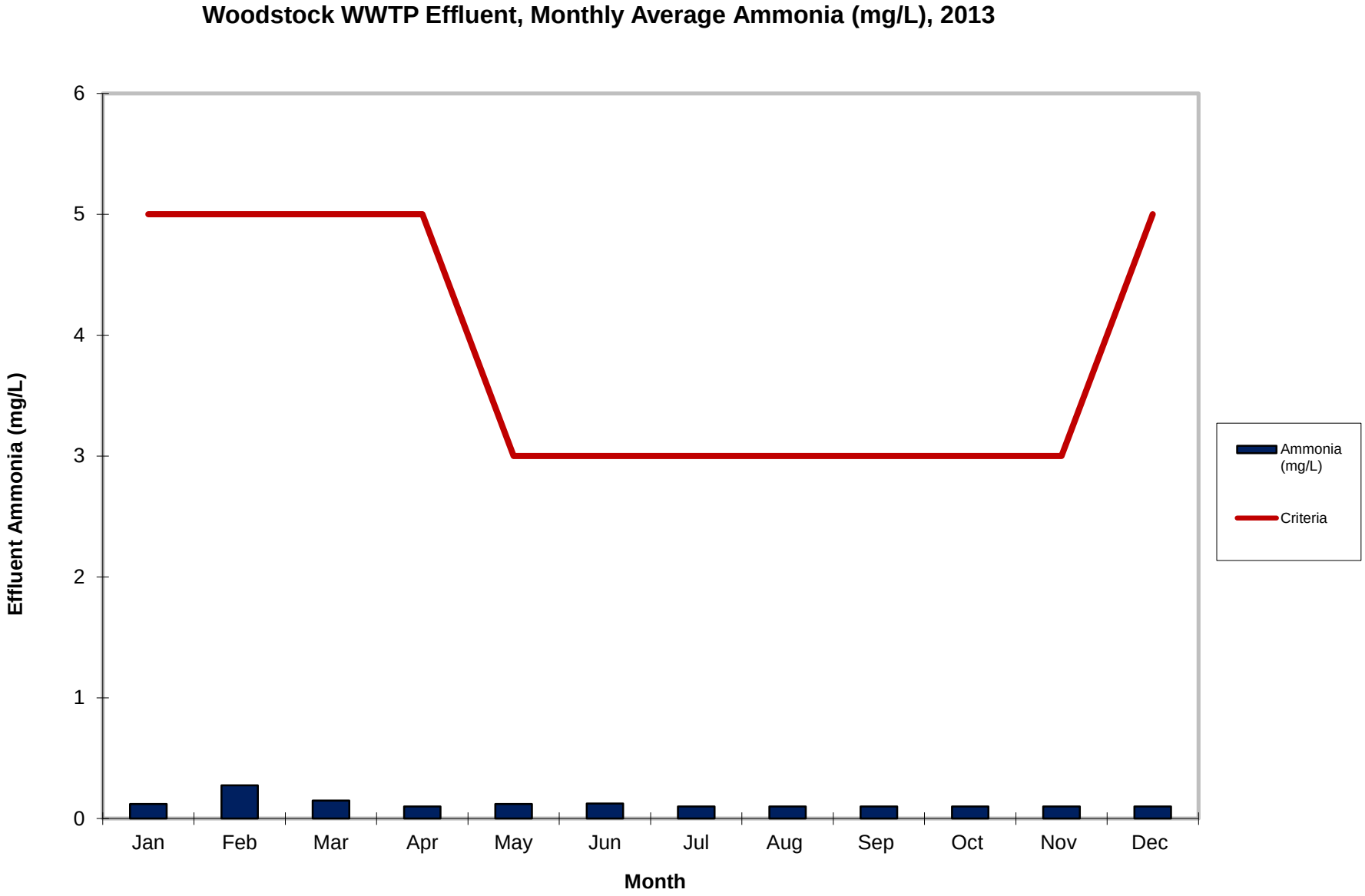

Woodstock WWTP Effluent, Monthly Average CBOD5 (mg/L), 2013
Effluent CBOD5 (mg/L)
25.0
20.0
15.0
10.0
5.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Woodstock WWTP Effluent, Monthly Average TSS (mg/L), 2013
Effluent TSS (mg/L)
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (mg/L)
Criteria

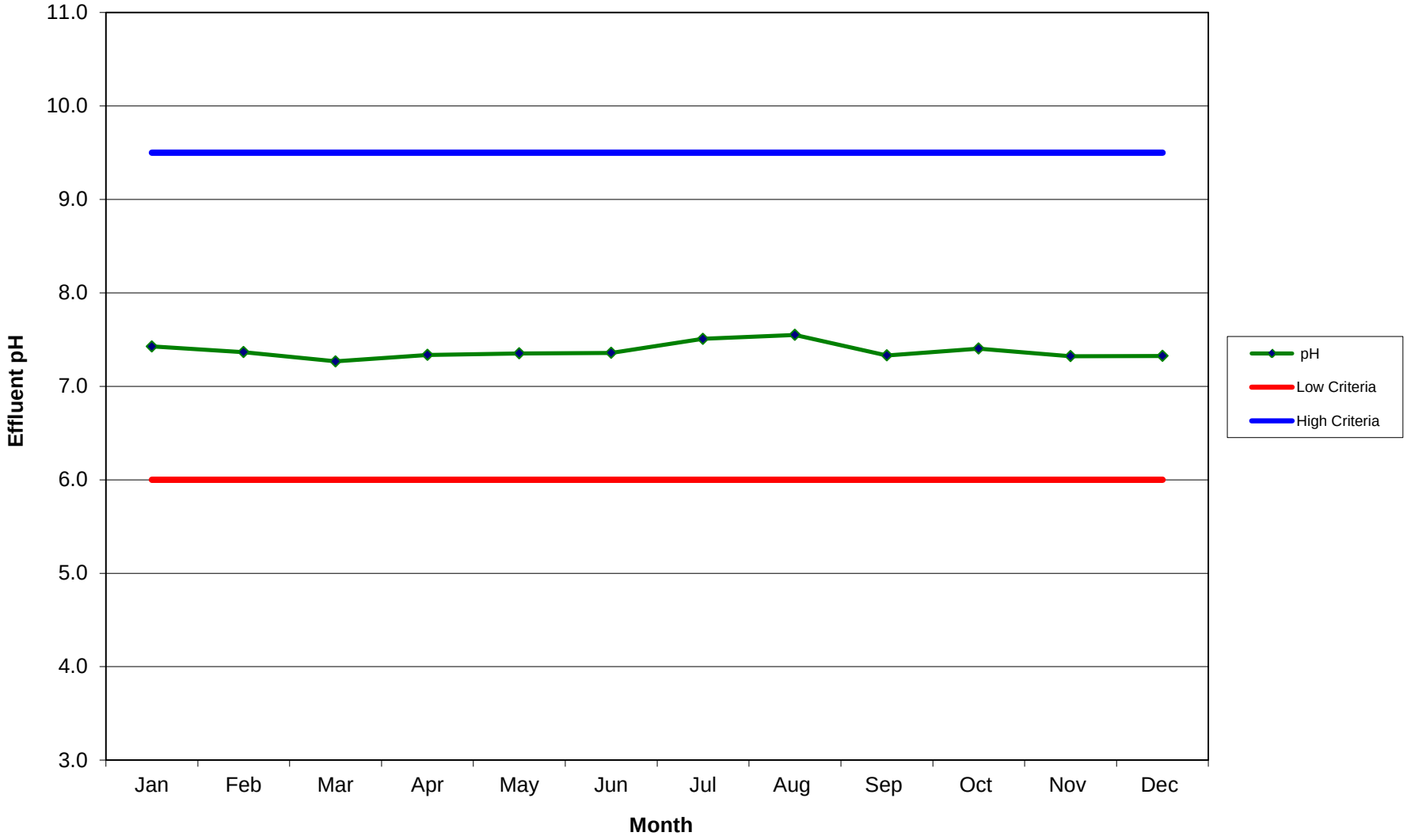

Woodstock WWTP Effluent, Monthly Average TP (mg/L), 2013
Effluent TP (mg/L)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Total P (mg/L)
Criteria

Woodstock WWTP Effluent, Monthly Geomean E. Coli, 2013




Woodstock WWTP Effluent, Monthly Average Ammonia (mg/L), 2013
Effluent Ammonia (mg/L)
6
5
4
3
2
1
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Ammonia (mg/L)
Criteria

Woodstock WWTP Effluent, Monthly Average pH, 2013



Municipality: Woodstock
PROJECT:Woodstock WWTP
Operator: Oxford County
Works Number:
120000685

2013

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Total 1000m3	Design
Total Flow (m^3)	715234	589692	941991	1043456	761474	726353	641577	536533	579026	764561	747477	649776				8697150	8697	
Monthly Avg. Daily Flow (m3/d)	23072.1	21060.4	30387	34782	24563.7	24212	20696	17307.5	19300.9	24663.3	24915.9	20960.5	23827	17308	34782			33000
Min. Daily Flow (m^3/d)	13633	14127	17053	23688	18530	17193	15511	12564	14088	17158	15007	13646	16017	12564	23688			72.0%
Max. Daily Flow (m3/d)	55624	28369	80835	62203	45795	33797	29780	21904	44085	51905	42912	48835	45504	21904	80835			
Influent																		
BOD_5 (mg/L)	126.4	110.8	117.0	115.5	123.4	109.8	125.8	136.8	124.0	110.3	83.3	85.3	132	83.25	137			
TSS (mg/L)	232.6	117.5	125.5	149.3	154.2	130.8	177.0	175.3	148.2	159.3	108.0	107.0	196	107	233			
Total P (mg/L)	5.6	2.1	2.0	2.4	2.7	1.8	3.4	5.1	3.1	3.3	2.4	2.3	3.0	1.8	5.6			
NH3+NH4-N (mg/L)	15.8	15.1	10.9	14.2	14.8	12.2	13.1	18.5	15.1	14.0	14.9	17.0	14.6	10.9	18.5			
TKN (mg/L)	28.2	17.9	16.0	20.1	20.5	16.6	23.0	28.9	24.2	22.6	19.7	21.7	21.6	16.0	28.9			
NITRITE (mg/L)	0.29	0.31	0.18	0.28	0.09	0.20	0.06	0.03	0.05	0.05	0.15	0.18	0.15	0.03	0.31			
NITRATE (mg/L)	0.42	0.43	0.12	0.86	0.15	0.33	0.09	0.06	0.06	0.10	0.39	0.81	0.32	0.06	0.86			
pH	7.75	7.61	7.56	7.63	7.62	7.54	7.75	7.73	7.53	7.65	7.62	7.71	7.64	7.53	7.75			
Temp Celcius	12.2	11.0	11.3	12.5	14.7	15.7	17.8	18.4	17.8	17.3	15.5	12.9	14.8	11.0	18.4			
$CBOD_5$ (mg/L)	131.2	95.3	100.5	93.0	77.4	85.3	110.4	98.8	92.0	99.0	67.0	91.3	95	67	131			
Primary Effluent																		Criteria
BOD5 (mg/L)	93.0	139.8	90.8	84.8	116.8	119.8	115.6	94.0	107.2	88.0	88.3	227.3	114	85	227			
TSS (mg/L)	149.8	131.0	85.5	81.3	127.0	115.8	158.0	142.0	125.2	102.8	91.5	314.8	135	81	315			
Total P (mg/L)	2.4	3.4	1.8	1.7	2.2	2.2	3.6	3.8	2.4	2.2	1.5	8.4	3.0	1.5	8.4			
NH3+NH4-N (mg/L)	17.6	22.7	11.5	12.9	17.5	13.9	14.7	20.6	15.6	14.6	16.9	19.3	16.5	11.5	22.7			
TKN (mg/L)	26.9	27.0	13.2	14.6	20.1	19.4	23.0	24.3	24.8	18.4	16.9	33.8	21.9	13.2	33.8			
NITRITE (mg/L)	0.51	0.29	0.30	0.35	0.25	0.22	0.05	0.06	0.08	0.31	0.84	0.43	0.31	0.05	0.84			
NITRATE (mg/L)	2.89	1.51	2.25	1.62	0.15	0.20	0.07	0.08	0.13	0.31	1.30	0.67	0.93	0.07	2.89			
pH	7.65	7.82	7.72	7.53	7.93	7.60	7.93	7.81	7.41	7.51	7.45	7.53	7.66	7.41	7.93			
Temp Celcius																		
$CBOD_5$ (mg/L)	56.0	51.5	37.8	35.8	54.8	50.3	67.0	57.3	60.4	44.8	38.8	103.8	55	36	104			

Plant Effluent																		
$CBOD_5$ (mg/L)	2.2	2.3	2.3	2.5	2.6	3.3	2.8	2.0	2.4	2.0	2.0	2.5	2.4	2.0	3.3			15/20
TSS (mg/L)	3.2	4.5	4.5	5.0	6.4	6.5	6.6	5.5	3.0	3.5	2.8	3.8	4.6	2.8	6.6			15
Total P (mg/L)	0.15	0.16	0.23	0.21	0.31	0.24	0.19	0.31	0.26	0.18	0.22	0.23	0.22	0.15	0.31			0.75
Soluble P (mg/L)	0.12	0.11	0.18	0.16	0.27	0.21	0.16	0.24	0.23	0.17	0.20	0.19	0.19	0.11	0.27			
Ammonia (mg/L)	0.12	0.28	0.15	0.10	0.12	0.13	0.10	0.10	0.10	0.10	0.10	0.10	0.12	0.10	0.28			3/5
TKN (mg/L)	1.9	1.1	1.6	1.5	1.7	1.9	2.1	1.1	2.1	1.0	1.5	0.5	1.5	0.5	2.1			
NITRITE (mg/L)	0.22	0.35	0.16	0.04	0.06	0.07	0.20	0.02	0.03	0.03	0.06	0.17	0.12	0.02	0.35			
NITRATE (mg/L)	20.5	21.5	18.8	15.8	19.3	17.7	18.2	14.6	19.8	15.8	16.6	19.6	18.2	14.6	21.5			
pH	7.43	7.37	7.27	7.34	7.35	7.36	7.51	7.55	7.33	7.40	7.32	7.32	7.38	7.27	7.55			6-9.5
Temp Celcius	11.3	10.5	11.8	12.7	15.8	16.9	19.3	20.0	19.2	16.5	13.6	12.1	15.0	10.5	20.0			
DO (mg/L)	8.7	7.7	7.2	7.5	8.4	9.2	7.8	8.0	8.3	8.4	8.4	8.7	8.2	7.2	9.2			
BOD5 (mg/L)	3.4	4.8	4.8	4.3	4.8	5.0	4.3	2.3	2.4	2.5	2.8	4.8	3.8	2.3	5.0			
Disinfection Effluent																		
E. Coli (cfu/100 mL) geomean					8.7	3.7	5.4	8.2	14.7	18.1			10	4	18			200
TRC (mg/L)					0.03	0.03	0.03	0.02	0.03	0.02			0.0255	0.02	0.03			
Influent Loadings																		
Month													Average	Min	Max			Criteria
BOD (kg/d)	2916	2332	3555	4017	3031	2657	2604	2367	2393	2719	2074	1787	3145	1787	4017			
TSS (kg/d)	5367	2475	3814	5191	3788	3166	3663	3033	2860	3928	2691	2243	4670	2243	5367			

Exhibit 2

Hauler Summary 2013

Hauler Name	Quantity											m3	
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Year to Date
Nor Pac	262	262	131	131								98	884
Aff Portables	9	9	8	10	11	12	13	18	10	11	15	12	138
Gerber						98							98
Halco		7	5	7	7	2							27
Grand Bend									2				2
Chitters	60	28	37	70	79	81	65	65	81	102	110	60	838
Watts	35	14	84	57	59	76	51	27	128	102	67	40	740
Denby	208	95	307	270	375	385	536	529	345	353	298	213	3,911
E + J	1				1		2		2		2		7
Jack Hall	65		67	249	416	310	297	289	295	307	268	149	2,712
Norms	30	32	66	74	73	93	130	172	98	138	104	56	1,066
Otterville	195	169	175	282	275	236	256	325	155	216	178	238	2,698
Thamesford WWTP		358	132										490
County SBR	189	94	170	113	245	132	170	189	94	226	170	151	1,942
Ingersoll WWTP	905	245											1,151
Salford Landfill Leachate	1,593	660	1,553	4,485					164	655	476	476	10,060
Weber Environmental			80	80	68								227
Municipality Bayam												583	583
Total Haulage	3,551	1,973	2,815	5,828	1,608	1,424	1,519	1,614	1,375	2,108	1,687	2,075	27,575

Public Works
P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

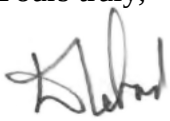
Dear Sir:

RE: 2013 Year-End Report, Ingersoll Wastewater Treatment Plant (WWTP)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) #0342-7WCKCJ and ECA #5936-8RKKNU issued February 2012.

I trust this report fulfills the intent of the ECA reporting requirements. If there are any questions, please contact me.

Yours truly,



Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Ingersoll Wastewater Treatment Plant (WWTP) is comprised of two plants; the 1947 Plant and the 1974 Plant. Both plants are conventional activated sludge treatment systems. They provided effective wastewater treatment in 2013, with an average flow of 5,207 m^3/d for the 1974 Plant, and 2,572 m^3/d for the 1947 Plant. The combined average flow of 7,779 m^3/d represents 76% of the design capacity of 10,230 m^3/d for both plants. The total combined volume treated in 2013 was 2,839,256 m^3.

Figure 1 Aerial view of Ingersoll WWTP

Plant Description

The Ingersoll Old and New Plants are owned and operated by Oxford County and began operation in 1947 and 1974, respectively. The facilities are conventional activated sludge plants consisting of primary and secondary treatment; both plants share the same ultraviolet light disinfection system and a combined single discharge point. The facility adds Aluminum Sulphate into the reactors for total phosphorus reduction.

Plant Specifications

Facility - Ingersoll Wastewater Treatment Plant
Design Capacity - 10,230 m^3/d

Average Daily Flow - 7,779 m^3/d (2013)
Receiving Water - Thames River
Classification - WWT – III
MOE ECA #0342-7WCKCJ
ECA #5936-8RKKNU

ECA Effluent Requirements

Parameter	Limits Monthly Average Concentration	Limits Monthly Average Loading	Objectives Monthly Average Concentration
CBOD	25 mg/L	256 kg/d	15 mg/L
TSS	25 mg/L	256 kg/d	15 mg/L
TP	1 mg/L	10.3 kg/d	0.75 mg/L
E.Coli	NA	NA	200 organisms/100 ml

pH between 6-9.5
Seasonal Disinfection May 1 - October 31

Sampling Procedure

Influent and effluent samples are collected bi-weekly using a composite sampler over a 24-hour period. Raw sewage samples are collected at the main lift station located on-site; the sample is drawn after the lift station pumps and prior to the primary tanks of either plant.

Effluent is sampled directly from the combined flow after it leaves the UV disinfection system prior to discharge and constitutes the effluent sample for the entire facility.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house testing is done for process control and is not included in this report.

Flows

The total volume of wastewater treated in 2013 was 2,839,256 m^3. The daily average flow was 7,779 m^3/day which represents 76% of the design flow for Ingersoll WWTP of 10,230 m^3 /day.

Raw Sewage Quality

The annual average raw sewage $CBOD_5$ concentration to the plant was 86 mg/L, which represents an average loading of 669 kg/day. The average suspended solids concentration was 143 mg/L, which represents a loading of 1,112 kg/day. Average nitrogen concentration, as TKN was 28.2 mg/L; equivalent to a loading of 219 kg/day. Total phosphorus was 2.8 mg/L, which represents a loading of 22 kg/day.

Plant Performance & Effluent

Detailed analytical data of annual and monthly averages are summarized later in this report in Exhibit 1.

Over the reporting period, the annual average effluent $CBOD_5$ concentration was 6 mg/L which represents a 93% reduction. The suspended solids annual average concentration was 9 mg/L, which represents a 94% reduction. The effluent Ammonia averaged 1.3 mg/L or a 92% reduction. Total phosphorus annual average concentration was 0.5 mg/L, which equates to an 82% reduction.

pH of both the influent and effluent streams is measured by the operator approximately four times per week. There was no single pH result outside the discharge limits of 6-9.5 for 2013.

The Ingersoll WWTP met all effluent discharge criteria for 2013.

Effluent Objectives

Effluent objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

The effluent met all effluent discharge objectives listed in the Plant's ECA at the Ingersoll WWTP.

Bypassing, Overflows, and Upset Conditions

There were no bypasses, overflows or upset conditions at the Ingersoll WWTP in 2013.

Maintenance and Calibration

The operating and maintenance staff from the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept on site at the Ingersoll WWTP.

R&R Instrumentation Services provided meter calibration service on both effluent meters in 2013.

Biosolids 2013

The Ingersoll Wastewater Treatment Plant historically utilized anaerobic digesters to stabilize biosolids prior to dewatering through a belt filter press. This year saw startup of the upgraded anaerobic digesters and the decommissioning of the belt filter press with the construction of the new dewatering facilities (centrifuge).

Some of the biosolids were trucked to the Woodstock WWTP until March 2013, with the rest dewatered by the new centrifuge on-site. The dewatered material was transported to and stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) in Salford, Ontario before being land applied.

Please see Biosolids 2013 Annual report, prepared and submitted separately, for more detailed information.

Summary

The Ingersoll WWTP operated within its hydraulic design criteria in 2013.

Digester upgrades began in 2011, and included the primary digester and secondary digester roof replacement and a new primary digester heating and mixing system. The digesters began operation again in July 2012.

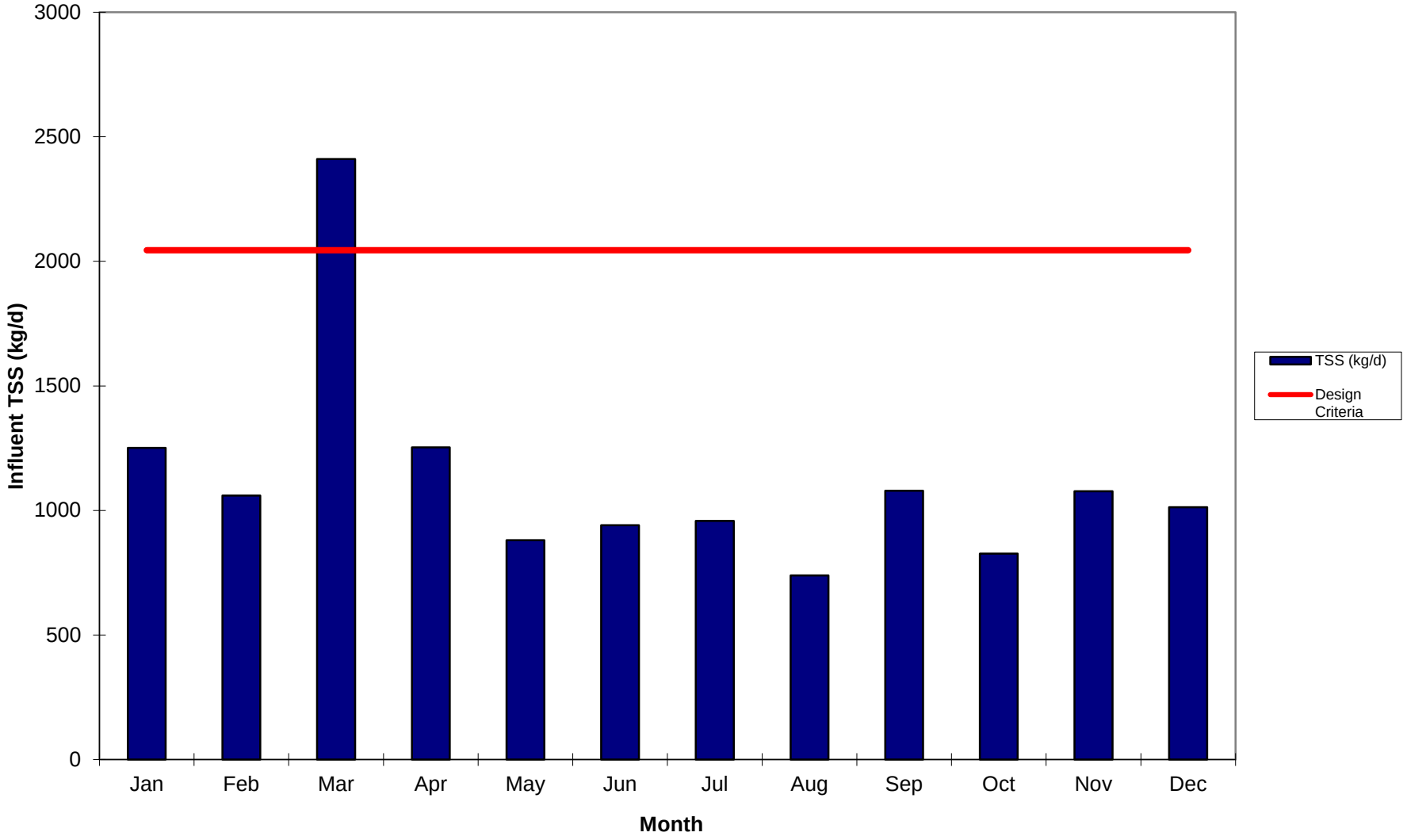
Following this project, Oxford County began an upgrade in October of the dewatering facility in Ingersoll which was substantially completed on March 13, 2013.

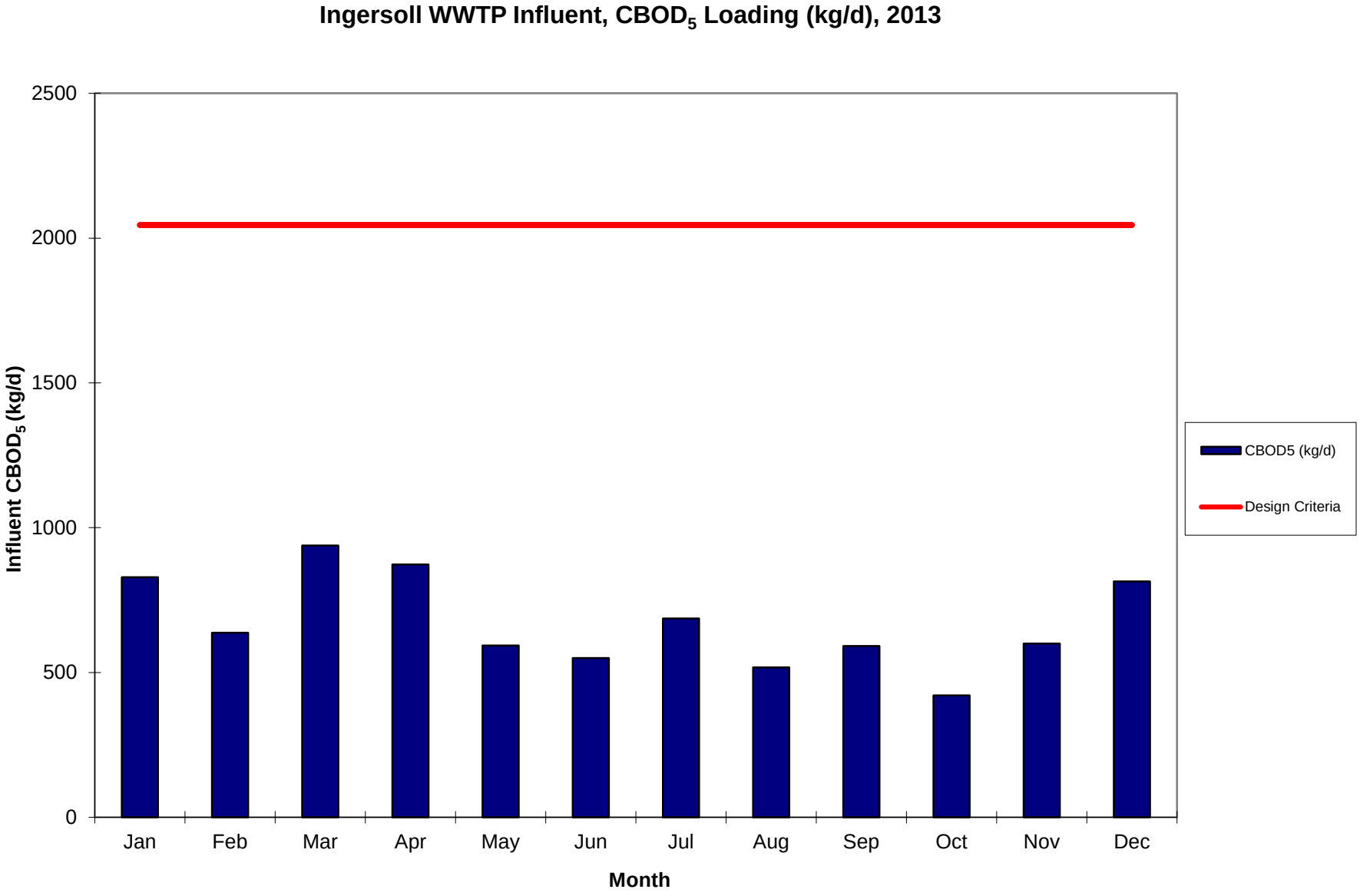
A Class Environmental Assessment was completed in October 2012 recommending upgrades to the Ingersoll WWTP, including the decommissioning of the 1947 Plant, and construction of a new Conventional Activated Sludge (CAS) Plant and upgrading the 1974 Plant. Engineering design of the recommended upgrades commenced in 2013.

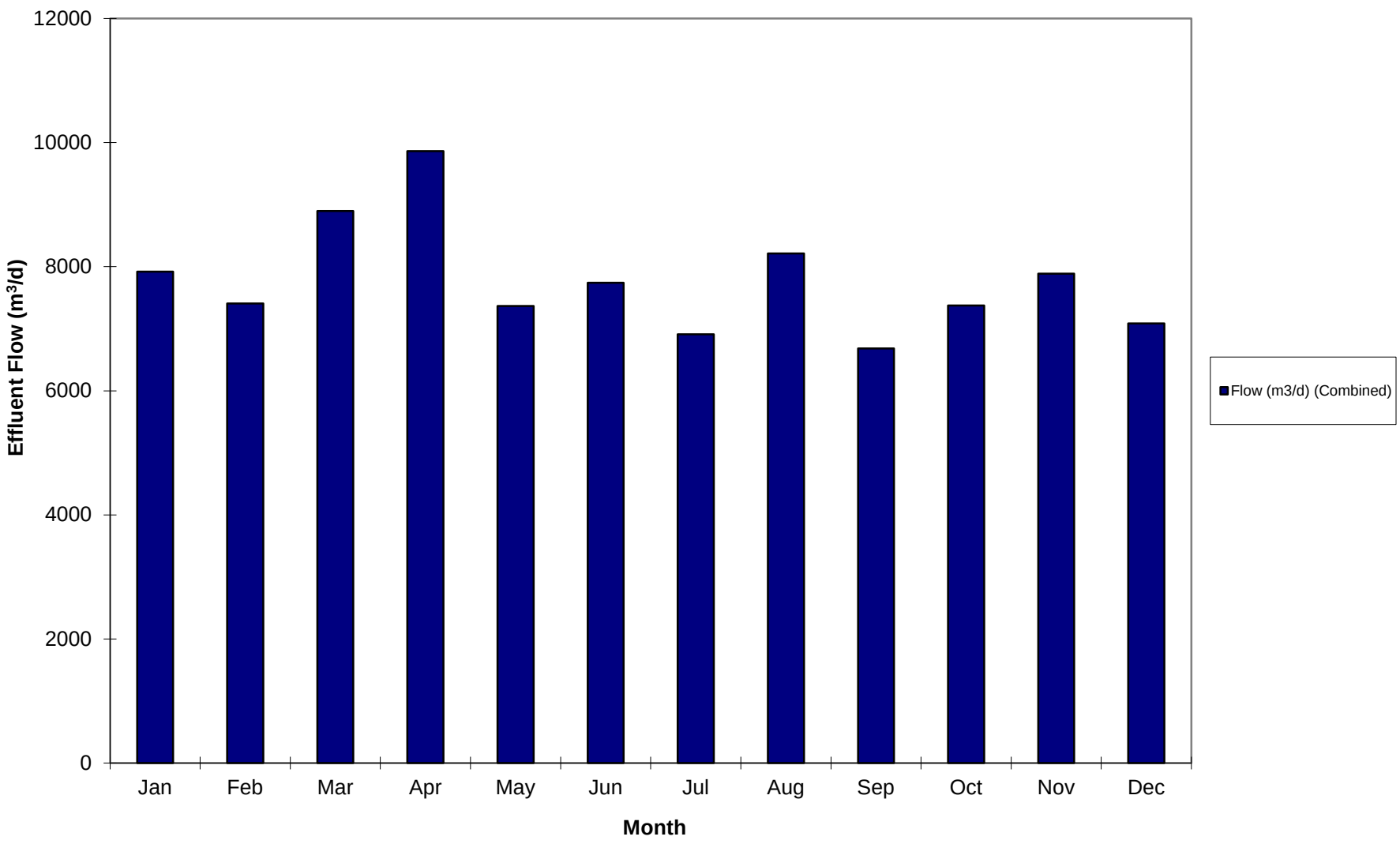
The first phase of construction is anticipated to begin in early 2014 and will include the construction of additional secondary clarifiers for the 1974 Plant and a new plant outfall. Once complete (likely in late 2014), the next phase will commence and will include decommissioning of the 1947 Plant and constructing a new CAS Plant in its place.

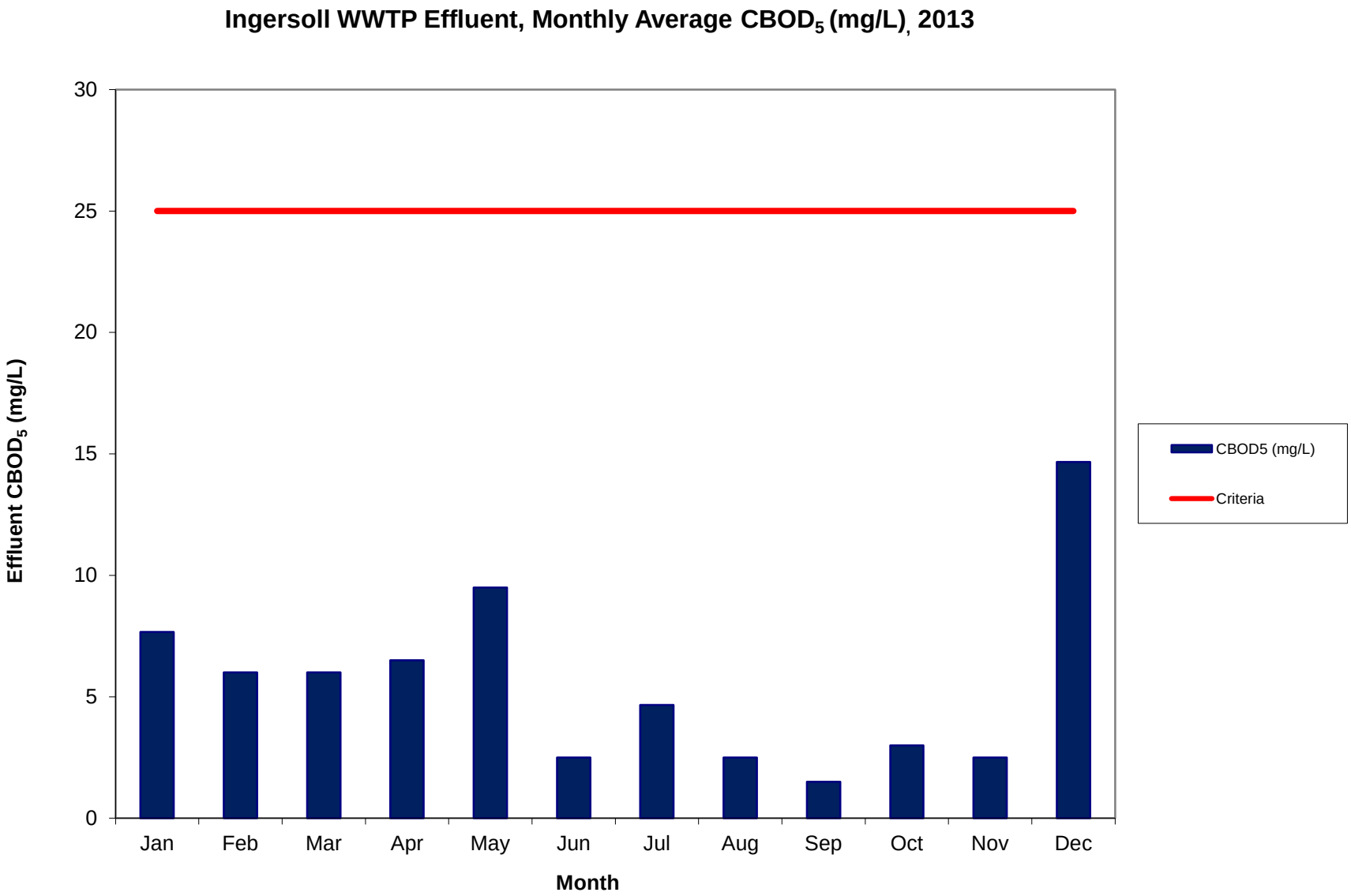
Exhibit 1

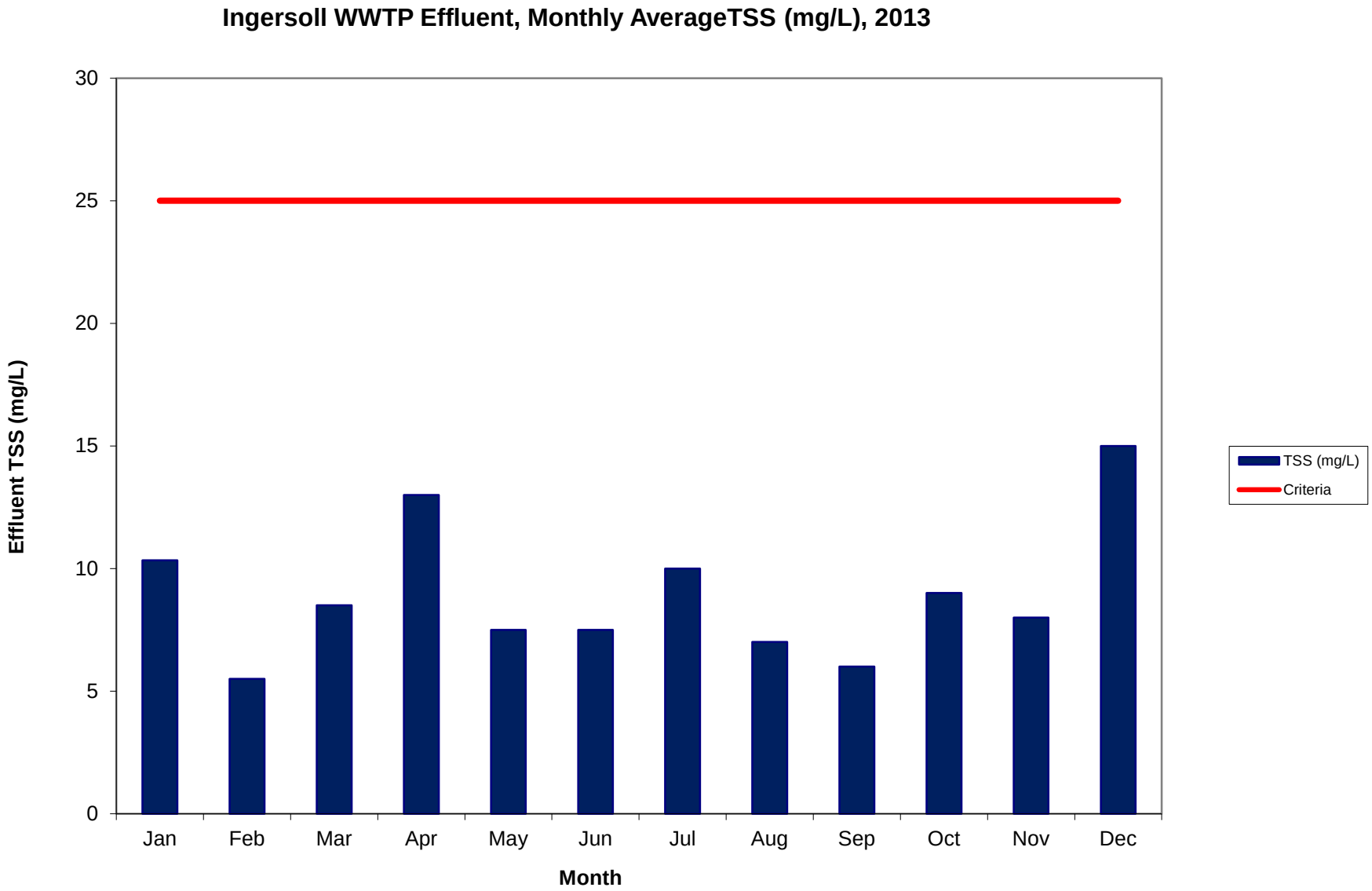
Ingersoll WWTP Influent ,TSS Loading (kg/d), 2013

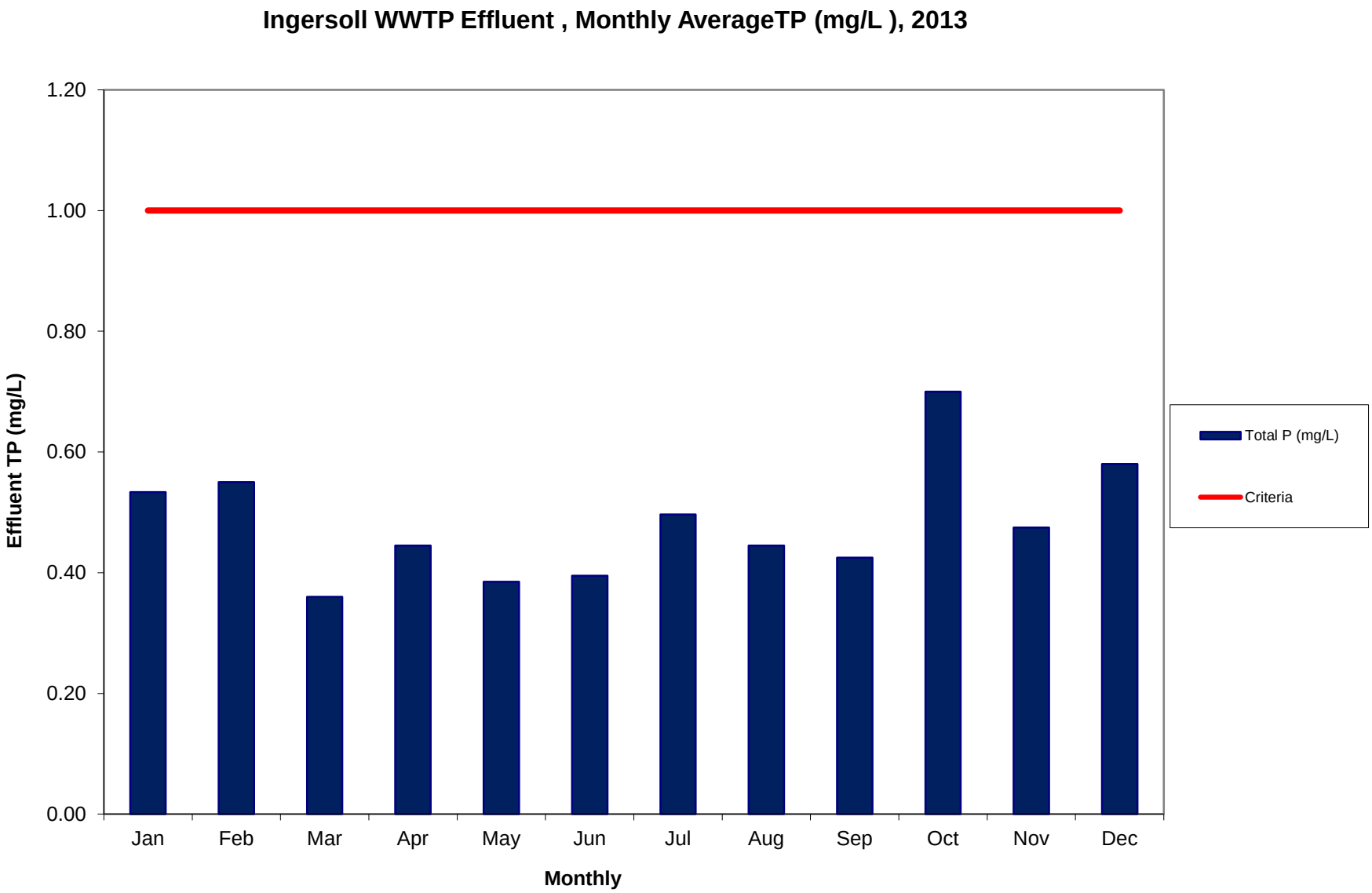



Ingersoll WWTP Influent, CBOD5 Loading (kg/d), 2013
Influent CBOD5 (kg/d)
2500
2000
1500
1000
500
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (kg/d)
Design Criteria

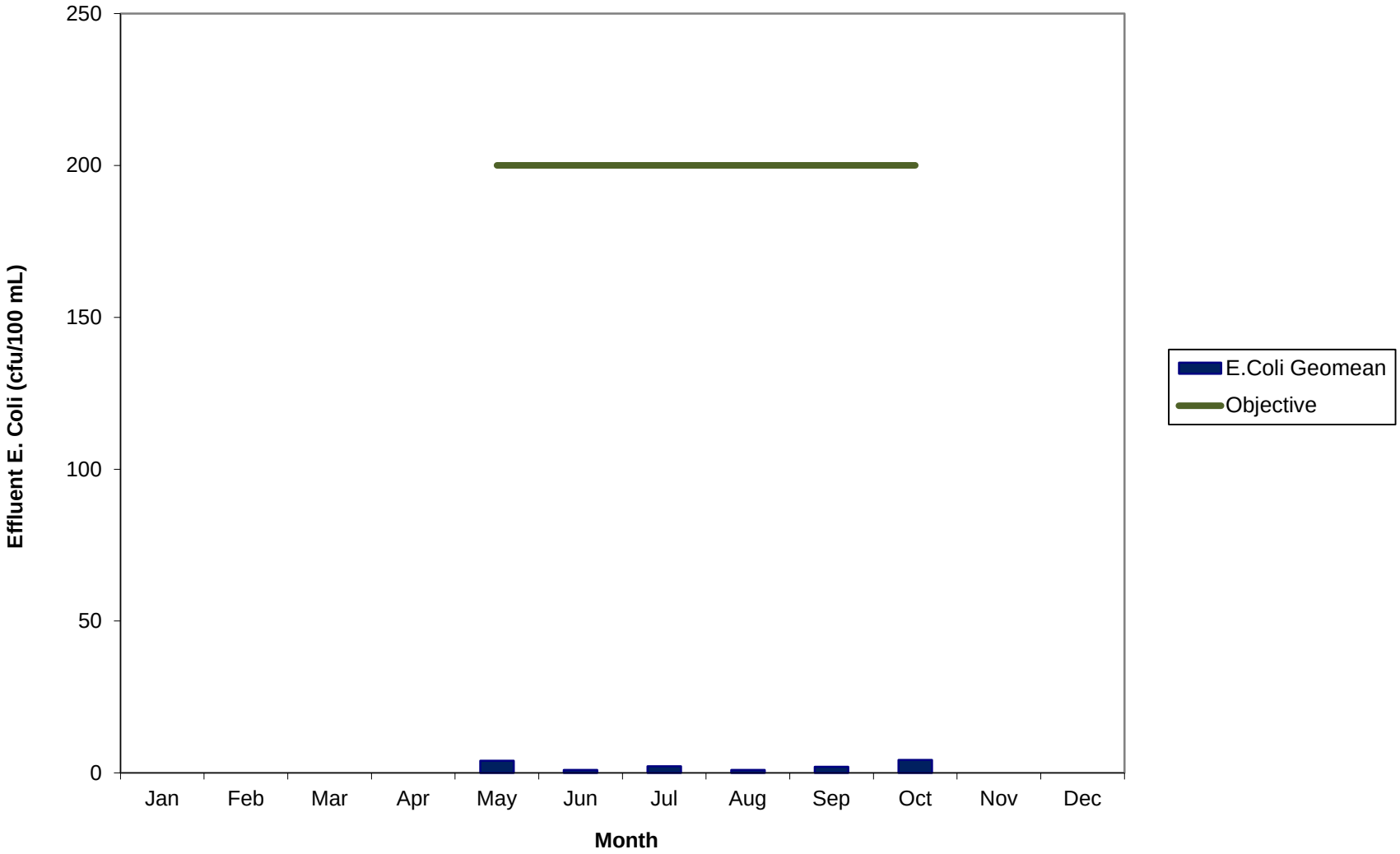

Ingersoll WWTP Effluent Flow (m3/d), 2013
Effluent Flow (m3/d)
12000
10000
8000
6000
4000
2000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Flow (m3/d) (Combined)

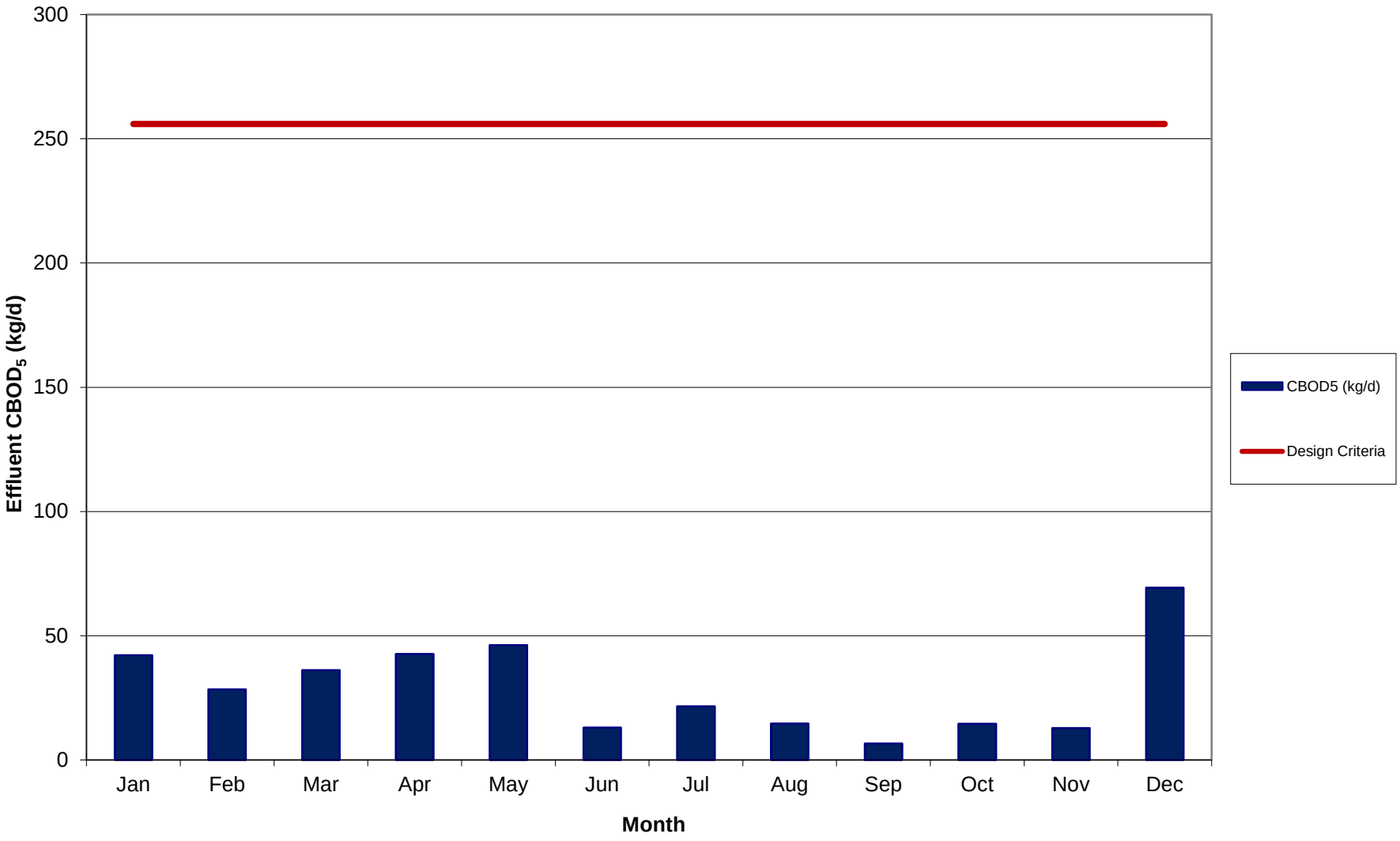

Ingersoll WWTP Effluent, Monthly Average CBOD5 (mg/L), 2013
Effluent CBOD5 (mg/L)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Ingersoll WWTP Effluent, Monthly AverageTSS (mg/L), 2013
Effluent TSS (mg/L)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (mg/L)
Criteria

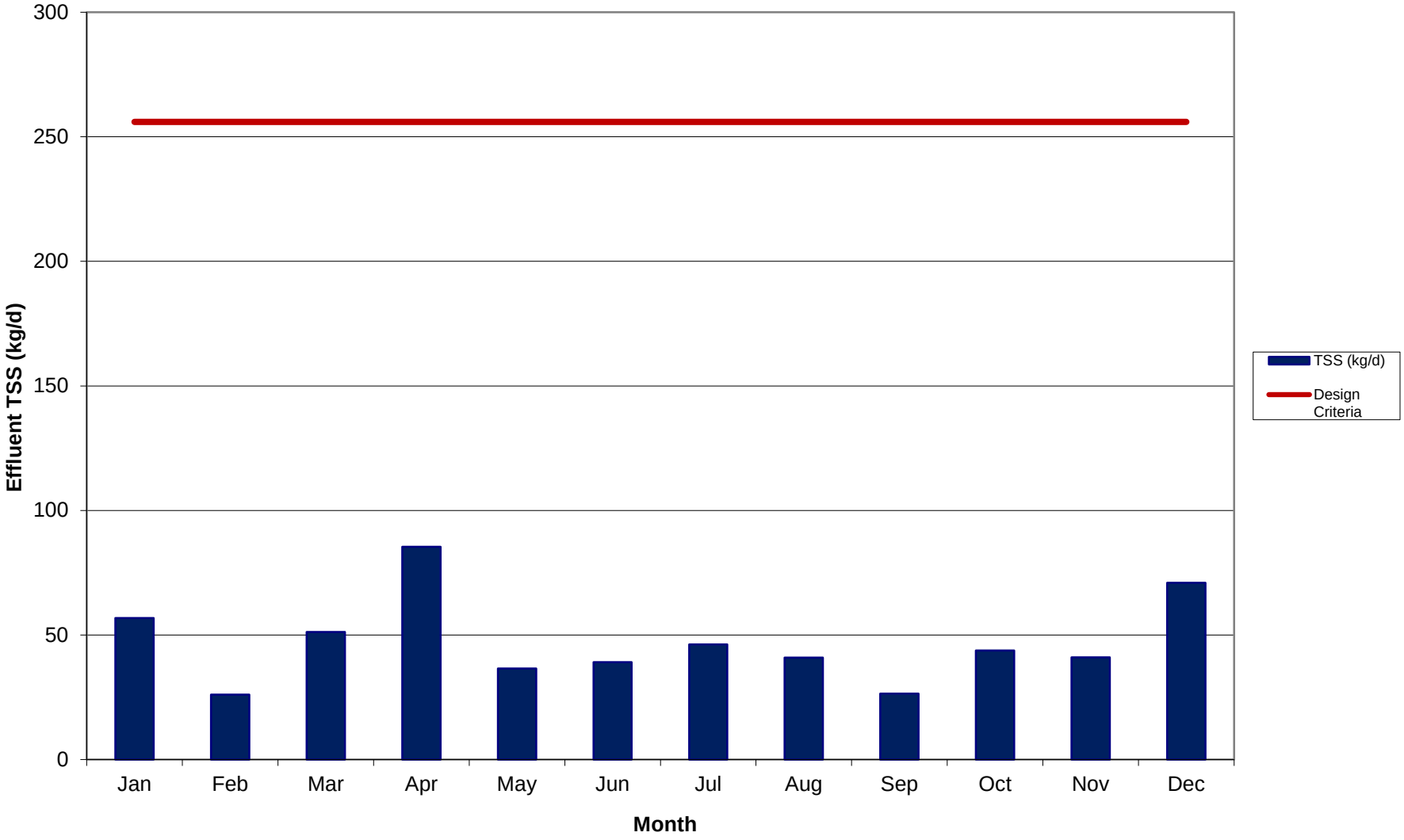

Ingersoll WWTP Effluent , Monthly AverageTP (mg/L), 2013
Effluent TP (mg/L)
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Monthly
Total P (mg/L)
Criteria

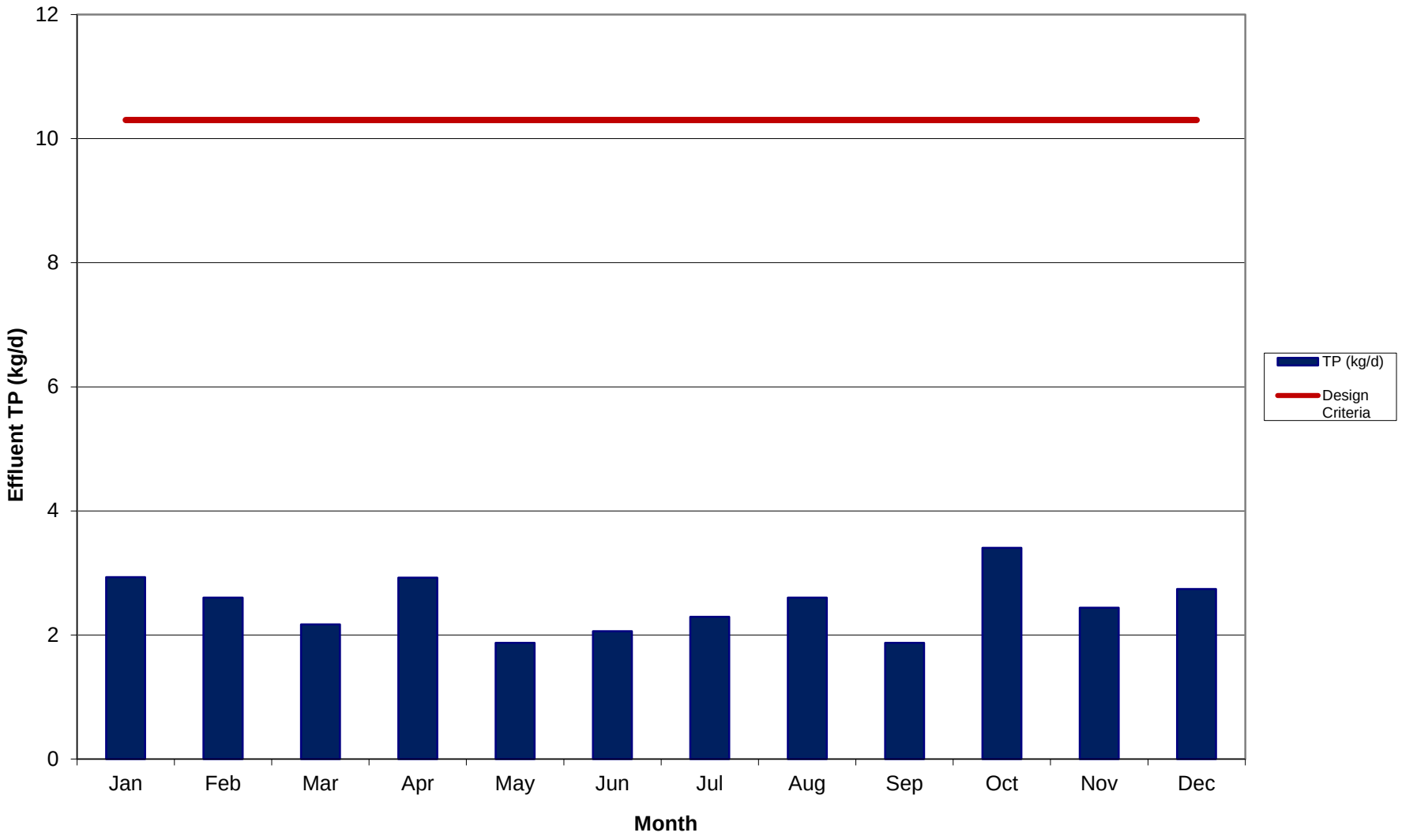
Ingersoll WWTP Effluent, Monthly Geometric Mean Density E. Coli (cfu/100 mL), 2013




Ingersoll WWTP Effluent, CBOD5 (kg/d) Loading to Thames River, 2013
Effluent CBOD5 (kg/d)
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (kg/d)
Design Criteria

Ingersoll WWTP Effluent, TSS (kg/d) Loading to Thames River, 2013




Ingersoll WWTP Effluent, TP (kg/d) loading to Thames River, 2013
Effluent TP (kg/d)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (kg/d)
Design Criteria

Municipality: Ingersoll
PROJECT:INGERSOLL WWTP
Operator: County of Oxford
Works Number:
(O) 110003978 (N) 110003969

2013

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Total 1000m3
Total Flow m^3	245466	207413	275791	295915	228300	232209	214202	254613	200416	228664	236679	219588				2839256	2839.256
Flow (m^3/d) (1974)	5495	4733	6024	6566	4865	5213	4617	5842	4405	4862	5132	4727	5207	4405	6566	Design	
Flow (m^3/d) (1947)	2423	2675	2873	3298	2500	2527	2293	2371	2276	2514	2758	2356	2572	2276	3298	Criteria	
Flow (m^3/d) (Combined)	7918	7408	8896	9864	7365	7740	6910	8213	6681	7376	7889	7083	7779	6681	9864	10230	
Max Daily Flow	14534	9546	19714	16399	9326	9157	9827	11308	8896	11696	10673	10944	11835	8896	19714		
Min Daily Flow	4604	6275	7140	6292	5276	5993	5296	5272	4448	5402	5460	5270	5561	4448	7140		
Common Influent																	
$CBOD_5$ (mg/L)	104.7	86.0	105.5	88.5	80.5	71.0	99.3	63.0	88.5	57.0	76.0	115.0	86	57	115		
TSS (mg/L)	158.0	143.0	271.0	127.0	119.5	121.5	138.7	90.0	161.5	112.0	136.5	143.0	143	90	271		
Total P (mg/L)	3.1	2.4	5.6	1.7	2.4	2.4	2.3	2.4	3.0	2.4	2.0	3.5	2.8	1.71	5.61		
NH3+NH4-N (mg/L)	16.67	21.70	12.60	10.85	20.15	11.90	20.97	21.10	20.90	16.75	11.50	16.25	16.8	10.85	21.7		
TKN (mg/L)	25.40	30.85	20.95	13.50	25.45	19.30	26.73	33.20	31.35	23.50	11.50	76.70	28.2	11.5	76.7		
NITRITE (mg/L)	0.17	0.23	0.70	0.60	0.02	0.02	0.06	0.04	0.14	0.47	0.58	0.24	0.27	0.015	0.7		
NITRATE (mg/L)	0.20	0.15	1.69	1.11	0.03	0.03	0.04	0.03	0.08	0.68	1.12	0.44	0.47	0.03	1.69		
pH (mg/L)	7.50	7.66	7.55	7.64	8.00	7.61	7.65	7.63	7.60	7.56	7.73	7.65	7.65	7.5	8		
Effluent Combined	Old and New Plant Combined Effluent after UV System Upgrade															Objectives	Limits
$CBOD_5$ (mg/L)	7.7	6.0	6.0	6.5	9.5	2.5	4.7	2.5	1.5	3.0	2.5	14.7	6	2	15	15	25
TSS (mg/L)	10.3	5.5	8.5	13.0	7.5	7.5	10.0	7.0	6.0	9.0	8.0	15.0	9	5.50	15.00	15	25
Total P (mg/L)	0.53	0.55	0.36	0.45	0.39	0.40	0.50	0.45	0.43	0.70	0.48	0.58	0.5	0.4	0.7	0.75	1
NH3+NH4-N (mg/L)	0.80	4.20	2.20	0.35	1.40	0.13	0.77	0.85	0.65	2.75	0.08	1.53	1.3	0.1	2.8		
TKN (mg/L)	1.55	7.50	3.00	1.13	4.60	4.00	2.60	2.30	2.80	4.25	2.00	2.63	3.196	1.125	4.600		
NITRITE (mg/L)	1.68	3.80	1.32	0.15	0.29	0.07	0.27	0.39	0.45	1.36	0.02	4.75	1.21	0.02	4.75		
NITRATE (mg/L)	14.47	15.70	15.35	17.60	22.50	19.55	21.67	26.75	20.85	23.35	19.70	17.20	19.557	15.350	26.750		
pH	7.46	7.53	7.46	7.63	7.75	7.68	7.67	7.77	7.81	7.56	7.63	7.39	7.6	7.4	7.8		
E.Coli Geomean					4	1	2	1	2	4			2	1.00	4	200	NA
unionized ammonia (mg/L)	0.017	0.026	0.012	0.003	0.026	0.003	0.010	0.030	0.019	0.030	0.002	0.008					

Influent Loadings

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Design
$CBOD_5$ (kg/d)	829	637	939	873	593	550	686	517	591	420	600	815	671	420	939		2045
TSS (kg/d)	1251	1059	2411	1253	880	940	958	739	1079	826	1077	1013	1116	739	2411		2045

Effluent Loadings to Thames River

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Limits
$CBOD_5$ (kg/d)	42	28	36	43	46	13	22	15	7	15	13	69	29	7	69		256
TSS (kg/d)	57	26	51	85	36	39	46	41	26	44	41	71	47	26	85		256
TP (kg/d)	3	3	2	3	2	2	2	3	2	3	2	3	2	2	3		10.3

Public Works
P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

Dear Sir:

RE: 2013 Year-End Report, Tillsonburg Wastewater Treatment Plant (WWTP)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) #9997-82RS5A.

I trust this report fulfills the intent of the annual reporting requirements of the ECA.

If there are any questions, please contact me.

Yours truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Tillsonburg WWTP (Figure 1) is a conventional activated sludge system that provided effective wastewater treatment in 2013. The 2013 average flow for the plant of 5,908 m^3/day represents 72% of the design capacity of 8,180 m^3/day. The total flow for 2013 was 2,156,491 m^3.

Plant Description

The facility is a conventional activated sludge plant consisting of primary and secondary treatment, with an outfall pipe to the Big Otter Creek. The facility adds aluminum sulphate into the reactors for phosphate reduction and ultraviolet light for seasonal disinfection.

Oxford County owns and operates the facility.

Figure 1 Tillsonburg WWTP Aerial Photo

Plant Specifications

Facility -	Tillsonburg Wastewater Treatment Plant
Design Capacity -	8,180 m3/day
Average Daily Flow -	5,908 m3/day (2013)
Receiving Water -	Big Otter Creek
Classification -	WWT – III
ECA	# 9997-82RS5A

ECA Effluent Requirements

Parameter	Limits Monthly Average Concentration	Limits Monthly Average Loading	Objectives Monthly Average Concentration
$CBOD_5$	25 mg/L	203 kg/d	15 mg/L
TSS	25 mg/L	203 kg/d	15 mg/L
TP	1 mg/L	8.1 kg/d	0.75 mg/L
E.Coli*	200 organisms/100 ml*	NA	150 organisms/100 ml*
pH	6.0-9.5		6.5-8.0
TRC			1.0

*Seasonally from May 1 to Nov. 30

Sampling Procedure

Raw sewage samples are collected where the influent streams combine before entering the sewage works. A composite sampler collects samples over a 24-hour duration on a bi-weekly basis.

The final effluent 24-hour composite sample is collected on a weekly basis after secondary treatment and disinfection, and prior to the effluent discharge to Big Otter Creek.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house testing is done for process control and is not included in this report.

Flows

The total flow treated in 2013 was 2,156,491 m^3. The daily average flow was 5,908 m^3/day which represents 72% of the design flow for Tillsonburg WWTP of 8,180 m^3/day.

Raw Sewage Quality

The annual average influent raw sewage $CBOD_5$ concentration to the plant was 177 mg/L which corresponds to an average influent loading of 1046 kg/day. The average total suspended solids concentration was 222 mg/L that corresponds to 1,312 kg/d. Average nitrogen level, as TKN, was 31 mg/L which represents a loading of 183 kg/d. Total phosphorus was 4.7 mg/L, which represents a loading of 28 kg/day.

Plant Performance & Effluent

Detailed analytical data of annual and monthly averages are summarized later in this report in Exhibit 1.

Over the reporting period, the annual average effluent $CBOD_5$ concentration was 2.8 mg/L. This is a 98.4% reduction. The total suspended solids average concentration was 8.7 mg/L, which represents a 96% reduction. Ammonia averaged 1.2 mg/L. Total phosphorus average was 0.45 mg/L, which resulted in a 90% reduction.

All pH is measured in the effluent by the operator at a minimum on a weekly basis and there was no single sample outside the range of 6-9.5 for 2013.

The effluent from the Tillsonburg WWTP met all discharge criteria for 2013.

Effluent Objectives

Effluent objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the plant's ECA were met at the Tillsonburg WWTP in 2013.

Bypassing, Overflows, and Upset Conditions

There were no bypasses, overflows or upset conditions at the Tillsonburg Wastewater Treatment Plant or collection system.

Maintenance and Calibration

The operating and maintenance staff from the Ingersoll and Tillsonburg WWTP conducts regularly scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept on site.

Calibrations are completed by R&R Instrumentation on an annual basis for all flow measurement devices.

Biosolids

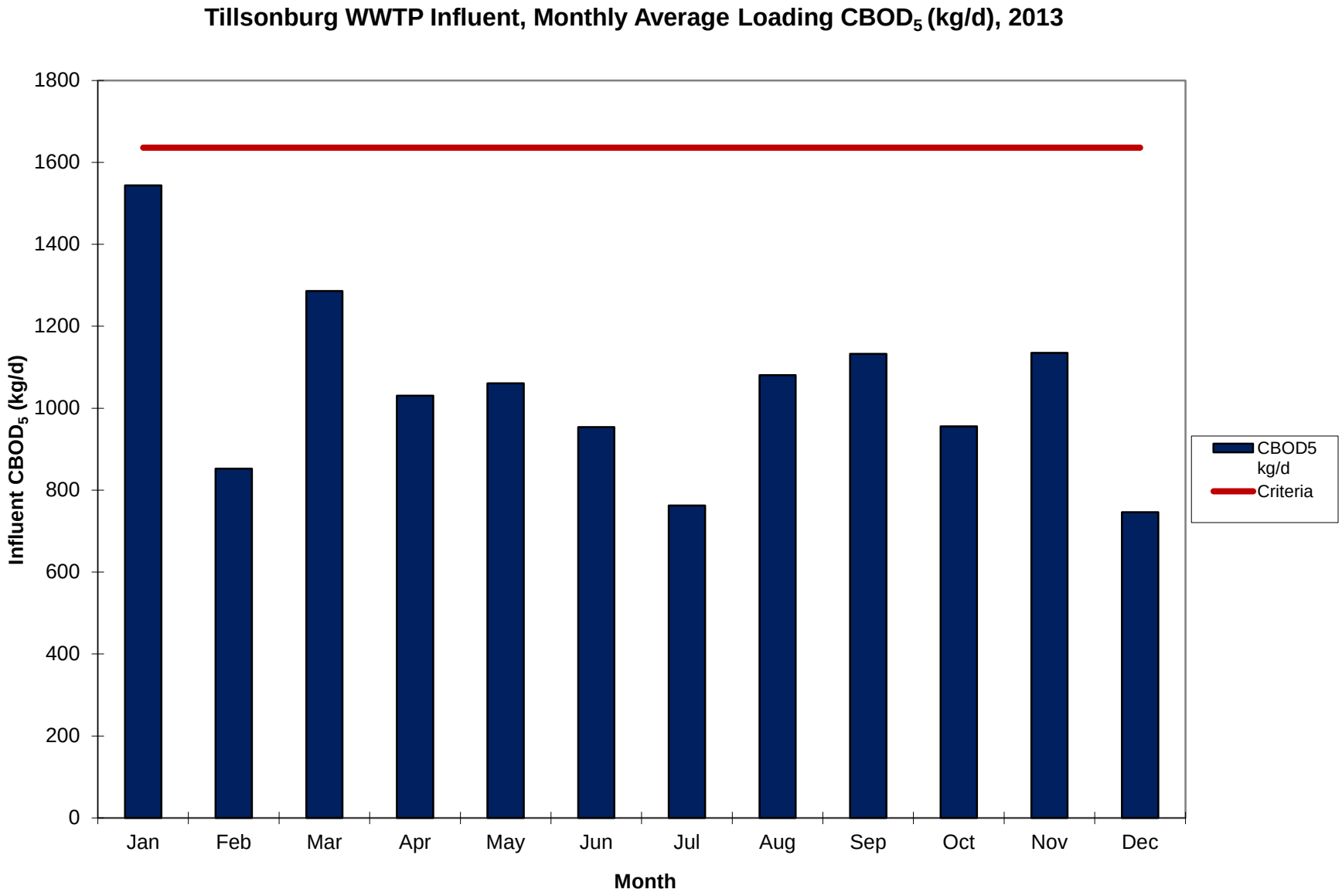
Biosolids are aerobically digested and dewatered, then transported to and stored at the Oxford County's Biosolids Centralized Storage Facility (BCSF) after which they are land applied.

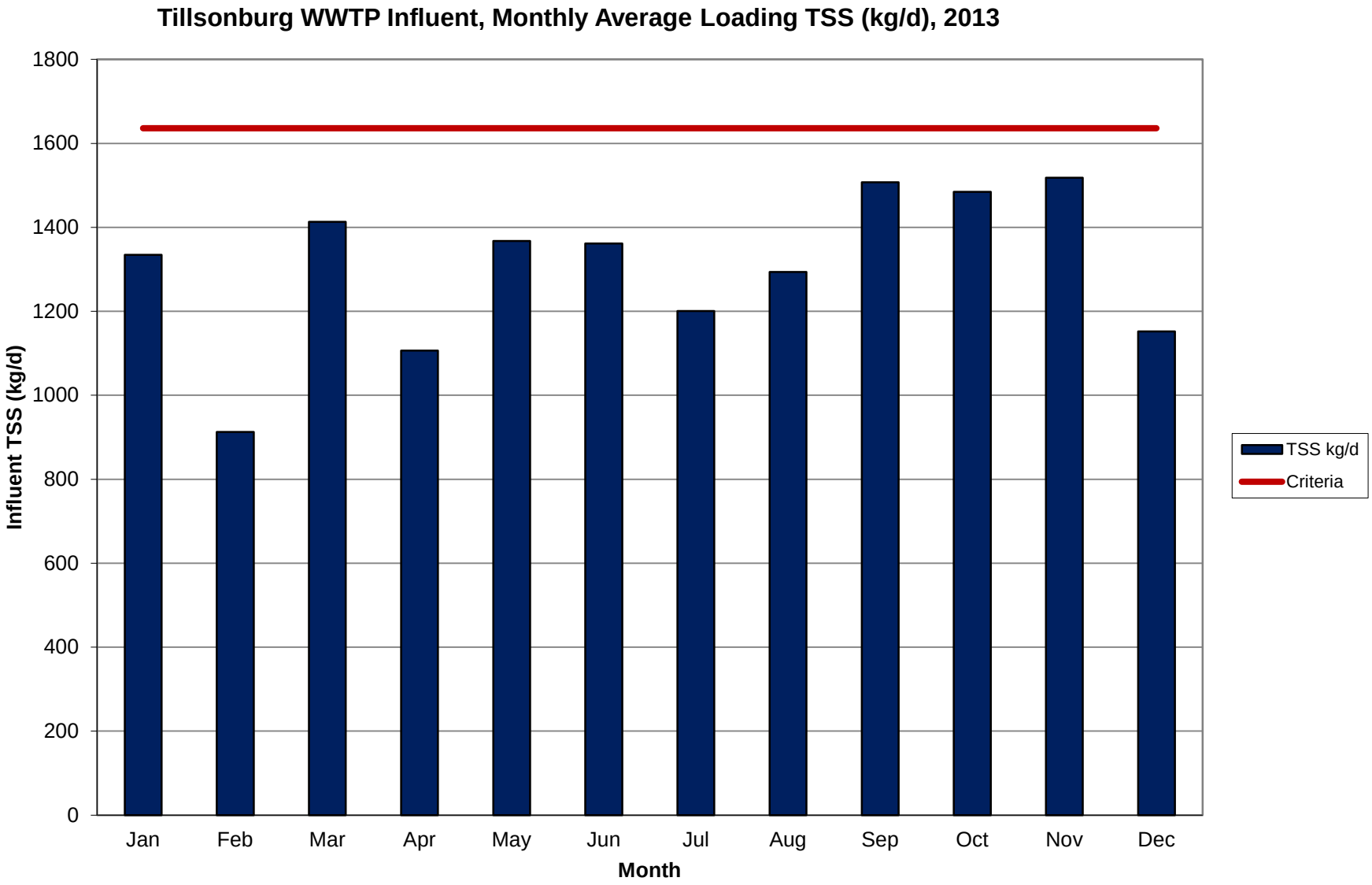
Details of the Biosolids and the land application program are contained in a separate Biosolids Annual Report.

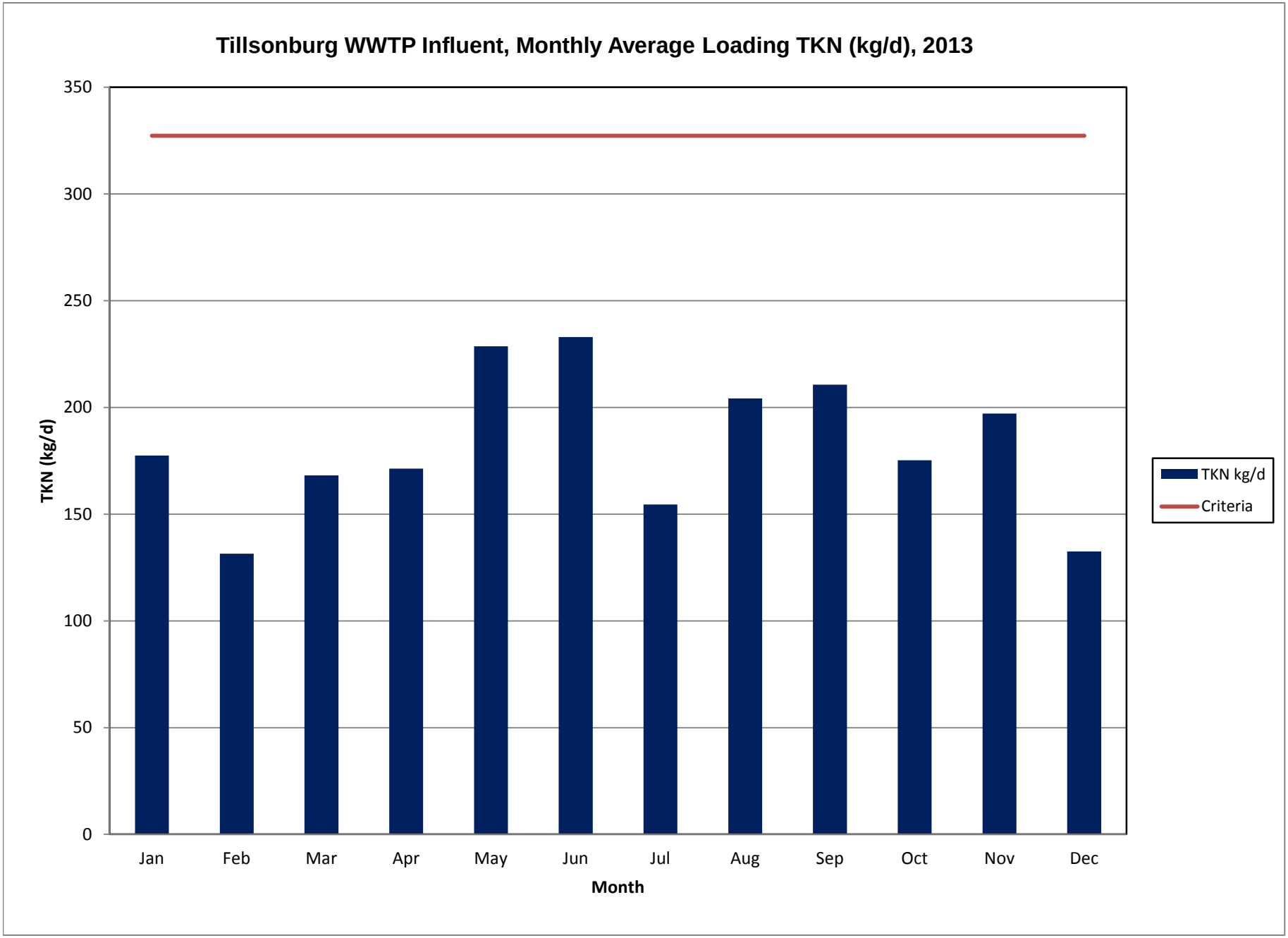
Summary

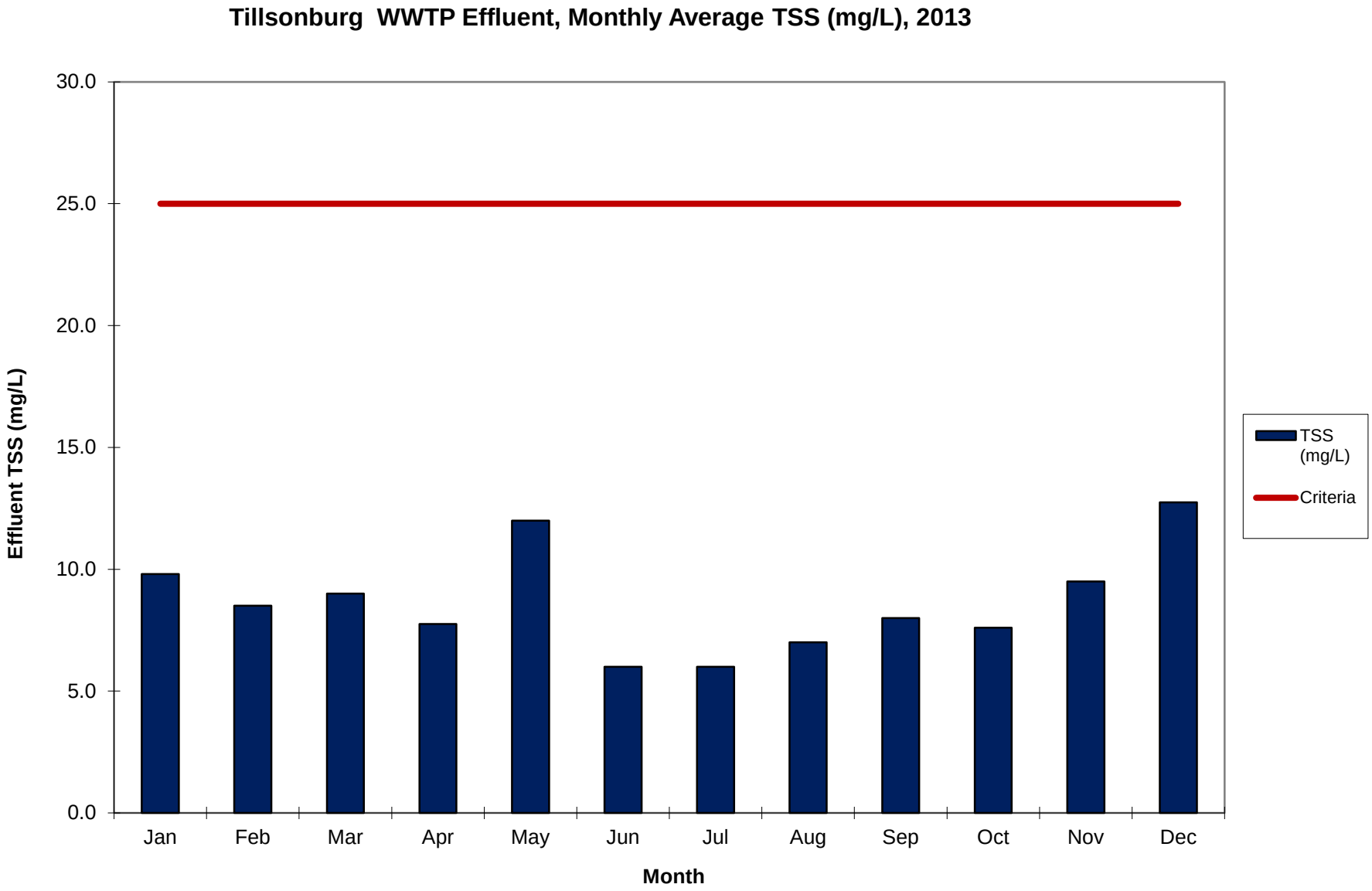
A Class Environmental Assessment was completed in July 2013 for the Tillsonburg WWTP, evaluating the future capacity needs and alternative treatment options. The recommended alternative will be implemented when warranted by the increase in future wastewater flows.

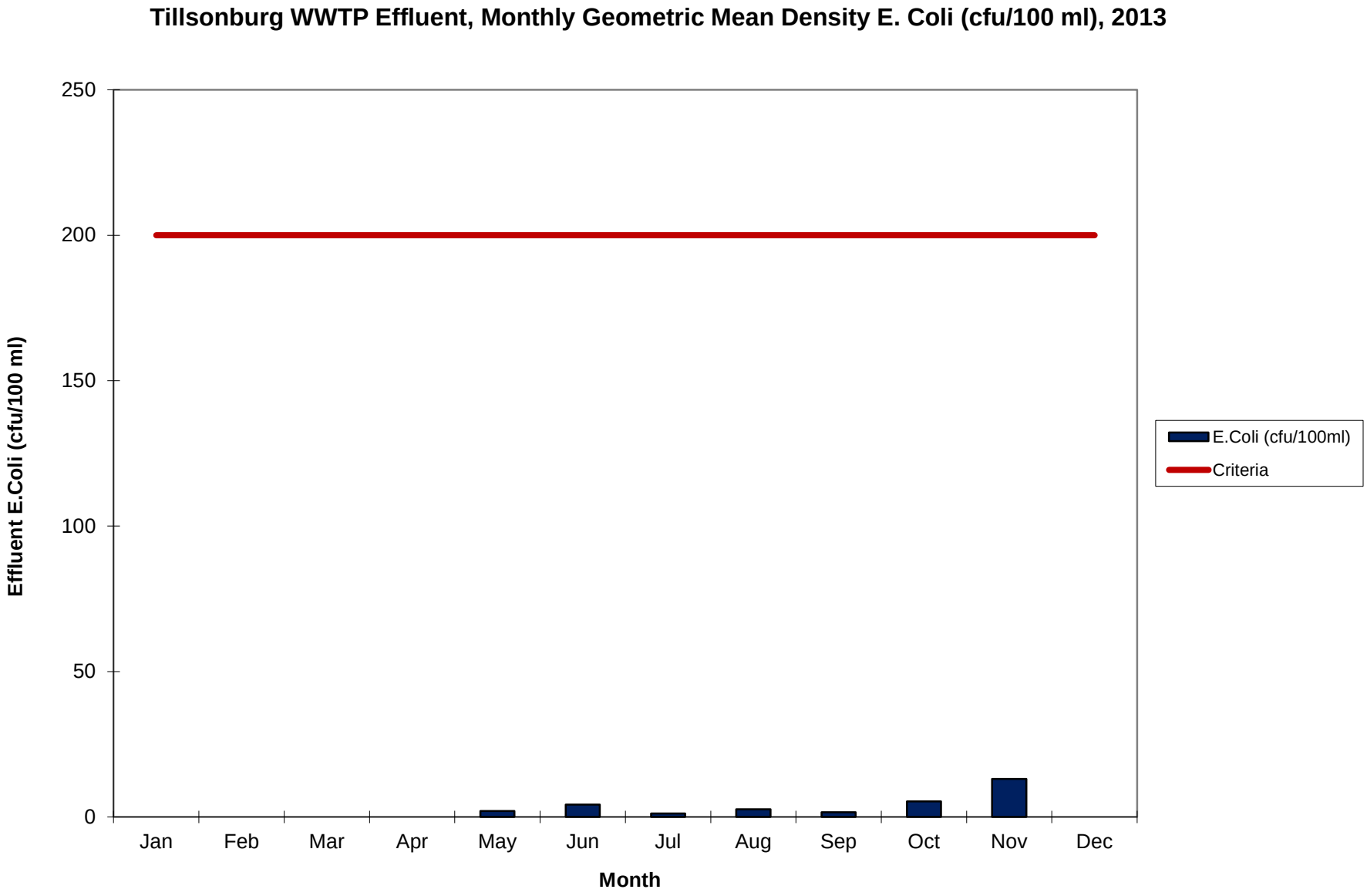
Exhibit 1

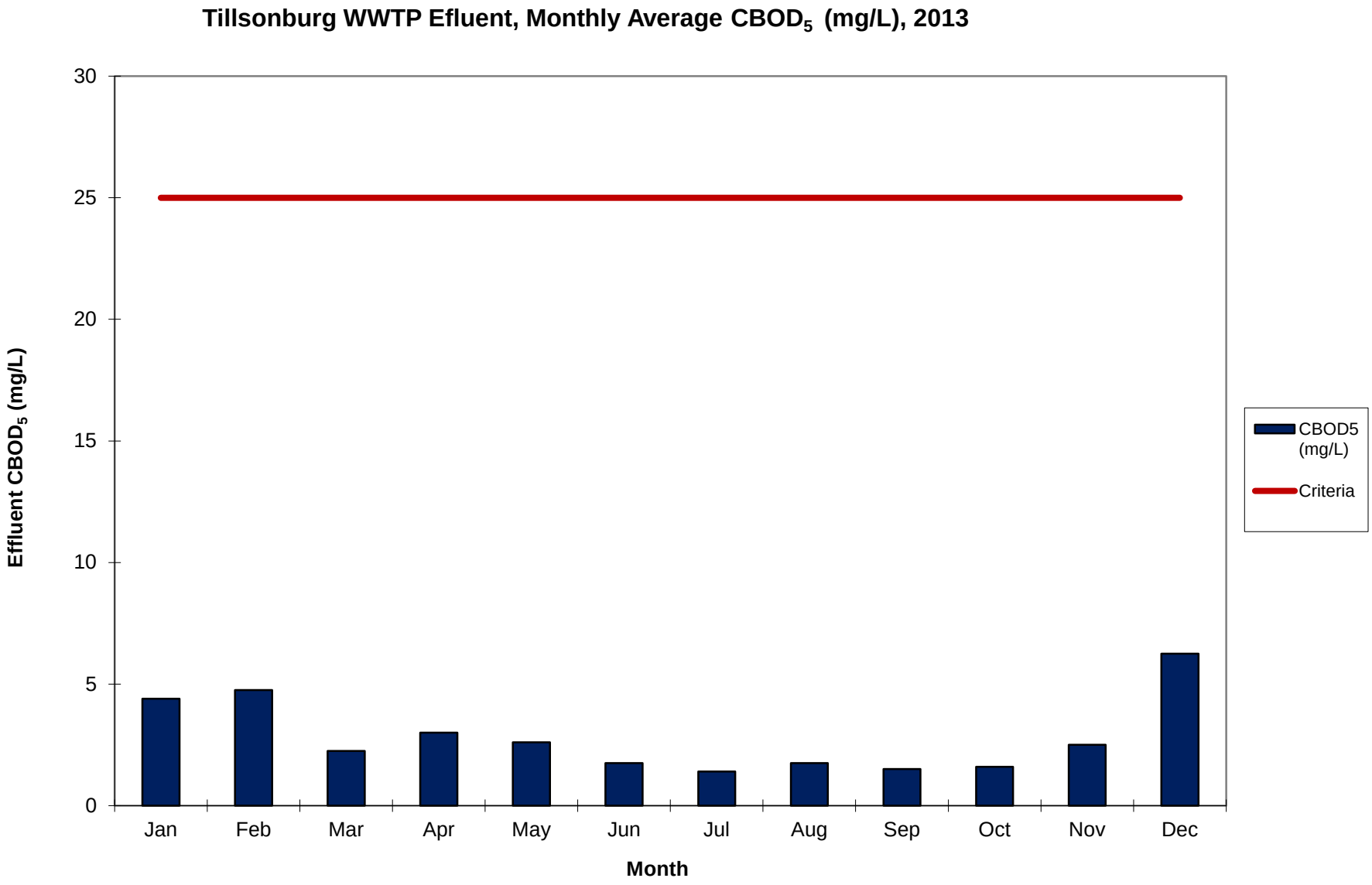

Tillsonburg WWTP Influent, Monthly Average Loading CBOD5 (kg/d), 2013
Influent CBOD5 (kg/d)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 kg/d
Criteria

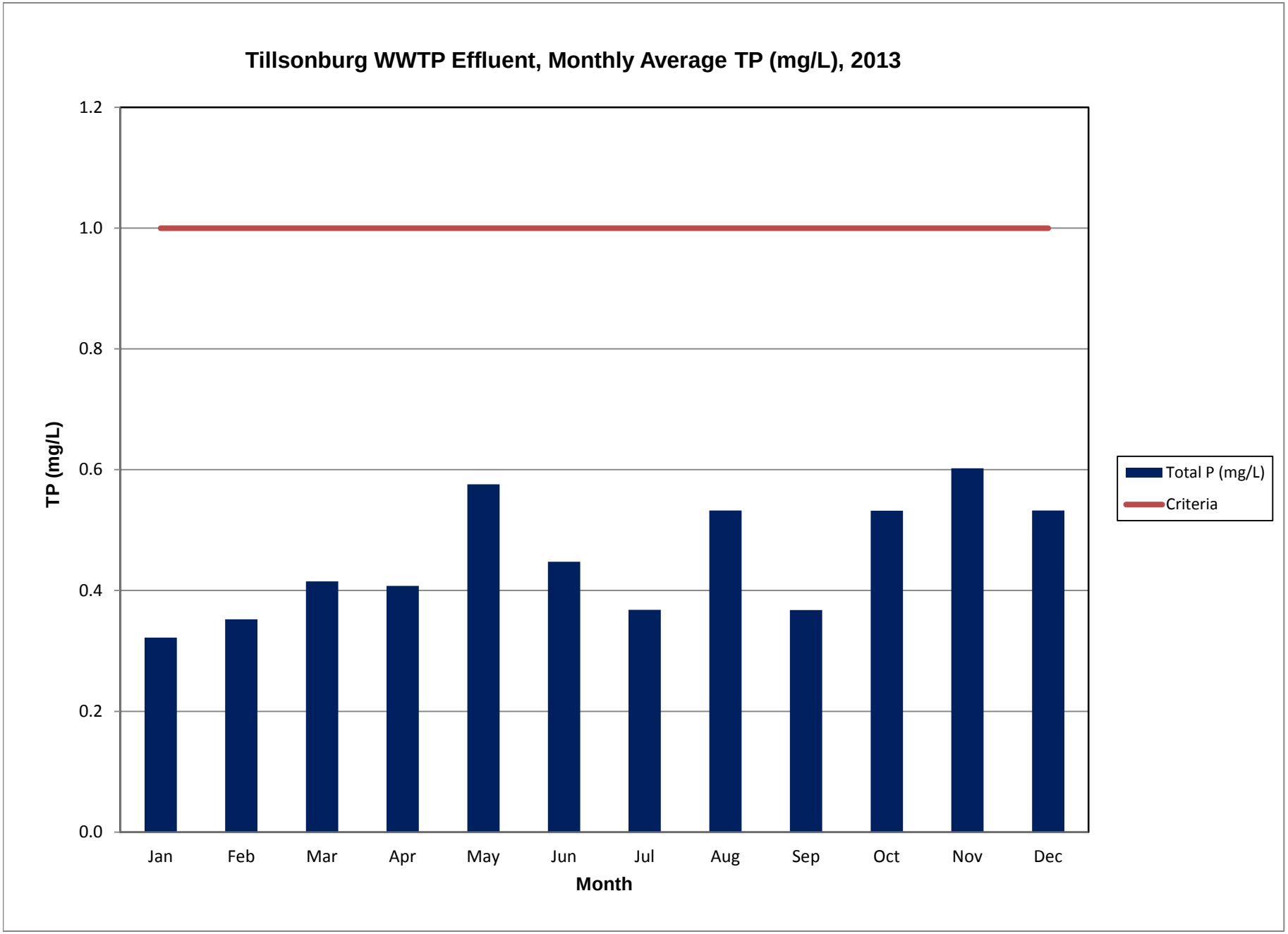

Tillsonburg WWTP Influent, Monthly Average Loading TSS (kg/d), 2013
Influent TSS (kg/d)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS kg/d
Criteria

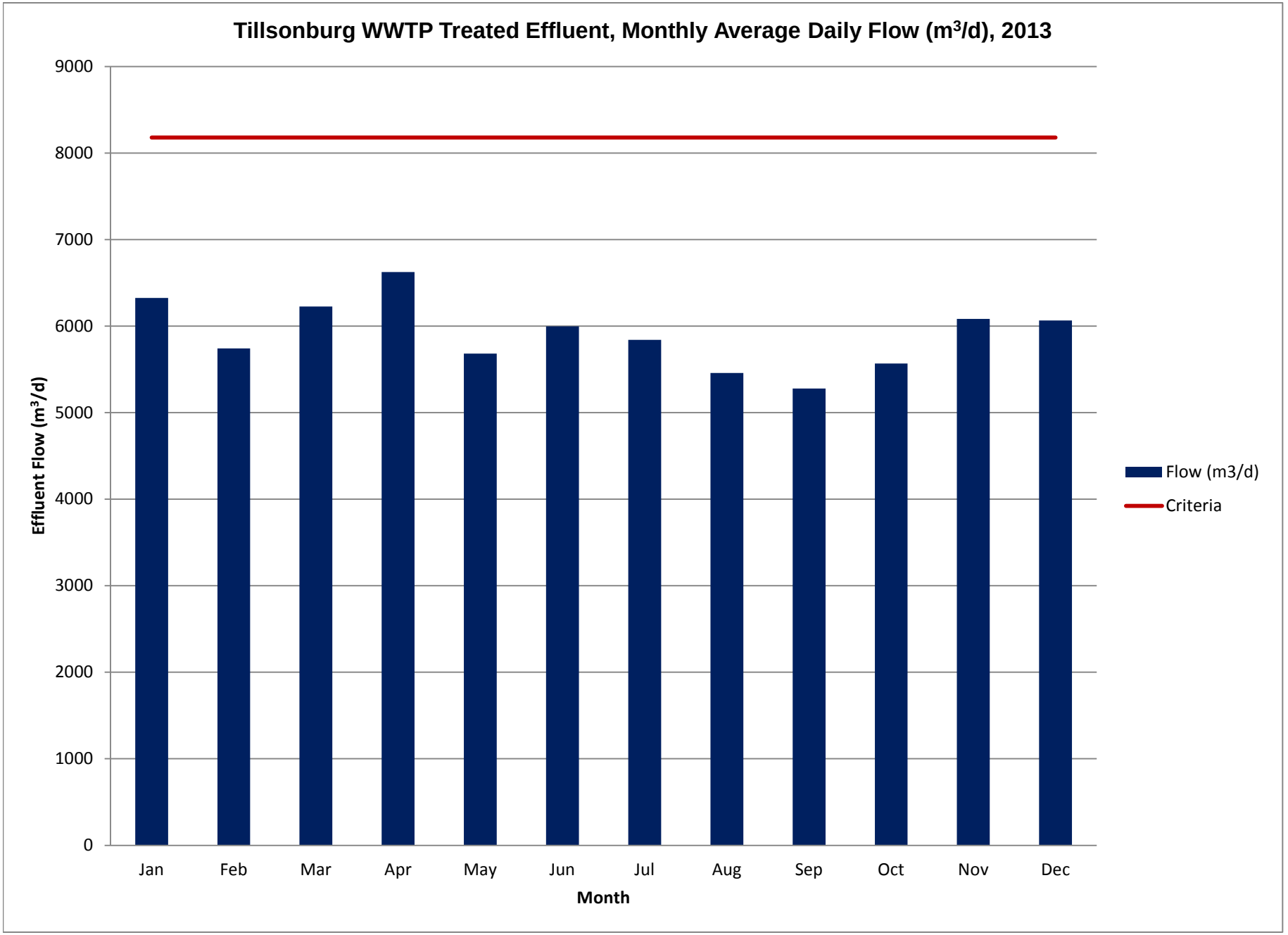

Tillsonburg WWTP Influent, Monthly Average Loading TKN (kg/d), 2013
350
300
250
200
150
100
50
0
TKN (kg/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TKN kg/d
Criteria


Tillsonburg WWTP Effluent, Monthly Average TSS (mg/L), 2013
Effluent TSS (mg/L)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (mg/L)
Criteria


Tillsonburg WWTP Effluent, Monthly Geometric Mean Density E. Coli (cfu/100 ml), 2013
Effluent E.Coli (cfu/100 ml)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
E.Coli (cfu/100ml)
Criteria


Tillsonburg WWTP Efluent, Monthly Average CBOD5 (mg/L), 2013
Effluent CBOD5 (mg/L)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Tillsonburg WWTP Effluent, Monthly Average TP (mg/L), 2013
1.2
1.0
0.8
0.6
0.4
0.2
0.0
TP (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Total P (mg/L)
Criteria


Tillsonburg WWTP Treated Effluent, Monthly Average Daily Flow (m3/d), 2013
Effluent Flow (m3/d)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Flow (m3/d)
Criteria

Municipality: Tillsonburg
Project: Tillsonburg WWTP
Operator: County of Oxford
Works Number: 110000757

2013

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Criteria
Total Flow (m^3)	196102	160766	193005	198768	176149	179902	181101	169219	158367	172604	182527	187981				2156491	
Flow (m^3/d)	6326	5742	6226	6626	5682	5997	5842	5459	5279	5568	6084	6064	5908	5279	6626		8180
Min Daily Flow (m^3/d)	4925	5233	5568	5397	4913	5166	5177	4766	4788	4894	5446	5045	5110	4766	5568		
Max Daily Flow (m^3/d)	10942	7873	9623	10180	8068	8831	7963	7497	7349	8534	8074	10506	8787	7349	10942		
Influent																	
BOD_5 (mg/L)																	
$CBOD_5$ (mg/L)	244	149	207	156	187	159	131	198	215	172	187	123	177	123	244		
TSS (mg/L)	211	159	227	167	241	227	206	237	286	267	250	190	222	159	286		
Total P (mg/L)	4.2	4.0	5.1	2.9	5.6	5.3	4.8	5.2	5.2	5.7	4.7	3.9	4.7	2.9	5.7		
Ammonia (mg/L)																	
TKN (mg/L)	28.05	22.90	27.00	25.85	40.23	38.85	26.45	37.4	39.9	31.5	32.4	21.85	31	22	40.23		
NITRITE (mg/L)																	
NITRATE (mg/L)																	
pH	7.67	7.61	7.59	7.75	7.54	7.43	7.39	7.58	7.79	7.50	7.62	7.72	7.60	7.39	7.785		
Temp (C)	14.85	12.40	12.75	12.40	16.20	17.10	18.50	21.65	20.80	20.50	16.95	15.85	16.7	12.4	21.7		
Effluent																	Criteria
BOD_5 (mg/L)																	
TSS (mg/L)	9.8	8.5	9.0	7.8	12.0	6.0	6.0	7.0	8.0	7.6	9.5	12.8	8.66	6.00	12.75		25
Total P (mg/L)	0.32	0.35	0.42	0.41	0.58	0.45	0.37	0.53	0.37	0.53	0.60	0.53	0.45	0.4	0.6		1
Ammonia (mg/L)	4.11	0.45	1.11	2.30	2.74	0.23	0.12	0.31	0.85	0.12	0.38	1.88	1.2	0.1	2.7		
TKN (mg/L)																	
NITRITE (mg/L)																	
NITRATE (mg/L)																	
pH	7.66	7.43	7.49	7.77	7.25	7.25	7.23	7.30	7.54	7.22	7.30	7.57	7.4	7.2	7.8		6-9.5
Temp (C)	13.8	12.4	11.6	12.8	15.5	18.3	19.6	21.1	21.0	20.0	17.2	15.0	16.5	11.6	21.1		
E.Coli (cfu/100ml)					2	4	1	3	2	5	13		4	1	13		200
$CBOD_5$ (mg/L)	4.4	4.8	2.3	3.0	2.6	1.8	1.4	1.8	1.5	1.6	2.5	6.3	2.8	1.4	6		25
Un-ionized Ammonia Calculated	0.050	0.011	0.007	0.047	0.020	0.003	0.003	0.003	0.008	0.0025	0.01	0.02	0.0	0.0			

Influent Loadings Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Design
$CBOD_5$ kg/d	1544	853	1286	1030	1061	954	762	1081	1132	956	1135	746	1046	746	1544		1636
TSS kg/d	1335	913	1413	1106	1368	1361	1201	1294	1507	1485	1518	1152	1312	913	1518		1636
TKN kg/d	177	131	168	171	229	233	155	204	211	175	197	132	183	131	233		327.2

Public Works
P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

Dear Sir:

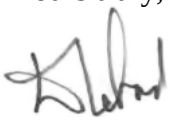
RE: 2013 Year-End Monitoring Report, Thamesford Wastewater Treatment Plant (WWTP)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) #6974-6FKKAY.

I trust this report fulfills the intent of the annual reporting requirements of the ECA.

If there are any questions, please contact me.

Yours truly,



Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Thamesford WWTP (Figure 1) provided effective wastewater treatment in 2013. The average daily flow for 2013 was 1,525 m^3/d. This represents 61% of the design criteria of 2,500 m^3/d. The total annual flow was 556,703 m^3 with an average monthly flow of 46,392 m^3.

Figure 1 Thamesford WWTP Aerial Photo

Plant Description

The Thamesford WWTP is one of Oxford County's nine wastewater treatment facilities.

The plant receives significant wastewater flows from a local major poultry processing plant; however, the treatment plant also receives domestic wastewater from the Community of Thamesford. The wastewater from the poultry processing plant is collected from various on-site business units and pumped to a pretreatment system comprised of an equalization silo and a Dissolved Air Flotation (DAF) unit. The company's effluent enters the lift station dedicated to their wastewater flow at the Wastewater Treatment Plant where it is pumped to the complete mix aeration basin prior to a plug flow reactor. The extended aeration system is comprised of two tanks: the complete mix basin and the plug flow reactor. After the plug flow reactor, the wastewater flows into one of two clarifiers where the settled activated sludge is either returned or wasted and the supernatant flows to either the old or the new sand filter, prior to disinfection and direct discharge to the Middle Thames River. Wasted biosolids are processed/stabilized in two aerobic digesters, and held on-site in a storage tank for eventual removal. Biosolids are applied to land application sites possessing the appropriate Nutrient Management Plan for a Non-Agricultural Source Material (NASM).

The treated effluent flow for purposes of calculating loading to the River is from the Parshall flume located after the stilling well just before discharge to the re-aeration chamber and the Middle Thames River. The flow used to apportion the loading to the plant is from two meters, one on each lift station. The influent meters and all other meters are calibrated annually.

Effluent Criteria

Effluent Parameter	Monthly Average Concentration (milligrams per litre unless otherwise indicated)	Monthly Average Loading (kilograms per day unless otherwise indicated)
Column 1	Column 2	Column 3
BOD_5		
- non-freezing (see Note 1)	10.0	25.0
- freezing (see Note 2)	15.0	37.5
Suspended Solids		
- non-freezing	10.0	25.0
- freezing	15.0	37.5
Total Phosphorus		
- non-freezing	0.2	0.5
- freezing	0.5	1.25
Total Ammonia Nitrogen		
- non-freezing	2.0	5.0
- freezing	5.0	12.5
Dissolved Oxygen	5.0	-
Total Chlorine Residual	0.01	-
E. Coli	200 organisms/100 mL (Monthly *Geometric Mean Density*)	-
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

Note 1: Non-freezing refers to conditions when the water temperature of the Middle Branch of Thames River is greater than 5 °C.

Note 2: Freezing refers to conditions when the water temperature of the Middle Branch of Thames River is equal to or less than 5 °C.

Sampling Description

Influent samples were taken from sampling ports located in-line after the influent pumps. Two 24-hour composite samplers take a sample every 15 minutes for a 24-hour period concurrent with effluent sampling. A sampler is installed on the municipal and the food processing company's influent lines. The two influent streams are separately tested, and then the results are mathematically combined, based on flow ratios.

Effluent samples were taken using a 24-hour composite sampler set to take a sample every 15 minutes for 24 hours. Samples were drawn from a stilling well prior to the parshall flume immediately before the discharge. Total residual chlorine (TRC) samples

are taken daily from the stilling well prior to the parshall flume. The stilling well follows the chlorination and de-chlorination chambers. The pH of the final effluent composite sample is also measured.

Following the parshall flume, effluent flows through a discharge pipe and drops approximately 0.75 m into a discharge well, where dissolved oxygen samples are taken. This discharge well aerates the effluent prior to discharge to the River, as reflected in the DO sample results.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples, except for TRC, DO and pH which are tested in the field. These results are used for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

Discussion of Results

Exhibit 1 is a summary Table with the average, maximum, and minimum values for all influent and effluent parameters. The table is based on all external test results.

The average annual influent BOD_5 concentration to the plant was 343 mg/L. This corresponds to an average BOD_5 loading of 523 kg/d, which is 39% of the design value of 1,333 kg/d. The average annual Influent TSS concentration to the plant was 204 mg/L. This corresponds to an average TSS loading of 311 kg/d which is 40% of the design criteria of 779 kg/d. The annual average TKN concentration was 67.1 mg/L. This corresponds to 102 kg/d which is 51% of the design value of 199 kg/d. The annual average TP concentration was 9.1 mg/L. This corresponds to 14 kg/d which is 61% of the design value of 23 kg/d. The annual average O&G loading is 27 mg/L. This corresponds to 42 kg/d.

The annual average BOD_5 concentration was 1.3 mg/L. This represents a 99.6% removal efficiency. The annual average TSS concentration was 2.5 mg/L which represents a 98.8% removal efficiency. The annual average ammonia concentration was 0.8 mg/L. The annual average TP concentration was 0.07 mg/L which represents a 99.2% removal efficiency.

Effluent pH is measured by the operator on a weekly basis (minimum) and there was no single sample outside the criteria of 6-9.5 in 2013. All dissolved oxygen readings in the effluent were measured at least weekly by the operator and no sample was below the required minimum of 5 mg/L.

River temperatures for the Middle Thames River are summarized monthly in the table included with this report.

There was no reported non-compliant event for the Thamesford Wastewater Treatment Plant for any discharge parameter in 2013 as all effluent discharge criteria were met.

Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the plant's ECA were met at the Thamesford WWTP in 2013 with the exception of three values: June and July monthly average TP results at 0.19 mg/L and 0.15 mg/L, respectively (the objective is 0.1 mg/L), and a TSS value of 5.8 mg/L in August (the objective is 5 mg/L).
(Note: the exceedances were related to the effluent objectives, as described above, rather than the more stringent effluent compliance limits/criteria).

All discharge criteria were met at the Thamesford WWTP in 2013.

Bypass, Overflow and Upset Events

There were no bypasses, overflows or upset events at the Thamesford WWTP in 2013.

On May 8, 2013 a leak from the Allen St. forcemain was discovered. This was due to failed underground pipe fittings. Parts were obtained and the repair and removal of impacted soil was performed on May 9, 2013.

This event was reported to the MOE at the time it occurred.

Maintenance and Calibration

The operating and maintenance staff from the Ingersoll WWTP conducts regular scheduled maintenance of the Thamesford WWTP equipment. Detailed maintenance records for each piece of equipment are kept on site at the Ingersoll Plant and are available upon request.

All flow meters were checked and calibrated by R&R instrumentation.

Summary

The Thamesford WWTP was operating within its design flow criteria and was within its discharge limits for 2013.

Biosolids 2013

Discussion:

Biosolids removal was contracted out for land application. The details of the quantity and quality of the biosolids for 2013 can be found in a separate Biosolids Annual Report.

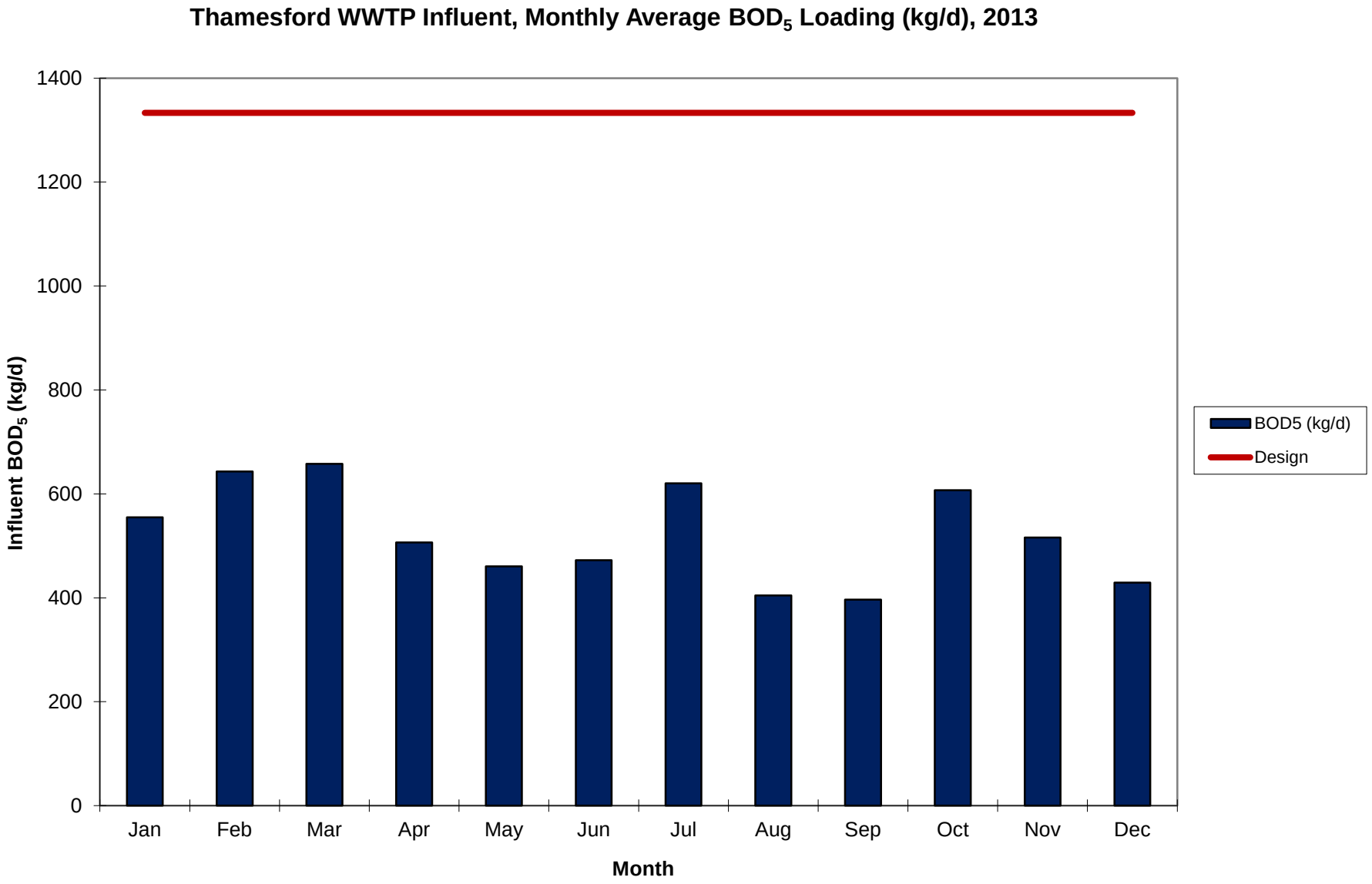
DAF Biosolids Activity

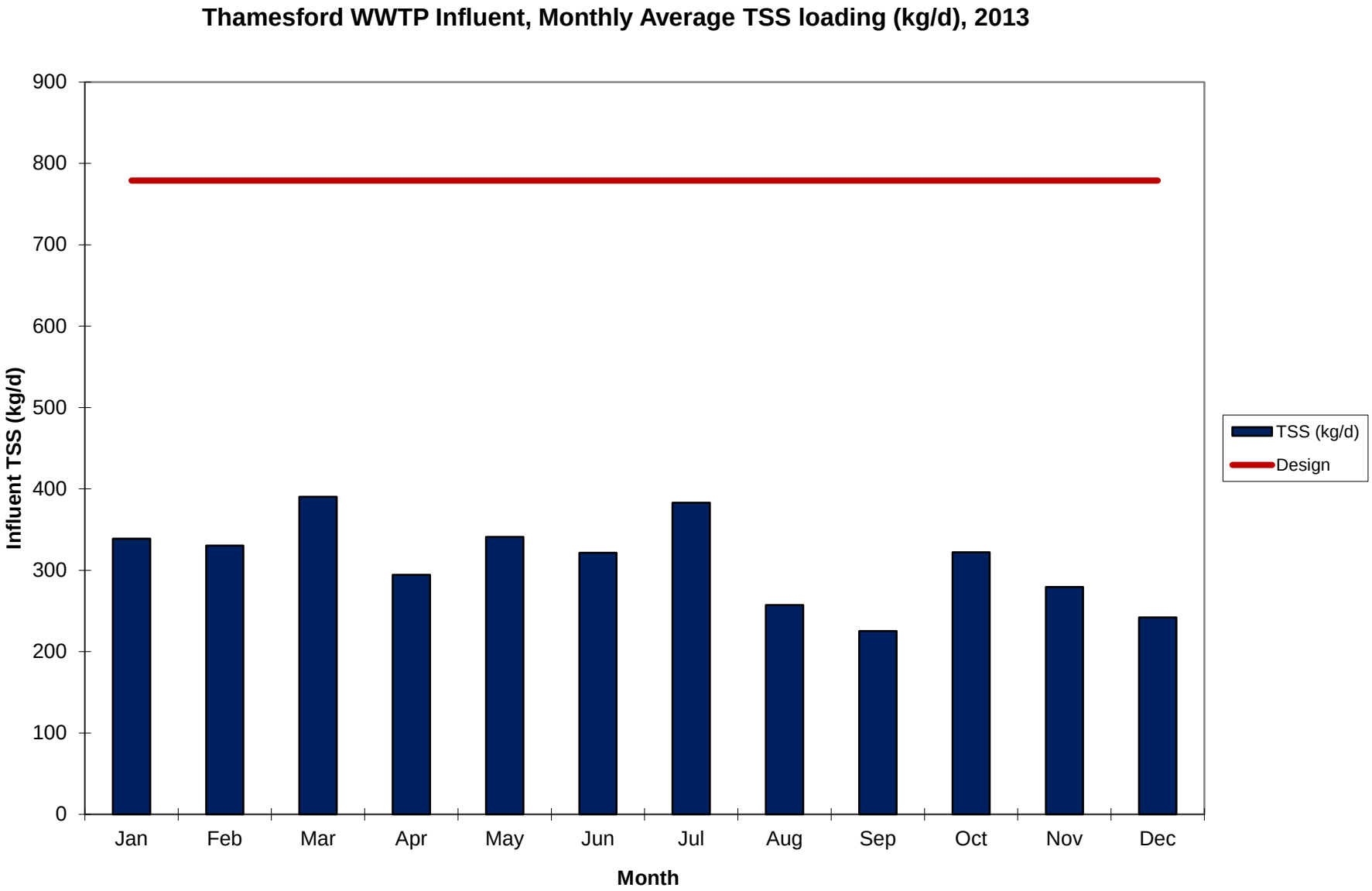
January to December 2013

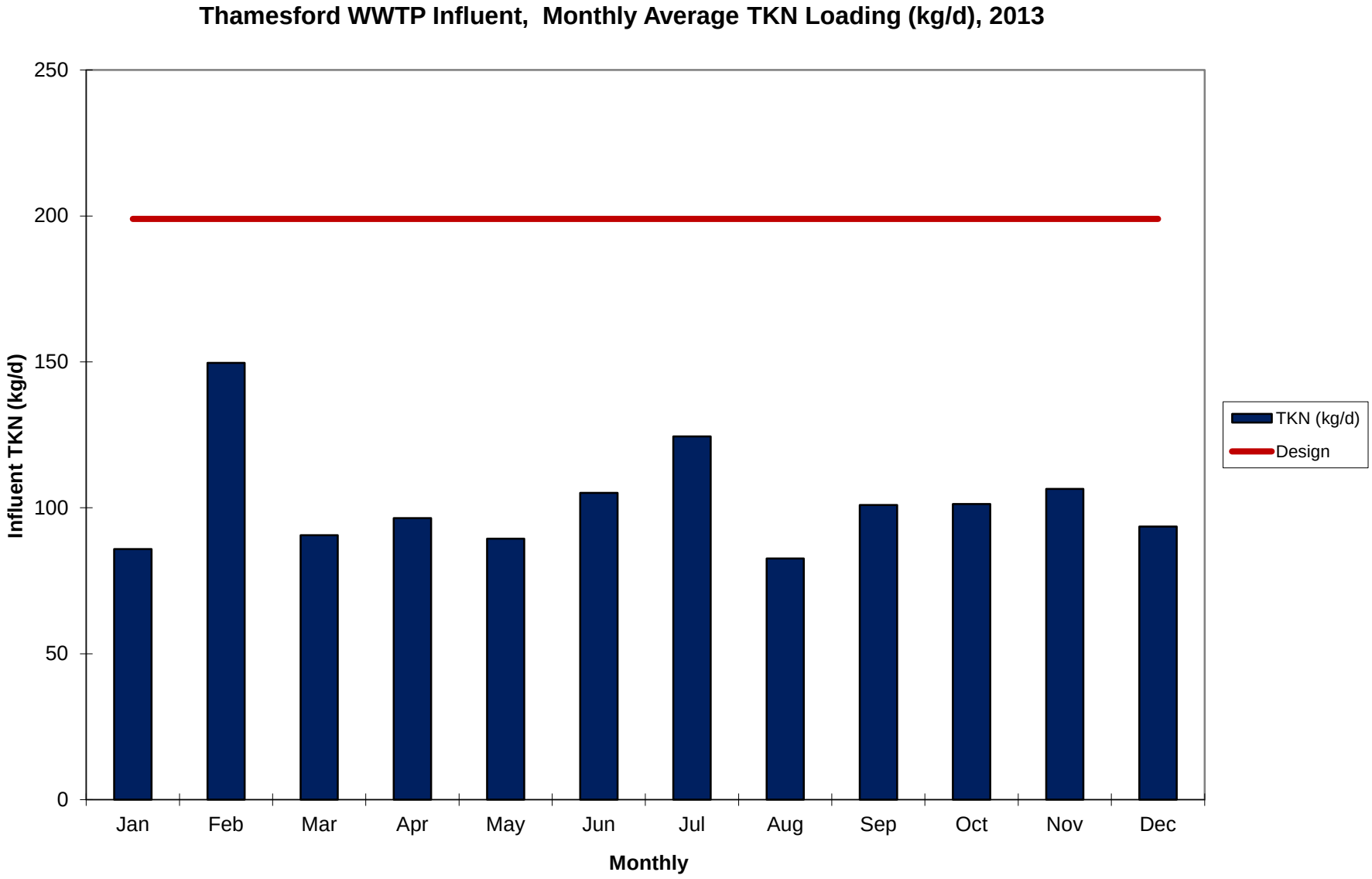
The major poultry processing plant operates its own wastewater pretreatment system which includes a Dissolved Air Flotation (DAF) treatment unit where sludge is generated. The material is transported to the Thamesford WWTP where it is combined with the WWTP stored Biosolids. There is an existing letter from the MOE indicating that this practice is acceptable.

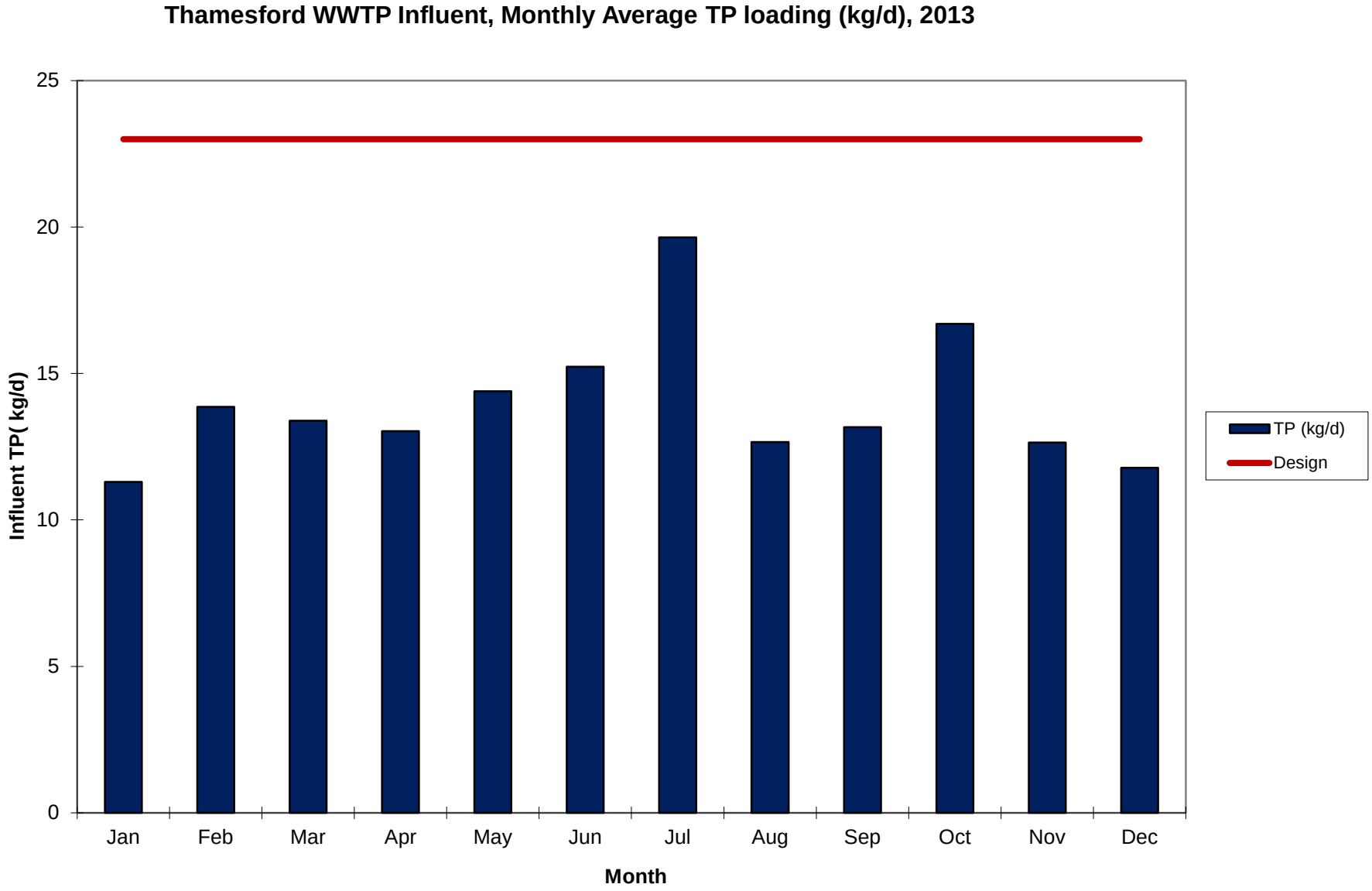
D.A.F. Sludge	
Month	Volume (m^3)
January	154
February	124
March	96
April	153
May	255
June	147
July	118
August	120
September	142
October	163
November	119
December	101
Total	1692

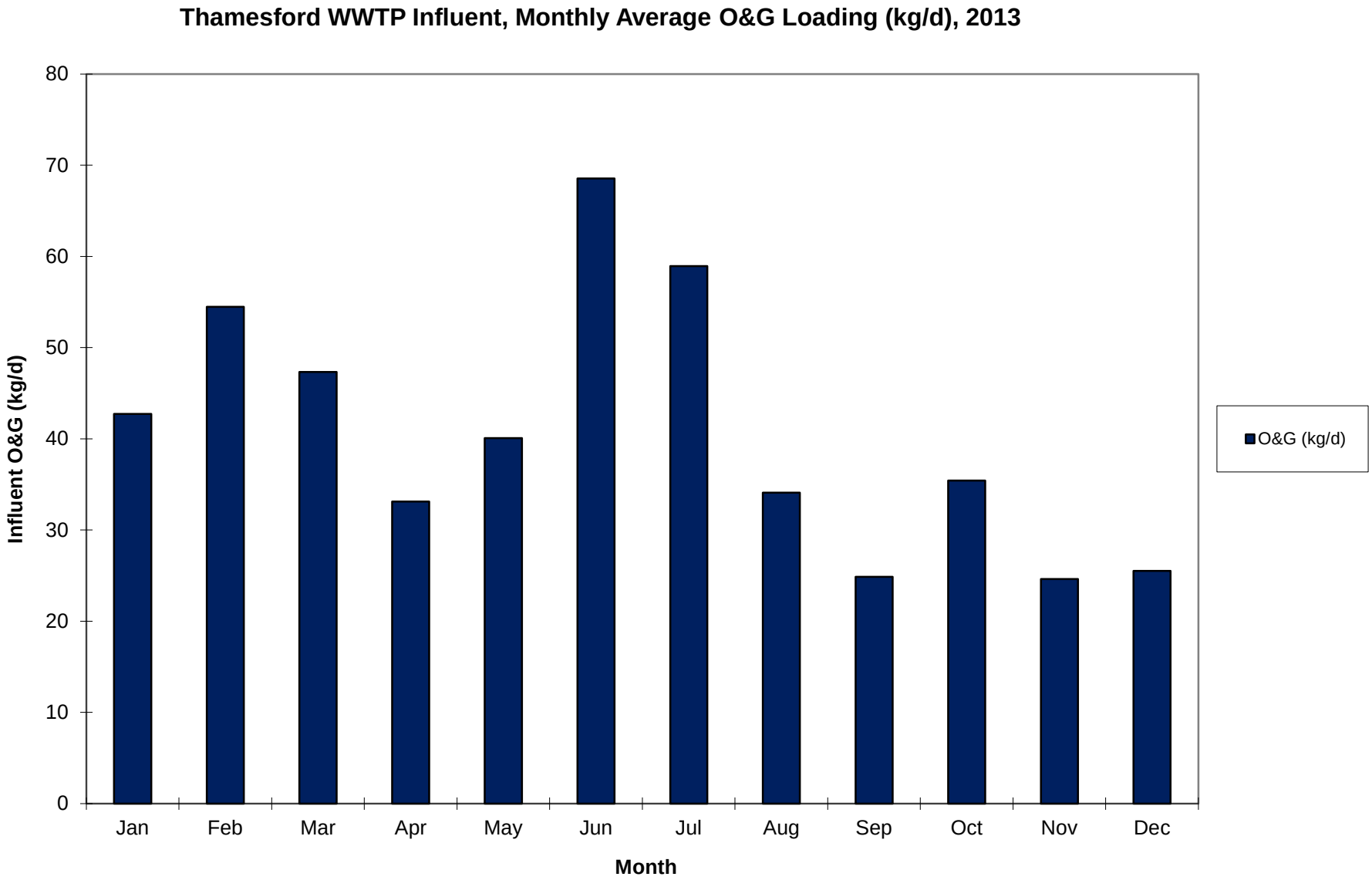
EXHIBIT 1

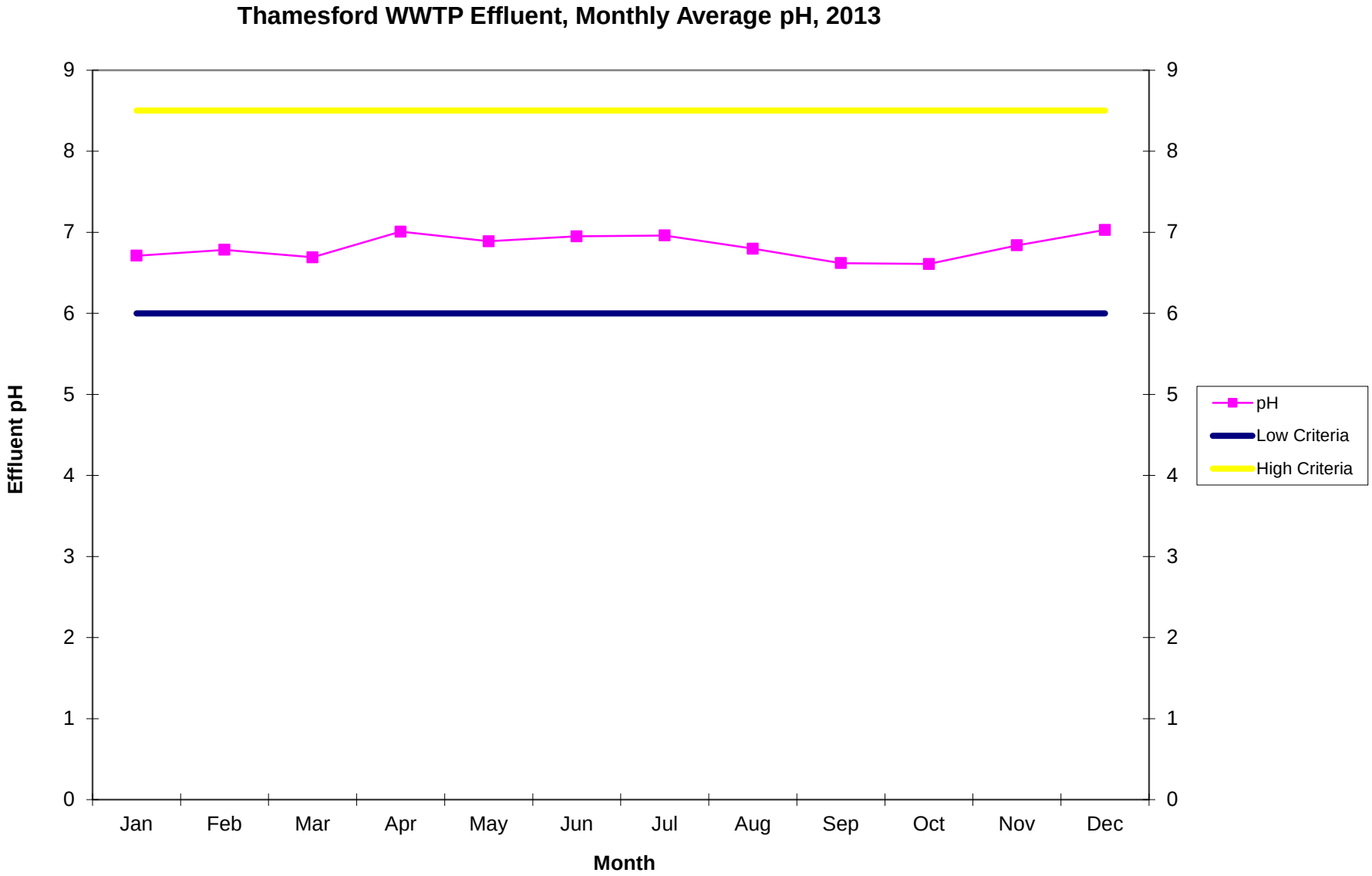

Thamesford WWTP Influent, Monthly Average BOD5 Loading (kg/d), 2013
Influent BOD5 (kg/d)
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
BOD5 (kg/d)
Design

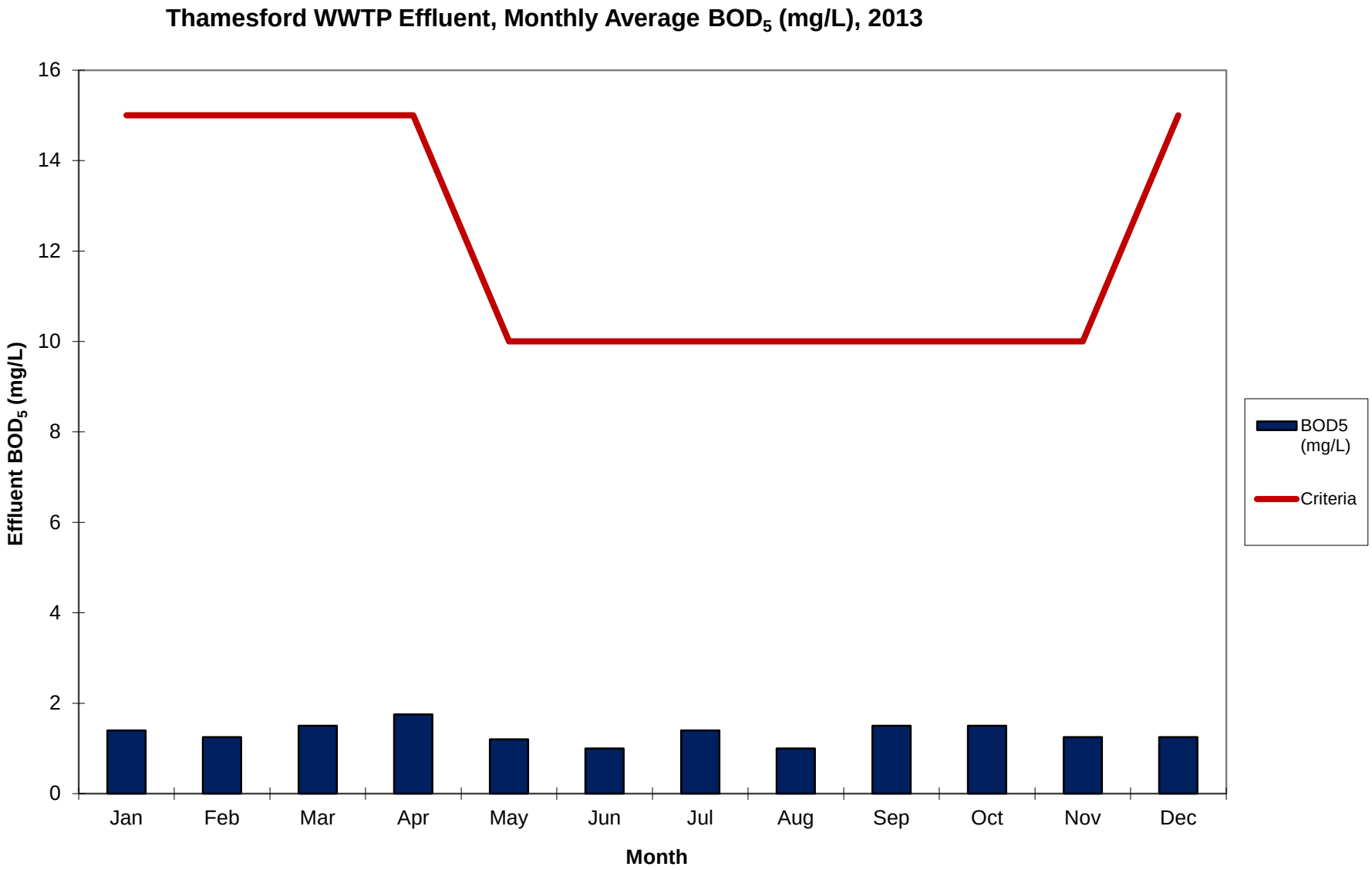

Thamesford WWTP Influent, Monthly Average TSS loading (kg/d), 2013
Influent TSS (kg/d)
900
800
700
600
500
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (kg/d)
Design

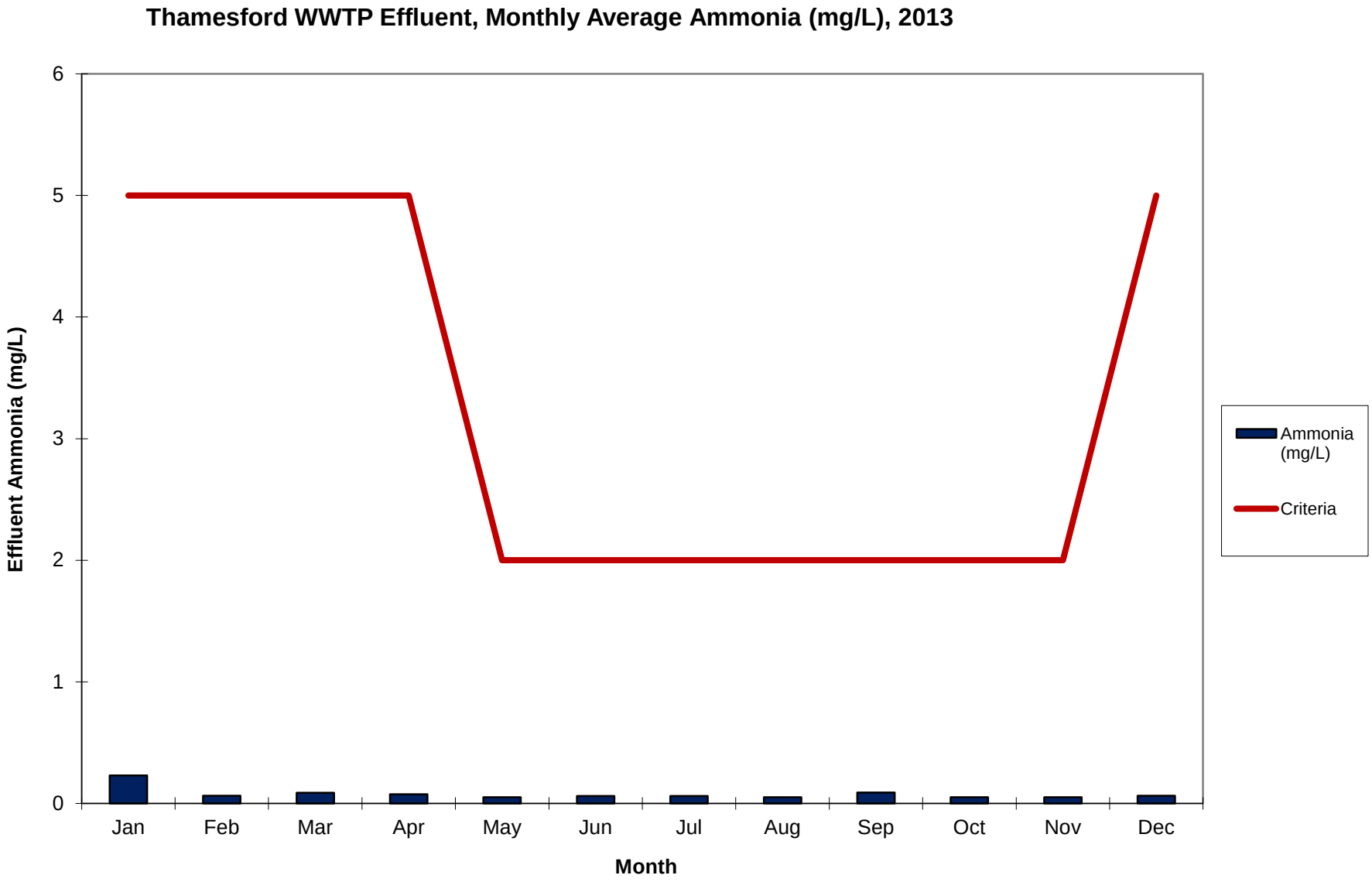

Thamesford WWTP Influent, Monthly Average TKN Loading (kg/d), 2013
Influent TKN (kg/d)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Monthly
TKN (kg/d)
Design

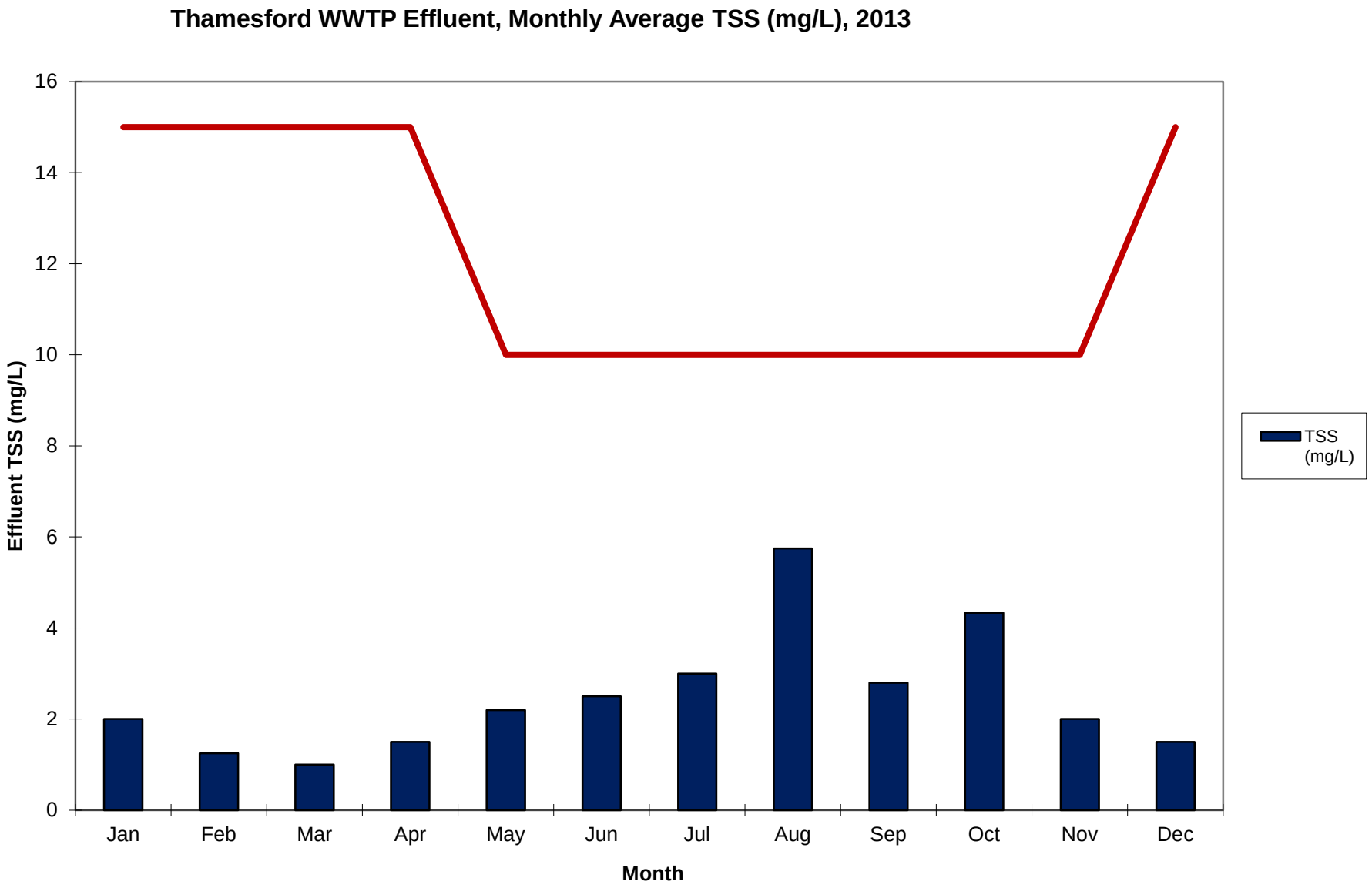

Thamesford WWTP Influent, Monthly Average TP loading (kg/d), 2013
Influent TP(kg/d)
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (kg/d)
Design

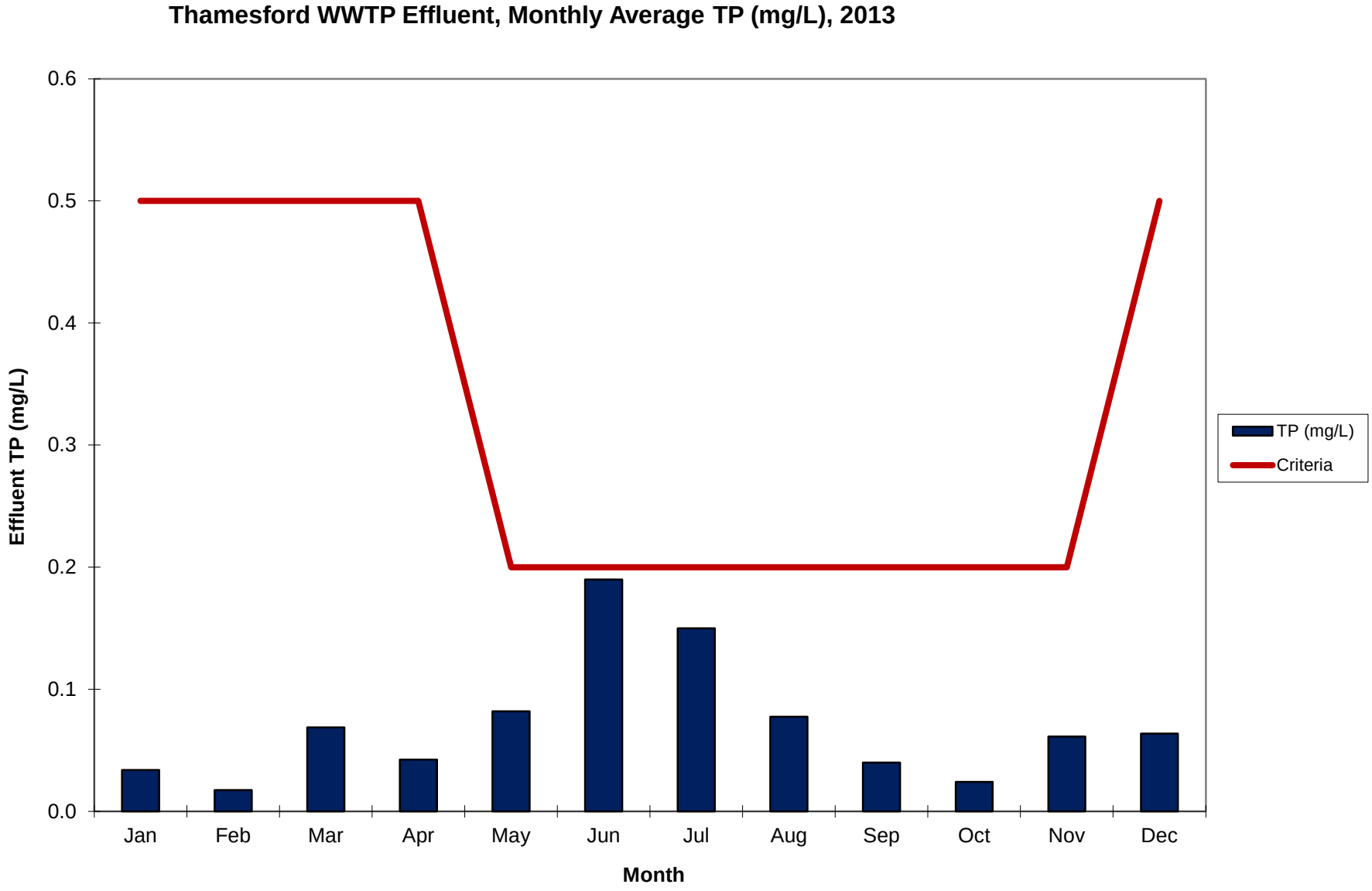

Thamesford WWTP Influent, Monthly Average O&G Loading (kg/d), 2013
Influent O&G (kg/d)
80
70
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
O&G (kg/d)

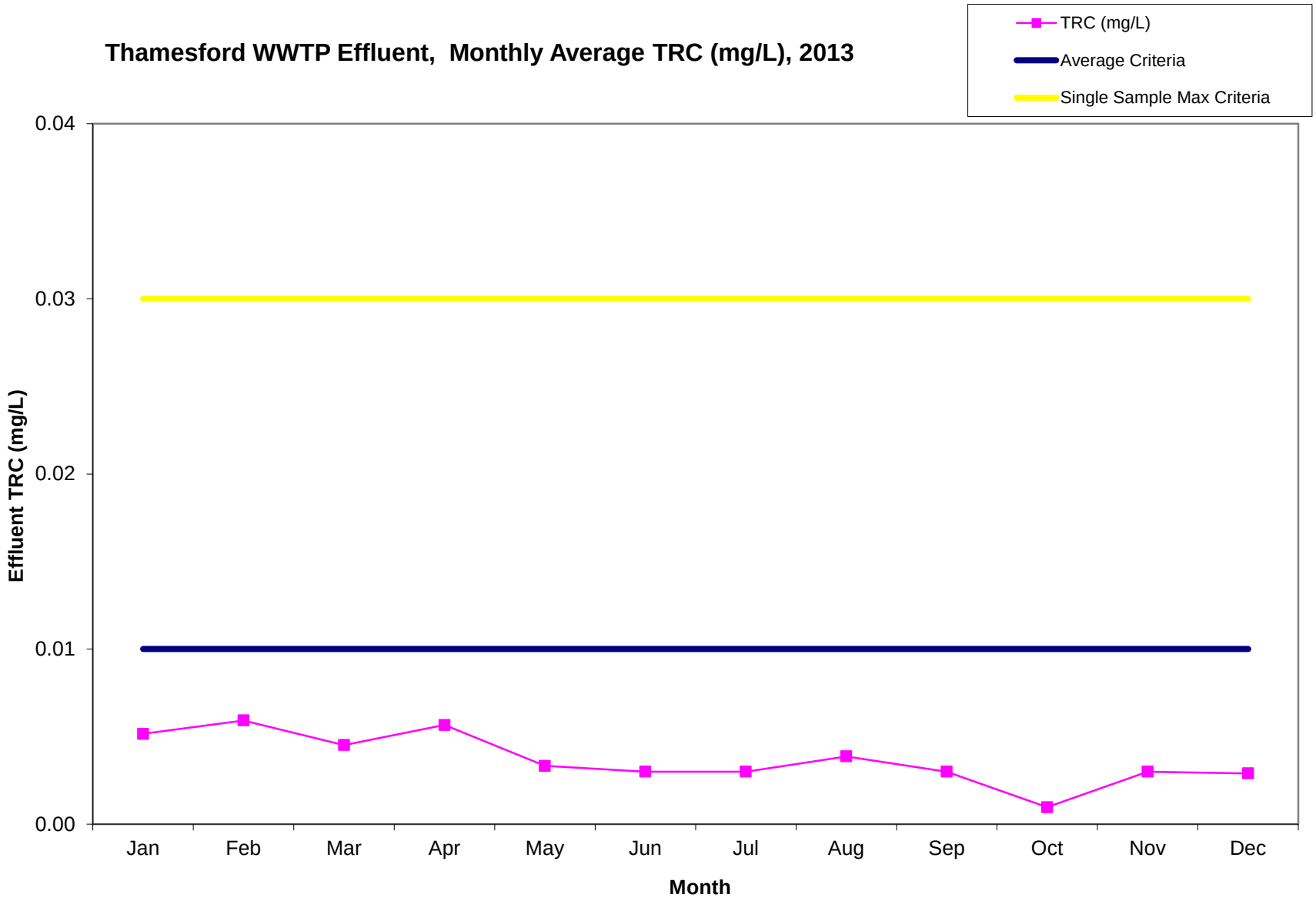

Thamesford WWTP Effluent, Monthly Average pH, 2013
Effluent pH
Month
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
1
2
3
4
5
6
7
8
9
pH
Low Criteria
High Criteria

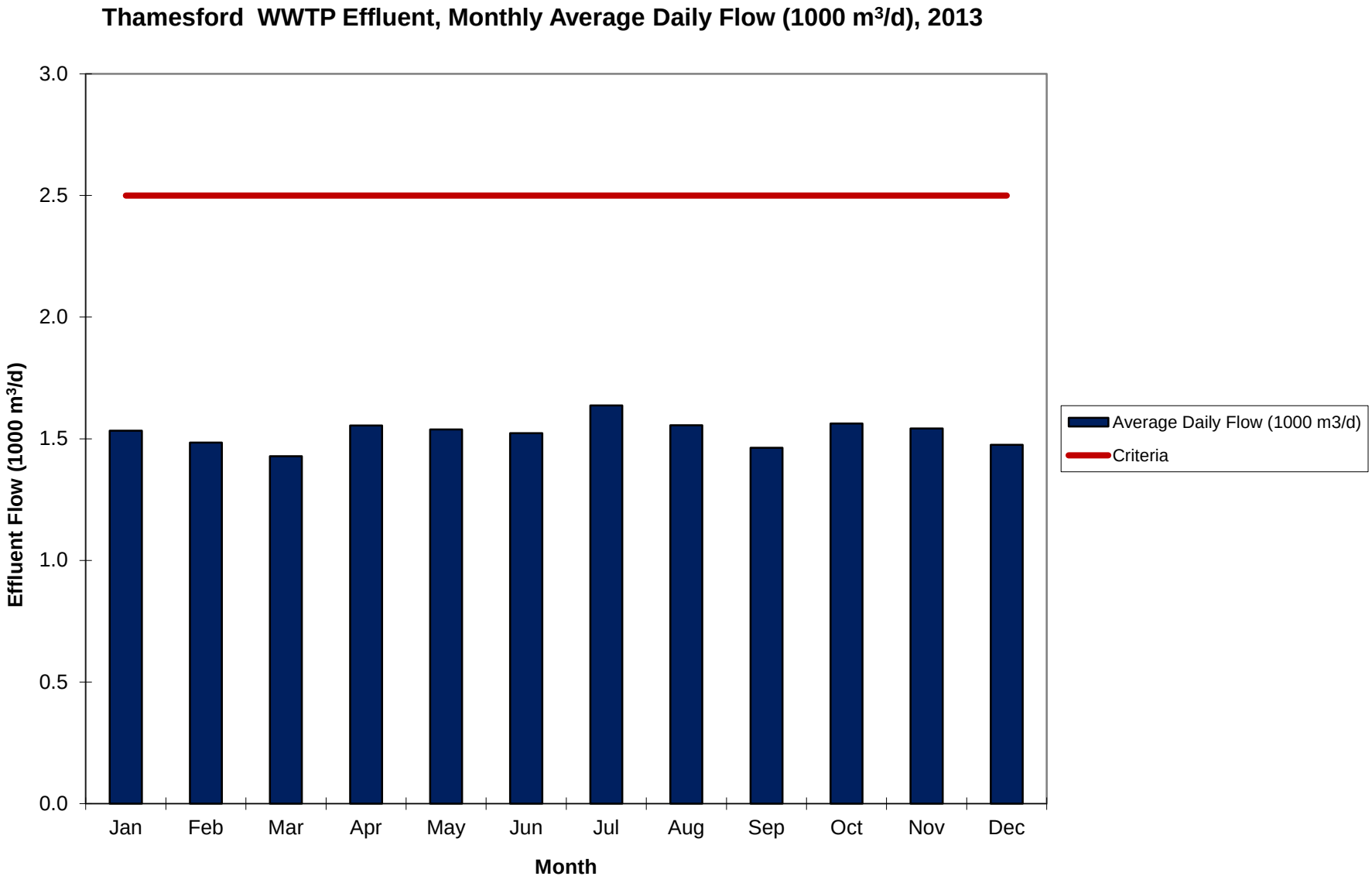

Thamesford WWTP Effluent, Monthly Average BOD5 (mg/L), 2013
Effluent BOD5 (mg/L)
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
BOD5 (mg/L)
Criteria


Thamesford WWTP Effluent, Monthly Average Ammonia (mg/L), 2013
Effluent Ammonia (mg/L)
6
5
4
3
2
1
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Ammonia (mg/L)
Criteria


Thamesford WWTP Effluent, Monthly Average TSS (mg/L), 2013
Effluent TSS (mg/L)
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (mg/L)


Thamesford WWTP Effluent, Monthly Average TP (mg/L), 2013
Effluent TP (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (mg/L)
Criteria


Thamesford WWTP Effluent, Monthly Average TRC (mg/L), 2013
TRC (mg/L)
Average Criteria
Single Sample Max Criteria
0.04
0.03
0.02
0.01
0.00
Effluent TRC (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Thamesford WWTP Effluent, Monthly Average Daily Flow (1000 m3/d), 2013
Effluent Flow (1000 m3/d)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Average Daily Flow (1000 m3/d)
Criteria

Municipality: THAMESFORD
PROJECT:THAMESFORD WWTP
Operator: County of Oxford
Works Number:
120002601

2013

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Criteria
Effluent Meter																	
Total Flow (1000 m^3)	47.541	41.569	44.277	46.633	47.691	45.677	50.758	48.218	43.902	48.455	46.259	45.723	46.392	41.569	50.758	556.703	
Average Daily Flow (1000 m^3/d)	1.534	1.485	1.428	1.554	1.538	1.523	1.637	1.555	1.463	1.563	1.542	1.475	1.525	1.428	1.637		2.5
Maximum Daily Flow (1000 m^3/d)	2.297	2.229	2.204	2.034	2.189	2.093	2.313	2.757	2.209	2.144	2.216	2.151	2.236	2.034	2.757		
Daily Average Influent (m3/d)																	
CSF Flow (m3/d)	997	864	811	789	849	810	892	1044	992	1043	940	970	917	789	1044		
Municipal (m3/d)	427	451	438	465	452	462	425	417	431	446	443	461	443	417	465		
Combined Flow (m3/d)	1424	1315	1249	1254	1301	1272	1316	1462	1423	1489	1383	1431	1360	1249	1489		
Production Average Influent																	
CSF Flow (m3/d)	1240	1119	1134	1025	1142	1128	1110	1331	1301	1227	1248	1280	1190	1025	1331		
Municipal (m3/d)	424	467	438	458	451	468	419	425	427	445	441	406	439	406	468		
Combined Flow (m3/d)	1664	1586	1571	1484	1593	1597	1529	1756	1728	1672	1689	1686	1630	1484	1756		
Combined Influent																	
pH	7.51	7.61	7.50	7.81	7.66	7.62	7.69	7.74	7.68	7.75	7.60	7.62	7.65	7.50	7.81		
$BOD_{5\ (mg/L)}$	361.8	433.0	460.6	326.0	299.2	310.0	379.0	260.1	271.0	388.3	334.7	290.9	343	260	461		
TSS (mg/L)	220.9	222.6	273.3	189.5	221.7	211.0	234.0	165.4	154.0	206.1	181.2	164.1	204	154	273		
TKN (mg/L)	56.0	100.8	63.4	62.0	58.1	69.0	76.0	53.1	69.0	64.8	69.1	63.5	67.1	53.1	76.0		
TP (mg/L)	7.4	9.3	9.4	8.4	9.4	10.0	12.0	8.1	9.0	10.7	8.2	8.0	9.1	8.0	12.0		
O&G (mg/L)	27.9	36.7	33.1	21.3	26.1	45.0	36.0	21.9	17.0	22.7	16.0	17.30	27	16	45		
Effluent																	
pH	6.71	6.78	6.69	7.01	6.89	6.95	6.96	6.80	6.62	6.61	6.84	7.03	6.82	6.61	7.03		6.0-9.5
$BOD_{5\ (mg/L)}$	1.4	1.3	1.5	1.8	1.2	1.0	1.4	1.0	1.5	1.5	1.3	1.3	1.3	1.0	1.8		10/15
TSS (mg/L)	2.0	1.3	1.0	1.5	2.2	2.5	3.0	5.8	2.8	4.3	2.0	1.5	2.5	1.0	5.8		10/15
Ammonia (mg/L)	0.23	0.06	0.09	0.08	0.05	0.06	0.06	0.05	0.09	0.05	0.05	0.06	0.077	0.050	0.090		2/5
TP (mg/L)	0.03	0.02	0.07	0.04	0.08	0.19	0.15	0.08	0.04	0.02	0.06	0.06	0.07	0.02	0.19		0.2/0.5
TRC (mg/L)	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.004	0.001	0.01		0.01
Temp	13.3	12.6	13.3	14.8	18.1	20.7	22.5	21.5	21.3	19.2	15.3	12.9	17.1	12.6	22.5		
DO (mg/L)	7.2	7.0	6.7	6.5	5.9	5.4	5.7	6.0	6.0	5.8	6.8	7.6	6.39	5.41	8		5
E. Coli (#/100mL)	1.25	1.00	1.50	1.00	1.00	3.00	1.00	1.19	1.00	1.00	1.00	1.00	1	1	3		200
Unionized Ammonia (mg/L)	0.0003	0.0001	0.0001	0.0002	0.0001	0.0050	0.0050						0.0015	0.0001	0.0050		

Influent Loadings based on Combined Average Daily Influent Flows and Results																	Design
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Criteria
BOD_5 (kg/d)	555	643	658	507	460	472	620	405	396	607	516	429	523	396	658		1333
TSS (kg/d)	339	330	390	295	341	321	383	257	225	322	279	242	311	225	390		779
TKN (kg/d)	86	150	91	96	89	105	124	83	101	101	106	94	102	83	150		199
TP (kg/d)	11	14	13	13	14	15	20	13	13	17	13	12	14	11	20		23
O&G (kg/d)	43	54	47	33	40	69	59	34	25	35	25	26	41	25	69		250

Public Works
P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

Dear Sir:

RE: 2013 Year-End Report, Tavistock Wastewater Treatment Plant (WWTP)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) # 7789-8AKJL5.

I trust this report fulfills the intent of the ECA reporting requirements. If there are any questions, please contact me.

Yours truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Tavistock WWTP provided effective wastewater treatment in 2013 and all effluent concentration limits, as specified by the ECA, were met.

The annual average daily flow in 2013 was 1,695 m^3/d, which represents 67% of the rated capacity of 2,525 m^3/d.

Plant Description

The Tavistock WWTP (Figure 1) consists of 3 aerated lagoon cells, 1 polishing pond and an Intermittent Sand Filter (ISF). The first three cells are equipped with Mat Aerators, and there are an additional six 15 hp aspirating surface aerators in Cell 1 to provide the necessary dissolved oxygen for the lagoons.

There is also the provision for continuous aluminum sulphate addition for phosphorus removal. The wastewater is dosed with aluminum sulphate as it enters Cell 1 and as the flow enters Cell 2.

Effluent from Cell 1 overflows to Cell 2, then into Cell 3 and/or Cell 4 where it is pumped through the filter beds and/or stored prior to discharge.

Oxford County operates the facility, utilizing the staff located at the Woodstock WWTP.

Figure 1 Aerial view of Tavistock WWTP (prior to recent expansion/upgrades)

Plant Specifications

Facilities - Four Lagoon Cells and an Intermittent Sand Filter
Design Capacity - 2,525 m^3/day
Average Daily Flow - 1,695 m^3/day (2013)
Receiving Stream - Hohner Drain (eventually to Thames River)
Plant Classification - WWT – I
ECA #7789-8AKJL5

Effluent requirements:

During first 9 months following substantial completion equivalent to previous ECA (Feb. 6, 2012 – Nov. 6, 2012):

$CBOD_5$	25 mg/L
Suspended Solids	25 mg/L
Total Phosphorus	1 mg/L

After first 9 months following substantial completion (beginning Nov. 7, 2012):

$CBOD_5$	15.0 mg/L
Suspended Solids	15.0 mg/L
Total Phosphorous	0.5/0.8 mg/L
Dissolved Oxygen	>4.0

Free Ammonia

(Jan.)	7.0 mg/L	(Feb)	10.0 mg/L
(Mar.)	8.5 mg/L	(Apr.)	8.0 mg/L
(May -Nov.)	1.0 mg/L	(Dec.)	3.0 mg/L

Sampling Procedures

Raw sewage is sampled a minimum of once monthly for $CBOD_5$, suspended solids, TKN, total phosphorous, pH and temperature.
Automatic composite samplers are used to collect raw sewage samples from Chamber 3 as the flow enters Cell 1. Automated composite samples are also taken at the same time from a major cheese processor in Tavistock. The cheese company can discharge significant loadings to the Tavistock Lagoon system and is under a surcharge agreement with Oxford County.

Grab samples of final effluent are taken weekly during effluent discharge and tested for $CBOD_5$, suspended solids, total phosphorous, pH, temperature, dissolved oxygen, nitrate nitrogen, nitrite nitrogen and ammonia nitrogen. Un-ionized ammonia, BOD_5 and E.Coli were also included under the amendment. SGS Lakefield Research Ltd. performs all sample analyses with the exception of pH, temperature, and dissolved oxygen which are measured in the field. A detailed summary of monthly raw sewage and final effluent analysis is provided in this report in Exhibit 1.

Flows

The annual average daily influent flow was 1,695 m^3/d this represents 67% of the rated capacity of 2,525 m^3/d included in ECA #7789-8AKJL5.

Plant treated effluent volume of 860,705 m^3 was released in 2013.

Raw Sewage Quality

The annual average raw sewage $CBOD_5$ concentration to the plant was 359 mg/L. This corresponds to an average $CBOD_5$ loading of 609 kg/day. The average suspended solids loading was 384 mg/L (or 651 kg/day). The annual raw sewage nitrogen levels as TKN were 40.5 mg/L (or a loading of 69 kg/day). Phosphorous levels averaged 14 mg/L, which correspond to 24 kg/day.

Plant Performance & Effluent Quality

Detailed analytical data of annual and monthly averages are summarized later in the report under Exhibit 1.

The annual $CBOD_5$ effluent concentration was 3.1 mg/L with a removal efficiency of 99.1%. The annual suspended solids effluent concentration was 5 mg/L with a removal efficiency of 98.7%. The annual average TKN effluent concentration was 2 mg/L with a removal efficiency of 95%. The annual average total phosphorous effluent concentration was 0.07 mg/L, which represents a removal efficiency of 99.5%.

.

All pH is measured in the effluent by the operator on a minimum weekly basis during discharge. There was no single sample with pH outside of the required range of 6-9.5 in 2013.

The Tavistock WWTP met all the discharge criteria within its ECA in 2013.

Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the ECA were met with the exception of the monthly average TSS in December which was 12.2 mg/L (just over the objective of 10 mg/L).
(Note: the exceedances were related to the effluent objectives, as described above, rather than the more stringent effluent compliance limits/criteria).

Bypassing, Overflows and Abnormal Conditions

There were no bypasses, overflows or abnormal events at the wastewater lagoons in 2013.

There was an overflow of approximately 925 m^3 of wastewater from the William St. sewage pumping station on April 19-20, 2013. This was due to a float being damaged by a contractor performing routine maintenance and later caused the pumps to lockout. An alarm was not sent, as another contractor was replacing a hydro pole at this location and had damaged the phone line. In order to prevent this from happening again, operations staff prepared a maintenance form for this type of work and when there is a failure to communicate with the alarm centre a report is automatically generated for staff.

On September 20, 2013, another overflow of about 3 m^3 occurred at the William St. sewage pumping station that was due to heavy rain. High flows were received due to major rain storm and the standby pump was offline for servicing. In response to this, investigations into wet weather flows to reduce peaking will continue.

These events were reported to the MOE at the time they occurred.

Maintenance and Calibration Activities

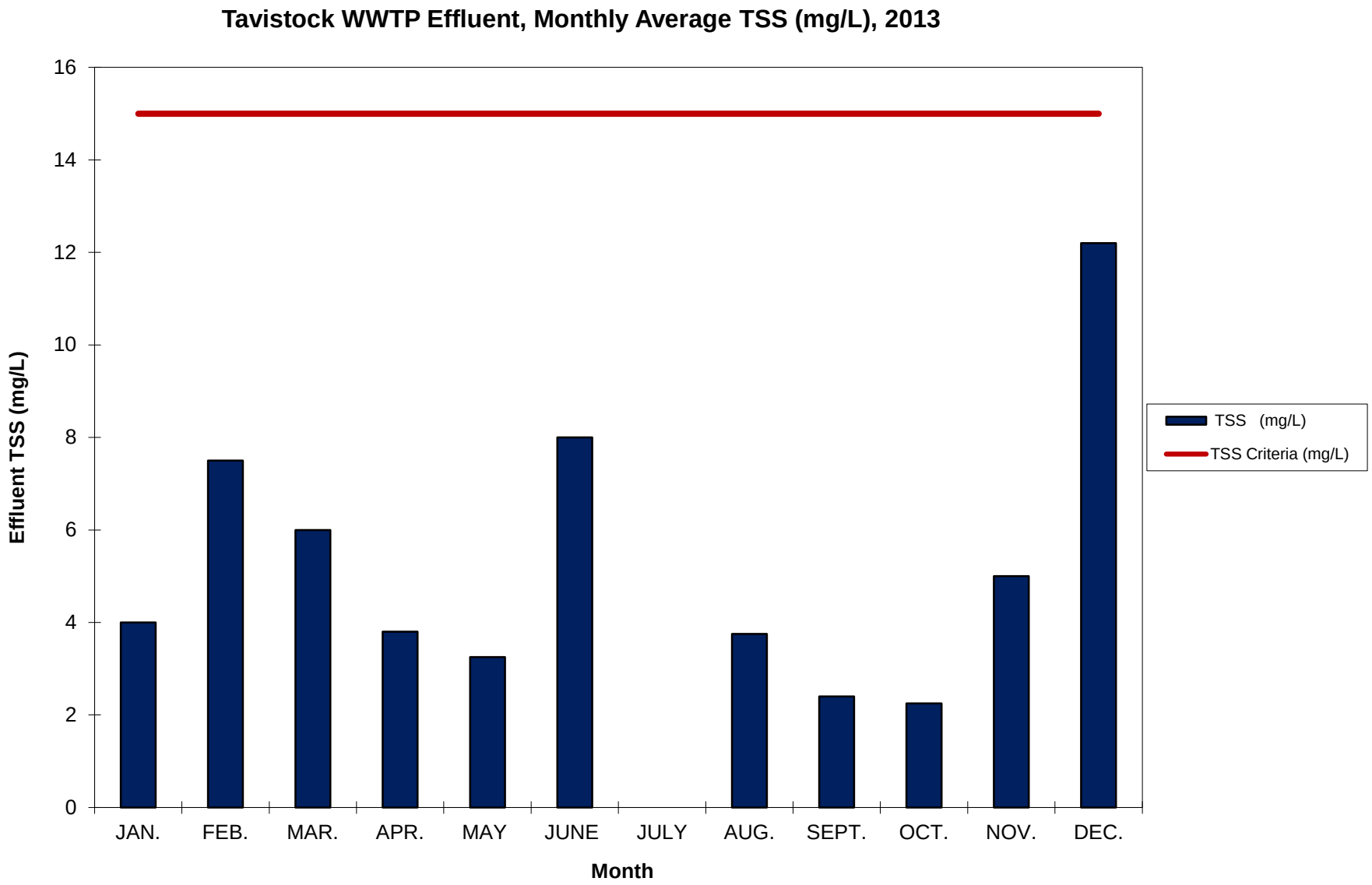
The operating and maintenance staff from the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept on-site at the Woodstock Plant.

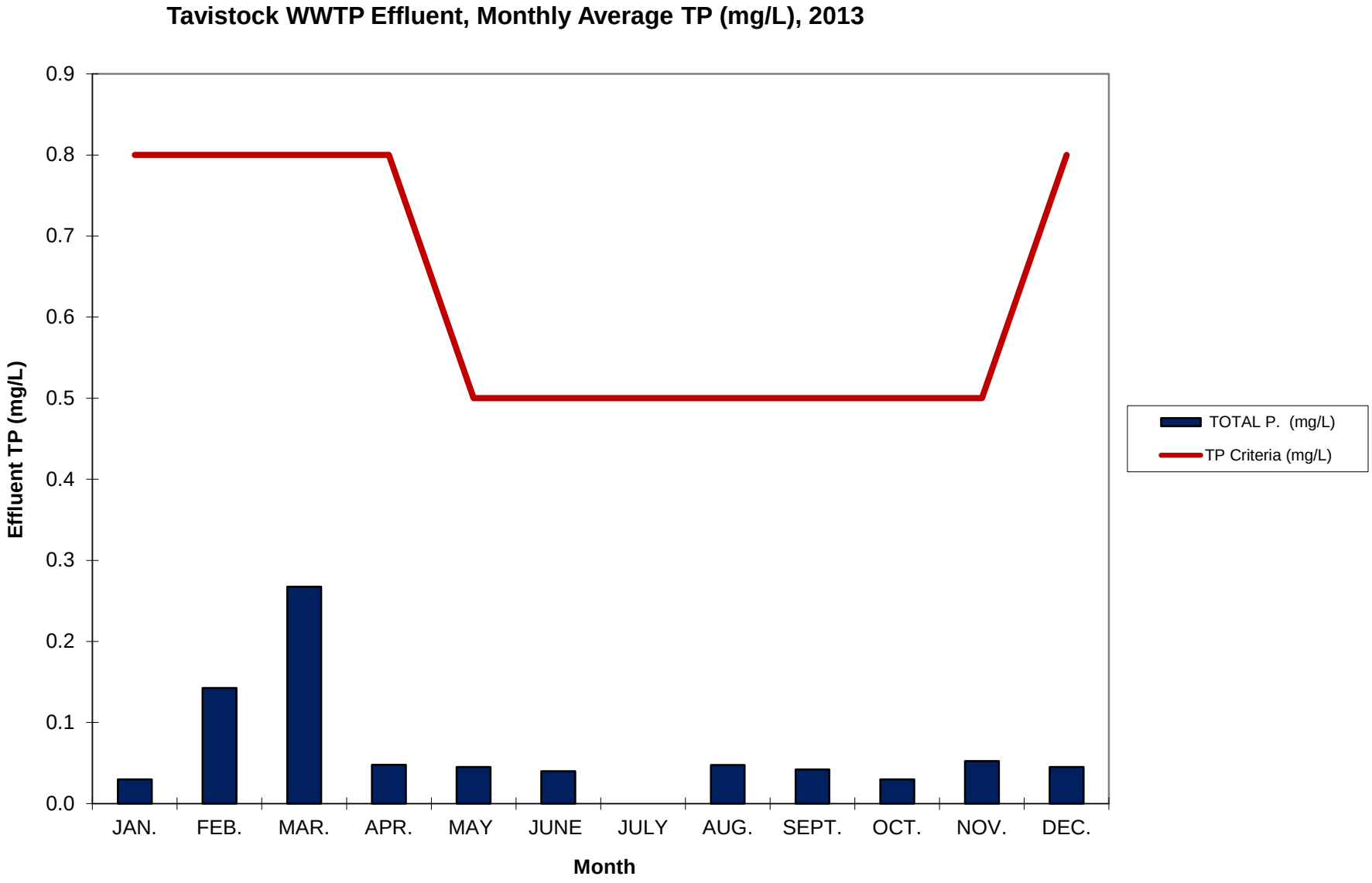
R & R Instrumentation calibrated all flow measuring equipment.

Summary

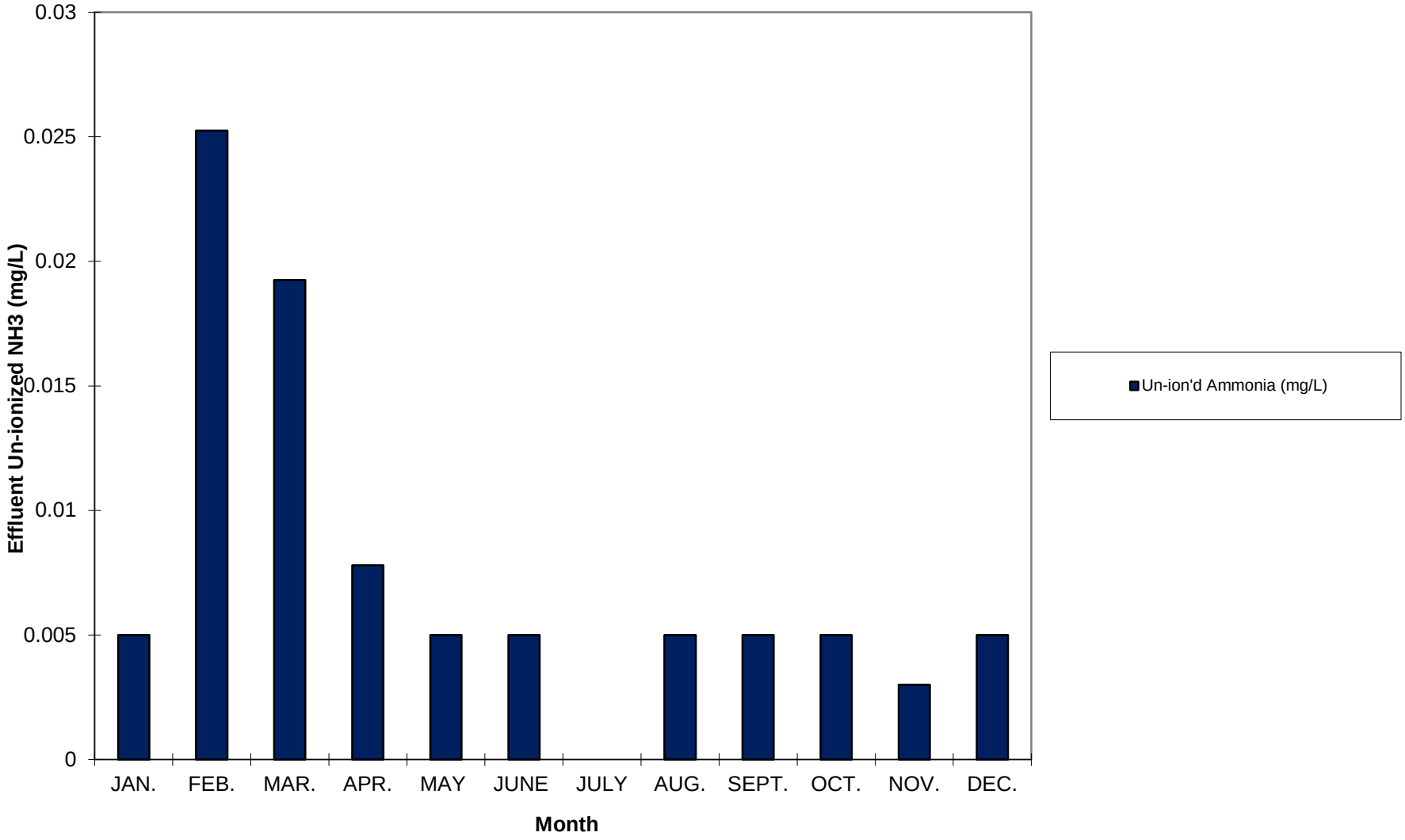
The Tavistock WWTP met all the discharge criteria within its ECA in 2013.

EXHIBIT 1

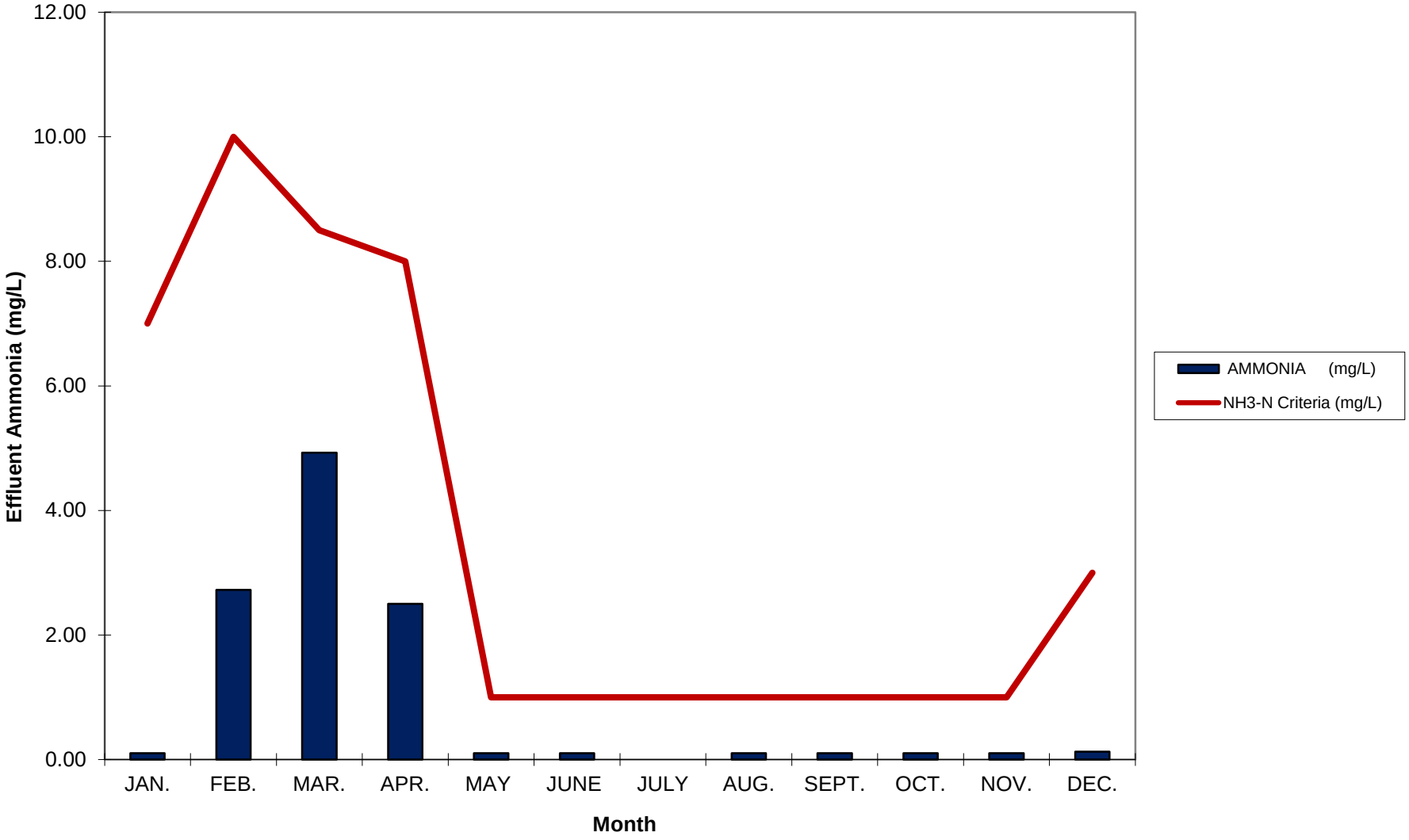

Tavistock WWTP Effluent, Monthly Average TSS (mg/L), 2013
Effluent TSS (mg/L)
16
14
12
10
8
6
4
2
0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
TSS (mg/L)
TSS Criteria (mg/L)

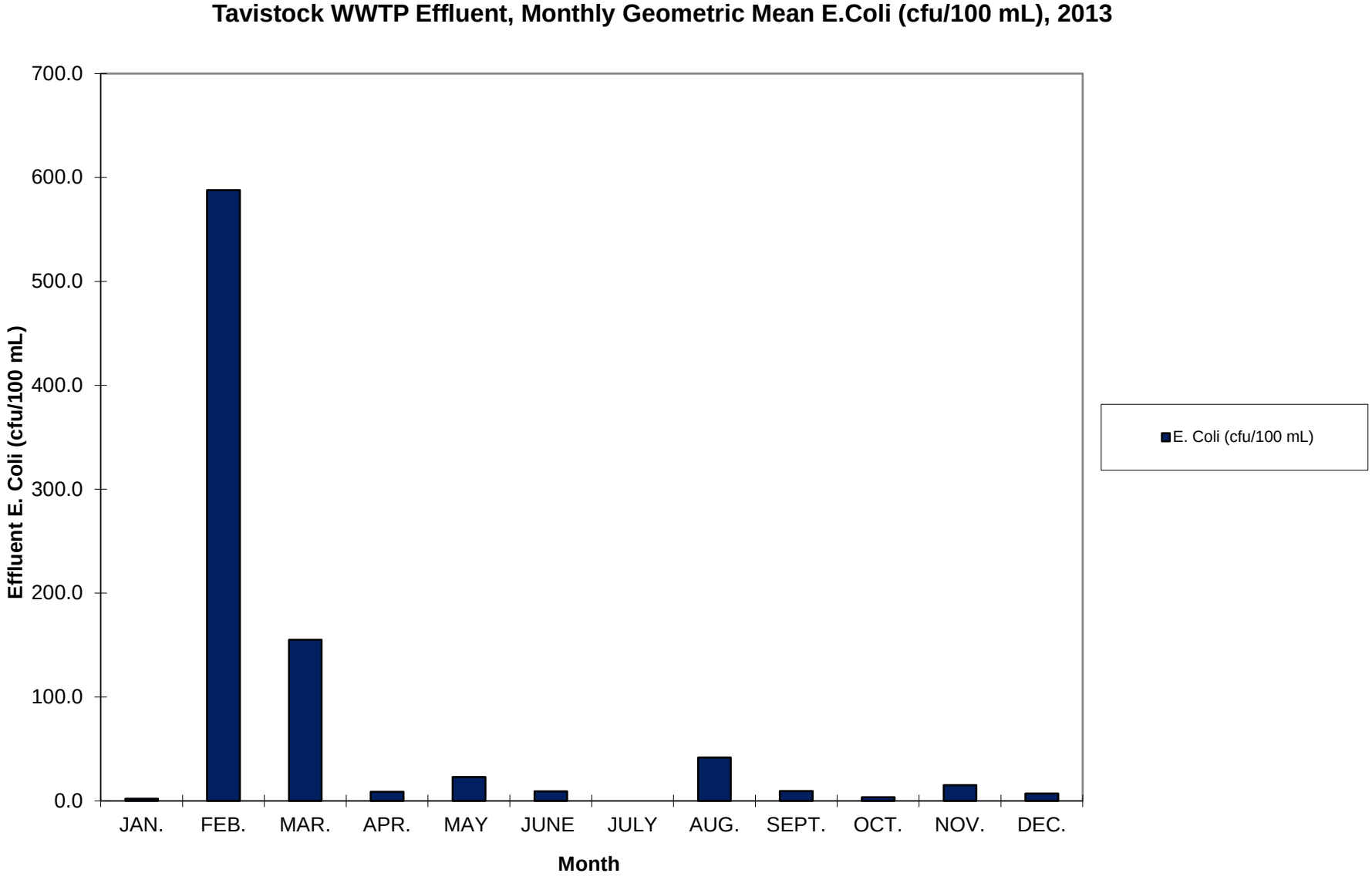

Tavistock WWTP Effluent, Monthly Average TP (mg/L), 2013
Effluent TP (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
TOTAL P. (mg/L)
TP Criteria (mg/L)

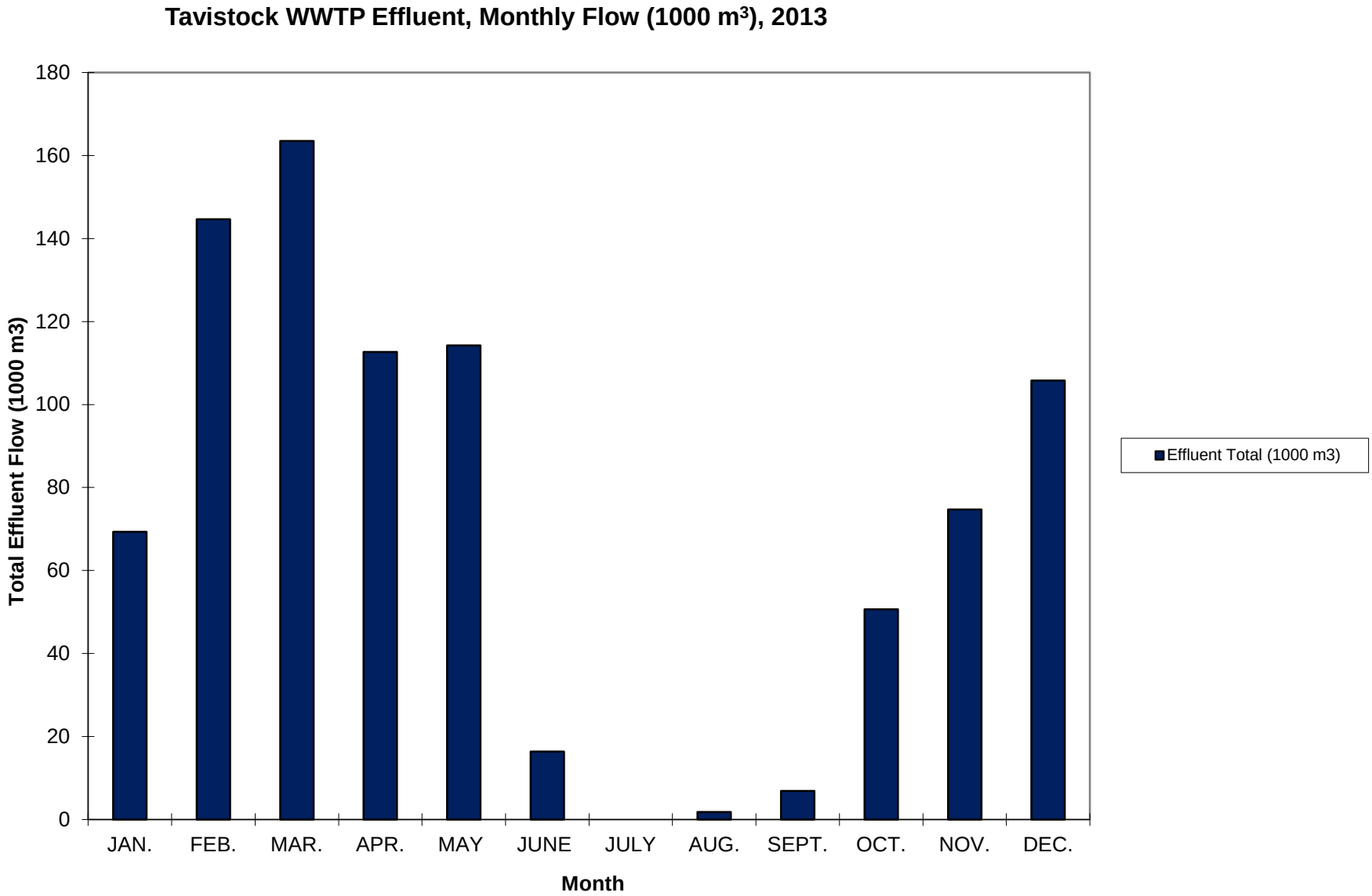
Tavistock WWTP Effluent, Monthly Average Un-ionized Ammonia (mg/L), 2013

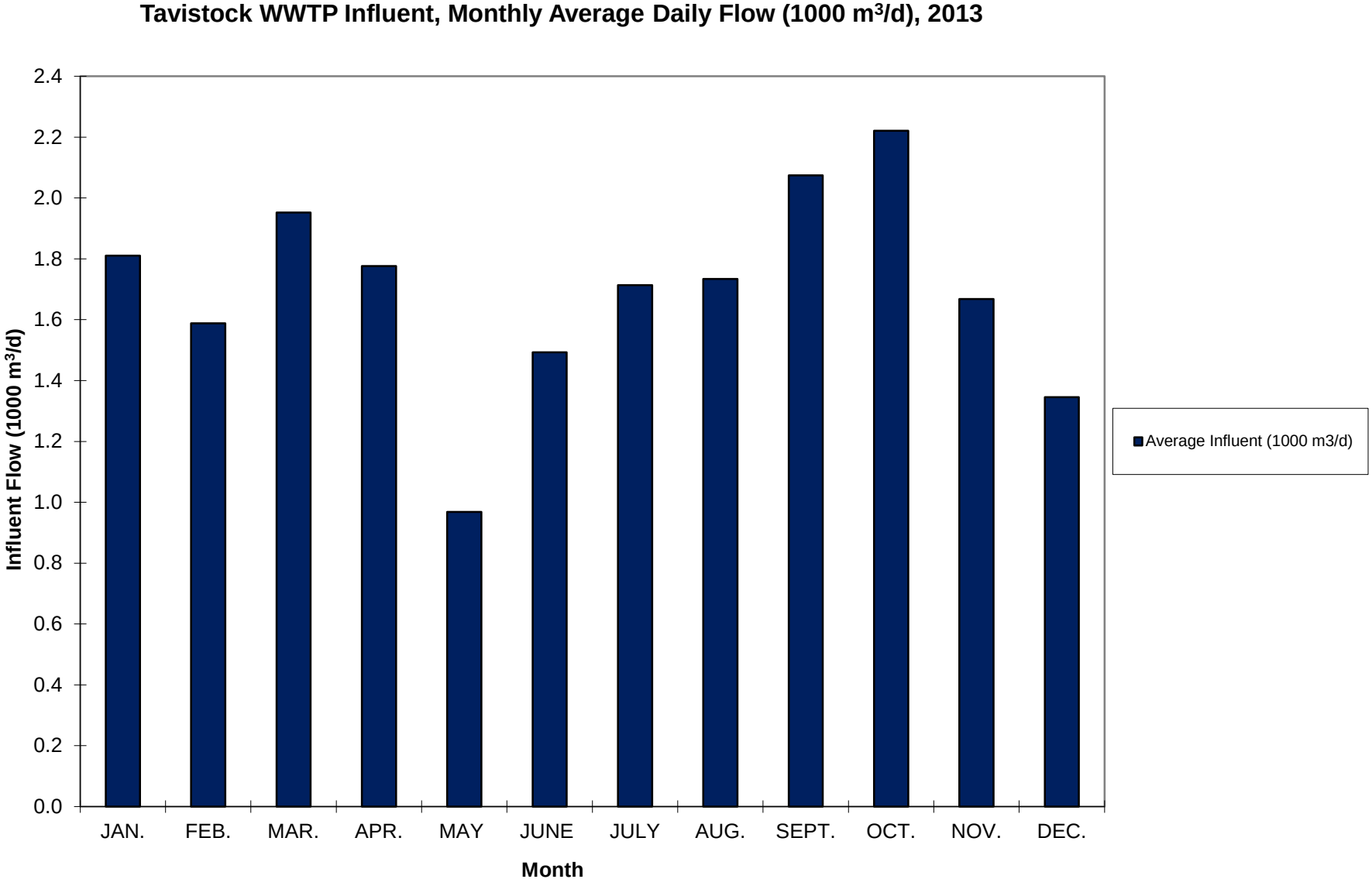


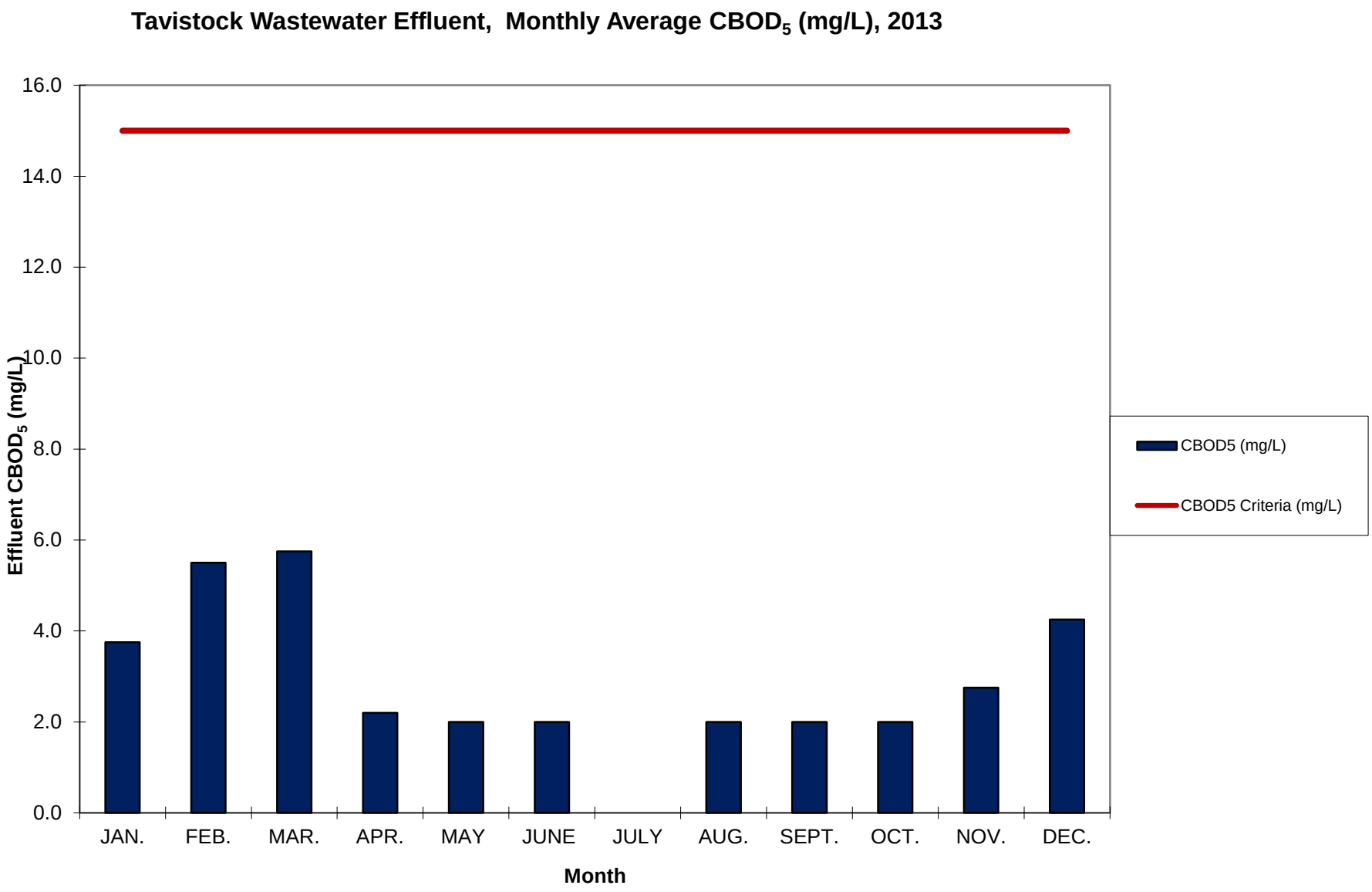
Tavistock WWTP Effluent, Monthly Average Ammonia (mg/L), 2013

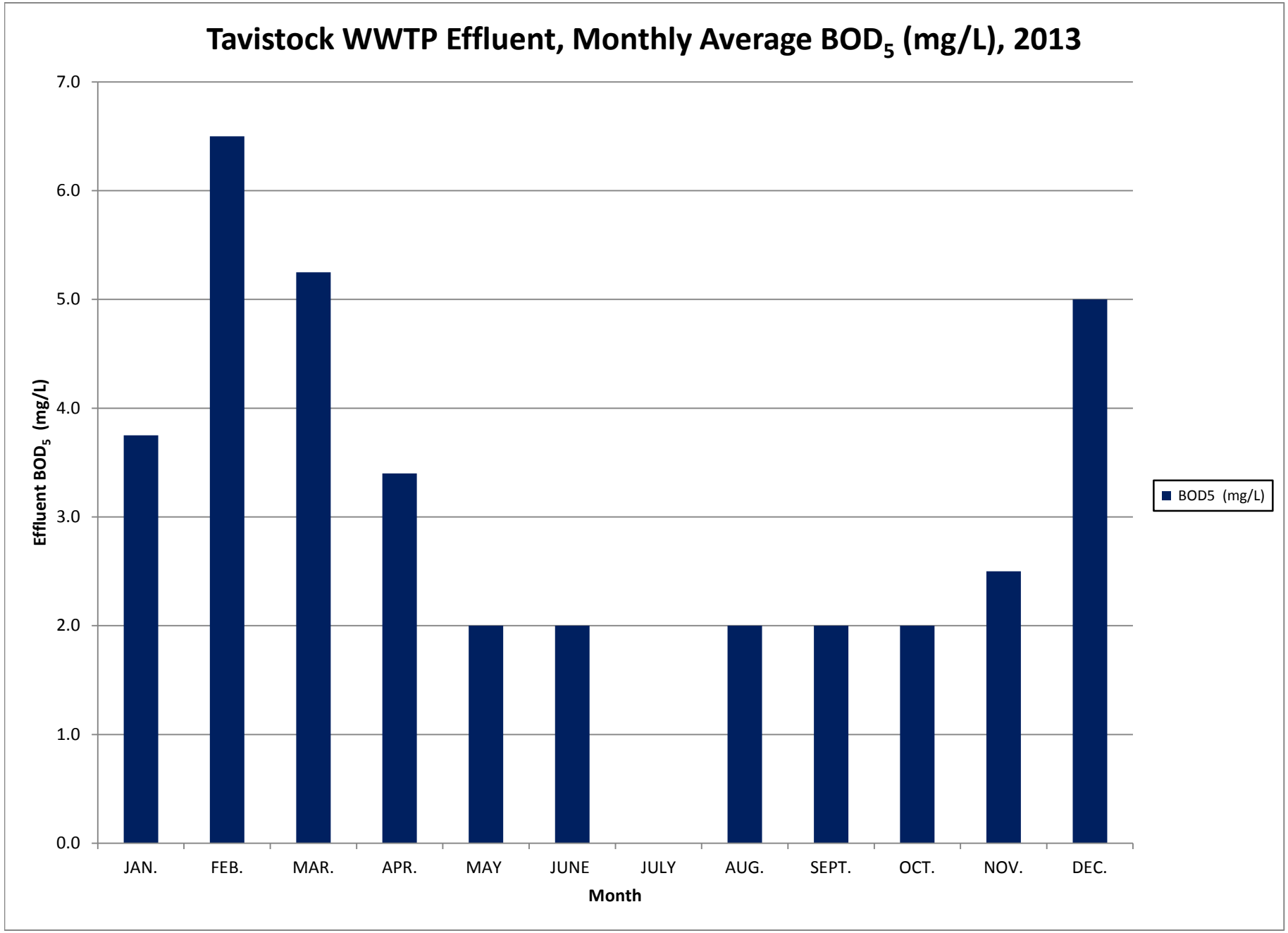



Tavistock WWTP Effluent, Monthly Geometric Mean E.Coli (cfu/100 mL), 2013
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Effluent E. Coli (cfu/100 mL)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
E. Coli (cfu/100 mL)

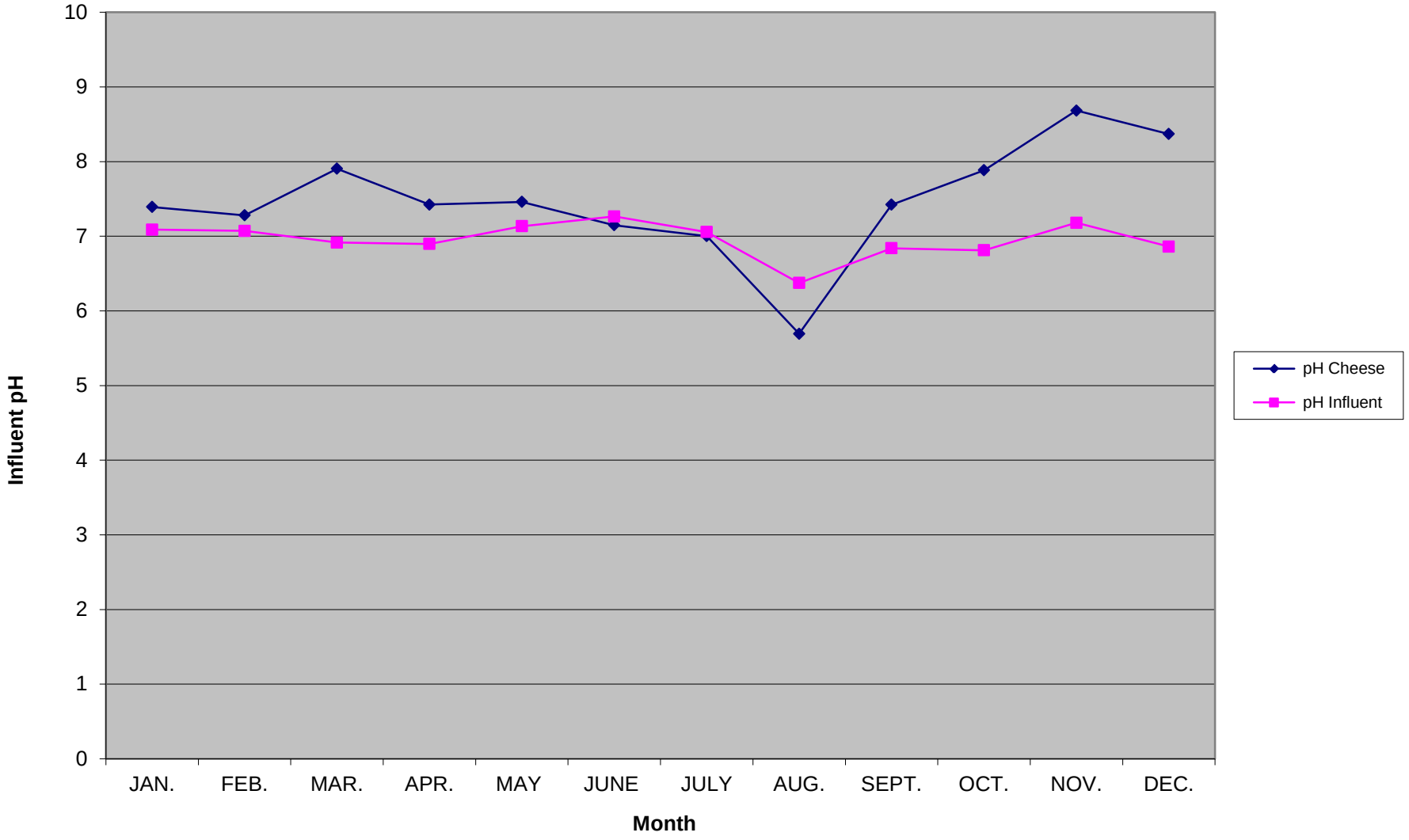

Tavistock WWTP Effluent, Monthly Flow (1000 m3), 2013
Total Effluent Flow (1000 m3)
180
160
140
120
100
80
60
40
20
0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
Effluent Total (1000 m3)

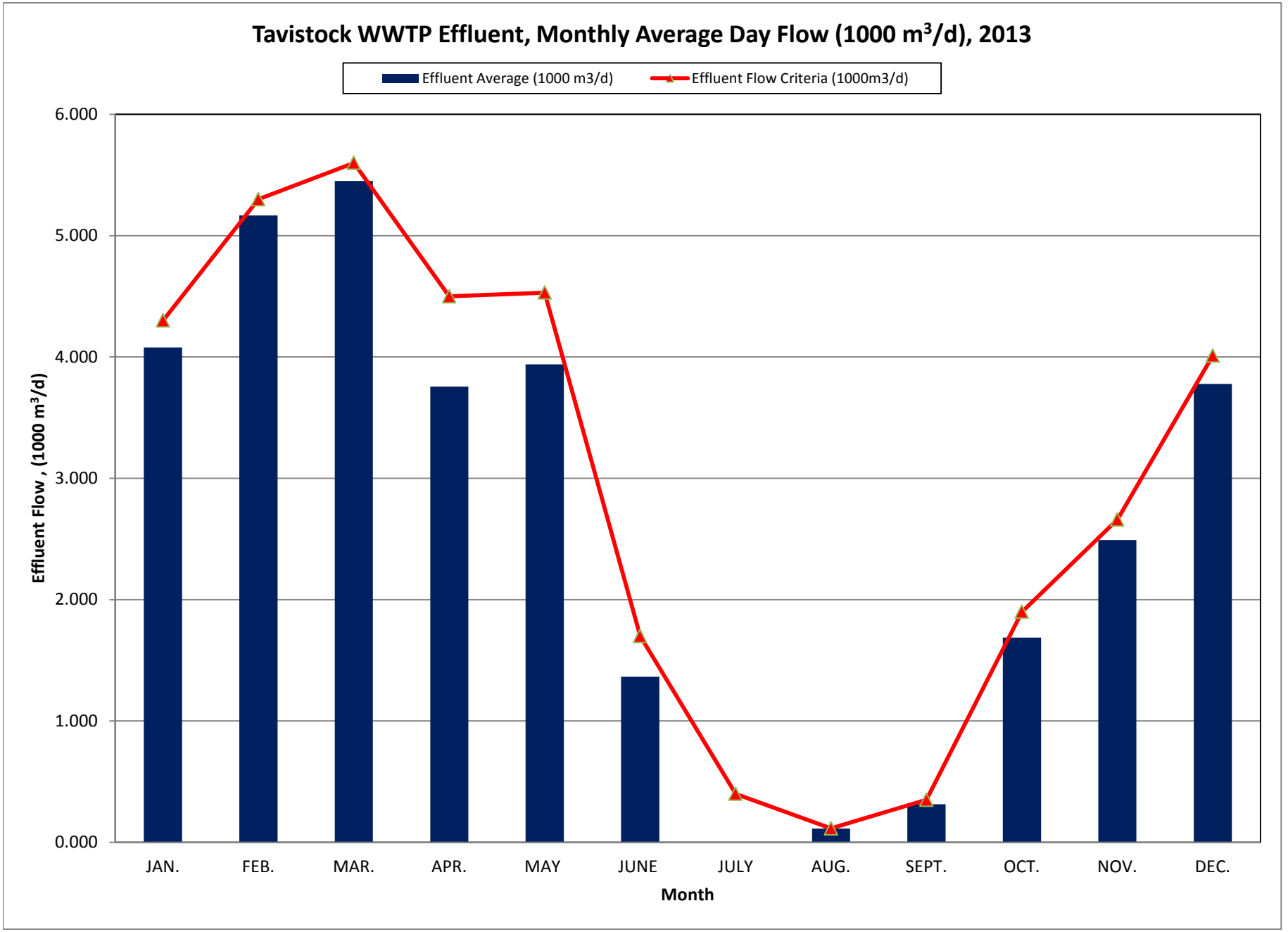

Tavistock WWTP Influent, Monthly Average Daily Flow (1000 m3/d), 2013
Influent Flow (1000 m3/d)
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
Average Influent (1000 m3/d)


Tavistock Wastewater Effluent, Monthly Average CBOD5 (mg/L), 2013
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Effluent CBOD5 (mg/L)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
CBOD5 (mg/L)
CBOD5 Criteria (mg/L)


Tavistock WWTP Effluent, Monthly Average BOD5 (mg/L), 2013
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Effluent BOD5 (mg/L)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
BOD5 (mg/L)

Cheese Plant pH vs Lagoon Influent pH 2013




Tavistock WWTP Effluent, Monthly Average Day Flow (1000 m3/d), 2013
Effluent Average (1000 m3/d)
Effluent Flow Criteria (1000m3/d)
6.000
5.000
4.000
3.000
2.000
1.000
0.000
Effluent Flow , (1000 m3/d)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month

Tavistock Influent Data 2013

#7789-8AKJL5

Month		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL	AVE.	Criteria
Total Influent	($1000\ m^3$)	56.114	44.460	60.514	53.291	30.014	44.776	53.122	53.758	62.235	68.855	50.049	41.716	**618.904**	**51.6**	
Average Influent	($1000\ m^3/d$)	1.810	1.588	1.952	1.776	0.968	1.493	1.714	1.734	2.075	2.221	1.668	1.346		**1.70**	**2.525**
Max Raw	($1000\ m^3/d$)	3.987	2.049	5.061	4.251	1.684	2.473	2.412	2.650	7.961	4.941	4.086	2.586		**3.7**	
Min Raw	($1000\ m^3/d$)	0.800	1.208	1.035	0.938	0.563	0.977	1.331	1.162	1.193	1.370	1.039	0.950		**1.05**	
Cheese Total	($1000\ m^3$)	12.926	10.907	13.225	13.200	13.619	12.730	14.331	16.027	16.559	17.192	16.678	16.392	**173.786**	**14.5**	
Cheese Average	($1000\ m^3/d$)	0.417	0.390	0.427	0.440	0.439	0.411	0.462	0.517	0.552	0.555	0.556	0.529		**0.474**	
Cheese Max	($1000\ m^3/d$)	0.682	0.595	0.670	0.697	0.707	0.735	0.688	0.885	0.852	0.952	0.871	1.117		**0.788**	
Cheese Min	($1000\ m^3/d$)	0.118	0.140	0.138	0.130	0.124	0.000	0.146	0.146	0.167	0.114	0.277	0.175		**0.140**	
Effluent Total	($1000\ m^3$)	69.348	144.654	163.500	112.651	114.268	16.372		1.822	6.914	50.653	74.732	105.791	**860.705**	**78.2**	**Table 3**
Effluent Average	($1000\ m^3/d$)	4.079	5.166	5.450	3.755	3.940	1.364		0.114	0.314	1.688	2.491	3.778		**2.9**	**0.1-5.6**
Effluent Max	($1000\ m^3/d$)	4.304	5.390	5.616	4.477	4.226	1.700		0.210	0.369	1.900	2.659	4.010		**3.2**	
Effluent Min	($1000\ m^3/d$)	2.478	3.884	2.110	1.319	3.535	0.263		0.002	0.053	0.828	1.996	0.088		**1.5**	

Tavistock Cheese Influent

BOD_5	(mg/L)	1157.4	904.5	984.3	800.8	956.8	905.3	899.2	1043.8	704.3	1234.2	919.5	1053.0		**964**	
SS	(mg/L)	223.2	220.8	269.0	268.8	312.8	269.0	248.6	301.8	235.5	357.0	320.0	326.3		**279**	
AMMONIA	(mg/L)	8.52	9.40	7.43	9.18	8.13	10.80	10.84	11.05	10.60	7.04	10.28	12.33		**10**	
TKN	(mg/L)	58.74	59.23	46.10	73.00	71.33	64.78	63.76	71.15	65.60	74.54	58.23	79.20		**65**	
NITRITE	(mg/L)	3.50	0.84	0.74	18.97	6.65	13.41	4.47	17.39	4.63	4.10	0.42	1.34		**6**	
NITRATE	(mg/L)	28.09	49.93	56.65	13.89	40.85	0.33	0.06	6.06	0.20	32.68	16.65	42.70		**24**	
TOTAL P.	(mg/L)	27.56	31.13	36.23	28.32	37.08	31.63	26.96	34.10	24.08	32.06	32.60	35.93		**31**	
pH	Cheese	7.39	7.28	7.91	7.42	7.46	7.15	7.00	5.69	7.42	7.88	8.68	8.37		**7.47**	

Tavistock Lagoon Influent

$CBOD_5$	(mg/L)	290.7	537.5	297.5	197.0	358.0	309.0	454.0	404.0	445.7	329.5	221.0	462.5		**359**	
BOD_5	(mg/L)	303.0	622.0	297.5	220.5	412.5	390.0	623.0	413.0	440.0	332.0	257.5	414.0		**394**	
SS	(mg/L)	266.0	333.0	267.0	223.0	349.0	350.0	762.0	368.0	708.3	388.5	279.0	309.0		**384**	
AMMONIA	(mg/L)	13.90	22.75	10.55	11.25	17.20	19.25	27.93	15.20	14.33	13.05	19.05	19.7		**17**	
TKN	(mg/L)	29.9	42.8	32.6	20.0	43.5	32.7	58.3	44.90	72.67	35.70	31.75	41.50		**40.5**	
NITRITE	(mg/L)	0.06	0.06	0.06	0.03	0.06	0.04	0.09	3.30	0.17	0.03	0.03	0.03		**0**	
NITRATE	(mg/L)	0.05	0.05	0.05	0.06	0.06	0.06	0.06	4.23	0.06	0.06	0.06	0.06		**0**	
TOTAL P.	(mg/L)	14.81	10.04	9.95	5.86	12.55	8.91	24.81	24.20	20.50	15.10	10.15	16.95		**14**	
pH	Influent	7.09	7.07	6.92	6.90	7.13	7.27	7.06	6.37	6.84	6.81	7.18	6.86		**6.96**	

Temperature (celcius)		9.8	7.5	10.2	12.0	18.7	12.0	20.5	21.3	20.3	17.7	13.6	12.1		**14.6**	

Tavistock Lagoon Effluent

														TOTAL	AVE.	Criteria
$CBOD_5$	(mg/L)	3.8	5.5	5.8	2.2	2.0	2.0		2.0	2.0	2.0	2.8	4.3		**3.11**	**15**
BOD_5	(mg/L)	3.8	6.5	5.3	3.4	2.0	2.0		2.0	2.0	2.0	2.5	5.0		**3.31**	
TSS	(mg/L)	4.0	7.5	6.0	3.8	3.3	8.0		3.8	2.4	2.3	5.0	12.2		**5**	**15**
AMMONIA	(mg/L)	0.10	2.73	4.93	2.50	0.10	0.10		0.10	0.10	0.10	0.10	0.13		**1.00**	**1 - 10**
TKN	(mg/L)	0.88	4.33	7.33	3.30	1.28	0.87		0.60	0.58	0.58	0.55	1.55		**1.98**	
NITRITE	(mg/L)	0.06	0.06	0.08	0.04	0.03	0.03		0.03	0.03	0.03	0.03	0.03		**0.0**	
NITRATE	(mg/L)	0.77	1.86	2.09	4.16	5.71	3.41		0.49	1.25	0.61	0.44	0.37		**1.9**	
TOTAL P.	(mg/L)	0.03	0.14	0.27	0.05	0.05	0.04		0.05	0.04	0.03	0.05	0.05		**0.07**	**0.5 - 0.8**
pH		8.26	7.75	7.48	7.41	7.45	8.13		7.67	7.65	7.58	7.79	8.07		**7.75**	**6.0-9.5**
E. Coli	cfu/100 mL	2.0	588.0	155.0	8.7	23.0	9.2		41.7	9.5	3.6	15.1	7.2		**78**	
Temp.	Celcius	2.9	2.3	3.6	6.2	15.9	11.0		18.9	19.0	12.9	5.6	2.1		**9.11**	
D.O.	(mg/L)	14.9	9.7	7.7	10.1	8.2	11.3		7.3	7.7	9.3	11.0	12.0		**9.9**	
Un-ion'd Ammonia	(mg/L)	0.005	0.025	0.019	0.008	0.005	0.005		0.005	0.005	0.005	0.003	0.005		**0.008**	

Criteria per Month

		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
$CBOD_5$ Criteria	(mg/L)	15	15	15	15	15	15	15	15	15	15	15	15
TSS Criteria	(mg/L)	15	15	15	15	15	15	15	15	15	15	15	15
TP Criteria	(mg/L)	0.8	0.8	0.8	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8
NH3-N Criteria	(mg/L)	7	10	8.5	8	1	1	1	1	1	1	1	3
DO	(mg/L)												
Influent Flow Design	(1000m3/d)	2.525	2.525	2.525	2.525	2.525	2.525	2.525	2.525	2.525	2.525	2.525	2.525
Un-ion'd Ammonia Criteria	(mg/L)												
E.Coli Criteria	(#/100 mL)												
Effluent Flow Criteria	(1000m3/d)	4.3	5.3	5.6	4.5	4.53	1.7	0.4	0.115	0.35	1.9	2.66	4.01
BOD_5 Criteria	(mg/L)												

Tavistock Influent Loading kg/d 2013

		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		**AVE.**
BOD_5 Loading	(kg/d)	481	529	581	392	399	522	1068	701	913	737	430	557		**668**
TSS Loading	(kg/d)	25	36	521	396	338	29	1306	638	1469	863	465	416		**650**
Cheese BOD Loading	(kg/d)	2095	352	420	352	420	144	416	540	389	684	511	557		**573**
Cheese TS Loading	(kg/d)	404	86	115	118	137	8	115	156	130	198	178	173		**151**
Cheese TKN Loading	(kg/d)	106	23	20	32	31	0	29	37	36	41	32	42		**36**
Cheese TP Loading	(kg/d)	50	12	15	12	16	13	12	18	13	18	18	19		**18**

Public Works
P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

Dear Sir:

RE: 2013 Year-End Monitoring Report, Norwich Wastewater Treatment Plant (WWTP)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) #1680-6F6QR5.

I trust this report fulfills the intent of the ECA annual reporting requirements.

If there are any questions, please contact me.

Yours truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview of Norwich Wastewater Treatment Plant

The Norwich WWTP (Figure 1) provided effective wastewater treatment in 2013. The average daily flow for 2013 was 1,110 m^3/d. This represents 72.5% of the rated capacity of 1,530 m^3/d.

Figure 1 Aerial view of Norwich WWTP

Plant Description

The Norwich WWTP is a lagoon treatment system serving the community of Norwich, Ontario. The wastewater is pumped from two pump stations to a splitter box; then to either of two lagoon cells as determined by the operator. Typically the wastewater is directed to the North Cell which is operated in series with the South Cell, followed with the filtering of the effluent through the sand filter beds performed for a period each day as required. The lagoons may discharge year-round; however, the freezing period prevents discharge through the filter beds (normally December to April).

Plant Specifications

Facilities -	Lagoons (2 cells) and an intermittent sand filter
Design Capacity -	1,530 m^3/day
Average Daily Flow -	1,110 m^3/day (2013)
Receiving Stream -	Otter Creek
Plant Classification -	WWT – I
Works Number -	110001480
MOE ECA	#1680-6F6QR5

Effluent Limits:

Effluent Parameters	Concentration in Effluent	
Escherichia Coli	200 organisms / 100 mL (monthly geometric mean density)	
	Monthly	
Effluent Parameters	Concentration	Loading[3]
BOD_5	10mg/L	23.7kg/d
Suspended Solids	10mg/L	23.7kg/d
Total Phosphorus Non-freezing period:		
	0.5mg/L	1.2kg/d
Freezing period	1.0mg/L	2.4kg/d
(Ammonia + Ammonium) Nitrogen[2] Non-freezing period:		
	3.0mg/L (5.0mg/L)[1]	11.8kg/d
Freezing period	5.0mg/L (8.0 mg/L)[1]	18.9kg/d
Total Chlorine Residual (when chlorine is in use)	0.002mg/L(0.01mg/L)[1]	0.005kg/d
Dissolved Oxygen	> 4.0 mg/L	

Notes: (1) Values in brackets indicate daily concentration limits.

(2) In addition to the (Ammonia + Ammonium) Nitrogen concentrations noted above, the un-ionized ammonia concentration in the effluent shall not exceed 0.1 mg/L for monthly average values and 0.2 mg/L for any individual sample.

(3) The loading are based on an average daily flow of 2,366 m^3/d over a 236-day discharge period.

The Owner shall maintain the pH of the effluent from the sewage treatment plant within the range of 6.0 to 9.5, inclusive, at all times.

Freezing period means the period of time during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius. Normally this period is from December 1st to April 30th.

Non-freezing period means the period of time during which the water temperature of the receiving stream is above 5 degrees Celsius.

Sampling Description

Influent samples were taken from the Lagoon influent splitter box. The sampling frequency is once per week and samples are tested for Biochemical Oxygen Demand (BOD_5), and Suspended Solids (SS) monthly, and Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN) weekly.

Effluent samples are taken using a 24-hour composite sampler set to take a sample every 15 minutes for the duration of the discharge period. BOD_5 and SS are sampled at least

monthly. TP, ammonia, TKN, pH, and temperature samples are taken three times per week; E.Coli and dissolved oxygen are tested at least weekly.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples except for pH, temperature and dissolved oxygen which are tested in the field during collection. These results are used for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

Discussion of Results

Presented in Table A that follows are the average, maximum and minimum values for all influent and effluent parameters. The calculation is based on all external test results and both flow meters.

The average flow was 1,110 m^3/d representing 72.5% of the design criteria of 1,530 m^3/d. The average annual influent BOD_5 concentration to the plant was 189 mg/L. This corresponds to an average BOD_5 loading of 210 kg/d. The average annual influent SS concentration to the plant was 223 mg/L which corresponds to an average SS loading of 248 kg/d. The annual average TKN concentration was 37 mg/L which corresponds to 41 kg/d. The annual average TP concentration was 4 mg/L which corresponds to 4.4 kg/d.

The annual average effluent BOD_5 concentration was 4.1 mg/L. This represents a 97.8% removal efficiency. The annual average SS concentration was 3.1 mg/L. This represents a 98.6% removal efficiency. The annual average Ammonia concentration was 1.1 mg/L. The annual average TP concentration was 0.24 mg/L which represents a 94% removal efficiency.

All pH is measured in the effluent by the operator a minimum of three times per week during discharge. There were no samples outside the pH range of 6-9.5 for 2013. All dissolved oxygen readings in the effluent were measured at least weekly by the operator during discharge and no sample was below the minimum of 4 mg/L.

The average, maximum, and minimum influent and effluent results were calculated and are shown in Table A of Exhibit 1.

The Norwich WWTP was operating within its discharge limits for 2013 with the exception of two months, July and October, where the monthly geometric mean E.Coli result was greater than 200 organisms/100 ml at 256 and 349, respectively. The Norwich lagoons do not have a disinfection system. The results were reported to the MOE and the discharge stopped.

Effluent Objectives

Effluent objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plants ECA were met with the exception of two E.Coli non-compliance results discussed previously, two BOD_5 results of 6 mg/L in April and July (objective is 5 mg/L), and a SS value of 6 mg/L in July (objective is 5 mg/L).
(Note: except for the two E.Coli results discussed above, the other exceedances were related to the effluent objectives, as described above, rather than the more stringent effluent compliance limits/criteria).

Bypasses, Overflows, and Upset Conditions 2013

There were no bypass or overflow events during the year. There were two non-compliant E.Coli results already referred to in the discussion of the results.

On January 13, 2013 there was an overflow of less than 10 m3 from the Sutton St. sewage pumping station that was due to heavy rain. An additional forcemain outlet into the Norwich Lagoons has been constructed that allows for increased pumping capacity. Investigations into wet weather flows to reduce peaking will continue.

This event was reported to the MOE at the time it occurred.

Maintenance Activities

Maintenance was completed as needed on the Wastewater Treatment Plant and was initiated by the operator during routine inspection of the system. The system is owned and operated by Oxford County and is supervised as one of a total of nine plants. The maintenance is completed by the southern area staff. Detailed records on each piece of equipment are kept at the Ingersoll WWTP.

R&R Instrumentation Services performed meter calibration on the lagoon effluent meter.

Summary

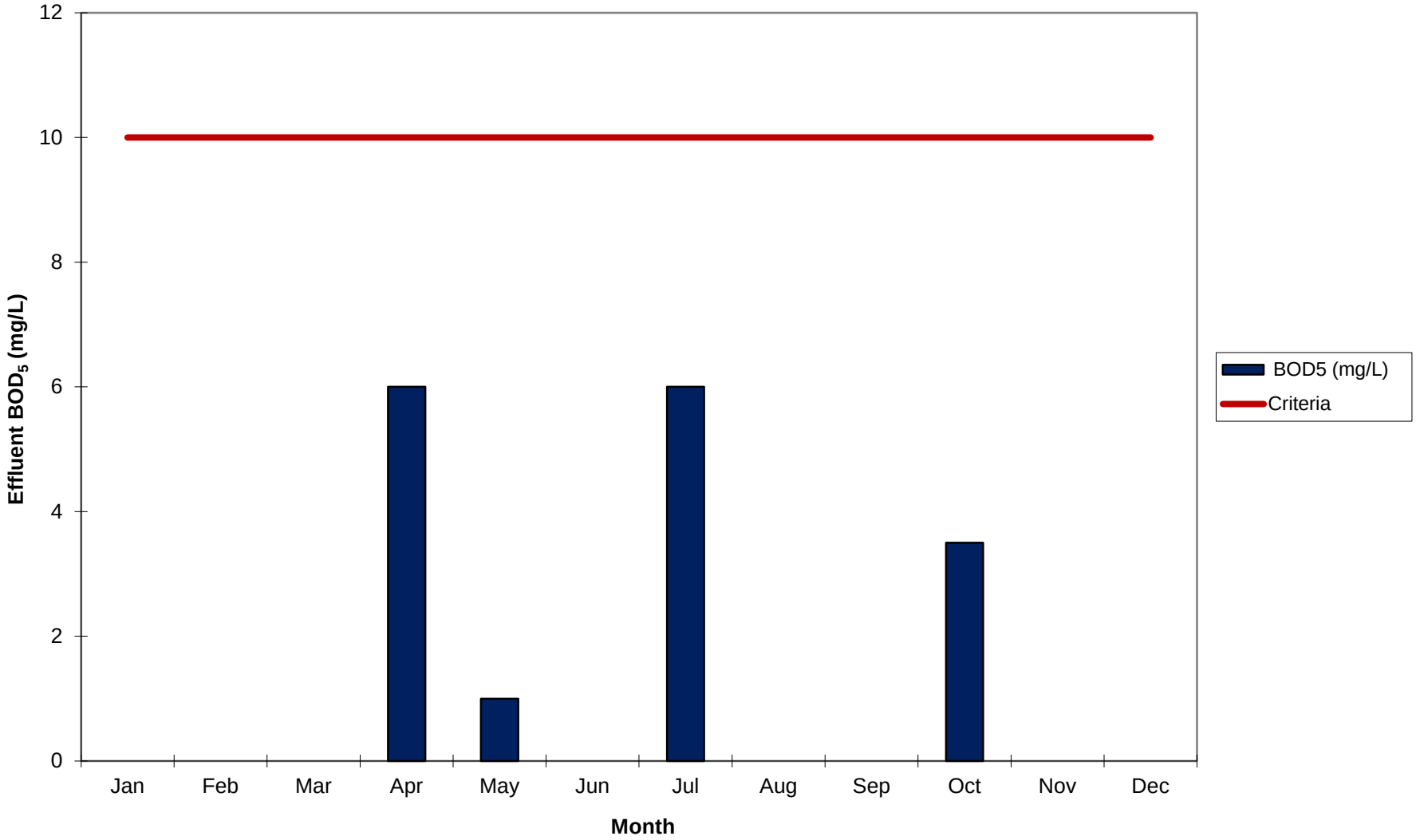
The Norwich WWTP was operating within its design flow criteria and was within its discharge limits for 2013 with the exception of the two E.Coli monthly geometric mean high results.

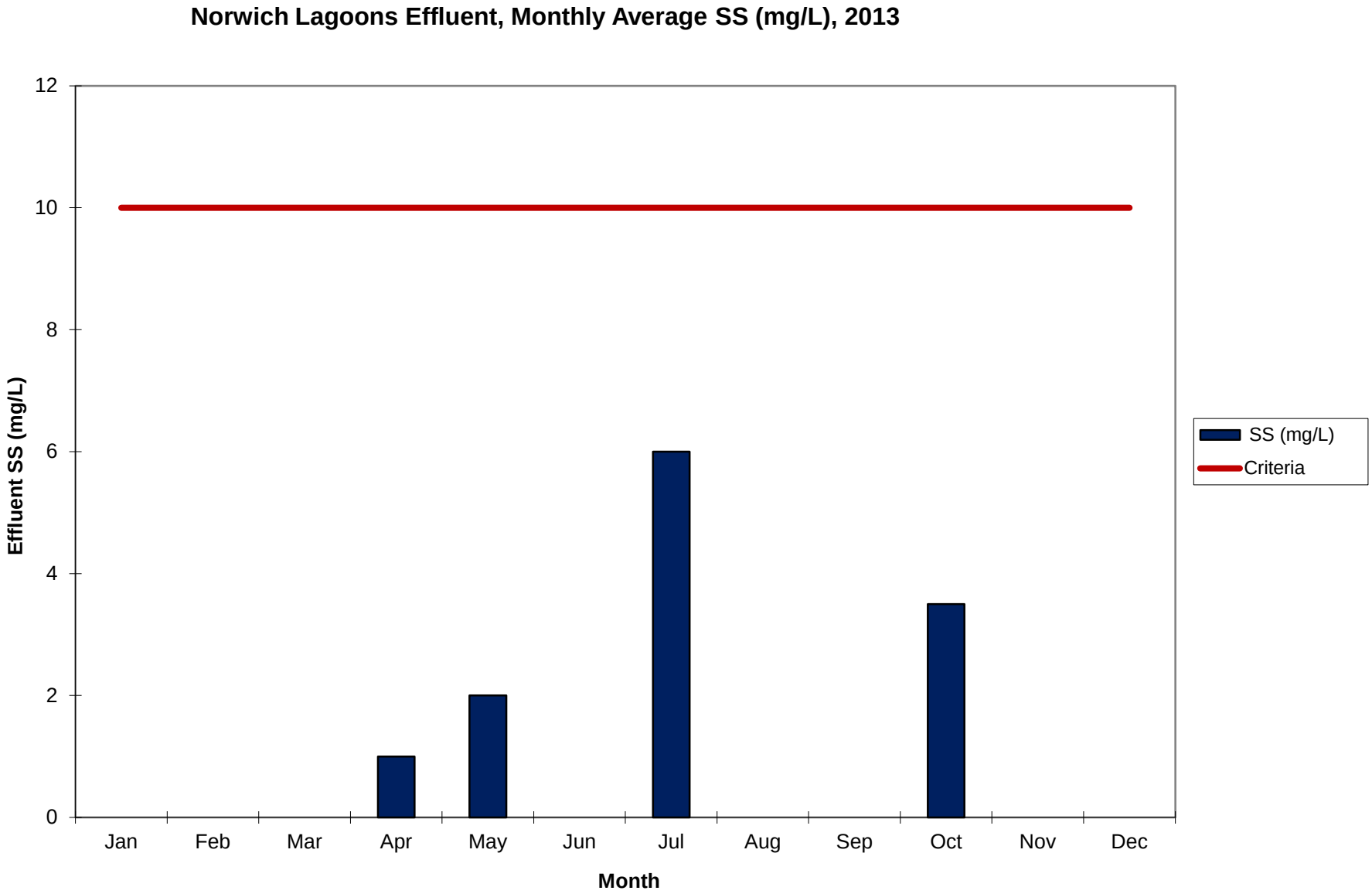
There is a Class Environmental Assessment study underway for the Norwich WWTP to determine the preferred alternative to upgrade the plant to meet the wastewater treatment needs of the community.

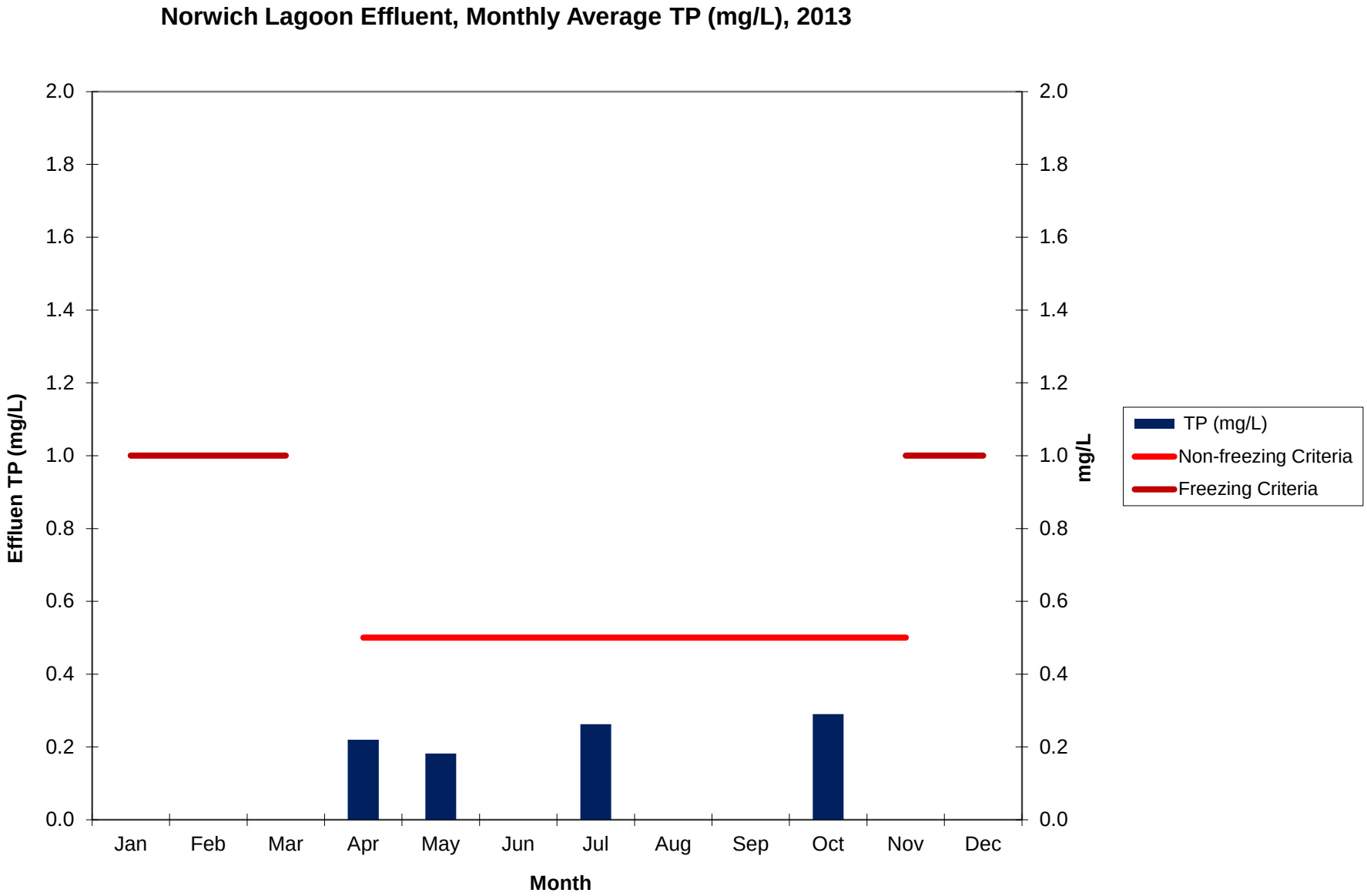
An additional emergency peak flow inlet was installed at the north end of cell 1 in the fall of 2013. The purpose of the inlet is to temporarily allow higher flows originating from the Sutton St. sanitary pumping station to avoid the potential for sewer surcharges that result in basement flooding or overflows to the creek during wet weather events.

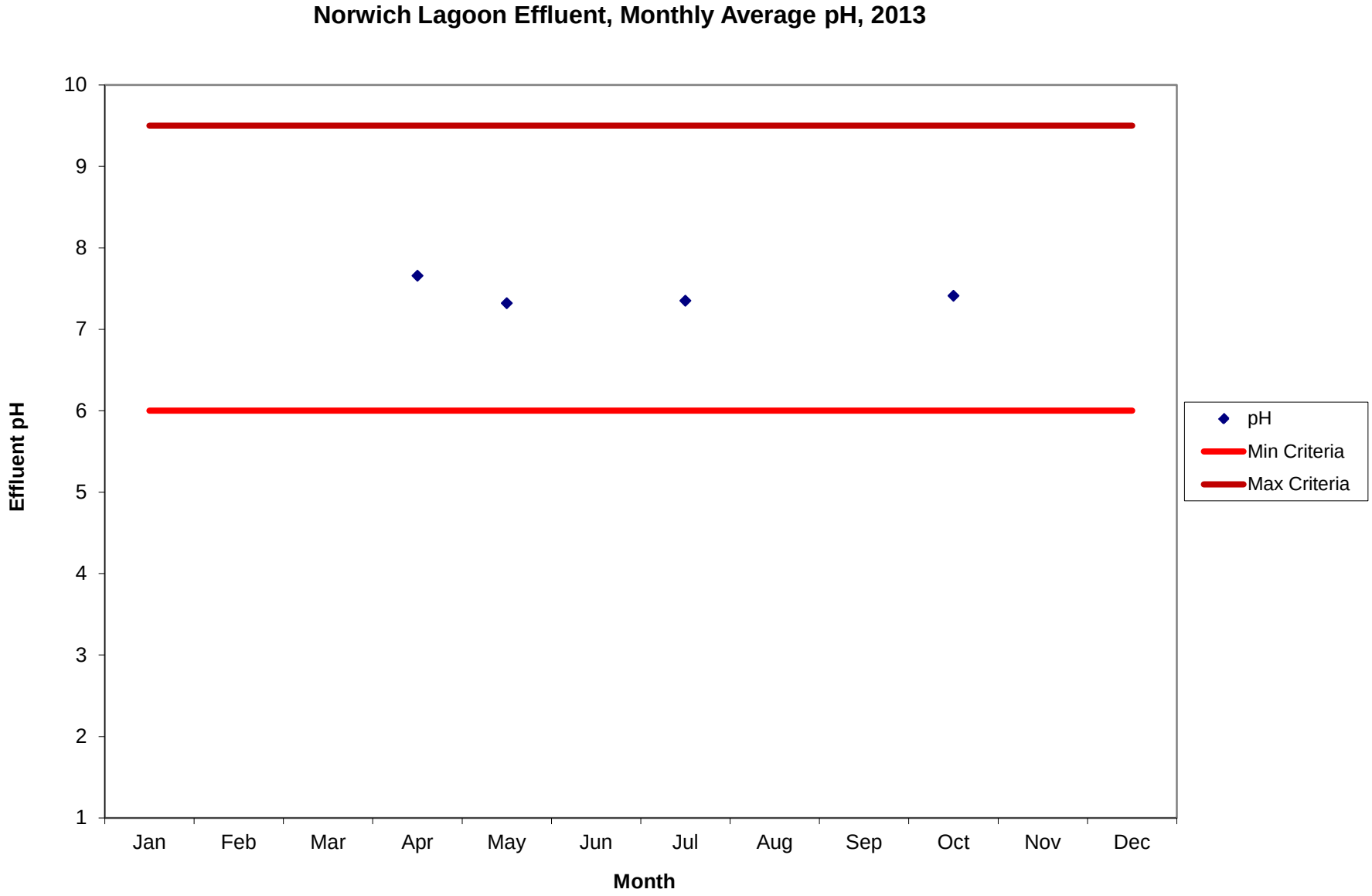
EXHIBIT 1

Norwich Lagoons Effluent, Monthly Average BOD_5 (mg/L), 2013

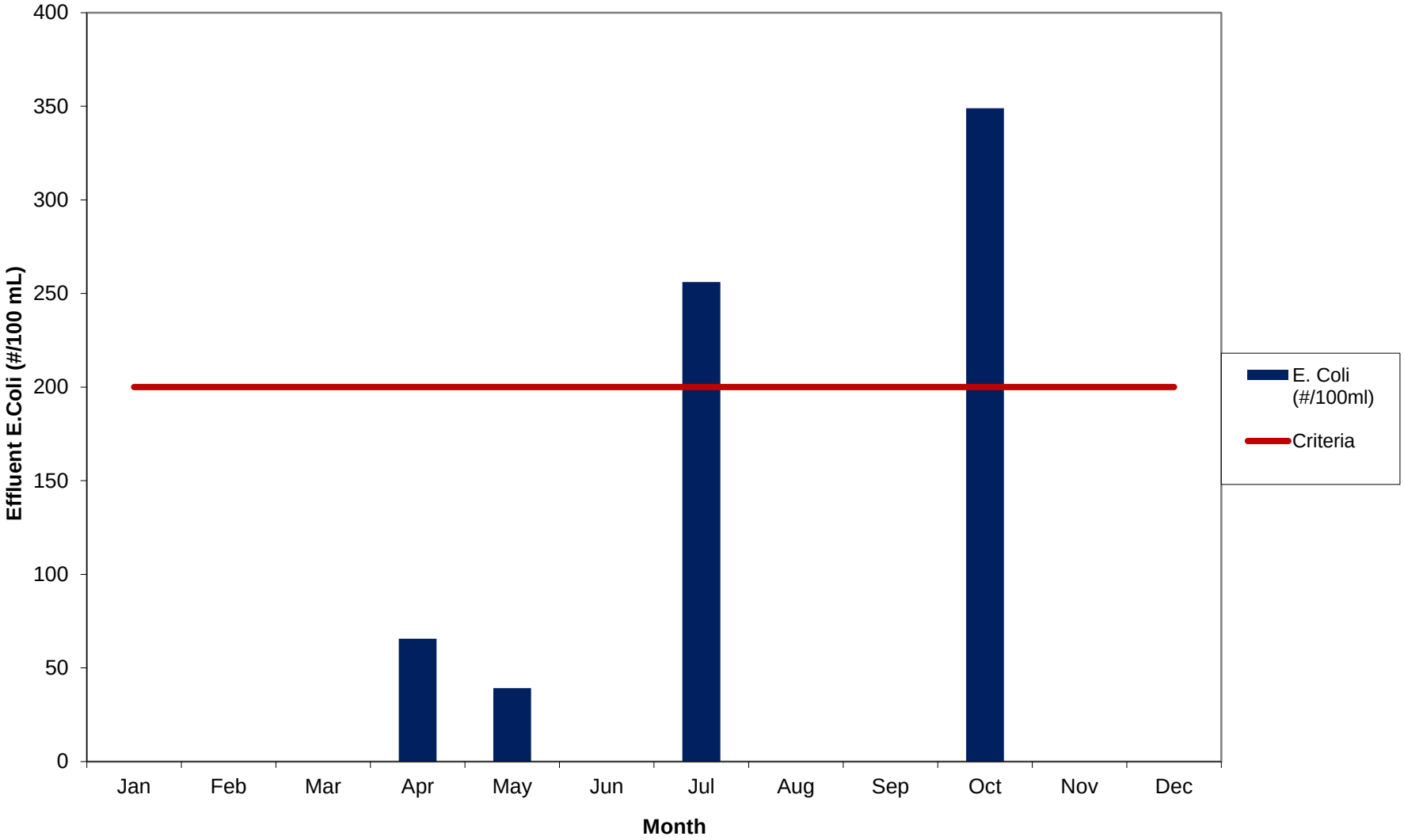


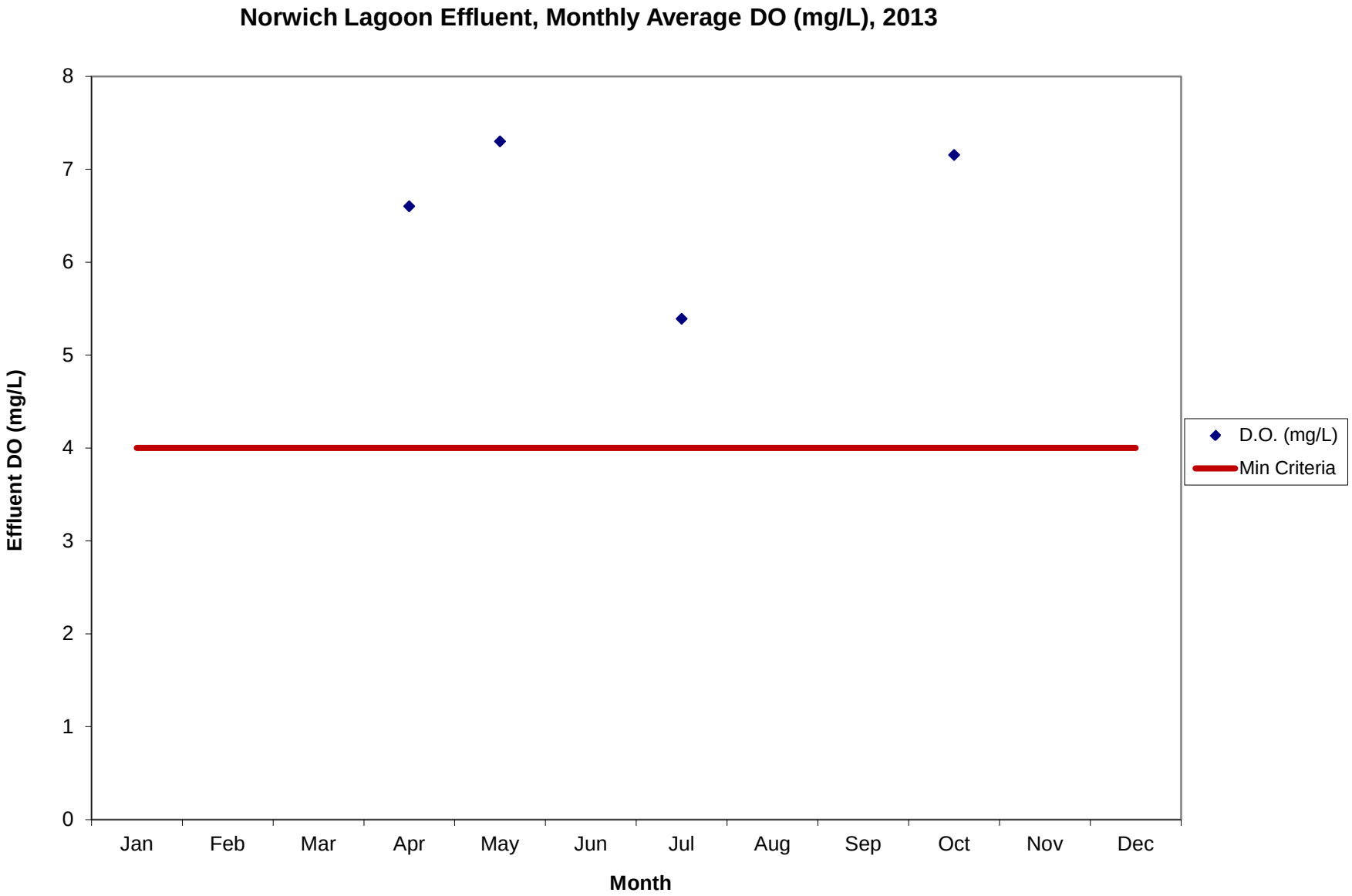

Norwich Lagoons Effluent, Monthly Average SS (mg/L), 2013
Effluent SS (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
SS (mg/L)
Criteria


Norwich Lagoon Effluent, Monthly Average TP (mg/L), 2013
Effluen TP (mg/L)
mg/L
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (mg/L)
Non-freezing Criteria
Freezing Criteria

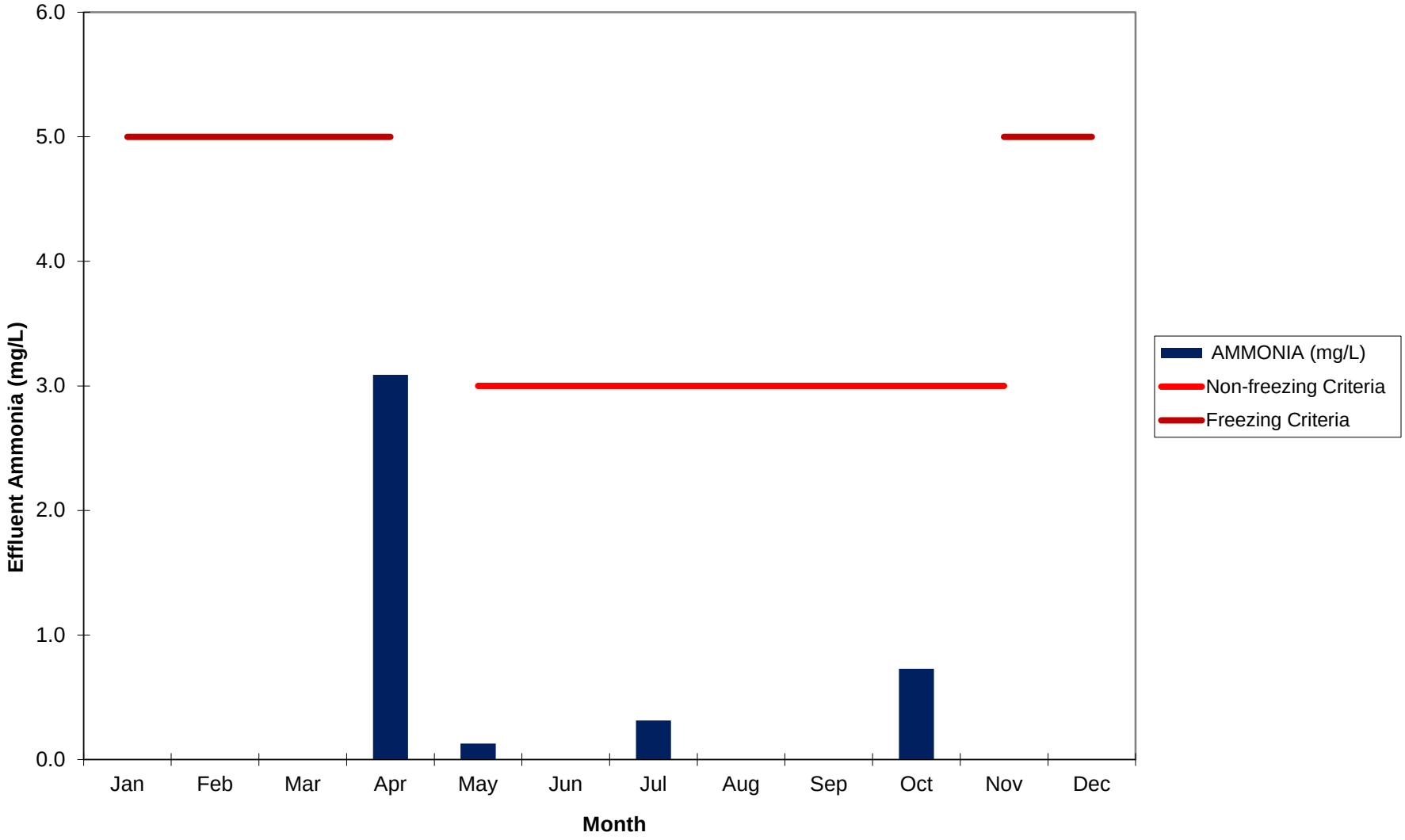

Norwich Lagoon Effluent, Monthly Average pH, 2013
Effluent pH
10
9
8
7
6
5
4
3
2
1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
pH
Min Criteria
Max Criteria

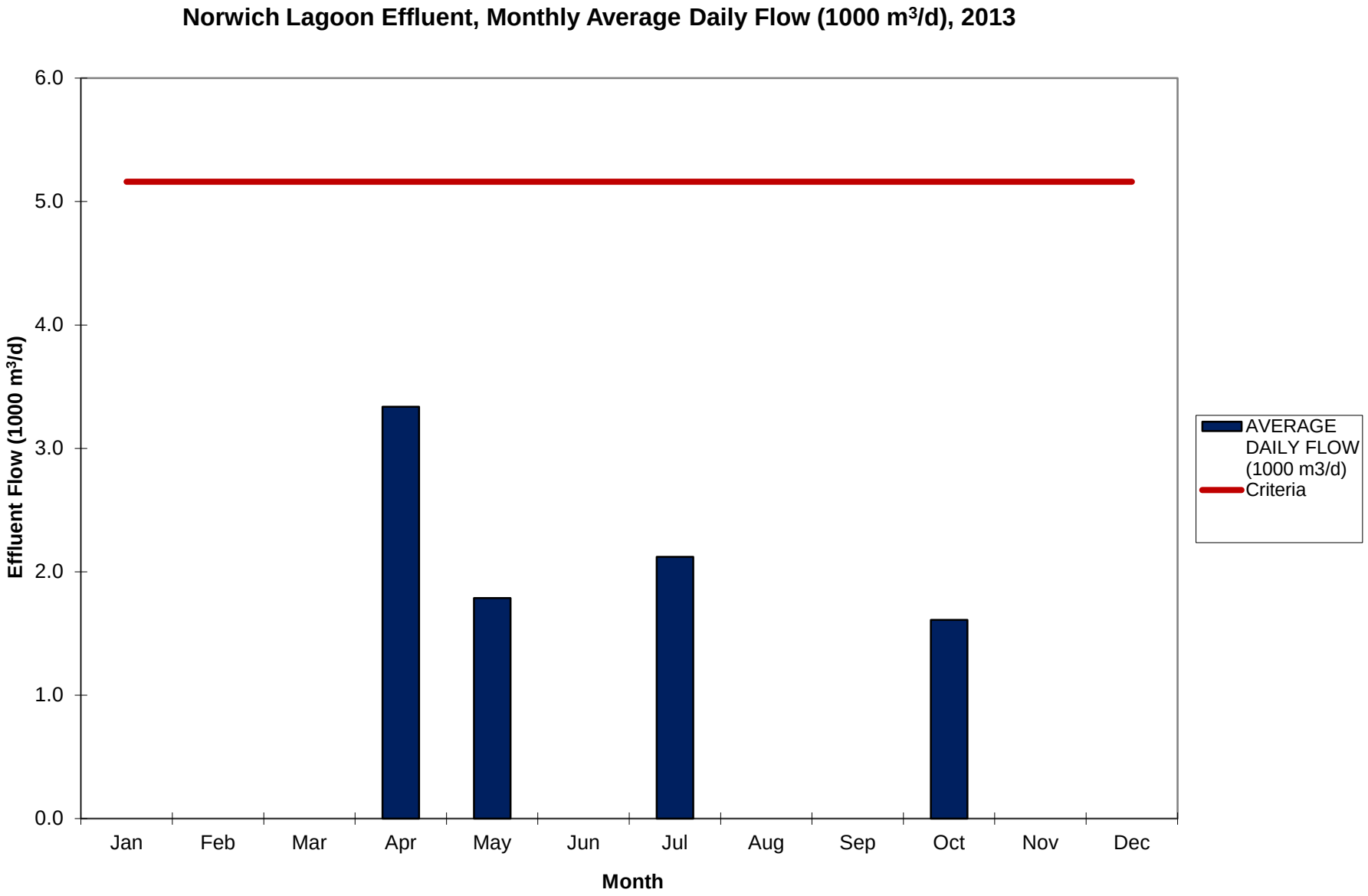
Norwich Lagoon Effluent, Monthly Geometric Mean Density E.Coli (#/100ml), 2013




Norwich Lagoon Effluent, Monthly Average DO (mg/L), 2013
Effluent DO (mg/L)
8
7
6
5
4
3
2
1
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
D.O. (mg/L)
Min Criteria

Norwich Lagoon Effluent, Monthly Average Ammonia (mg/L), 2013




Norwich Lagoon Effluent, Monthly Average Daily Flow (1000 m3/d), 2013
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Effluent Flow (1000 m3/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
AVERAGE DAILY FLOW (1000 m3/d)
Criteria

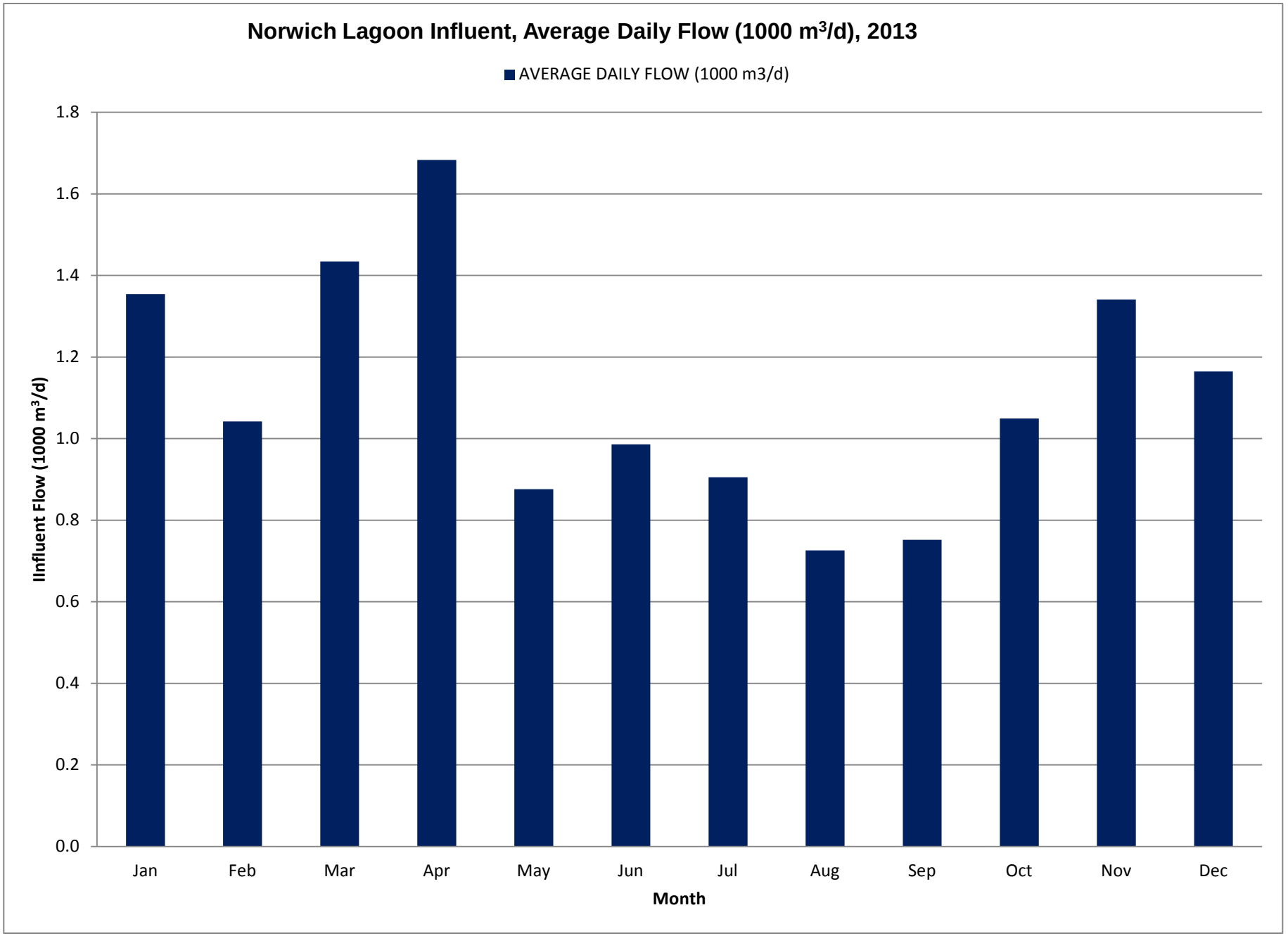

Norwich Lagoon Influent, Average Daily Flow (1000 m3/d), 2013
AVERAGE DAILY FLOW (1000 m3/d)
Influent Flow (1000 m3/d)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

TABLE A	NORWICH LAGOONS			WORKS # 110001480			YEAR 2013										
LAGOON INFLUENT FLOW	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			ANNUAL	DESIGN CRITERIA	CofA Criteria	% Capacity
TOTAL (1000 m3)	41.987	29.174	44.465	50.498	27.163	30.554	28.069	22.508	22.563	32.535	40.237	36.106	TOTAL		405.859			
AVERAGE DAILY FLOW (1000 m3/d)	1.354	1.042	1.434	1.6833	0.876	0.986	0.905	0.726	0.752	1.050	1.341	1.165	AVERAGE DAILY FLOW		1.110		1.53	72.5%
MAX. DAILY FLOW (1000 m3/d)	4.155	1.712	5.023	5.129	1.145	2.092	1.318	1.113	1.620	1.961	3.995	3.962	MAX. DAILY FLOW		5.129			
MIN. DAILY FLOW (1000 m3/d)	0.522	0.725	0.712	0.758	0.601	0.355	0.527	0.553	0.450	0.701	0.745	0.615	MIN. DAILY FLOW		0.355			
LAGOON INFLUENT RESULTS															ANNUAL AVERAGE		ANNUAL MAXIMUM	ANNUAL MINIMUM
BOD (mg/L)	200	222	239	155	146	160	221	196	147	219	173	188			189		239	146
SS (mg/L)	258	200	247	220	158	470	166	216	160	143	152	287			223		470	143
AMMONIA (mg/L)																		
TKN (mg/L)	33.80	30.35	25.78	27.20	36.72	46.70	38.00	41.78	67.30	39.90	28.73	33.35			37		67.3	25.8
NITRITE (mg/L)																		
NITRATE (mg/L)																		
TOTAL P. (mg/L)	3.91	3.19	3.09	2.43	3.69	5.56	4.38	4.52	6.98	4.43	2.26	3.96			4.0		7.0	2.3
pH	7.65	7.45	7.61	7.54	7.01	7.04	7.04	7.13	7.17	7.25	7.16	7.34			7.28		7.65	7.01
LAGOON EFFLUENT FLOW													TOTAL ANNUAL FLOW		Monthly AVERAGE	DESIGN CRITERIA	CofA Criteria	CofA 236 day
TOTAL (1000 m3)				66.758	51.846		33.921			38.624			191.149		47.787			
AVERAGE DAILY FLOW (1000 m3/d)				3.338	1.788		2.120			1.609					2.214			
MAX. DAILY FLOW (1000 m3/d)				4.107	3.237		3.089			3.682					3.529			
MIN. DAILY FLOW (1000 m3/d)				2.773	1.134		0.146			0.540					1.148			
LAGOON EFFLUENT RESULTS															Yearly AVERAGE	DISCHARGE CRITERIA	ANNUAL MAXIMUM	ANNUAL MINIMUM
$BOD_{5\ (mg/L)}$				6.0	1.0		6.0			3.5					4.1	10	6	1.0
SS (mg/L)				1.0	2.0		6.0			3.5					3.1	10	6.0	1
AMMONIA (mg/L)				3.09	0.13		0.31			0.73					1.1	3.0 non freezing	3.1	0.13
TKN (mg/L)																& 5.0 freezing		
NITRITE (mg/L)																		
NITRATE (mg/L)																		
TP (mg/L)				0.22	0.18		0.26			0.29					0.24	0.5 non freezing	0.29	0.18
																& 1.0 freezing		
pH				7.66	7.32		7.35			7.41					7.43	6.00-9.00	7.66	7.32
E. Coli (#/100ml)				65.6	39.3		256.1			349.0					177	200	349	39
Temp. Celcius				8.5	16.0		23.5			10.9					14.7		23.5	8.5
D.O. (mg/L)				6.6	7.3		5.4			7.2					6.6	(4.0)	7.3	5.4

Public Works
P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

Dear Sir:

RE: 2013 Year-End Report, Plattsville Wastewater Treatment Plant (WWTP)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) # 3133-7QWH4N.

I trust this report fulfills the intent of the ECA annual reporting requirements. If there are any questions, please contact me.

Yours truly,

Don Ford BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

C.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Plattsville WWTP provided effective wastewater treatment in 2013 and all effluent concentration limits as specified by MOE ECA # 3133-7QWH4N were met on a monthly basis. The annual average daily flow rate was 519 m^3/d; this represents 65% of the WWTP rated capacity of 800 m^3/d.

Figure 1 Plattsville WWTP Aerial Photo

Plant Description

Wastewater is treated at the Plattsville WWTP (Figure 1), which includes two aerated lagoon cells and two conventional wastewater stabilization ponds. Phosphorus removal is accomplished through batch dosing of Aluminum Sulphate. Treated wastewater is pumped to an intermittent sand filter designed for ammonia removal prior to discharge to the Nith River.

Oxford County operates the facility, utilizing the staff located at the Woodstock WWTP.

Plant Specifications

Facilities - Lagoons
Design Capacity - 800 m^3/day
Average Daily Flow - 519 m^3/day (2013)
Receiving Stream - Nith River
Plant Classification - WWT – I
Works Number - 110003022
MOE ECA # 3133 7QWH4N
Effluent Limits:
Monthly Average $CBOD_5$ 10 mg/L
Monthly Average Suspended Solids 10 mg/L
Monthly Average Total Phosphorous 0.5 mg/L
Monthly Average Ammonia when Nith > 12 degrees Celsius 2 mg/L
Monthly Average Ammonia when Nith < 12 degrees Celsius 5 mg/L

E.Coli geometric mean 200 CFU per 100 ml
Effluent is discharged according to a discharge table (Table 3) within the ECA.

Sampling Procedures

Raw influent wastewater is sampled on a monthly basis and is analyzed for BOD_5, TSS, TKN, TP and pH. Effluent discharge samples are collected bi-weekly or monthly and at an interval to meet the percentage of drawdown of the lagoon cell as stipulated in the ECA during discharge periods and analyzed for $CBOD_5$, TSS, Total Ammonia Nitrogen, TP, E. Coli, temperature and pH.

Groundwater monitoring requires that an annual sample be collected and tested for Total Organic Carbon, Total Phosphorus, Total Kjeldahl Nitrogen, Nitrite and Nitrate.
Two samples were collected and are referred to as the shallow well sample and deep well sample. The results are included in an attached Table under Exhibit 2.

Flows

The total flow treated in 2013 was 189,408 m^3. The average daily flow of 519 m^3/day was 65% of the design capacity of 800 m^3/day.

Plant effluent can be discharged in accordance with Table 3 - Monthly Discharge Regime contained in the ECA. The total annual discharge for 2013 was 189,408 m^3.

Raw Sewage Quality

The annual average raw sewage BOD_5 concentration to the plant was 138 mg/L. This corresponds to an average BOD_5 loading of 72 kg/day. The average suspended solids loading was 202 mg/L equivalent to 105 kg/day loading. The annual raw sewage nitrogen levels (as TKN) were 40.2 mg/L. Phosphorous levels averaged 4.3 mg/L, which correspond to 2.2 kg/day.

Plant Performance & Effluent Quality

Detailed analytical data of annual and monthly averages are summarized later in the report under Exhibit 1.

The plant met all effluent discharge limits contained in the ECA for 2013. The pH was within the required range for all effluent samples in 2013.

Over the reporting period, the annual average effluent $CBOD_5$ concentration was 2.3 mg/L. The annual average suspended solids concentration was 6.1 mg/L with a removal efficiency of 97%. The annual average ammonia nitrogen concentration was 0.54 mg/L with a removal efficiency of 98.4%. The annual total phosphorous level was 0.04 mg/L, which represents a removal efficiency of 99%.

Effluent Objectives

The objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All monthly average effluent objectives were met for 2013 with the exception of TSS which did not meet the effluent objective of 5 mg/L in April, June, September, October and November.
(Note: the exceedances were related to the effluent objectives, as described above, rather than the more stringent effluent compliance limits/criteria).

The plant met all effluent discharge limits contained in the ECA for 2013.

Bypassing and Abnormal Conditions

There were no bypass or overflow events to the Nith River at the Plattsville Lagoons in 2013.

There were no collection system overflows in 2013.

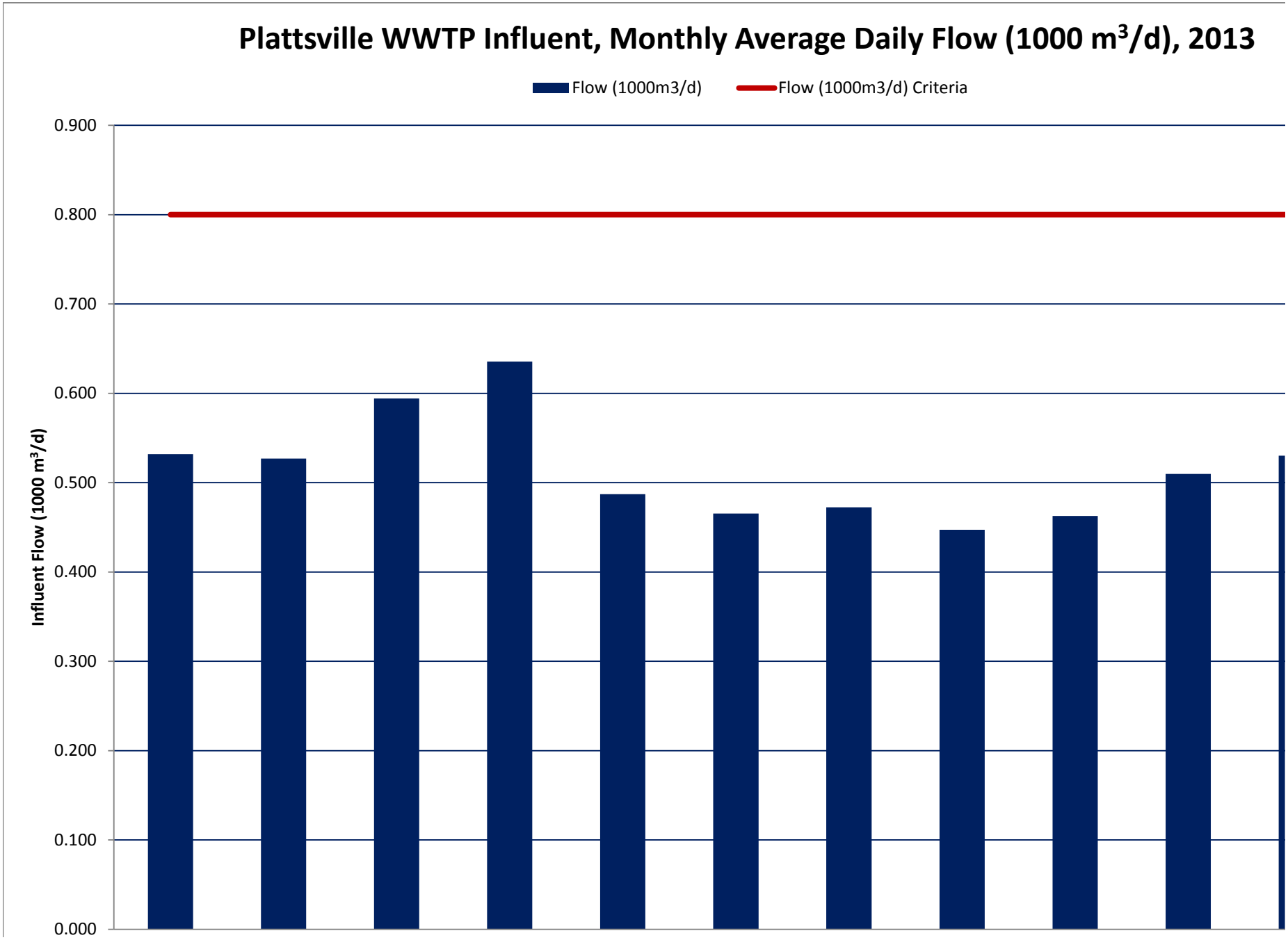
Maintenance Activities

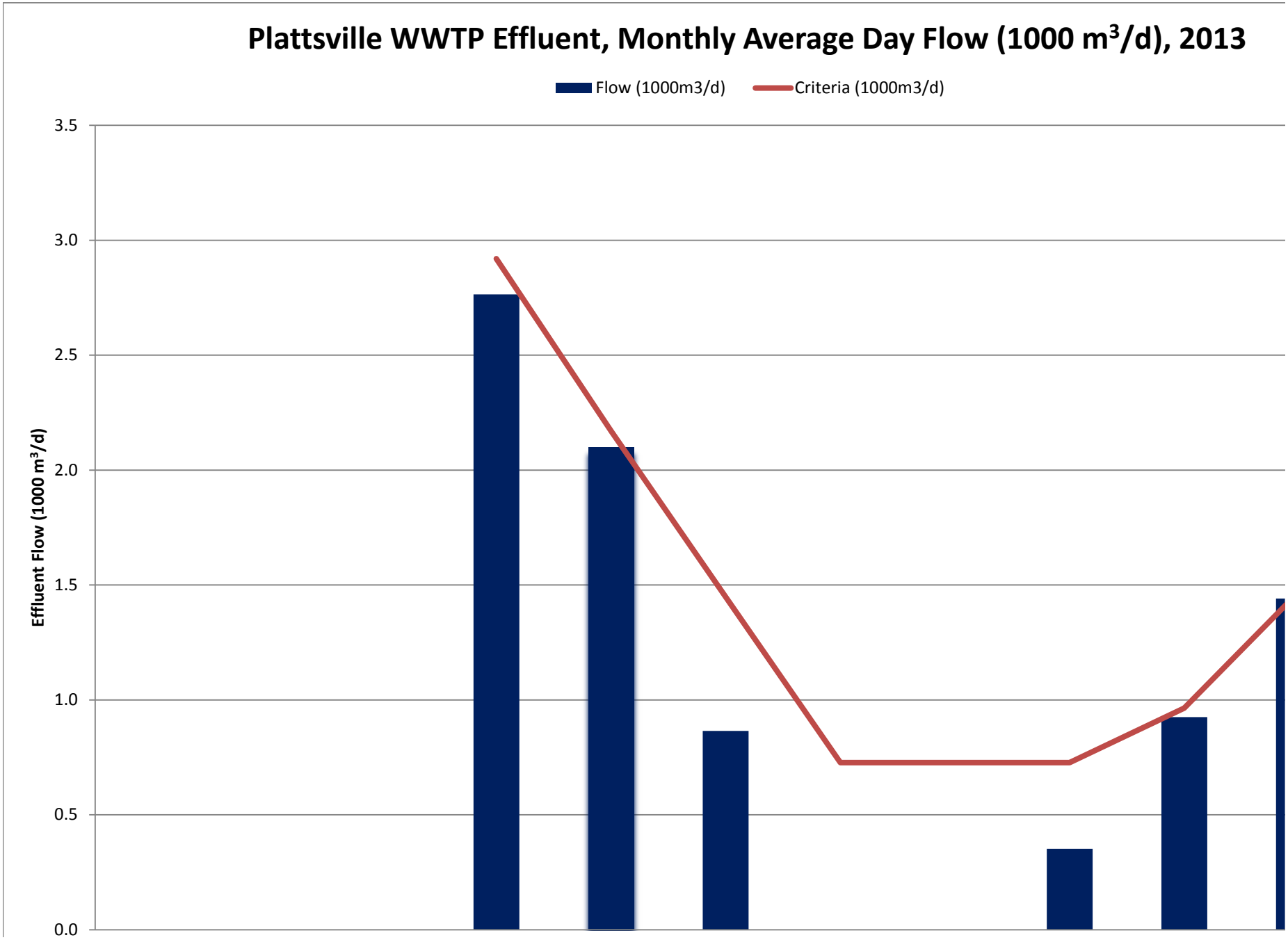
Regularly scheduled maintenance of the plant equipment including surface aerators is conducted by the operating and maintenance staff of the Woodstock WWTP. Detailed maintenance records are kept on file at the Woodstock WWTP.

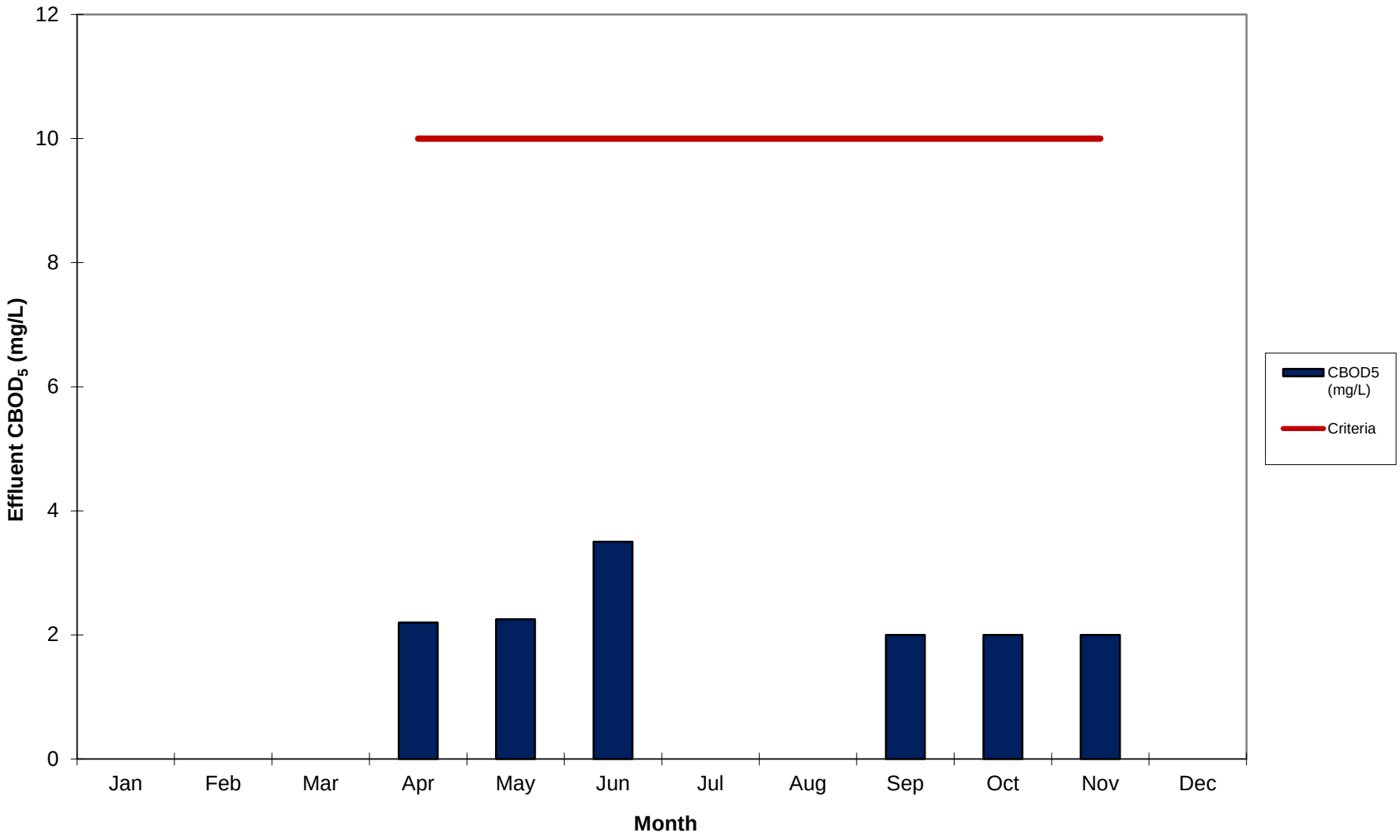
Summary and Recommendations

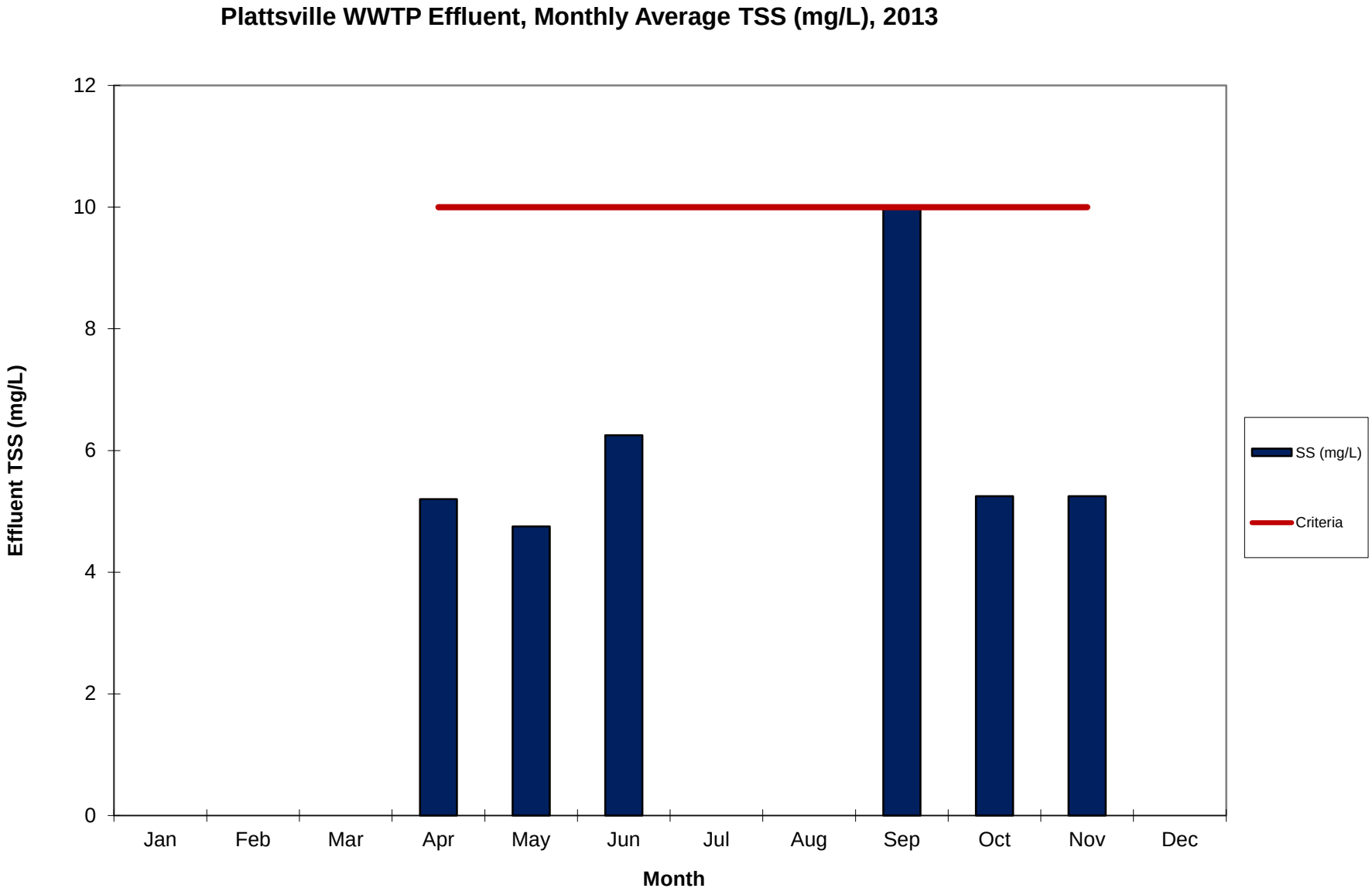
The wastewater treatment plant performed well during 2013 and met all discharge requirements.

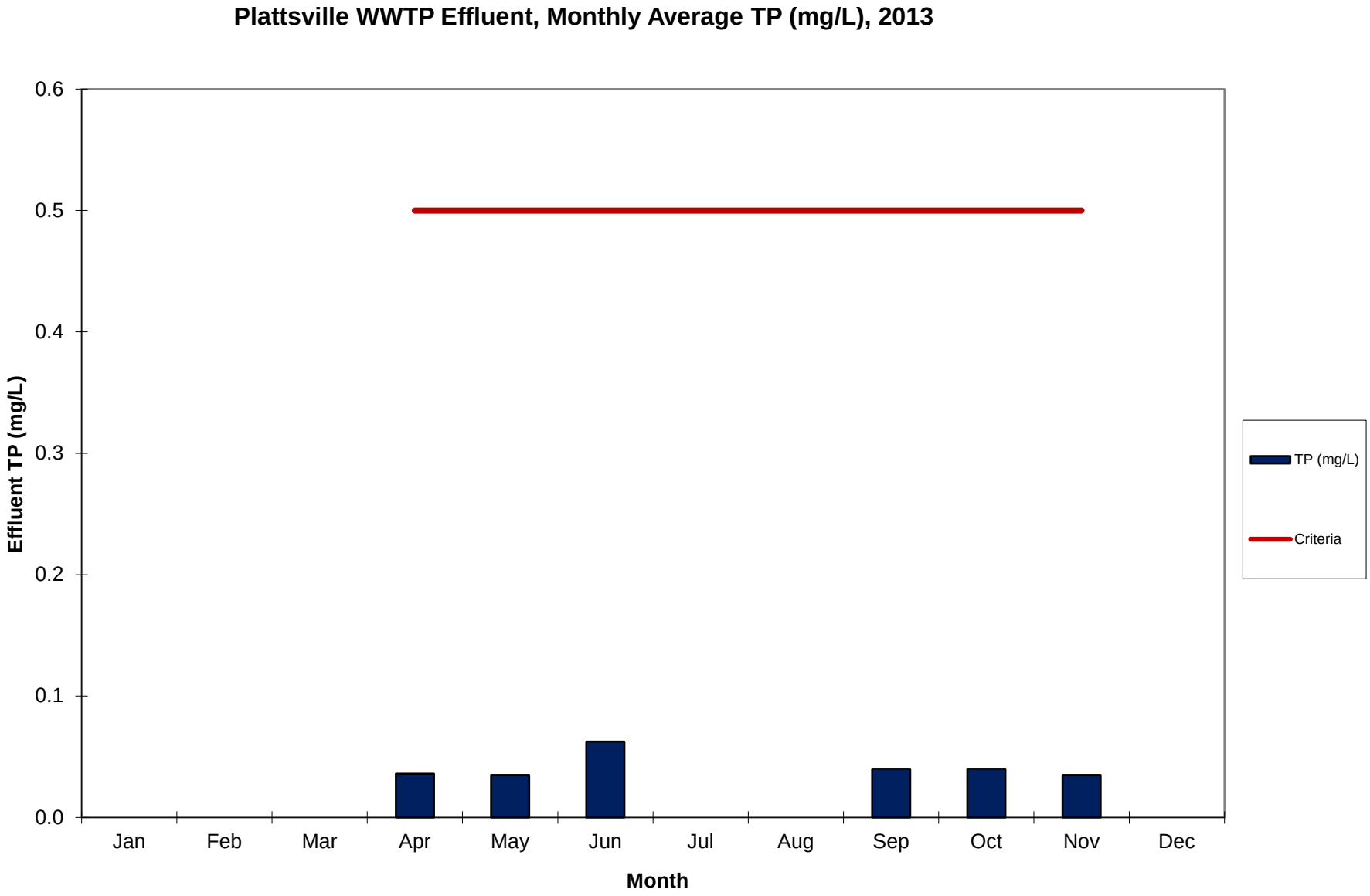
EXHIBIT 1


Plattsville WWTP Influent, Monthly Average Daily Flow (1000 m3/d), 2013
Flow (1000m3/d)
Flow (1000m3/d) Criteria
Influent Flow (1000 m3/d)
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000

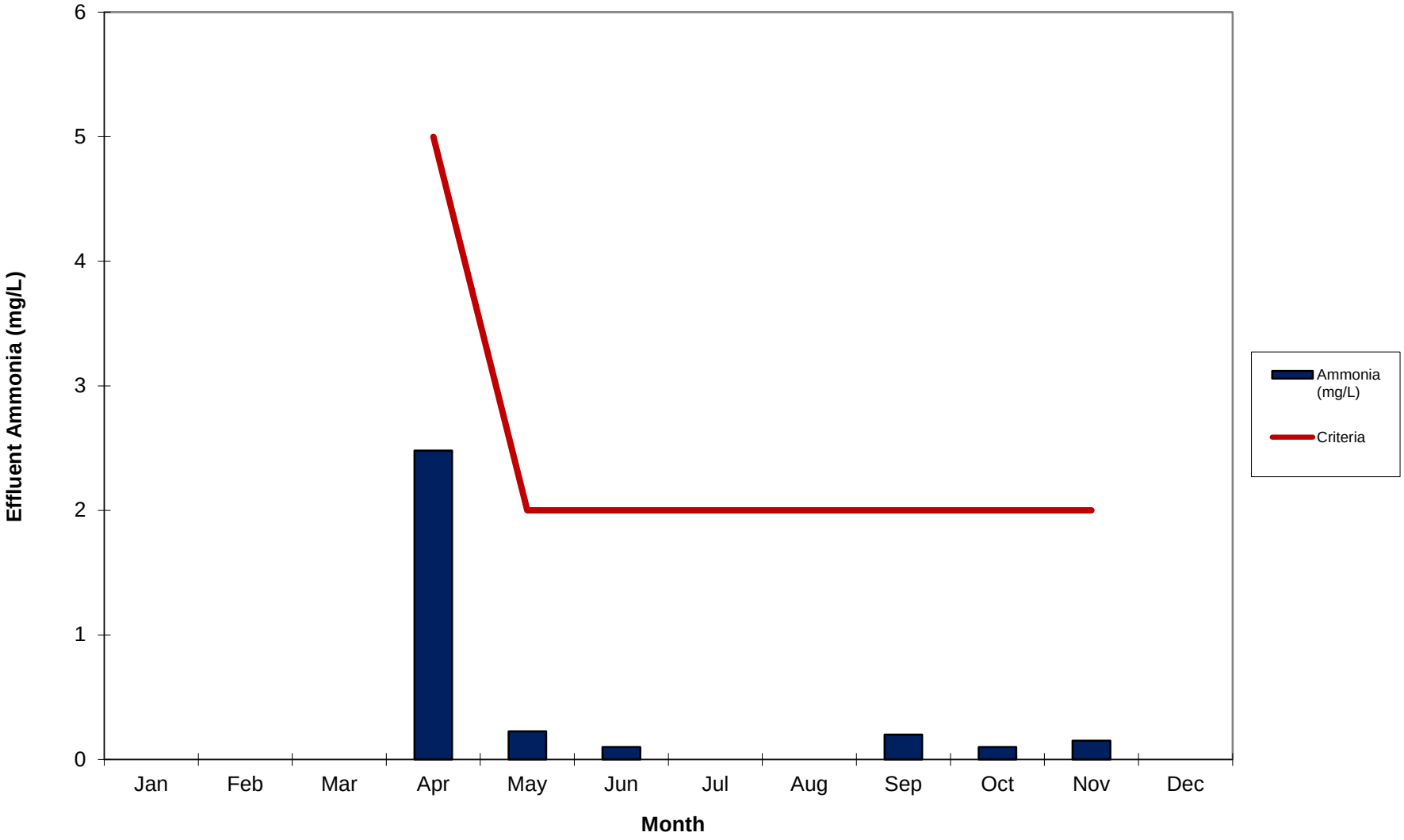

Plattsville WWTP Effluent, Monthly Average Day Flow (1000 m3/d), 2013
Flow (1000m3/d)
Criteria (1000m3/d)
Effluent Flow (1000 m3/d)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0


Plattsville WWTP Effluent, Monthly Average CBOD5 (mg/L), 2013
Effluent CBOD5 (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Plattsville WWTP Effluent, Monthly Average TSS (mg/L), 2013
Effluent TSS (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
SS (mg/L)
Criteria


Plattsville WWTP Effluent, Monthly Average TP (mg/L), 2013
Effluent TP (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (mg/L)
Criteria

Plattsville WWTP Effluent, Monthly Average Ammonia (mg/L), 2013



Municipality: Plattsville
PROJECT:Plattsville Lagoons
Operator: County of Oxford
Works Number:
110003022

2013

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Min	Max	Total	
Influent																	
Total Flow (1000m^3)	16.487	14.757	18.420	19.064	15.099	13.962	14.648	13.867	13.882	15.804	15.903	17.515				189.408	Criteria
Flow (1000m^3/d)	0.532	0.52704	0.594	0.635	0.487	0.465	0.473	0.447	0.463	0.510	0.530	0.565	0.519	0.447	0.635		0.8
Max Flow (1000m^3/d)	0.750	0.744	1.410	0.860	0.658	0.567	0.562	0.546	0.665	0.752	0.710	0.820	0.754	0.546	1.410		2.98
Min Flow (1000m3/d)	0.393	0.442	0.471	0.416	0.363	0.375	0.252	0.365	0.330	0.340	0.232	0.378	0.363	0.232	0.471		
Influent																	
BOD_5 (mg/L)	30.0	216.0	82.0	148.0	222.0	118.0	107.0	190.0	187.0	110.0	90.0	152.0	138	30	222		
SS (mg/L)	41.0	265.0	107.0	157.0	634.0	213.0	178.0	216.0	143.0	150.0	135.0	182.0	202	41	634		
AMMONIA (mg/L)	14.2	21.6	22.6	24.2	45.6	46.0	29.6	55.5	32.8	31.4	41.3	44.6	34.1	14.2	55.5		
TKN (mg/L)	19.1	25.0	26.9	25.3	50.7	51.0	37.9	51.4	46.4	33.7	56.3	58.9	40.2	19.1	58.9		
NITRITE (mg/L)	0.06	0.06	0.32	0.03	0.04	0.03	0.03	0.30	0.03	0.03	0.03	0.03	0.08	0.03	0.32		
NITRATE (mg/L)	0.42	0.05	2.35	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.28	0.05	2.35		
TP (mg/L)	1.7	0.4	2.0	3.7	8.8	4.6	3.4	5.2	5.4	4.5	5.2	6.5	4.3	0.4	8.8		
Temp	10.0	9.1	9.0	10.6	15.4	15.7	16.0	20.0	19.7	16.5	13.2	10.1	13.78	9.04	20.00		
pH	8.07	8.02	7.91	7.80	7.92	7.93	7.99	7.82	8.26	8.13	8.18	8.02	8.00	7.80	8.26		
Effluent																	
Total Flow (1000m3)				77.406	65.094	20.759			2.110	27.762	28.825					221.956	
Flow (1000m3/d)				2.765	2.100	0.865			0.352	0.925	1.441		1.408	0.352	2.765		
Criteria (1000m3/d)				2.920	2.170	1.447	0.727	0.727	0.727	0.964	1.472						

Plant Effluent	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Min.	Max.	Compliance Criteria	
$CBOD_5$ (mg/L)				2.2	2.3	3.5			2.0	2.0	2.0		2.3	2.0	3.5	Average*	≤ 10
SS (mg/L)				5.2	4.8	6.3			10.0	5.3	5.3		6.1	4.8	10.0	Average**	≤ 10
Ammonia (mg/L)				2.48	0.23	0.10			0.20	0.10	0.15		0.54	0.10	2.48	Average[1]	2 / 5
TKN (mg/L)				3.76	0.65	1.13			1.10	0.50	0.50		1.27	0.50	3.76		
NITRITE (mg/L)				0.03	0.03	0.03			0.03	0.03	0.03		0.03	0.03	0.03		
NITRATE (mg/L)				3.80	5.09	3.98			18.40	0.58	1.25		5.52	0.58	18.40		
TP (mg/L)				0.04	0.04	0.06			0.04	0.04	0.04		0.04	0.04	0.06	Average***	≤ 0.5
pH				7.49	7.35	7.33			7.47	7.45	7.34		7.40	7.33	7.49		
E. Coli (#/100ml)				2.0	9.0	93.5			96.0	15.0	2.5		14	2	96	Geomean	200
Temp. Celcius				7.9	16.4	18.3			17.1	12.1	7.4		13.2	7.35	18.3		
D.O. (mg/L)				10.4	7.9	7.9			9.2	10.0	11.1		9.4	7.89	11.1		

Influent Loadings **Month**	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Min	Max	Criteria
BOD5 kg/d	15.955	113.840	49	94.049	108.128	54.917	50.559	84.991	86.531	56.079	47.709	85.880	71	48	108	
TSS kg/d	21.805	139.664	64	99.77	308.799	99.130	84.108	96.62	66.171	76.471	71.564	102.830	105	64	309	
Effluent Loadings																
CBOD5 kg/d				6	5	3			1	2	3		3	1	6	
TSS kg/d				14	10	5			4	5	8		8	4	14	
TP kg/d				0.100	0.073	0.054			0.014	0.037	0.050		0.055	0.014	0.100	
Total Ammonia kg/d				6.856	0.472	0.086			0.070	0.093	0.216		1.299	0.070	6.856	
Criteria																
CBOD5 Criteria kg/d	0	0	0	29	22	14	7	7	7	10	15	0				
TSS Criteria kg/d	0	0	0	29	22	14	7	7	7	10	15	0				
TP Criteria kg/d	0	0	0	1.46	1.09	0.72	0.36	0.36	0.36	0.48	0.74	0				
Total Ammonia Criteria kg/d	0	0	0	15	4	3	1	1	1	2	3	0				

* MOE Criteria: CBOD5 Monthly Average not to exceed 10 mg/L
** MOE Criteria: TSS Monthly Average not to exceed 10 mg/L
[1] MOE Criteria: Ammonia Monthly Average changes when stream is > 12 or < 12 degrees celcius respectively
*** MOE Criteria: TP Monthly Average not to exceed 0.50 mg/L

EXHIBIT 2

Plattsville Wastewater Treatment Facility
Monitoring Well Chemistry (Lab Analyses)

	2010				2011		2012		2013	
Parameter	**February 25, 2010**	**March 9, 2010**	**March 18, 2010**	**August 26, 2010**	**March 15, 2011**	**March 29, 2011**	**March 29, 2012**	**April 10, 2012**	**May 16, 2013**	**May 29, 2013**
	Shallow - Raw, Decant	**Shallow** - Raw, Decant	**Shallow** - Raw, Decant	**Shallow** - Raw, Decant	**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Shallow**
TOC (mg/L)	1.2 , 1.3	1.5 , 1.2	1.2 , <1.0	1.7 , 1.6	2.2	<1.0	1.2	1.1	2.0	<1.0
Total P (mg/L)	0.06 , <0.03	<0.03 , <0.03	<0.03 , <0.03	0.06 , <0.03	0.03	<0.03	<0.03	0.14	0.11	0.12
TKN (mg/L N)	<0.5 , <0.5	<0.5 , <0.5	<0.5 , <0.5	<0.5 , <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ammonia/ium (mg/L N)	NA	<0.1 , <0.1	<0.1 , <0.1	<0.1 , <0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Nitrite (mg/L N)	<0.06 , <0.06	<0.06 , <0.06	<0.06 , <0.06	<0.06 , <0.06	<0.06	<0.06	<0.06	<0.06	<0.03	<0.03
Nitrate (mg/L N)	0.33 , 0.32	0.43 , 0.37	0.41 , 0.36	0.32 , 0.32	0.26	0.24	0.27	0.27	0.16	<0.06
Nitrate+Nitrite (mg/L N)	0.33 , 0.32	0.43 , 0.37	0.41 , 0.36	0.32 , 0.32	0.26	0.24	0.27	0.27	0.16	<0.06
Chloride (mg/L)					4.4	4.0	3.1	4.6	2.6	18
	Deep - Raw, Decant	**Deep** - Raw, Decant	**Deep** - Raw, Decant	**Deep** - Raw, Decant	**Deep**	**Deep**	**Deep**	**Deep**	**Deep**	**Deep**
TOC (mg/L)	<1.0 , <1.0	<1.0 , <1.0	<1.0 , <1.0	<1.0 , <1.0	1.6	1.1	<1	<1.0	1.4	<1.0
Total P (mg/L)	0.54 , <0.03	0.39, <0.03	0.37 , <0.03	0.66 , 0.06	<0.03	0.2	0.17	0.06	0.09	0.3
TKN (mg/L N)	<0.5 , <0.5	<0.5 , <0.5	<0.5 , <0.5	<0.5 , <0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ammonia/ium (mg/L N)	NA	<0.1 , <0.1	<0.1 , 0.1	<0.1 , 0.1	<0.1	0.1	<0.1	0.3	<0.1	0.2
Nitrite (mg/L N)	<0.06 , <0.06	<0.06 , <0.06	<0.06 , <0.06	<0.06 , <0.06	<0.06	<0.06	<0.06	<0.06	<0.03	<0.03
Nitrate (mg/L N)	<0.05 , <0.05	<0.05 , <0.05	<0.05 , <0.05	<0.05 , <0.05	0.05	0.06	0.09	<0.05	0.14	<0.06
Nitrate+Nitrite (mg/L N)	<0.06 , <0.06	<0.06 , <0.06	<0.06 , <0.06	<0.06 , <0.06	<0.06	0.06	0.09	<0.06	0.14	<0.06
Chloride (mg/L)					17	17	18	18	3.1	19

Notes: There is a single monitoring well at the site. The monitoring well is equipped with separate shallow and deep monitoring intervals: Shallow 4.4 - 6.3 m BGL, Deep 9 - 12.2 m BGL.

Public Works
P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

Dear Sir:

RE: 2013Year-End Report, Drumbo Sequencing Batch Reactor (SBR)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) #3-2191-90-916.

I trust this report fulfills the intent of the ECA reporting requirements. If there are any questions, please contact me.

Yours truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Drumbo Sequencing Batch Reactor (SBR) provided effective wastewater treatment in 2013 with an average flow for the plant of 290 m^3/d which represents 107% of the design capacity of 272 m^3/d. The total flow in 2013 was 105,995 m^3.

Plant Description

The Drumbo SBR began operation in its present configuration in 1992. The SBR plant consists of two alternating reactors, pressure filters and ultra-violet radiation for disinfection, with an outfall pipe to the Cowan Drain. The plant adds aluminum sulphate into the reactors for phosphorus control.
Oxford County operates the plant, utilizing the staff located at the Woodstock WWTP.

Plant Specifications

Plant -	Sequencing Batch Reactor
Design Capacity -	272 m^3 / day
Peak Capacity -	774 m^3 / day (2013)
Average Daily Flow -	290 m^3 / day
Receiving Area -	Cowan Drain
Classification -	WWT – II
ECA numbers -	3-2191-90-916
	8-1158-92-006

Effluent Criteria:	Ave. Monthly Concentration	Average Loading
BOD_5 (Period A)	10 mg/L	2.8 kg/day
BOD_5 (Period B)	15 mg/L	4.0 kg/day
Suspended Solids (Period A)	10 mg/L	2.8 kg/day
Suspended Solids (Period B)	15 mg/L	4.0 kg/day
Total Phosphorus (Period A)	0.5 mg/L	0.14 kg/day
Total Phosphorus (Period B)	1.0 mg/L	0.27 kg/day
Total Ammonia (Period A)	3.0 mg/L	0.8 kg/day
Total Ammonia (Period B)	5.0 mg/L	1.36 kg/day
Total Chlorine Residual	0.01 mg/L	

Note:

Period A refers to the time that the receiving stream temperature exceeds 5^{o} C.

Period B refers to the time that the receiving stream temperature is less than or equal to 5^{o} C.

The geometric mean density of E.Coli in the effluent shall not exceed 200 per 100 ml for any calendar month.

The average monthly concentration of dissolved oxygen in the effluent shall not be less than 5.0 mg/L.

Sampling Procedure

Influent samples are taken using a 24-hour composite sampler on a bi-weekly basis from the transfer tank; this tank receives flow from the trash tank, which holds most of the daily flow.

Effluent samples are taken bi-weekly using a 24-hour composite sampler installed so as to sample during periods of flow from either of two reactors. Samples are taken on site and tested for pH, chlorine residual, dissolved oxygen, and temperature.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, D.O., chlorine residual, and temperature.

Flows

The total flow treated in 2013 was 105,995 m^3. The daily average flow was 290 m^3/day which represents 107% of the design flow for Drumbo of 272 m^3 /day.

Raw Sewage Quality

The annual average raw sewage BOD_5 concentration to the plant was 112 mg/L; equivalent to a loading of 33 kg/day. The average suspended solids concentration was 77 mg/L; equivalent to 22 kg/day of loading. Average nitrogen levels, as TKN, were 32 mg/L; equivalent to a loading of 9 kg/day. Total phosphorus was 3 mg/L, which represents a loading of 0.87 kg/day.

Plant Performance & Effluent

Detailed analytical data of annual and monthly averages are summarized later in this report in Exhibit 1.

The plant met all effluent discharge limits contained in the ECA in 2013.

Over the reporting period, the annual average effluent BOD_5 concentration was 4.9 mg/L or an equivalent reduction of 96%. The average suspended solids concentration was 5.9 mg/L,

which represents a 92% reduction. Ammonia averaged 1.7 mg/L (a 94% reduction); total effluent phosphorus average concentration was 0.17 mg/L: a 99% reduction.

Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

The Drumbo SBR did not meet all objective limits in 2013. The objective of 5 mg/L for BOD were not met in May, July, September, and October. The objective of 5 mg/L for TSS were not met during the same months. The objective of 2 mg/L was not met for Ammonia for the month of June.
(Note: the exceedances were related to the effluent objectives, as described above, rather than the more stringent effluent compliance limits/criteria).

The plant met all effluent discharge limits/criteria contained in the ECA in 2013.

Bypassing, Upset and Abnormal Conditions

There were no overflows from the Drumbo SBR in 2013.

Maintenance

The operating and maintenance staff from the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept at the Woodstock Wastewater Treatment Plant (WWTP).

Summary

The Drumbo SBR operated within discharge criteria through 2013. A technical evaluation was completed by XCG consultants in 2013 to evaluate the hydraulic capability of the plant.

A Class Environment Assessment was initiated in 2013 to investigate practical alternatives to increase treatment capacity to meet projected future flows. In the interim, Oxford County will optimize the treatment process and apply for MOE approval to re-rate the plant to a higher rated capacity of approximately 300 m^3/d, as discussed with MOE staff.

BIOSOLIDS ANNUAL REPORT 2013

Discussion:

Biosolids are a combination of waste activated sludge and primary sludge which is drawn from the Trash tank which is the first tank the raw wastewater enters before siphoning into the transfer tank that loads the reactors. The tank is designed to allow the settling and collection of solids for removal by truck.

The removal is accomplished by the Oxford County sewage truck with a useful volume of approximately 19 m^3 as permitted under an MOE Waste Management System certificate number A800939, or is accomplished by a contracted certified waste hauler as needed.

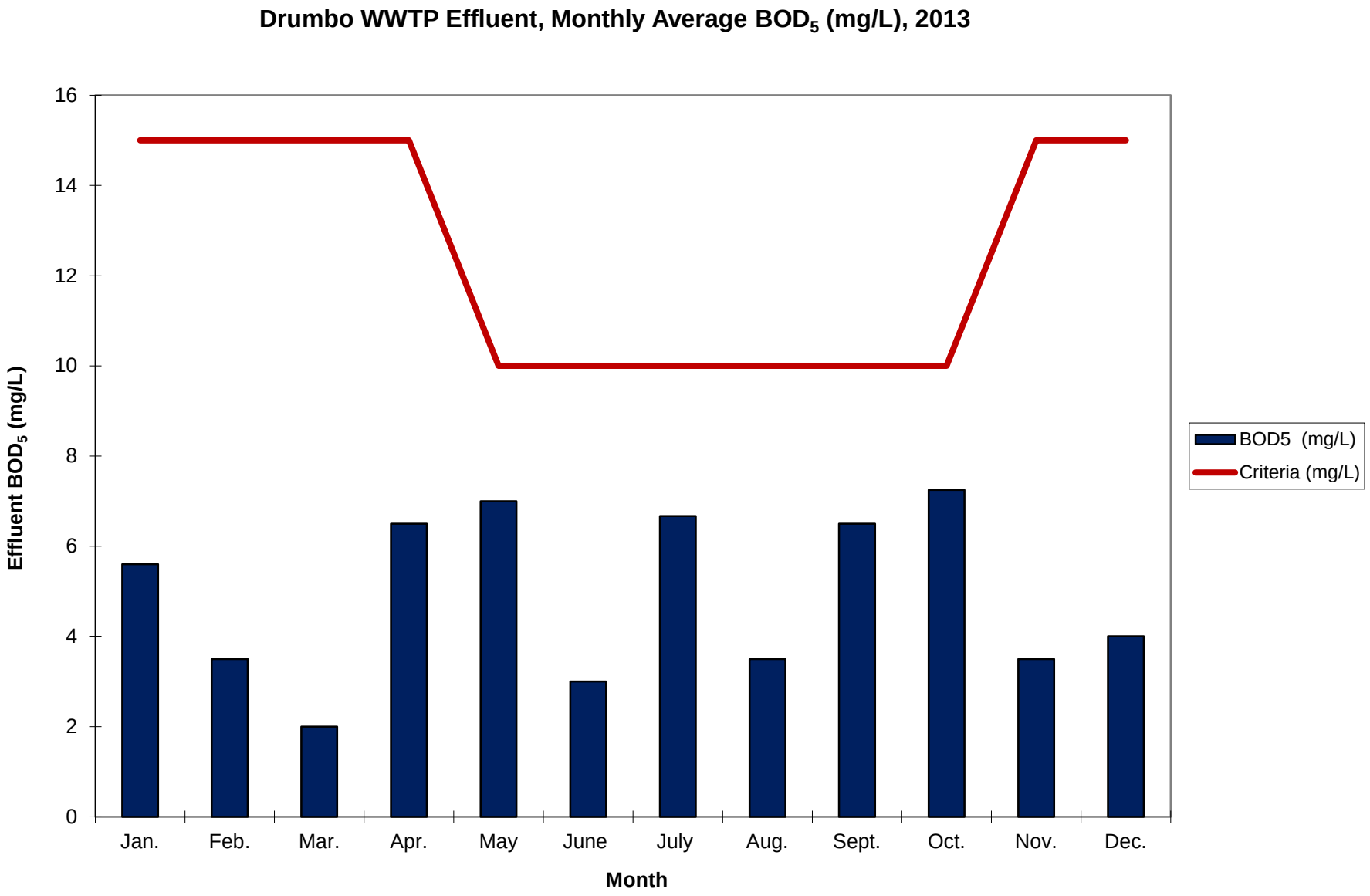
The biosolids are then transported to the Woodstock WWTP for digestion.

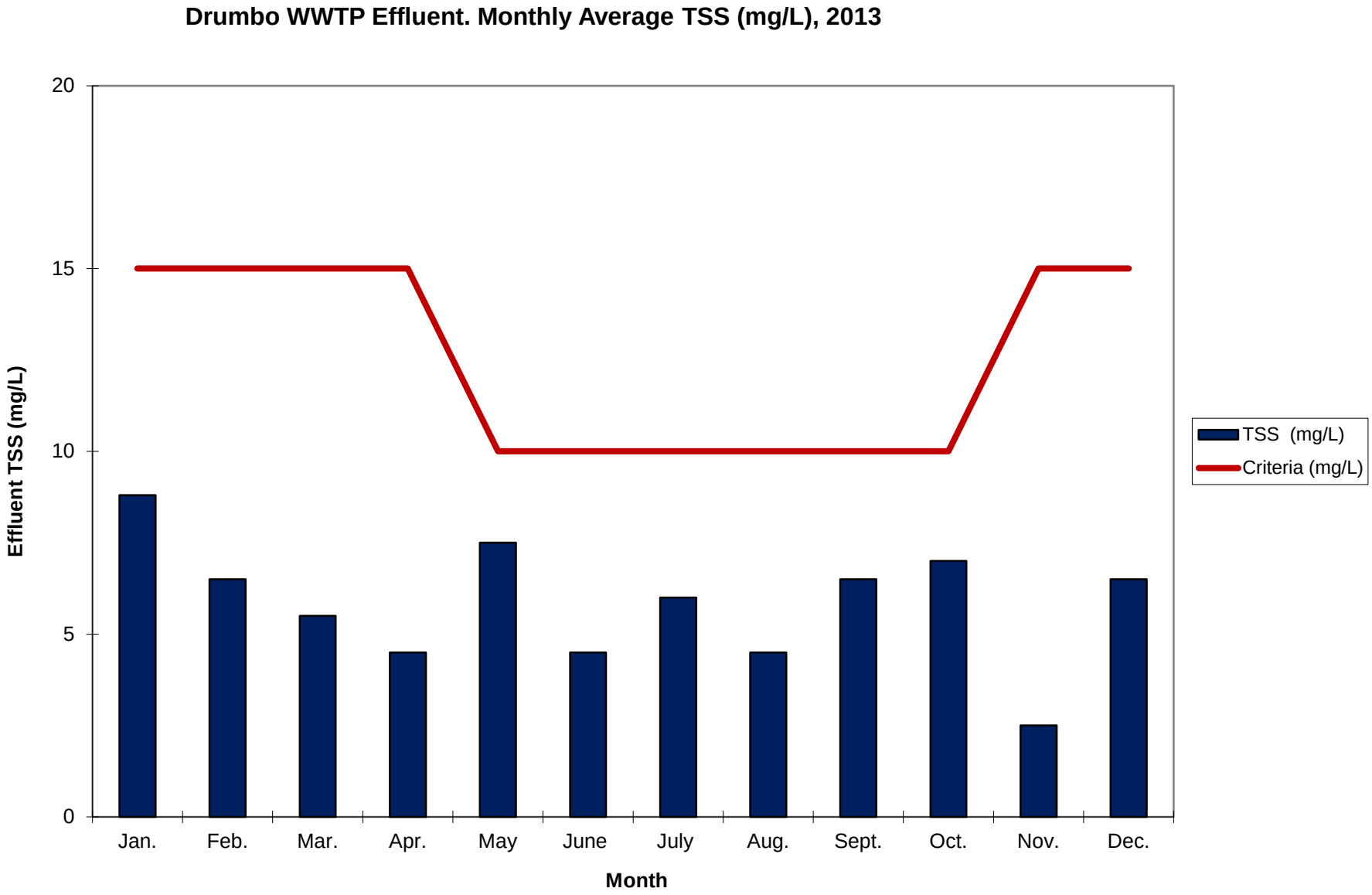
The total volume of biosolids from the Drumbo WWTP in 2013 was 1,942 m^3. Below are the monthly volumes of biosolids transported to the Woodstock WWTP in 2013.

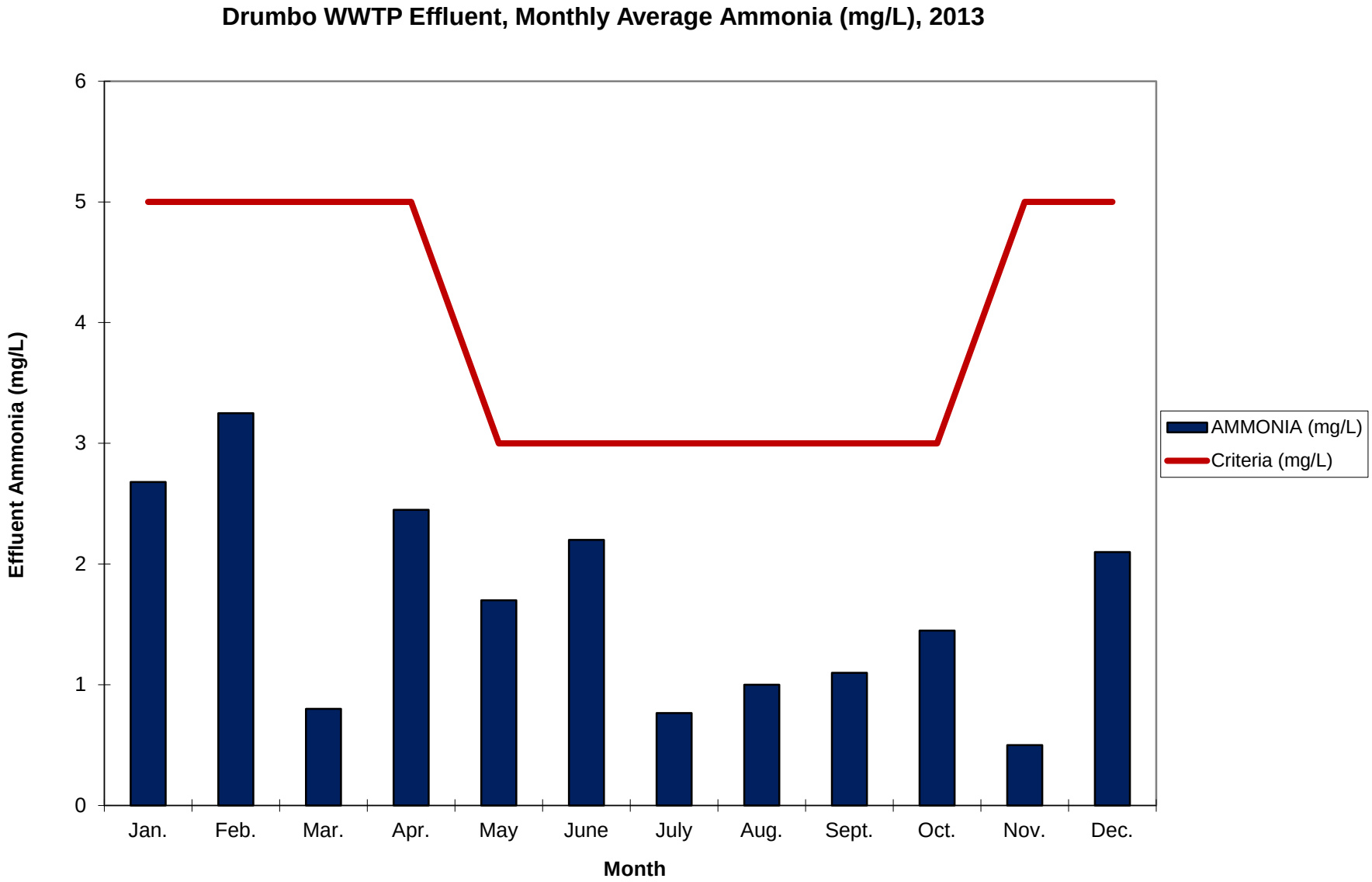
SUMMARY OF ALL BISOLIDS REMOVAL

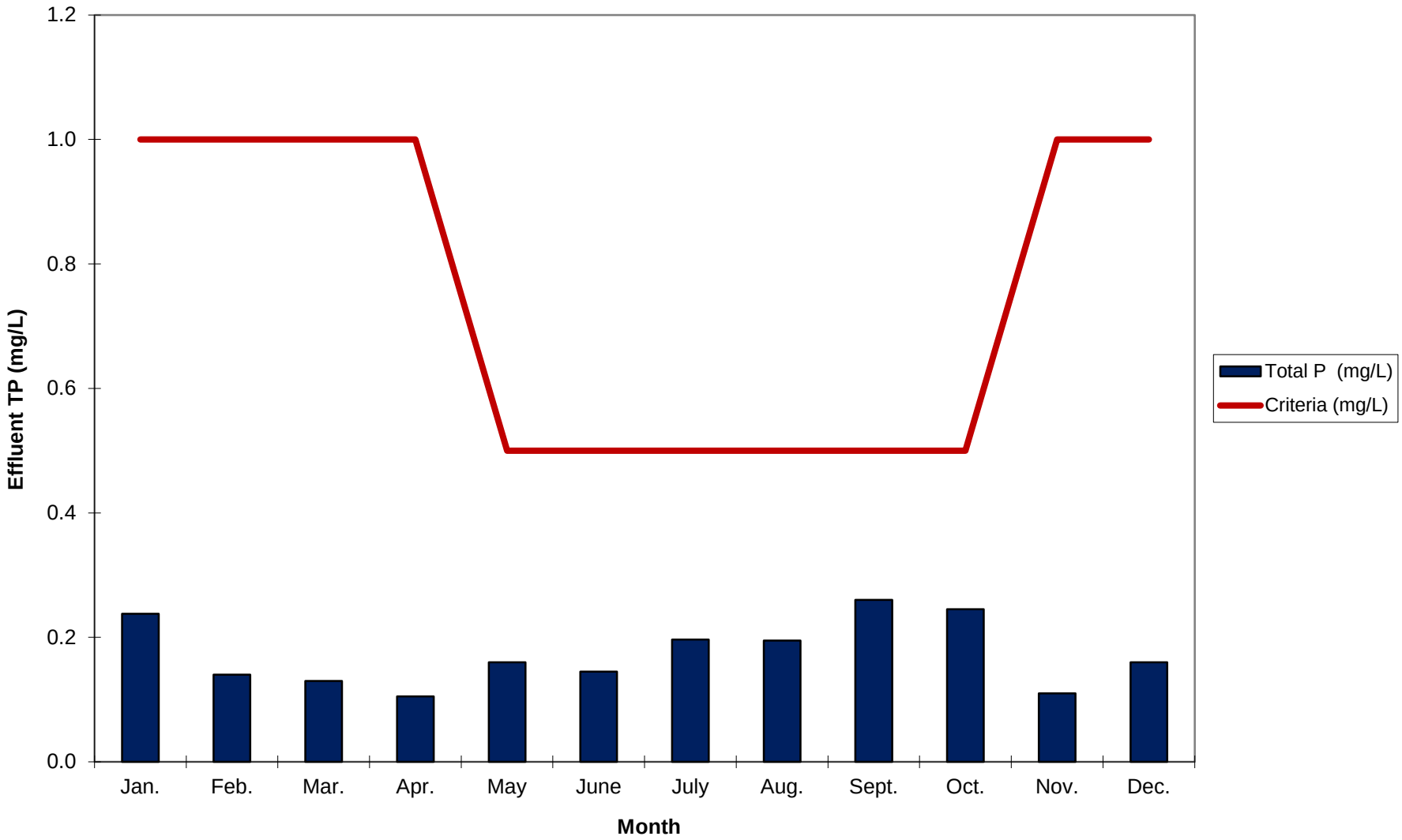
DATE	BIOSOLIDS QUANTITY(m^3)
January	189
February	94
March	170
April	113
May	245
June	132
July	170
August	189
September	94
October	226
November	170
December	151
2013 Total	1,942

Exhibit 1

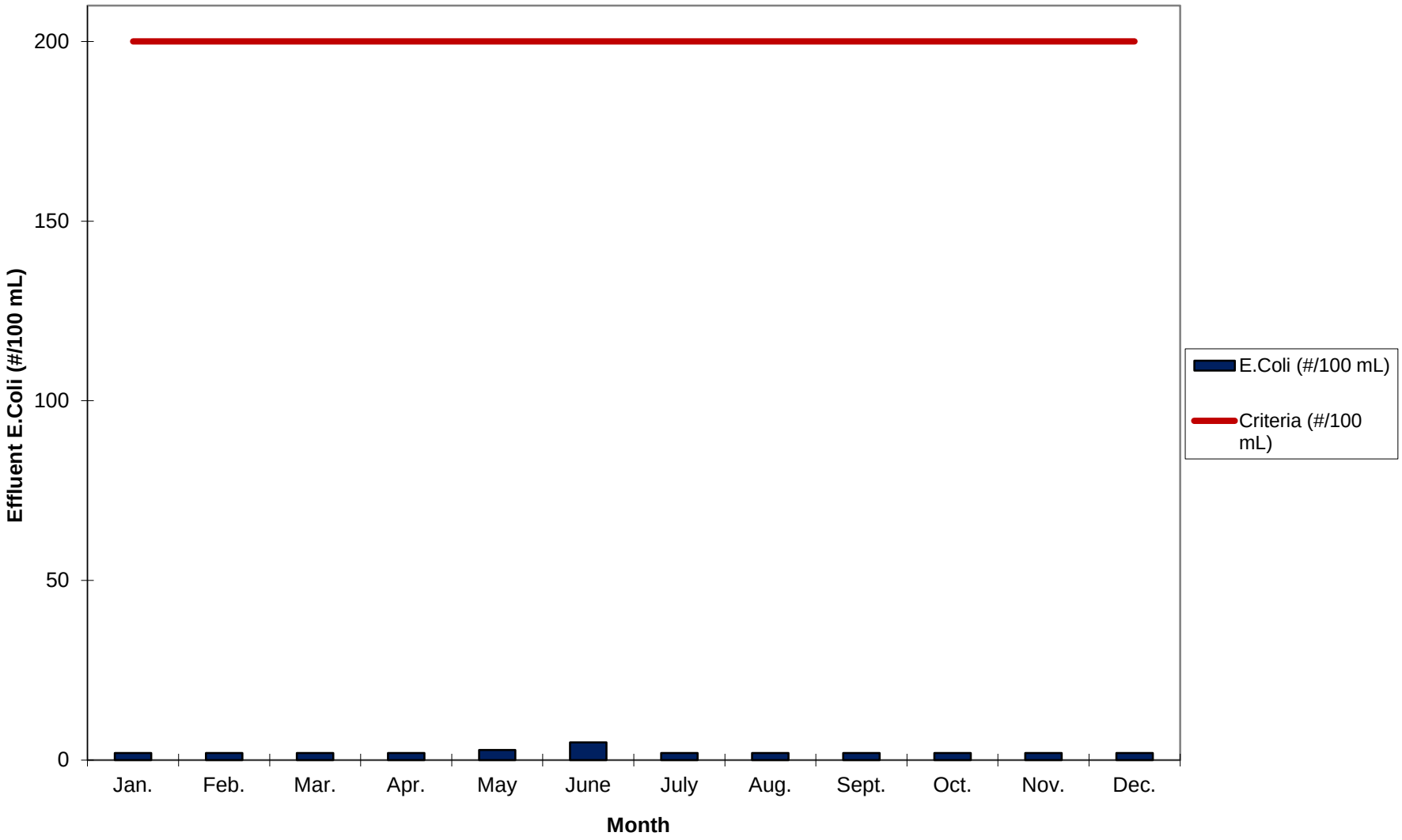

Drumbo WWTP Effluent, Monthly Average BOD5 (mg/L), 2013
Effluent BOD5 (mg/L)
16
14
12
10
8
6
4
2
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
BOD5 (mg/L)
Criteria (mg/L)

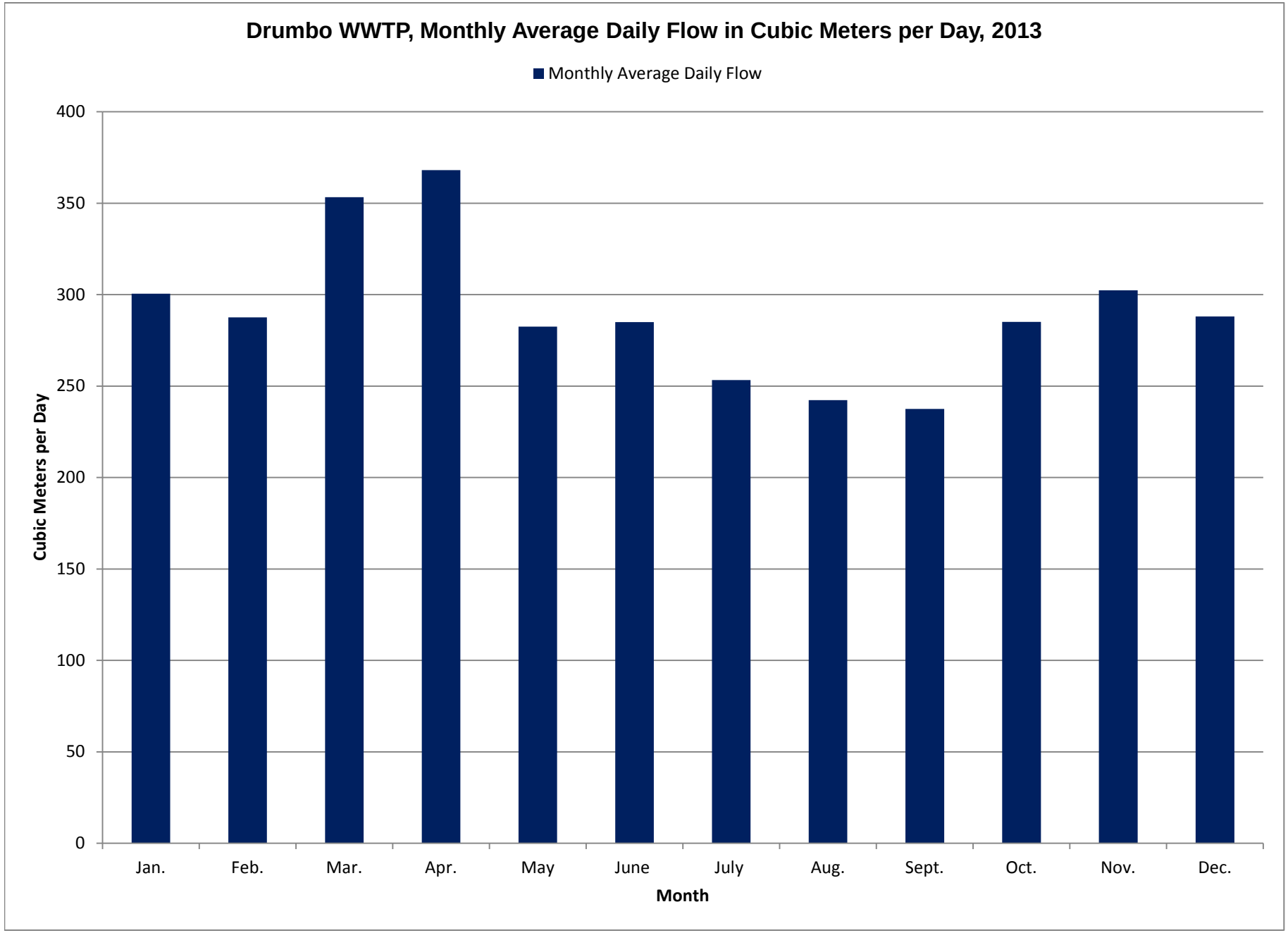

Drumbo WWTP Effluent. Monthly Average TSS (mg/L), 2013
Effluent TSS (mg/L)
20
15
10
5
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
TSS (mg/L)
Criteria (mg/L)


Drumbo WWTP Effluent, Monthly Average Ammonia (mg/L), 2013
Effluent Ammonia (mg/L)
0
1
2
3
4
5
6
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
AMMONIA (mg/L)
Criteria (mg/L)


Drumbo WWTP Effluent , Monthly AverageTP (mg/L), 2013
Effluent TP (mg/L)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
Total P (mg/L)
Criteria (mg/L)

Drumbo WWTP Effluent, Monthly Geometric Mean Density E.Coli (#/100 mL), 2013




Drumbo WWTP, Monthly Average Daily Flow in Cubic Meters per Day, 2013
Monthly Average Daily Flow
Cubic Meters per Day
400
350
300
250
200
150
100
50
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month

DRUMBO RAW INFLUENT 2013

Month		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Ave.	Criteria
Volume	(m3)	9316	8051	10953	11041	8758	8548	7852	7513	7125	8837	9071	8930	**105,995**	**8833**	
Monthly Average Daily Flow	(m3/d)	301	288	353	368	283	285	253	242	238	285	302	288		**290**	**272**
Min	(m3/d)	215	238	257	292	255	237	211	203	196	220	248	220		**233**	
Max	(m3/d)	387	338	605	710	334	339	294	305	335	366	379	369		**397**	**774**
BOD_5	(mg/L)	143	104	57	92	116	104	145	140	109	134	100	105		**112**	
CBOD	(mg/L)	125	83	46	52	86	78	117	96	83	102	65	81		**84**	
TSS	(mg/L)	101	67	34	57	70	78	115	88	79	113	64	66		**77**	
Total Phosphorus	(mg/L)	2.9	2.7	1.6	2.1	3.6	3.5	4.1	3.8	2.1	4.2	3.0	3.1		**3**	
ALKALINITY	(mg/L)	349.0	370.0	328.5	324.0	361.5	390.0	388.3	354.0	387.5	373.0	392.5	399.0		**368**	
TKN	(mg/L)	27.23	36.05	19.05	20.75	33.65	36.30	35.57	33.90	31.50	36.65	32.30	38.50		**32**	
AMMONIA	(mg/L)	23.8	34.0	13.25	18.4	23.6	32.3	29.3	28.4	30.7	26.4	31.7	28.0		**27**	
NITRATE	(mg/L)	0.05	0.05	2.57	1.38	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06		**0**	
NITRITE	(mg/L)	0.08	0.06	0.64	1.19	0.05	0.04	0.03	0.03	0.03	0.03	0.13	0.27		**0**	
pH		7.42	7.50	7.45	7.42	7.39	7.26	7.03	7.85	7.27	7.27	7.37	7.30		**7**	
Temp		11.3	10.0	9.8	11.6	15.3	17.4	19.6	20.0	20.1	17.4	14.3	11.8		**15**	

DRUMBO FINAL EFFLUENT 2013

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		**Ave**	**Criteria A**	**Criteria B**
BOD_5	(mg/L)	5.6	3.5	2.0	6.5	7.0	3.0	6.7	3.5	6.5	7.3	3.5	4.0		**4.9**	**10**	**15**
CBOD	(mg/L)	4.2	2.5	2.0	2.0	2.5	2.0	2.3	2.0	2.0	2.0	2.0	3.0		**2.4**		
TSS	(mg/L)	8.8	6.5	5.5	4.5	7.5	4.5	6.0	4.5	6.5	7.0	2.5	6.5		**5.9**	**10**	**15**
Total P	(mg/L)	0.24	0.14	0.13	0.11	0.16	0.15	0.20	0.20	0.26	0.25	0.11	0.16		**0.17**	**0.5**	**1**
ALKALINITY	(mg/L)	213.2	212.5	208.5	200.0	198.0	226.0	213.7	192.5	199.5	204.0	222.5	209.5		**208**		
TKN	(mg/L)	4.14	4.00	0.85	2.70	1.95	2.50	1.03	1.80	1.55	2.38	1.05	2.15		**2.17**		
AMMONIA	(mg/L)	2.68	3.25	0.80	2.45	1.70	2.20	0.77	1.00	1.10	1.45	0.50	2.10		**1.666**	**3**	**5**
NITRATE	(mg/L)	6.27	11.05	11.89	10.85	12.80	9.66	11.62	16.35	16.35	14.15	13.3	15.3		**12.5**		
NITRITE	(mg/L)	7.46	2.38	0.14	0.23	0.71	1.15	0.79	0.98	0.40	0.31	0.26	1.08		**1.32**		
PH	(mg/L)	7.54	7.46	7.39	7.30	7.33	7.49	7.20	8.05	7.87	7.30	7.33	7.31		**7.46**		
Dissolved Phosphorus	(mg/L)	0.10	0.12	0.04	0.03	0.10	0.08	0.10	0.14	0.15	0.22	0.08	0.08		**0.10**		
Dissolved Oxygen	(mg/L)	8.2	8.7	8.9	9.0	7.8	7.6	7.3	7.1	7.6	7.7	7.9	8.7		**8.1**	**Min= 5**	**Min= 5**
E.Coli	(#/100 mL	2	2	2	2	3	5	2	2	2	2	2	2		**2.3**	**200**	**200**

Compliance criteria are based on Periods A and B, where Period A refers to the time that the receiving stream exceeds 5 degrees C. and Period B refers to the time that the receiving stream is less than or equal to 5 degrees C, as measured by operating staff.

Drumbo SBR Effluent Discharge Loading kg/d 2013

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		**Ave.**	**Criteria A**	**Criteria B**
BOD_5	(kg/d)	1.7	1.0	0.7	2.4	2.0	0.9	1.7	0.8	1.5	2.1	1.1	1.2		**1.4**	**2.8**	**4.0**
TSS	(kg/d)	2.6	1.9	1.9	1.7	2.1	1.3	1.5	1.1	1.5	2.0	0.8	1.9		**1.7**	**2.8**	**4.0**
TP	(kg/d)	0.07	0.04	0.05	0.04	0.05	0.04	0.05	0.05	0.06	0.07	0.03	0.05		**0.05**	**0.1**	**0.3**
NH4	(kg/d)	0.81	0.93	0.28	0.90	0.48	0.63	0.19	0.24	0.26	0.41	0.15	0.60		**0.49**	**0.80**	**1.36**

Drumbo SBR Influent Loading kg/d 2013

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		**Ave.**		
BOD	(kg/d)	43	30	20	34	33	30	37	34	26	38	30	30		33		
TSS	(kg/d)	30	19	12	21	20	22	29	21	19	32	19	19		23		
TP	(kg/d)	1	1	1	1	1	1	1	1	0	1	1	1		1		
TKN	(kg/d)	8	10	7	8	10	10	9	8	7	10	10	11		9		

Compliance criteria are based on Periods A and B, where Period A refers to the time that the receiving stream exceeds 5 degrees C. and Period B refers to the time that the receiving stream is less than or equal to 5 degrees C, as measured by operating staff

Public Works
P. O. Box 1614, 21 Reeve St., Woodstock, Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

February 15, 2014

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Tom Clubb
Drinking Water Programs Supervisor
Ministry of the Environment
3232 White Oak Road, 3rd Floor
London, ON
N6E 1L8

Dear Sir:

RE: 2013 Year-End Monitoring Report, Mount Elgin Wastewater Treatment Plant (WWTP)

The attached year-end report has been prepared as required by the Environmental Compliance Approval or ECA (previously referred to as a Certificate of Approval) #0611-6Q3JQL.

I trust this report fulfills the intent of the annual reporting requirements of the ECA.

If there are any questions, please contact me.

Yours truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager of Environmental Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Mount Elgin Wastewater Treatment Plant (WWTP) provided effective wastewater treatment in 2013. The average daily flow for 2013 was 32 m^3/d. This represents 34% of the design criteria of 95.25 m^3/d.

Plant Description

The Recirculating Sand Filter (RSF) system is one component of the overall sewage treatment system. In septic tank effluent gravity (STEG) collection systems, the wastewater is collected from individual homes in septic tanks where it is pretreated to remove solids and grease before it drains by gravity to the small diameter collection mains. The small diameter collection mains direct the primary treated effluent to a pump station located near the Mount Elgin Road entrance of the sewage treatment plant.

The primary treated effluent is the raw influent to the sewage treatment system where it is pumped to recirculation tanks. The influent is pumped to the recirculating sand filter and then collected and pumped to a splitter valve that allows 80% of the flow to recirculate and 20% to enter the dosing tank. From the dosing tank, treated effluent is pumped to the shallow buried trench drainfield that provides for the subsurface discharge. Effluent samples are collected from the dosing tank ahead of the drainfield.

SAMPLING DESCRIPTION

Grab samples are collected from the influent lift station on a quarterly basis. Samples are tested for Carbonaceous Biochemical Oxygen Demand (CBOD), Suspended Solids (SS), Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN).

Effluent grab samples are analyzed for CBOD, SS, TP, ammonia, TKN, nitrite, nitrate, pH, and E.Coli at least quarterly.

Groundwater testing is done for nitrites, nitrates, and pH on a quarterly basis.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples except pH, which is tested in the field during collection. These results are used in this report for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

DISCUSSION OF RESULTS

Calculated in Table A that follows are the average, maximum, and minimum values for all influent, and effluent parameters. External test results and flow information are used in the calculation.

The average annual influent CBOD concentration to the plant for 2013 was 112 mg/L, with an average flow of 32 m^3/d; this corresponds to an average CBOD loading of 3.6 kg/d. The average annual influent SS concentration to the plant was 57 mg/L. This

corresponds to an average SS loading of 1.8 kg/d. The annual average TKN concentration was 67 mg/L. This corresponds to 2.1 kg/d. The annual average TP concentration was 7.2 mg/L which corresponds to 0.23 kg/d.

There are no effluent limits for the system, however, the ECA requires Oxford County to use best efforts to operate the sewage treatment facilities with the objective that the concentrations of both CBOD and Suspended Solids do not exceed 10 mg/L in the effluent ahead of the subsurface disposal system. The Mount Elgin facility met all effluent objectives for 2013.

The annual average effluent CBOD concentration was 1.8 mg/L. This represents a 98.4% removal efficiency. The annual average SS concentration was 2.5 mg/L. This represents a 95.6% removal efficiency. The annual average ammonia concentration was 1.4 mg/L. The annual average TP concentration was 6.7 mg/L which represents a 6.9% removal efficiency.

The average, maximum, and minimum influent and effluent results were calculated and are given in Table A in Exhibit 1.

Overflows, bypasses and Upset Conditions

There were no overflows, or bypasses of the treatment system.

Maintenance and Calibration

Maintenance was completed as needed on the wastewater system and was initiated by the operator during routine inspection of the system. The system is owned, operated, and maintained by Oxford County and is supervised as one of the nine wastewater treatment plants. Maintenance is completed by the southern area staff. Detailed records on each piece of equipment are kept at the Ingersoll WWTP.

R&R Instrumentation Services performed meter calibration on the influent meter and records are kept at the Ingersoll WWTP.

Other Activities

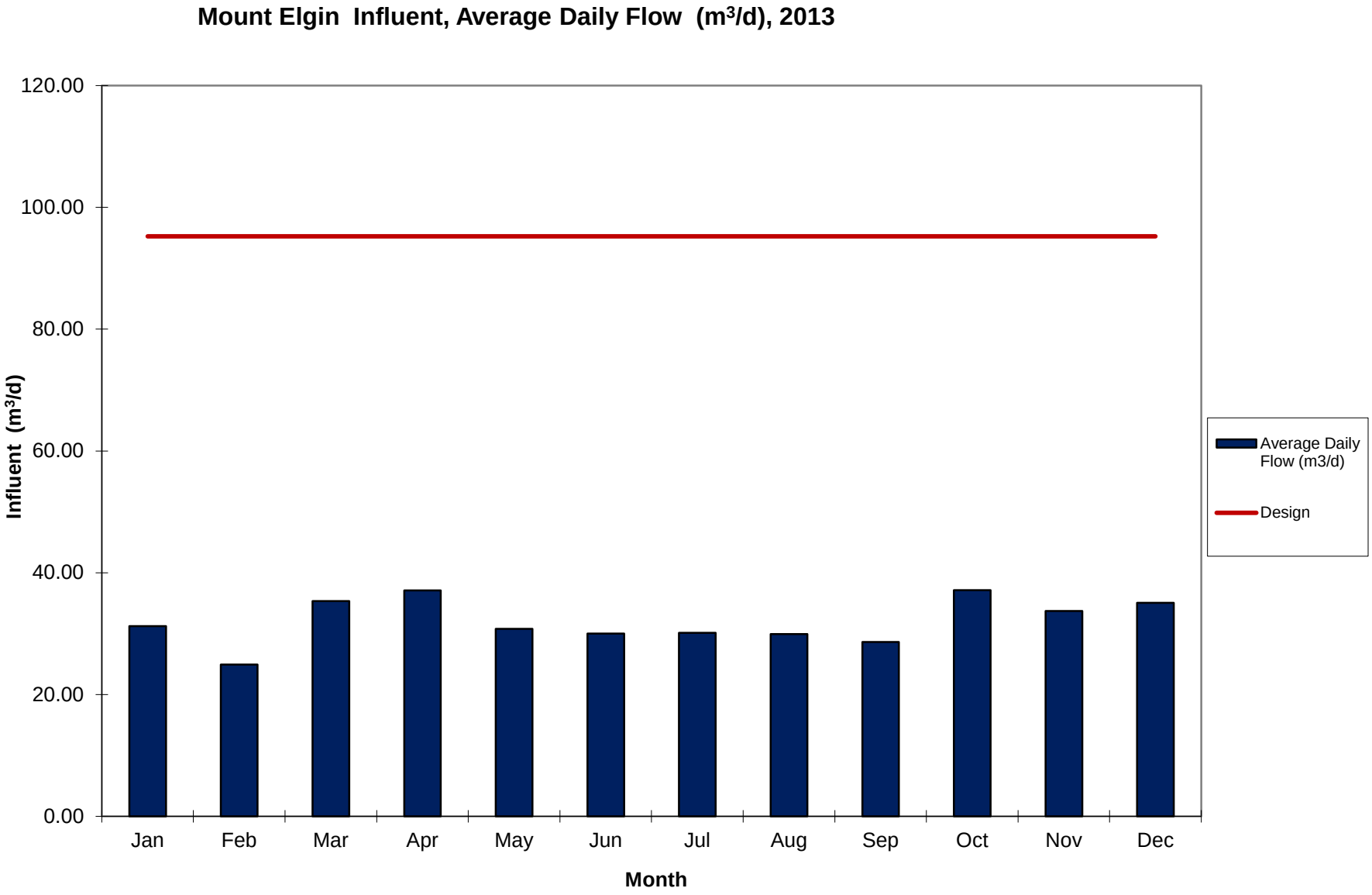
Under Exhibit 2, included in this report, are the results from groundwater monitoring for 2013 in a table format. In addition, the original monitoring report from 2006 detailing the monitoring wells is included which contains a sketch of their locations.

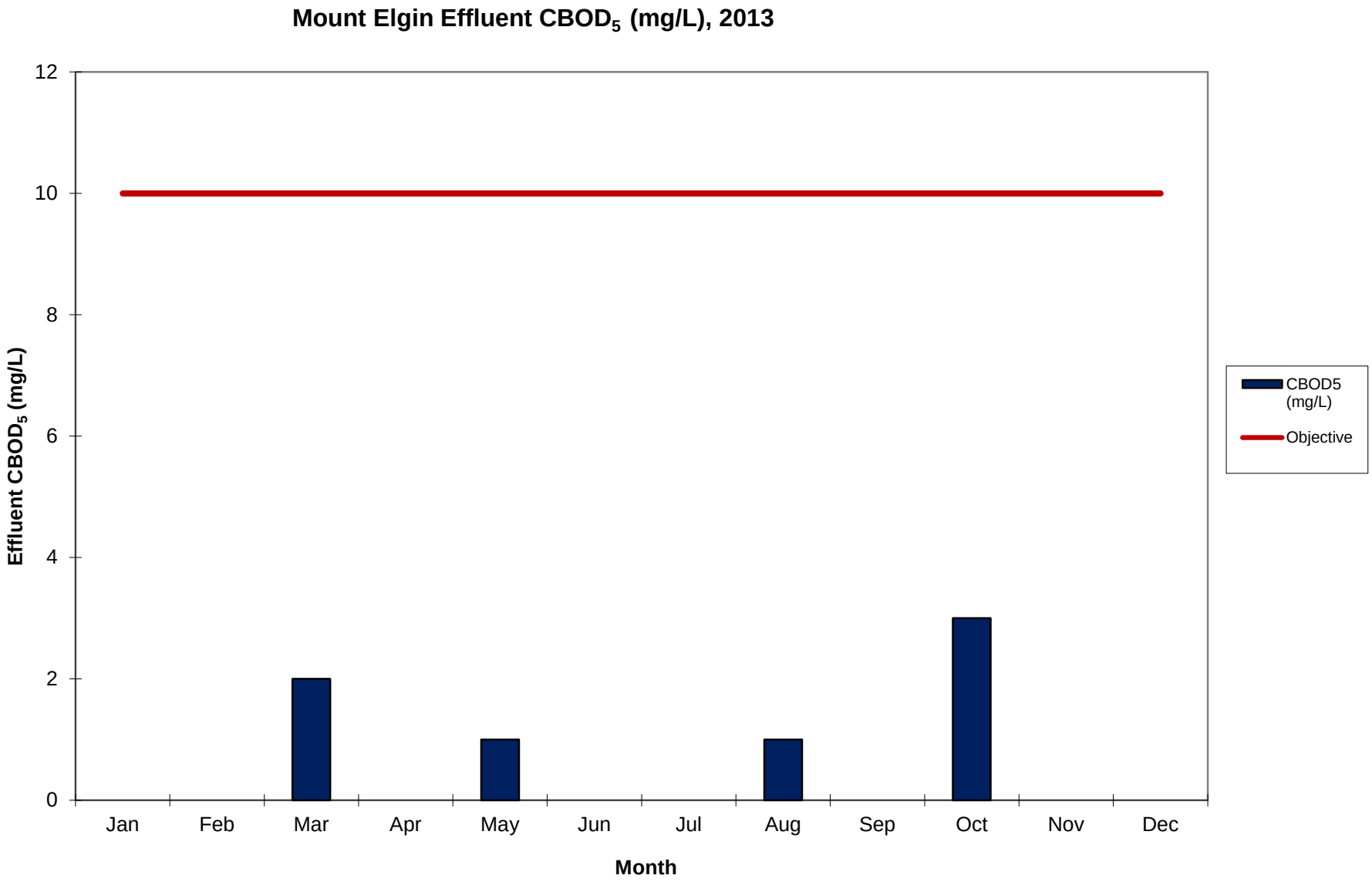
Summary

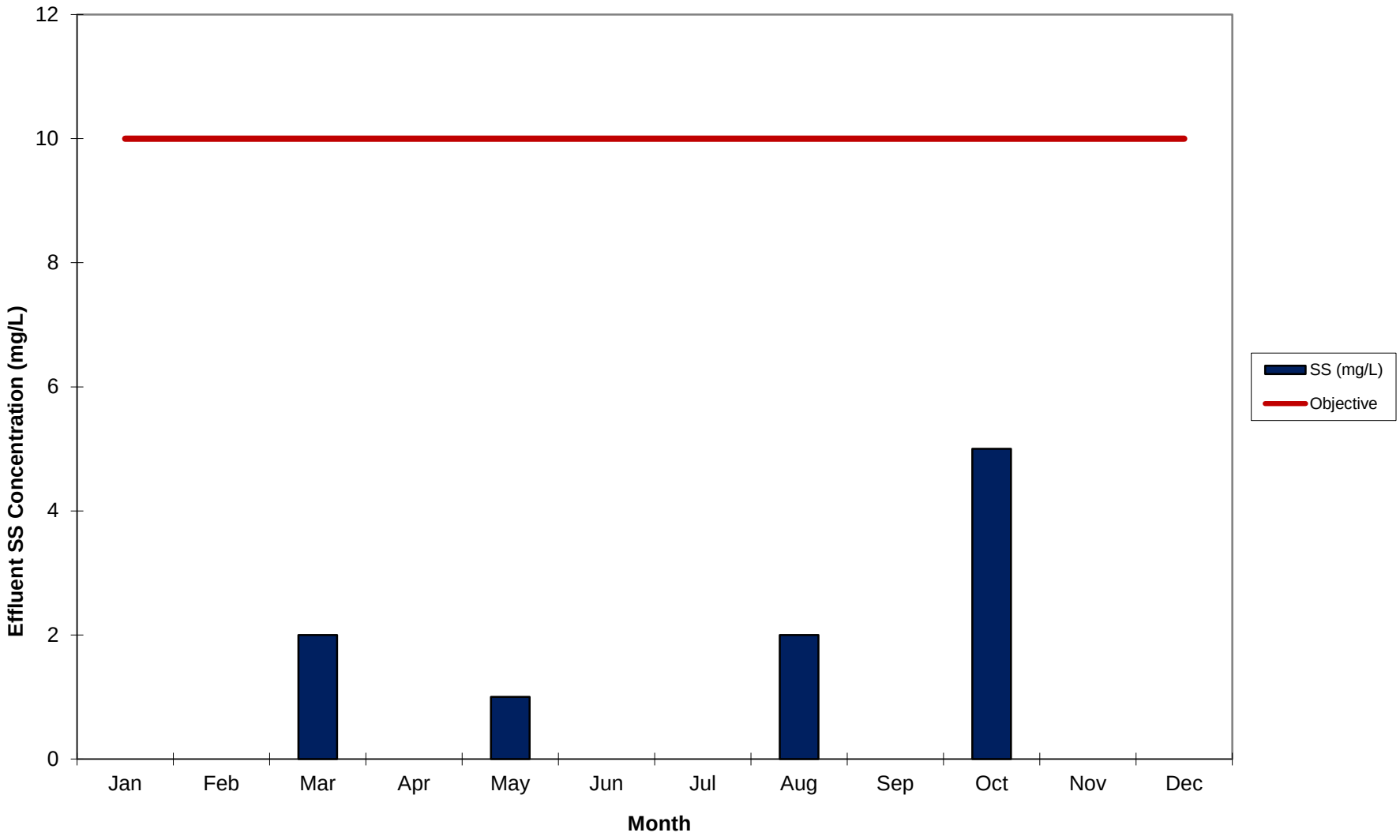
The Mount Elgin wastewater treatment system was operating within its design flow criteria and was within its objectives for 2013.

Oxford County is proceeding with design of the next phase (Phase 2) which is already included within the current ECA. Construction is scheduled for 2014.

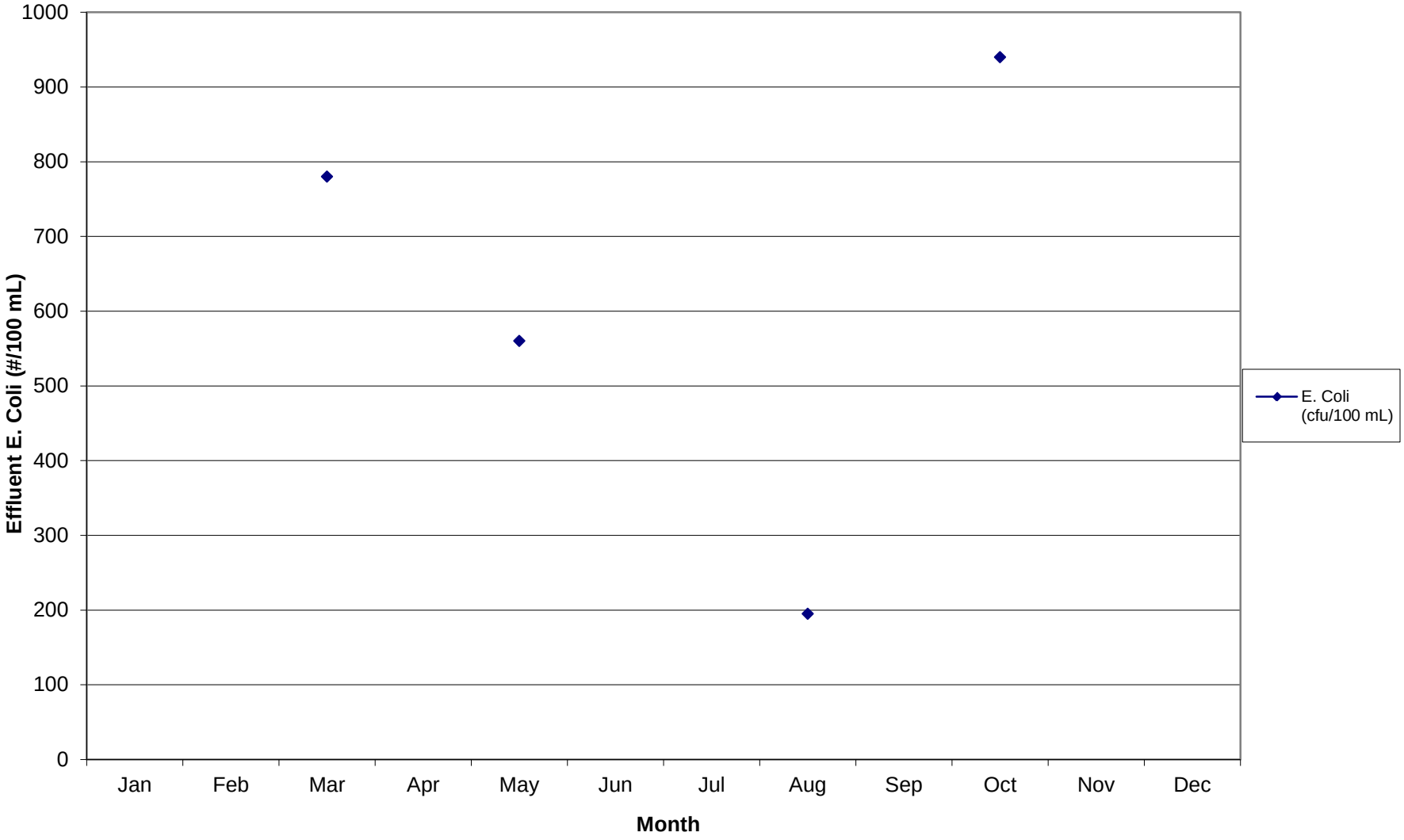
EXHIBIT 1


Mount Elgin Influent, Average Daily Flow (m3/d), 2013
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Influent (m3/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Average Daily Flow (m3/d)
Design


Mount Elgin Effluent CBOD5 (mg/L), 2013
Effluent CBOD5 (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Objective


Mount Elgin Effluent, SS (mg/L), 2013
Effluent SS Concentration (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
SS (mg/L)
Objective

Mount Elgin Effluent E. Coli (#/100 mL), 2013



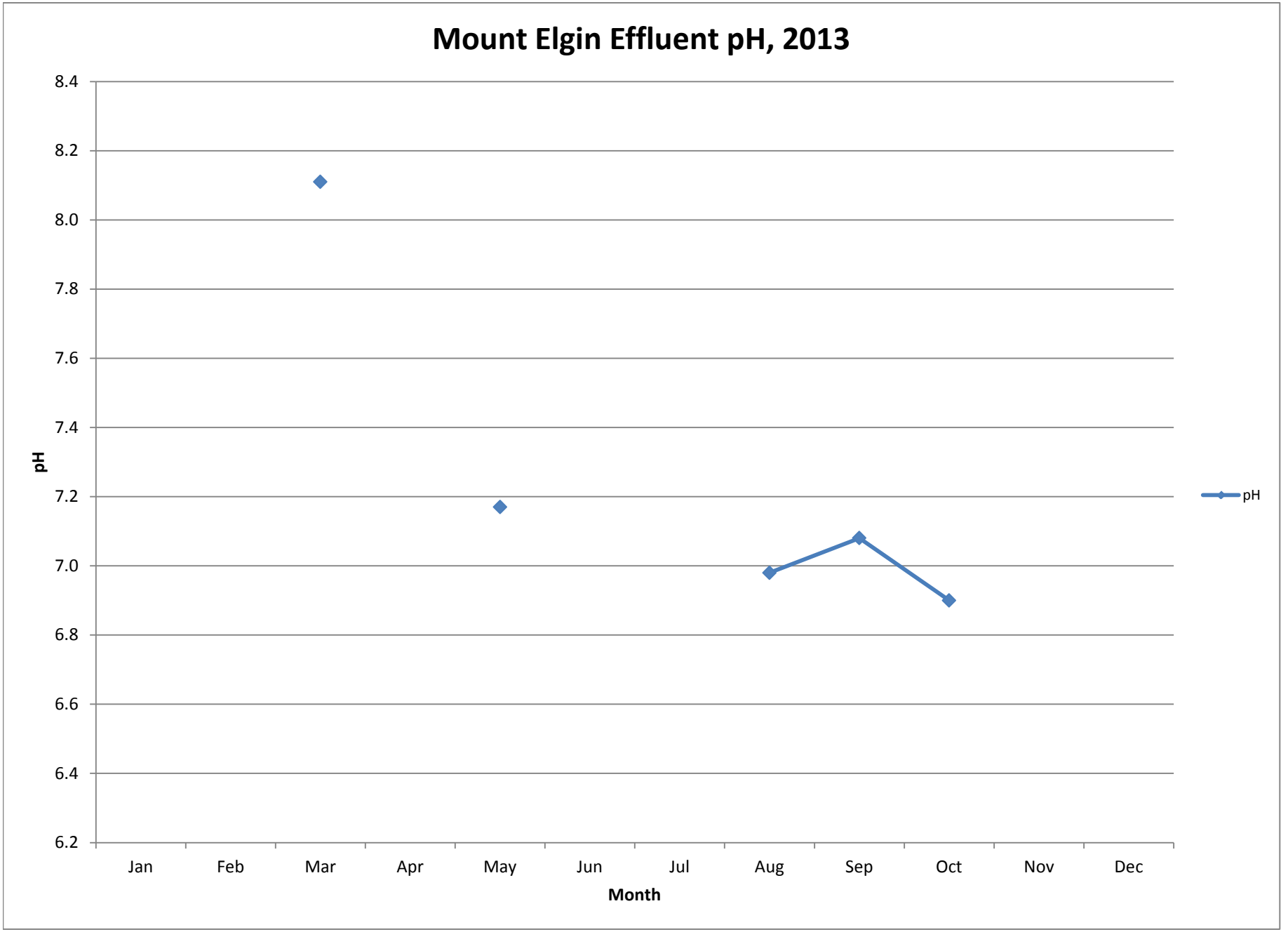

Mount Elgin Effluent pH, 2013
8.4
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
6.4
6.2
pH
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
pH

TABLE A	Mt Elgin Wastewater Draft		WORKS # 120002870		YEAR 2013											
INFLUENT FLOW	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		AVERAGE	DESIGN CRITERIA	DESIGN CRITERIA	
															Phase 1	All Phases	
TOTAL (m^3)	968	698	1096	1113	954	900	933	927	859	1151	1011	1087	TOTAL	11697			
Average Daily Flow (m^3/d)	31	25	35	37	31	30	30	30	29	37	34	35	AVERAGE DAILY FLOW	32	95.25	381	
MAX. DAILY FLOW (m^3/d)	34	34	35	41	36	32	49	31	36	45	44	42	MAX. DAILY FLOW	49			
INFLUENT RESULTS														AVERAGE		Results MAXIMUM	Results MINIMUM
CBOD5 mg/L			104		151			89		102				111.5		151	89
SS (mg/L)			30		55			70		74				57.3		74	30
TKN (mg/L)			48.8		79.1			74.6		65.7				67.1		79.1	48.8
TOTAL P. (mg/L)			4.34		8.75			9.21		6.61				7.2		9.21	4.34
pH					7.49			7.34	7.45	7.52				7.4		7.52	7.34
EFFLUENT RESULTS														AVERAGE		Results MAXIMUM	Results MINIMUM
$CBOD_5$ (mg/L)			2		1			1		3				1.8		3	1.0
SS (mg/L)			2		1			2		5				2.5		5	1.0
Ammonia (mg/L)			1.3		0.05			1.20		2.90				1.4		2.9	0.1
TKN (mg/L)			1.5		3.20			2.20		12.40				4.8		12.4	1.5
TP (mg/L)			4.0		6.3			8.4		8.1				6.7		8.38	4.0
pH			8.11		7.17			6.98	7.08	6.90				7.2		8.11	6.9
E. Coli (cfu/100 mL)			780		560			195		940				532	Geomean	940	195.0
Nitrates (mg/L)			27.3		46.0			42.6		0.03				29.0		46	0.0
Nitrites (mg/L)			0.17		0.02			0.33		0.41				0.2		0.41	0.0

EXHIBIT 2

Mt Elgin Wastewater Treatment Facility
Monitoring Well Chemistry (Lab Analyses)

		2013					
		Well 1	**Well 2**	**Well 3**	**Well 1**	**Well 2**	**Well 3**
Parameter		**March 14-13**	**March 14-13**	**March 14-13**	**June 13-13**	**June 13-13**	**June 13-13**
Well Level (metres)		3.19	3.38	3.75	3.12	3.23	3.55
Nitrite (mg/L N)		< 0.06	< 0.06	< 0.06	< 0.03	< 0.03	< 0.03
Nitrate (mg/L N)		< 0.05	8.25	< 0.05	< 0.06	11.1	< 0.06
Nitrate+Nitrite (mg/L N)		< 0.06	8.25	< 0.06	< 0.06	11.1	< 0.06
Ph		7.89	7.98	8	7.71	7.78	7.85
		Well 1	**Well 2**	**Well 3**	**Well 1**	**Well 2**	**Well 3**
Parameter		**August 28-13**	**August 28-13**	**August 28-13**	**November 9/13**	**November 9/13**	**November 9/13**
Well Level (metres)		2.63	3.01	3.43	3.23	3.58	3.88
Nitrite (mg/L N)		< 0.03	< 0.03	< 0.03	<0.03	<0.03	<0.03
Nitrate (mg/L N)		< 0.06	6.87	< 0.06	<0.06	8.89	<0.06
Nitrate+Nitrite (mg/L N)		< 0.06	6.87	< 0.06	<0.06	8.89	<0.06
Ph		8.06	7.98	8.1	7.9	7.76	7.77

5849E1.L03

January 24, 2006

EMAIL TRANSMISSION

The Corporation of the County of Oxford
P.O. Box 397
21 Market Square
Woodstock, Ontario
N4S 7Y3

Attention: Mr. Todd Gregg, C.E.T.
Oxford County Water and Wastewater Operations Coordinator

Dear Sir:

Re: Installation of Monitoring Wells for Mount Elgin Wastewater Treatment System
Lots 12 and 13, Concession 4 (Former Township of Dereham)
Township of South-West Oxford, County of Oxford

Please find enclosed our report of the installation of on-site monitoring wells as part of the groundwater monitoring program for the Mount Elgin Wastewater Treatment System, as required by terms and conditions of Ministry of The Environment (MOE) Certificate of Approval (C of A) Number 4672-5EAGKD.

Monitoring Program

In order to comply with the monitoring requirements of the C of A, Naylor Engineering Associates Ltd. (Naylor Engineering) was retained by the County of Oxford to drill and sample three on-site boreholes, and to install groundwater monitoring wells at each borehole location. The boreholes were located around the perimeter of the leaching beds in order to monitor groundwater conditions both up and down gradient of the treatment system The installed monitoring wells were surveyed for location (±0.3 m) and elevation (±0.03 m), relative to a geodetic site benchmark, by the County of Oxford, as shown in the attached Site Plan, from the County of Oxford.

Quality assurance/quality control (QA/QC) was maintained during the field program through equipment decontamination, and the in-house QA/QC measures implemented by the analytical laboratory.

On December 21, 2005, the boreholes and monitoring well installations were completed using a CME-55 track-mounted drill rig equipped with continuous flight hollow stem augers, supplied and operated by Geo-Environmental Drilling Ltd., under the direction of Naylor Engineering staff. Soil cuttings generated during the drilling operations were stockpiled on site adjacent to the borehole locations.

The monitoring wells were constructed, developed, and sampled by Naylor Engineering staff in accordance with the procedures specified in the MOE's Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. This ensures that sampling activities and laboratory procedures comply with industry-accepted standards, and that the results are suitable for future use.

As per the requirements of Ontario Regulation 903, of the Ontario Water Resources Act, the licensed drilling contractor will forward a completed well record to the property owner and the Ministry of the Environment for Ontario. This regulation encompasses test holes and provides detailed requirements for monitoring well construction, test hole sealing, well record submission, drilling contractor licensing, well tagging, protective covers, and decommissioning.

Monitoring Well Installation and Well Development

The subsurface conditions encountered at the borehole locations generally comprised surficial topsoil and sand, underlain by native deposits of sand, and sand and gravel; further underlain by native silt and silt till. The boreholes were terminated in the silt and silt till soils, at depths of 3.66 to 3.96 m below existing grade. Descriptions of the soil stratigraphy and well construction details are contained on the appended borehole logs.

Each monitoring well was constructed using flush-threaded 50 mm diameter Trilock pipe with rubber O-ring seals to prevent leakage. The monitoring well screens comprised 3 m lengths of 10-slot well screen delivered to the site pre-cleaned, and enclosed in individually sealed plastic bags. Prior to installation, the screens and riser pipes were not allowed to come into contact with the ground or any drilling equipment.

The wells were installed by inserting the screen and pipe into the hollow stem of the augers and then pulling back the augers. Sand was added as the augers were removed in order to pack the screens in place. Sand filter material was added until the level of sand was approximately 60 cm above the top of the screens. Bentonite seals were then placed at the top of each sand pack up to the ground surface to prevent the infiltration of surface water. Protective steel well casings with locking caps were installed for each well and concreted into place. The tops of the riser pipes were vented to allow accurate measurement of stabilized groundwater levels.

Dedicated Waterra™ tubing and inertial pumps (i.e. foot valves) were installed in the wells to facilitate well development and groundwater sampling, and to eliminate the possibility of cross contamination during sampling activities. On January 4, 2006 (approximately two weeks after drilling to allow the wells to equilibrate and to allow disturbance from drilling to subside) the static groundwater level was measured at each monitoring well location using a Heron water level meter. The water table was encountered at depths of 0.26 to 0.71 m below grade, corresponding to Elevations 273.21 to 273.80 m) as shown on the appended borehole logs.

The tape measure and probe were washed with an Alconox solution spray and then rinsed with distilled water prior to, and on completion of all measurements. After measuring the static water levels, the monitoring wells was purged of a minimum of five well volumes, prior to obtaining groundwater samples using the dedicated Waterra™ tubing and inertial pump installed in the wells. Well development water from the purging process was re-infiltrated onto the ground surface. Groundwater characteristics, including temperature, pH, and electrical conductivity were monitored and recorded in the field during well development and sampling, to ensure that the groundwater matrix had stabilized after drilling and well-purging and that representative water samples were obtained.

Groundwater Sampling and Analytical Testing

Following well development, representative groundwater samples were obtained by Naylor Engineering staff and submitted to the County of Oxford, to forward to SGS Lakefield Research Limited of Lakefield, Ontario, a CAEL-accredited analytical testing laboratory. Groundwater samples collected from the monitoring wells were collected directly from the pump discharge line into the appropriate sample containers supplied by the analytical laboratory. Samples were packaged in a rigid, thermally insulated cooler to maintain specified sample temperatures ($4^{o}C$). A completed chain of custody form prepared by County of Oxford staff accompanied the samples.

All groundwater sampling and analytical testing was completed in accordance with the Guidance on Sampling and Analytical Methods for Use at Contaminated Sites In Ontario (MOE, 1996). Standard laboratory QA/AC procedure will be followed to ensure the quality of analytical results obtained from all samples. The analytical test results, as reported to the County of Oxford by SGS Lakefield Research Limited, are enclosed.

We trust that this letter report is sufficient to meet the requirements of the County of Oxford, and the Ministry of the Environment. If you have any questions or comments regarding the information presented herein, please contact the undersigned at your convenience.

Yours very truly,

Bill Leedham, C.E.T., C.E.S.A.
Senior Environmental Technologist

Carol L. Mitchell, P.Eng.
Senior Environmental Engineer

jmp

Att.
Encl. Borehole/Monitoring Well Logs (MW1, MW2, and MW3)
Encl. Site Plan (as supplied by the County of Oxford)
Encl. Certificate of Analysis from SGS Lakefield Research Limited

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Monitoring Well Number: 1

Ground Elevation: *273.68 m*

Project: *Monitoring Program for Wastewater Plant*

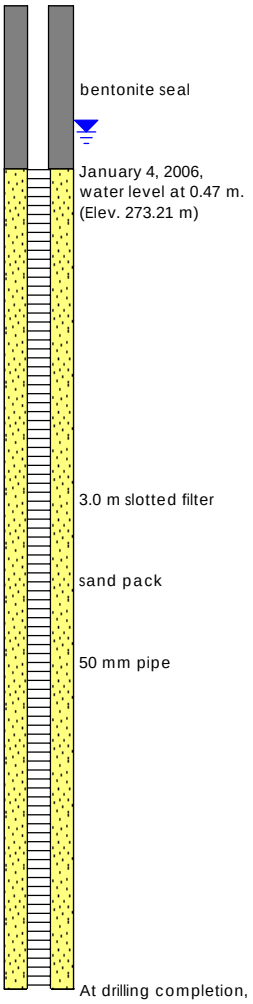
Job No.: *5849E1*

Location: *Mount Elgin Wastewater Treatment Plant, Mount Elgin, Ontario*

Drill Date: *December 21, 2005*

Depth (m)	Description	Elevation (m)	Sample Number	Sample Type	N-Value
	Ground Elevation	273.68			
0.00	***SAND:*** loose grey silty sand, very moist to wet	273.00			
1.00					
	SILT: loose grey sandy silt, wet	272.00	1	SS	8
2.00					
		271.00	2	SS	5
3.00					
	Monitoring Well terminated at 3.66 m.	270.00			
4.00					

Dynamic Cone: 20 40 60 80
Standard Penetration: 20 40 60 80
Shear Strength (PP) kPa: 50 100 150 200
Shear Strength (FV) kPa: 50 100 150 200
Water Content (%): WP WL; 10 20 30



Reviewed by: *BL*

Field Tech.: *BL*

Drill Method: *Solid Stem Auger*

Sheet: *1 of 1*

Notes: *Top of Casing Elevation: 274.48 m.*

Drafted by: *SR(00b)*

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Monitoring Well Number: 2

Ground Elevation: *274.51 m*

Project: *Monitoring Program for Wastewater Plant*

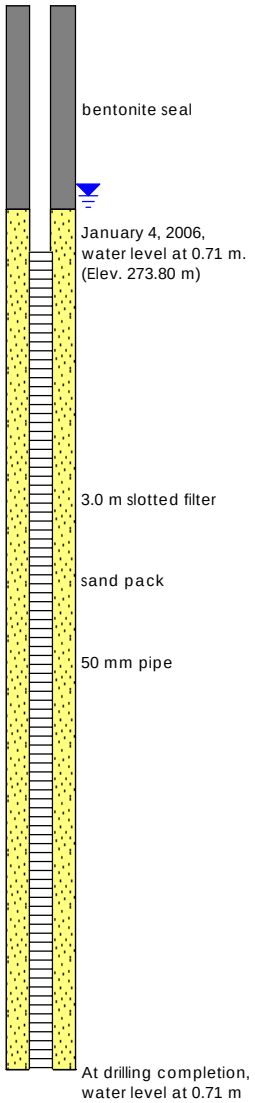
Job No.: *5849E1*

Location: *Mount Elgin Wastewater Treatment Plant, Mount Elgin, Ontario*

Drill Date: *December 21, 2005*

Depth (m)	Description	Elevation (m)	Number	Type	N-Value
	Ground Elevation	274.51			
0.00	***SAND:*** compact grey coarse sand, occasional gravel, trace silt, wet	274.00			
1.00	***SILT:*** compact grey sandy silt, interlayered with coarse sand and gravel, wet	273.00	1	SS	12
2.00		272.00			
3.00	***SILT TILL:*** loose to compact grey silt till, trace clay and fine sand, very moist	271.00	2	SS	7
4.00	Monitoring Well terminated at 3.96 m.	270.00			

Dynamic Cone: 20 40 60 80
Standard Penetration: 20 40 60 80
Shear Strength (PP) kPa: 50 100 150 200
Shear Strength (FV) kPa: 50 100 150 200
Water Content (%): WP WL; 10 20 30



Reviewed by: *BL*

Field Tech.: *BL*

Drill Method: *Solid Stem Auger*

Sheet: *1 of 1*

Notes: *Top of Casing Elevation: 275.21 m.*

Drafted by: *SR(00b)*

Naylor Engineering Associates Ltd.
CONSULTING ENGINEERS

Monitoring Well Number: 3

Ground Elevation: *274.03 m*

Project: *Monitoring Program for Wastewater Plant*

Job No.: *5849E1*

Location: *Mount Elgin Wastewater Treatment Plant, Mount Elgin, Ontario*

Drill Date: *December 21, 2005*

Depth (m)	Description	Elevation (m)	Number	Type	N-Value
	Ground Elevation	274.03			
0.00	***SAND AND GRAVEL:*** loose to compact grey/brown silty sand and gravel, very moist to wet				
		273.00	1	SS	16
1.00					
2.00		272.00			
3.00		271.00	2	SS	12
	SILT: compact grey sandy silt, wet				
4.00	Monitoring Well terminated at 3.96 m.	270.00			

Dynamic Cone: 20 40 60 80
Standard Penetration: 20 40 60 80
Shear Strength (PP) kPa: 50 100 150 200
Shear Strength (FV) kPa: 50 100 150 200
Water Content (%): WP WL; 10 20 30

Groundwater Observations and Standpipe Details:
- January 4, 2006, water level at 0.26 m. (Elev. 273.77 m)
- 3.0 m slotted filter
- sand pack
- 50 mm pipe
- At drilling completion, water level at 0.26 m

Reviewed by: *BL*

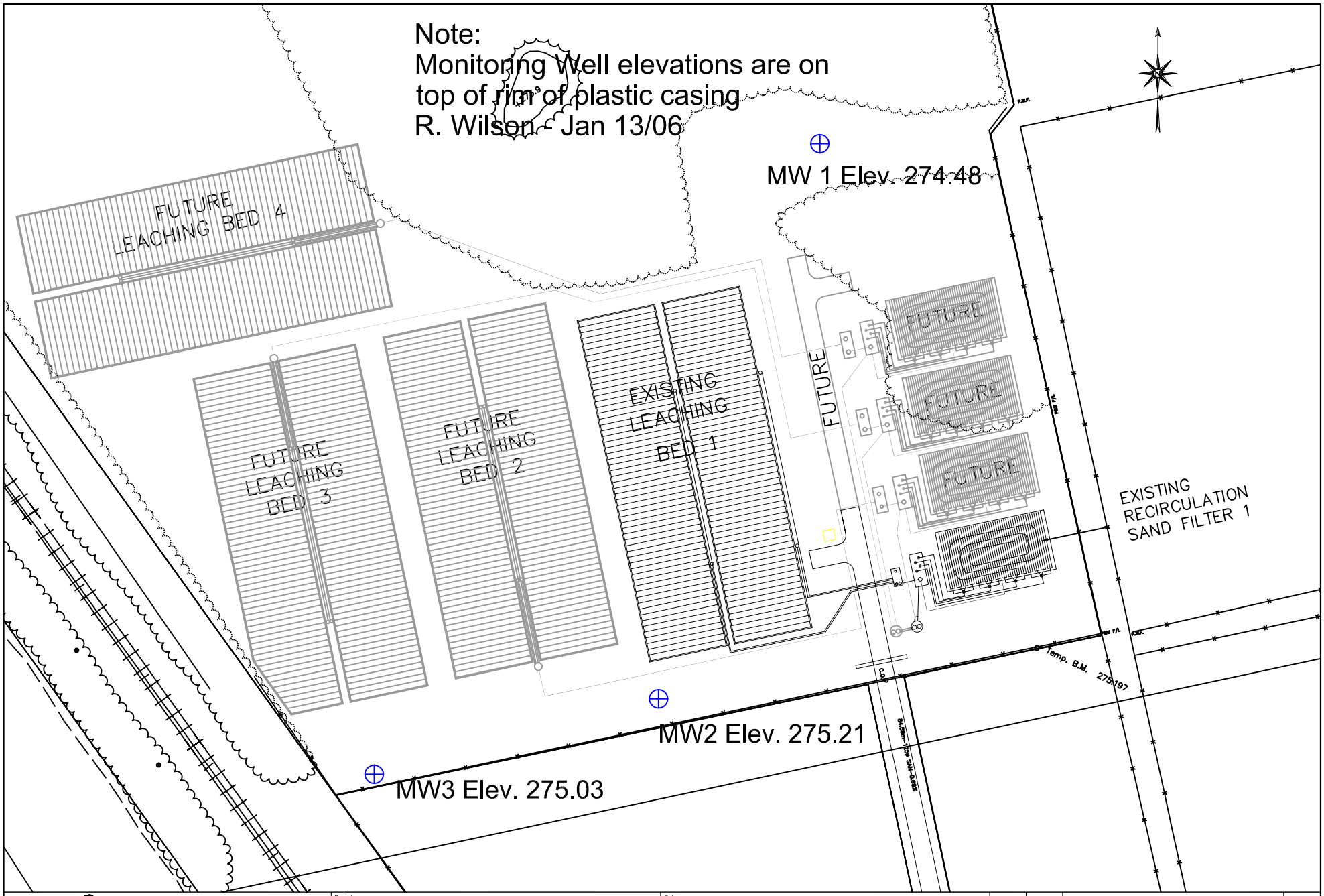
Field Tech.: *BL*

Drill Method: *Solid Stem Auger*

Sheet: *1 of 1*

Notes: *Top of Casing Elevation: 275.03 m.*

Drafted by: *SR(00b)*



OxfordCounty
growing stronger...together
PUBLIC WORKS
21 MARKET SQUARE, BOX 397
WOODSTOCK, ONT. N4S-7Y3
PHONE: (519)539-9800 FAX: (519)421-2207

Project: MOUNT ELGIN WASTEWATER TREATMENT PLANT	Date: Jan 13/06
Drawing Title:	File Location: X:\wip\brian\MtElginWWTP_SitePlan.dwg
Scale: No Scale	Drawn By: BH

REV #	DATE	REVISIONS & ADDITIONS	BY

SGS Lakefield Research Limited
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2038 FAX: 705-652-6441

County of Oxford (Mount Elgin WWTP Monitoring Wells)
Attn : Linda Truscott ltruscott@ocl.net; tgregg@ocl.net

21 Market St.
Woodstock, ON
N4S 1H6,

Phone: 519-421-2203 ext:226/519-539-0015 dial 7 x3115519-539-9800
Fax:pdf format

Wednesday, January 11, 2006

Date Rec. : 05 January 2006
LR Report: **CA12116-JAN06**

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Approval Date	4: Analysis Approval Time	5: NR Mount Elgin WWTP MW 1	6: NR Mount Elgin WWTP MW 2	7: NR Mount Elgin WWTP MW 3
Sample Date & Time					04-Jan-06	04-Jan-06	04-Jan-06
Temperature [°C]	---	---	---	---	10.8	10.8	10.8
pH [no unit]	06-Jan-06	13:11	09-Jan-06	09:44	7.71	7.87	7.69
Phosphate [mg/L]	05-Jan-06	20:22	09-Jan-06	13:55	< 1	< 1	< 1
Chloride [mg/L]	05-Jan-06	20:22	11-Jan-06	14:19	3.1	< 2.0	9.5
Nitrite (as nitrogen) [mg/L]	05-Jan-06	20:22	06-Jan-06	14:32	< 0.06	< 0.06	< 0.06
Nitrate (as nitrogen) [mg/L]	05-Jan-06	20:22	06-Jan-06	14:32	< 0.05	2.90	< 0.05
Nitrate + Nitrite (as nitrogen) [mg/L]	05-Jan-06	20:22	06-Jan-06	14:32	< 0.06	2.90	< 0.06
Diss.Reactive Phos. [mg/L]	11-Jan-06	09:25	11-Jan-06	12:26	< 0.03	< 0.03	< 0.03

Carrie Greenlaw
Project Coordinator
Environmental Services, Analytical

OnLine LIMS