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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Woodstock Wastewater Treatment Plant (WWTP), 2012

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, County of Oxford

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater 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 the Mount Elgin recirculating sand filter (RSF).

Oxford County is centrally located in Southwestern Ontario 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.

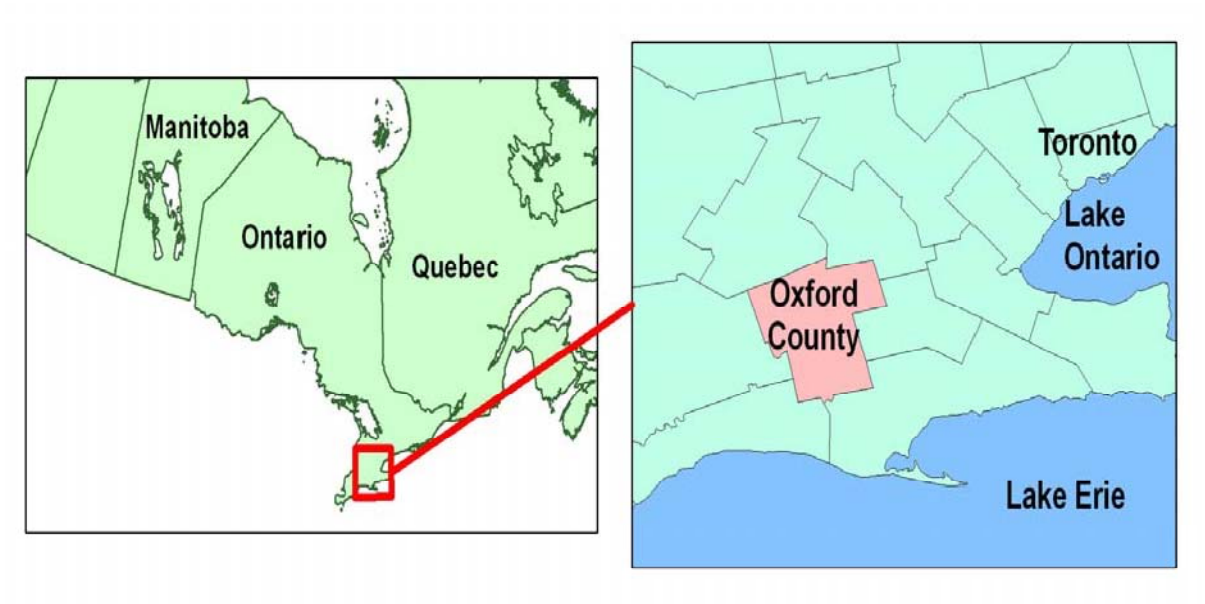


Figure 1 – Location of Oxford County

Treatment Plant Description

The Woodstock WWTP provides wastewater treatment for residential, commercial and industrial users in the City of Woodstock and for the Villages 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 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 2012, with an average flow for the plant of 19,876 m^3/day which represents 60.2% of the design capacity of 33,000 m^3/day. The total flow for 2012 was 7,271,509 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 - 19,876 m^3 / day
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 2012 was 7,271,509 m^3. The daily average flow was 19,876 m^3/day which represents 60.2% 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 165 mg/L, which represents an average loading of 3,280 kg/day. The average $CBOD_5$ concentration was 140 mg/L (or 2783 kg/day of loading). The average suspended solids concentration was 218 mg/L (or 4333 kg/day of loading). Average nitrogen levels, as TKN were 27.4 mg/L (or a loading of 544 kg/day). Total phosphorus was 4.9 mg/L, which represents a loading of 97 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 2.3 mg/L (or an equivalent 98.4% reduction). The suspended solids average was 3.6 mg/L, which represents a 98% reduction. Ammonia averaged 0.16 mg/L (or a 99.1% reduction). Total phosphorus average was 0.2 mg/L, which represents a 92% 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 2012.

Staff tests Total Residual Chlorine (TRC) 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. There were five individual TRC results at 0.05 mg/L and two at 0.06 mg/L in the months of May and June 2012 which may have been caused in part by a small leak and a faulty sensor. The Federal Government's P2 target for TRC of 0.02 mg/L was achieved on an average of six monthly results (disinfection from May through to October 2012).

There was no reported non-compliant event for the Woodstock Wastewater Treatment Plant for any discharge parameter in 2012 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.

Overflows, Bypassing, Upset and Abnormal Conditions

There were no bypasses or overflows from the Woodstock WWTP in 2012 and there were no upset conditions noted during the year.

There was an overflow of 2-3 m^3 of wastewater from the collection system on June 6th, 2012 at Devonshire Ave. and Cree Ave. This was reported to the MOE at the time it occurred. It took place during maintenance work when the discharge outlet was momentarily blocked. The duration was approximately 90 seconds and the wastewater flowed into a storm sewer leading to the Thames River (Pittock Reservoir). Staff visually inspected the outfall and did not detect any evidence of a spill.

Maintenance and Calibration

The operating and maintenance staff at the Woodstock WWTP conducts regular 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

Discussion:

The 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 prior to land application. The testing results and land application details are summarized in a separate Biosolids report, appended.

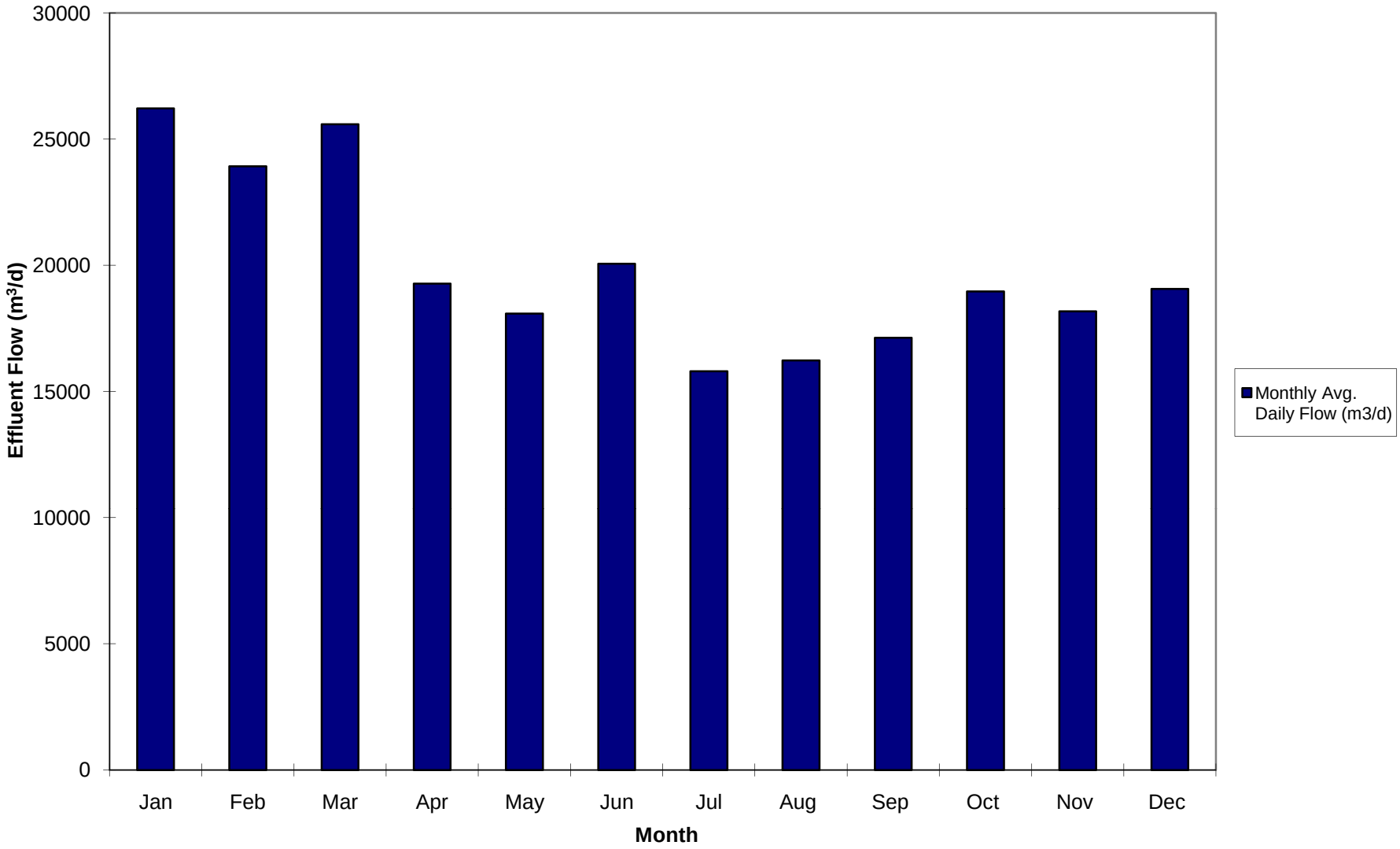
Haulers Report

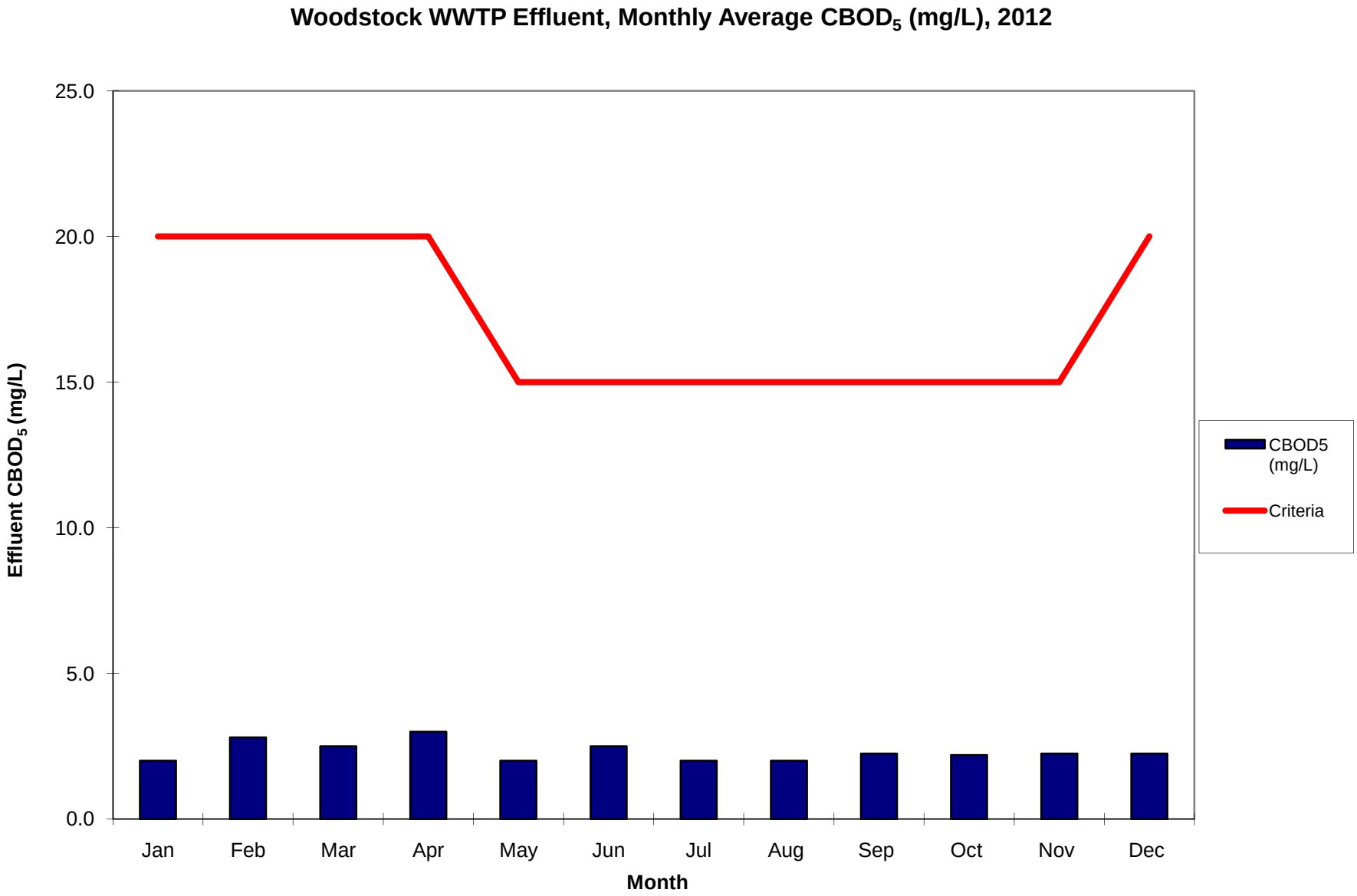
Exhibit 2 is a summary table for incoming septic haulers for volumes.

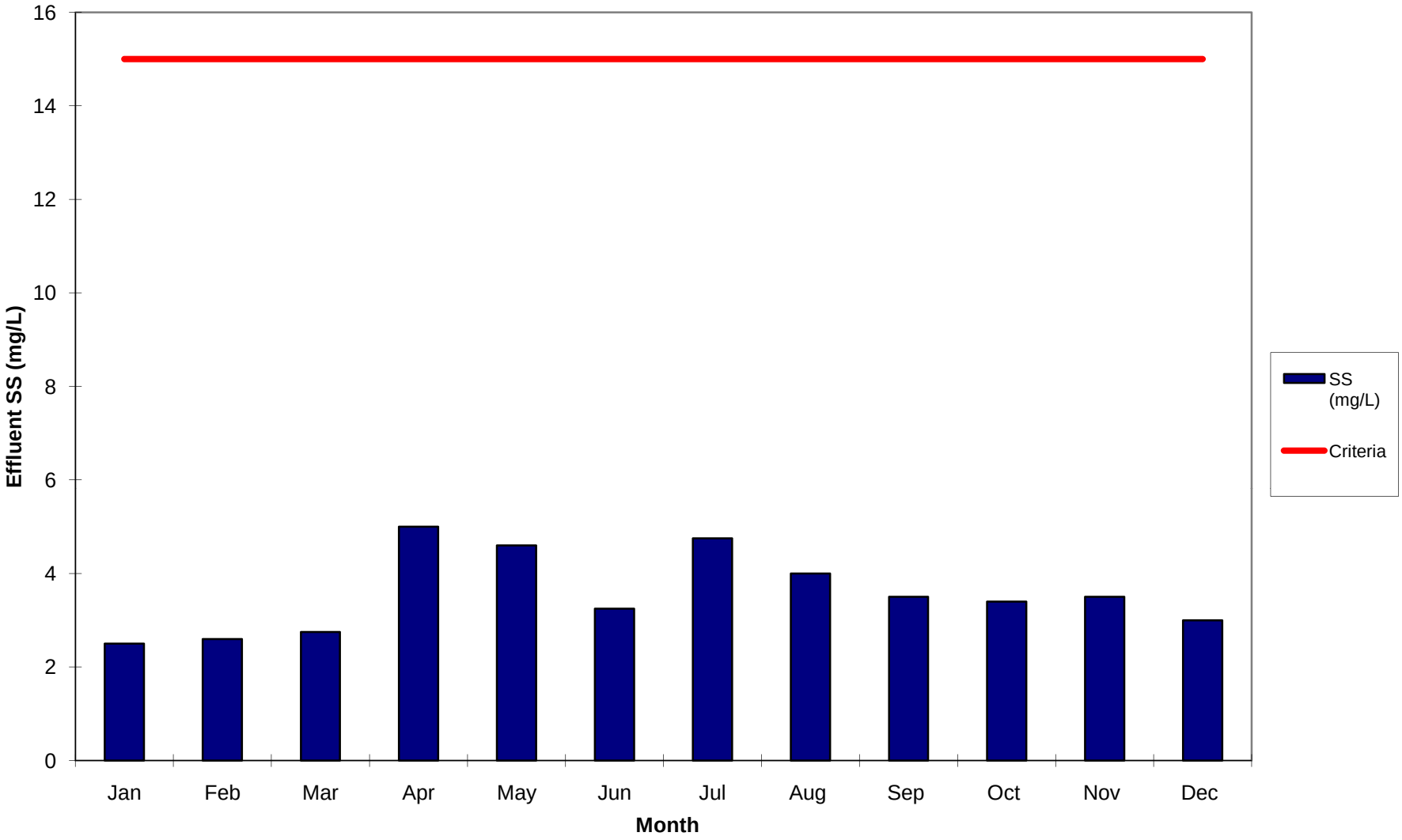
Summary

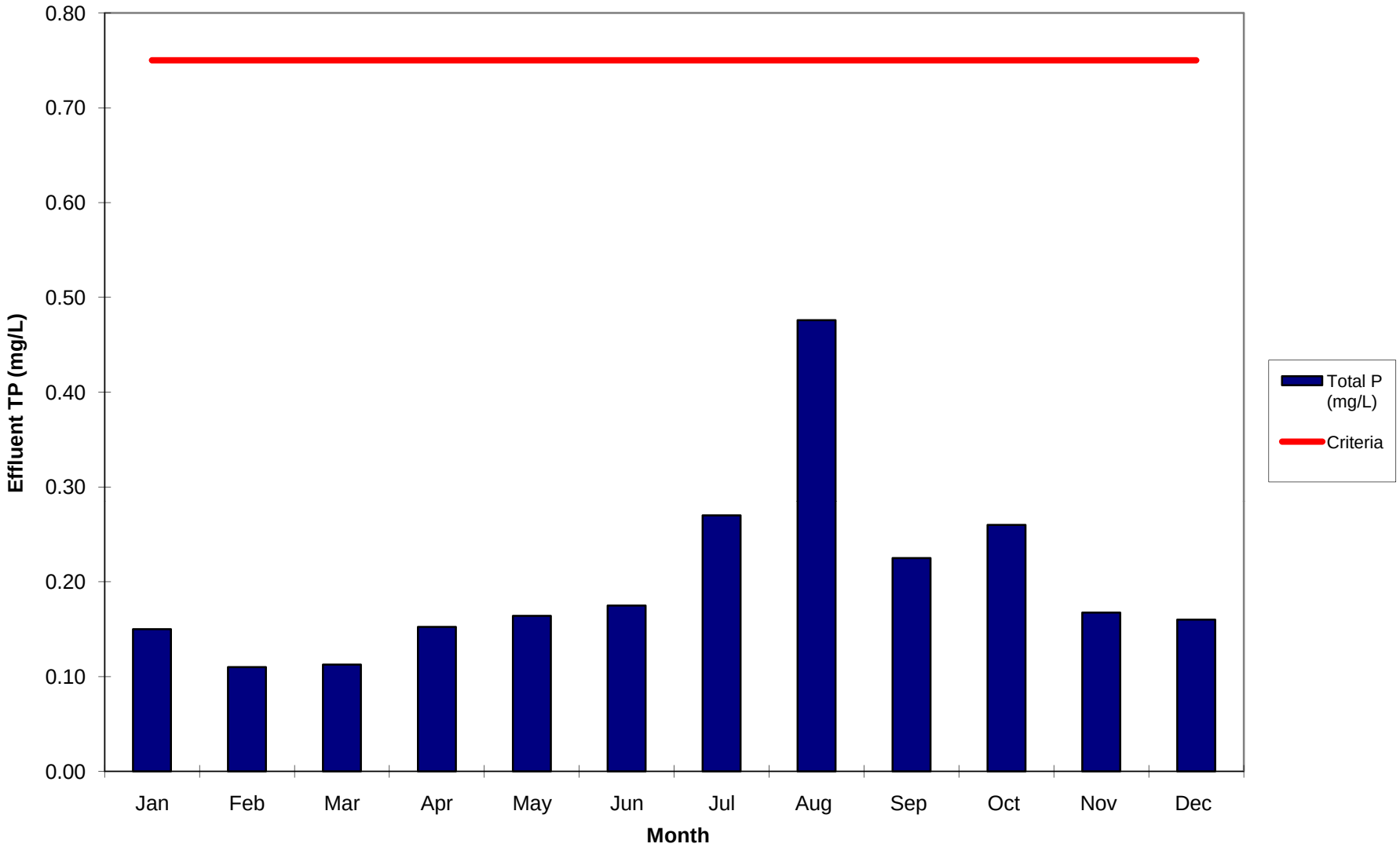
The Woodstock WWTP was operating within its design flow criteria and was within its discharge limits for 2012.

Exhibit 1

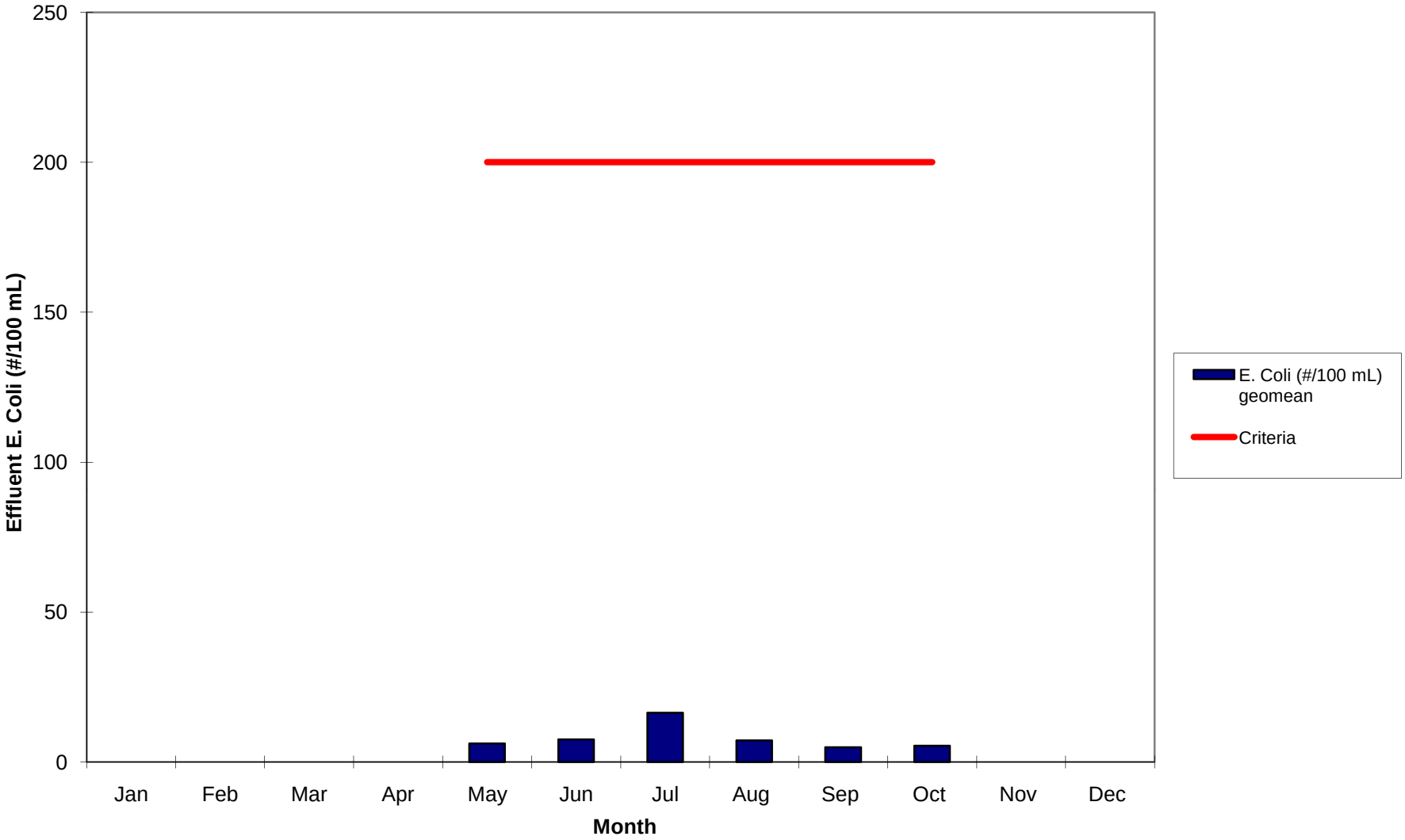

Woodstock WWTP Effluent, Monthly Average Daily Flow, 2012
30000
25000
20000
15000
10000
5000
0
Effluent Flow (m³/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Monthly Avg. Daily Flow (m3/d)


Woodstock WWTP Effluent, Monthly Average CBOD5 (mg/L), 2012
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

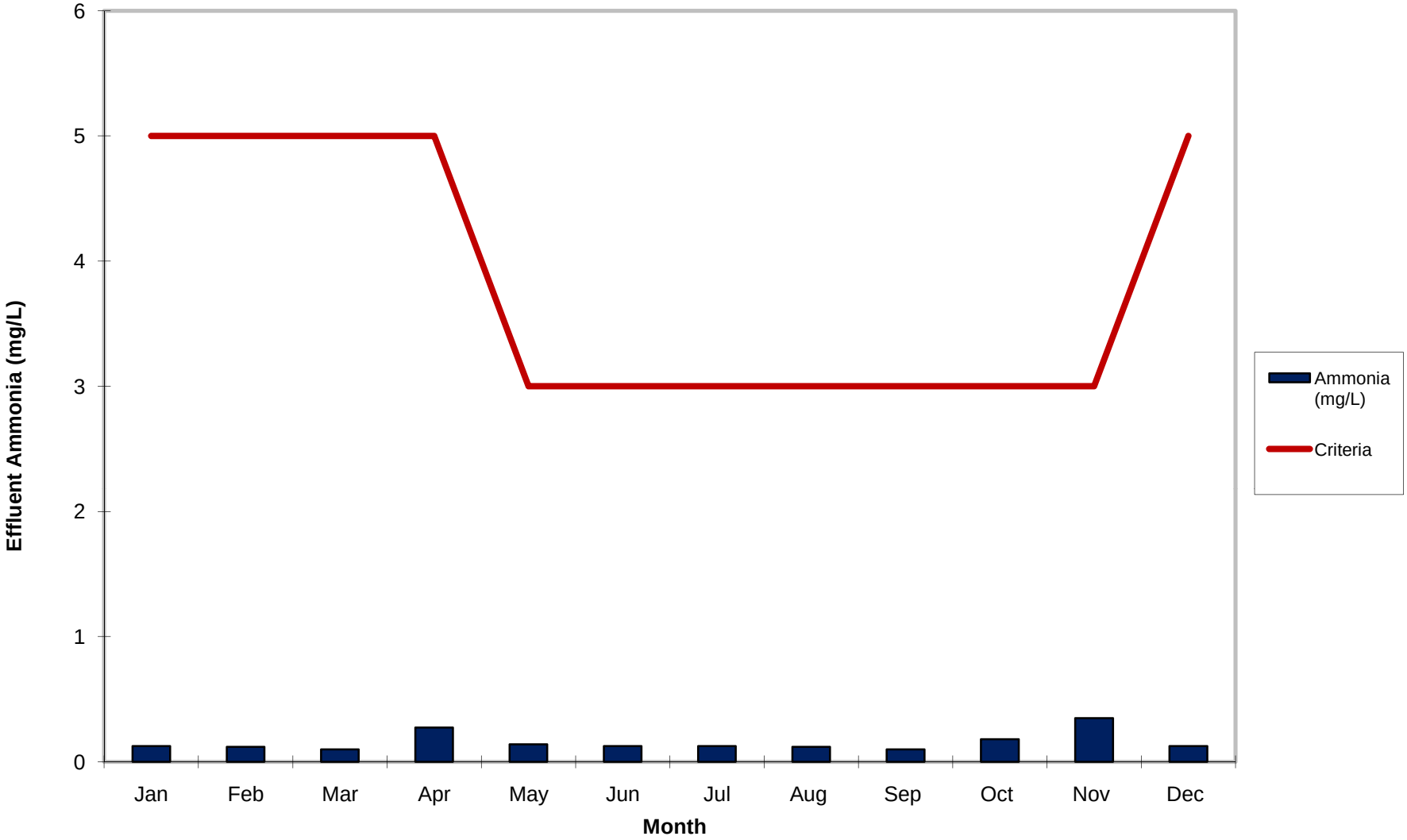

Woodstock WWTP Effluent, Monthly Average SS (mg/L), 2012
Effluent SS (mg/L)
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
SS (mg/L)
Criteria


Woodstock WWTP Effluent, Monthly Average TP (mg/L), 2012
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

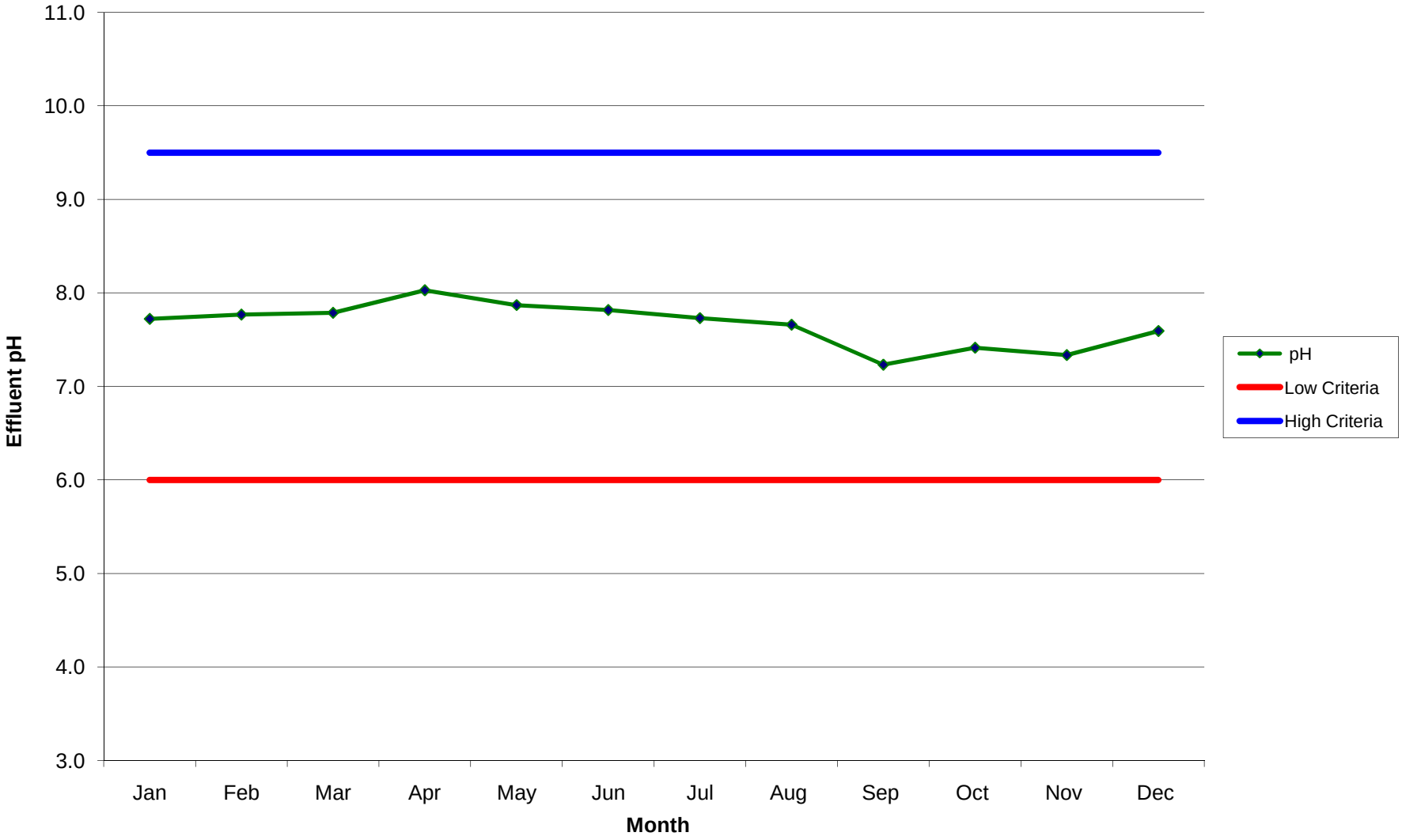
Woodstock WWTP Effluent, Monthly Geomean E. Coli, 2012



Woodstock WWTP Effluent, Monthly Average Ammonia (mg/L), 2012



Woodstock WWTP Effluent, Monthly Average pH, 2012



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

2012

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Total 1000m3	
Total Flow (m^3)	812720	693691	793299	578263	560695	601864	489839	503020	513768	588036	545385	590929				7271509	7272	Design
Monthly Avg. Daily Flow (m3/d)	26216.8	23920.4	25590	19275.4	18086.9	20062.1	15801.3	16226.5	17125.6	18968.9	18179.5	19062.2	19876	15801	26217			33000
Min. Daily Flow (m^3/d)	19163	19162	17373	12878	14004	14318	12939	10975	12639	12744	13481	14666	14529	10975	19163			60.2%
Max. Daily Flow (m3/d)	34961	30133	34000	25396	22229	31811	19513	23928	24995	31786	24951	26795	27542	19513	34961			
Influent																		
BOD_5 (mg/L)	212.5	123.2	161.5	163.0	168.2	164.5	168.5	174.0	175.5	173.0	124.3	173.5	165	123.2	213			
SS (mg/L)	295.5	180	248	167	250	182	149	206	245	282	205	202	218	149	296			
Total P (mg/L)	9.0	2.8	5.9	3.1	5.5	3.3	4.0	4.5	4.8	8.4	4.0	3.7	4.9	2.8	9.0			
NH3+NH4-N (mg/L)	15.8	17.4	14.6	18.1	17.3	16.3	18.1	21.4	19.2	20.2	17.6	17.9	17.8	14.6	21.4			
TKN (mg/L)	34.4	24.1	27.6	20.5	31.8	23.1	25.4	29.8	27.0	35.5	24.4	25.2	27.4	20.5	35.5			
NITRITE (mg/L)	0.32	0.25	0.25	0.13	0.06	0.06	0.06	0.06	0.06	0.17	0.06	0.10	0.13	0.06	0.32			
NITRATE (mg/L)	1.09	0.52	0.29	0.07	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.20	0.05	1.09			
pH	7.88	7.91	7.73	8.03	7.89	7.78	7.74	7.63	7.25	7.60	7.5	7.77	7.73	7.25	8.03			
Temp Celcius	11.5	11.4	12.2	13.9	14.8	17.8	19.6	19.7	18.9	17.1	15.3	13.5	15.5	11.4	19.7			
$CBOD_5$ (mg/L)	163	119	138	121	156	135	132	139	135	164	114	160	140	114	164			
Primary Effluent																		Criteria
BOD5 (mg/L)	69	69	80	92	131	98	48	48	50	99	168	91	87	48	168			
SS (mg/L)	109	103	98	116	183	131	68	56	72	180	261	170	129	56	261			
Total P (mg/L)	2.1	2.2	2.0	2.6	3.5	2.3	1.4	1.8	1.7	3.8	6.3	3.0	2.7	1.4	6.3			
NH3+NH4-N (mg/L)	13.4	17.2	14.1	18.3	17.9	17.1	19.2	17.5	17.7	21.6	21.7	18.8	17.9	13.4	21.7			
TKN (mg/L)	14.1	17.9	15.5	19.1	20.8	18.7	21.2	22.1	18.6	31.2	23.2	22.9	20.4	14.1	31.2			
NITRITE (mg/L)	0.32	0.33	0.33	0.21	0.22	0.26	0.20	0.19	0.23	0.15	0.20	0.19	0.23	0.15	0.33			
NITRATE (mg/L)	1.51	2.01	2.42	1.60	1.40	1.65	1.92	1.79	1.90	1.81	2.00	2.49	1.87	1.40	2.49			
pH	7.89	7.87	7.63	8.00	7.94	7.80	7.79	7.81	7.28	7.65	7.46	7.74	7.74	7.28	8.00			
Temp Celcius																		
$CBOD_5$ (mg/L)	39.5	38	41	53	55	37	27	32	35	71	65	63	46	27	71			

Plant Effluent																		
$CBOD_5$ (mg/L)	2.0	2.8	2.5	3.0	2.0	2.5	2.0	2.0	2.3	2.2	2.3	2.3	2.3	2.0	3.0			15/20
SS (mg/L)	2.5	2.6	2.8	5.0	4.6	3.3	4.8	4.0	3.5	3.4	3.5	3.0	3.6	2.5	5.0			15
Total P (mg/L)	0.15	0.11	0.11	0.15	0.16	0.18	0.27	0.48	0.23	0.26	0.17	0.16	0.20	0.11	0.48			0.75
Soluble P (mg/L)	0.12	0.11	0.10	0.11	0.13	0.14	0.23	0.40	0.22	0.23	0.13	0.13	0.17	0.10	0.40			
Ammonia (mg/L)	0.13	0.12	0.10	0.28	0.14	0.13	0.13	0.12	0.10	0.18	0.35	0.13	0.16	0.10	0.35			3/5
TKN (mg/L)	0.7	1.4	1.7	1.8	0.6	2.3	2.6	0.7	0.8	1.3	2.9	2.8	1.6	0.6	2.9			
NITRITE (mg/L)	0.12	0.08	0.07	0.10	0.06	0.06	0.06	0.06	0.06	0.18	0.31	0.15	0.11	0.06	0.31			
NITRATE (mg/L)	17.6	19.4	19.2	23.2	23.8	21.6	22.1	20.7	19.8	20.4	21.3	21.8	20.9	17.6	23.8			
pH	7.72	7.77	7.79	8.03	7.87	7.82	7.73	7.66	7.23	7.41	7.34	7.59	7.66	7.23	8.03			6-9.5
Temp Celcius	11.6	12.0	13.9	14.4	17.0	20.4	22.3	21.2	19.7	17.8	15.3	14.2	16.7	11.6	22.3			
DO (mg/L)	7.6	7.6	7.7	7.5	7.7	7.8	7.2	8.2	8.7	8.9	8.4	8.1	8.0	7.2	8.9			
BOD5 (mg/L)	3.0	3.4	3.0	4.8	2.8	2.5	2.0	2.4	2.0	2.2	4.5	2.0	2.9	2.0	4.8			
Disinfection Effluent																		
E. Coli (#/100 mL) geomean					6.2	7.5	16.4	7.2	4.9	5.4			8	5	16			200
TRC (mg/L)					0.03	0.03	0.02	0.03	0.02	0.02			0.0243	0.02	0.03			
Influent Loadings																		
Month													Average	Min	Max			Criteria
BOD (kg/d)	5571	2947	4133	3142	3042	3300	2663	2823	3006	3282	2259	3307	3290	2259	5571			
TSS (kg/d)	7747	4315	6340	3219	4514	3641	2350	3349	4196	5349	3722	3855	4335	2350	7747			

Exhibit 2

Hauler Summary 2012

Hauler Name	Quantity								Gallons				
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Year to Date
Gerber						7,200		14,400					21,600
Halco				700	450		250					300	1,700
Grand Bend									2,000				2,000
Chitters	6,900	6,100	13,300	16,400	20,700	24,500	22,100	22,200	17,500	21,400	14,200	11,600	196,900
Drumbo SBR	28,000	28,000	25,200	19,600	30,800	31,400	47,600	54,350	49,800	29,050	33,200	24,900	401,900
Denby	43,400	18,600	78,400	106,300	106,800	88,800	81,900	80,300	57,400	86,600	69,500	32,900	850,900
Thamesford WWTP	45,000	180,000	65,000	20,000									310,000
Jack Hall	19,500	13,900	31,200	54,500	70,800	66,000	45,400	35,600	52,100	73,900	61,800	34,200	558,900
Norms	16,300	14300	25,800	33,600	45,000	36,200	43,300	46,400	28,300	18,000	19,600	13,600	340,400
Otterville	37,800	44,800	42,300	60,600	64,200	53,400	56,700	35,400	41,900	61,700	50,200	37,100	586,100
E + J		150		325	675	475							1,625
Watts	3,600	6,100	5,000	22,600	19,000	14,400	30,900	7,900	5,200	14,600	16,400	6,200	151,900
Aff Portables	1,225	1,650	1,405	1,525	1,100	1,910	1,645	1,130	2,110	1,865	1,770	1,240	18,575
Nor Pac	64,800	43,200	21,600										129,600
Ingersoll WWTP	253,400	207,400	233,400	242,600	256,800	175,800				219,950	153,550	112,050	1,854,950
Salford Landfill Leachate		166,957	157,058						128,682	130,002	215,130	25,736	823,565
Total Haulage	519,925	731,157	699,663	578,750	616,325	500,085	329,795	297,680	384,992	657,067	635,350	299,826	6,250,615

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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Ingersoll Wastewater Treatment Plant (WWTP) 2012

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, however, the construction project is not substantially complete yet.

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, County of Oxford

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

Overview

The Ingersoll Wastewater Treatment Plant (WWTP) is comprised of two plants: Old Plant and New Plant. Both Old and New Plants are conventional activated sludge treatment systems. They provided effective wastewater treatment in 2012, with an average flow of 4,658 m^3/d for the New Plant, and 2,138 m^3/d for the Old Plant. The combined average flow of 6,796 m^3/d represents 66% of the design capacity of 10,230 m^3/d for both plants. The total combined volume treated in 2012 was 2,485,773 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 - 6,796 m^3/d
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 2012 was 2,485,773 m^3. The daily average flow was 6,796 m^3/day which represents 66% 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 109 mg/L, which represents an average loading of 740 kg/day. The average suspended solids concentration was 155 mg/L, which represents a loading of 1053 kg/day. Average nitrogen concentration, as TKN was 22.3 mg/L; equivalent to a loading of 152 kg/day. Total phosphorus was 2.6 mg/L, which represents a loading of 18 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 94.5% reduction. The suspended solids annual average concentration was 8 mg/L, which represents a 94.8% reduction. The effluent Ammonia averaged 0.5 mg/L or a 97% reduction. Total phosphorus annual average concentration was 0.4 mg/L, which equates to an 85% reduction.

pH of both influent and effluent streams is measured by the operator approximately four times a week. There was no single pH result outside the discharge limits of 6-9.5 for 2012.

The Ingersoll WWTP met all effluent discharge criteria for 2012.

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 11 out of 12 months of objectives for $CBOD_5$ and TSS and met all effluent discharge objectives for TP and E.Coli listed in the plants ECA at the Ingersoll WWTP.

Ingersoll WWTP met all effluent discharge criteria for 2012.

Bypassing, Overflows, and Upset Conditions

There were no bypasses, overflows or upset conditions at the Ingersoll Wastewater Treatment Plant in 2012.

There was a potential overflow from the collection system at the Carnegie St. sanitary pumping station on June 21st of an amount estimated to be less than 5 m^3. This event was due to a heavy rainfall event and infiltration/inflow. The sewage in the lift station was above the overflow level for approximately 10 minutes; however, the creek level was also high and may have prevented discharge. The event was reported to the MOE at the time as a precaution.

Maintenance and Calibration

The operating and maintenance staff from the Ingersoll WWTP conducts regular 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 2012.

Biosolids 2012

The Ingersoll Wastewater Treatment Plant utilizes 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.

All biosolids were trucked to the Woodstock WWTP in 2012, with the exception of a small quantity that was pressed after the commissioning of the digesters but before the startup of the new biosolids dewatering facilities. That material was taken and stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) in Salford, Ontario and later land applied.

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

Summary

The Ingersoll WWTP was operating within its hydraulic design criteria in 2012.

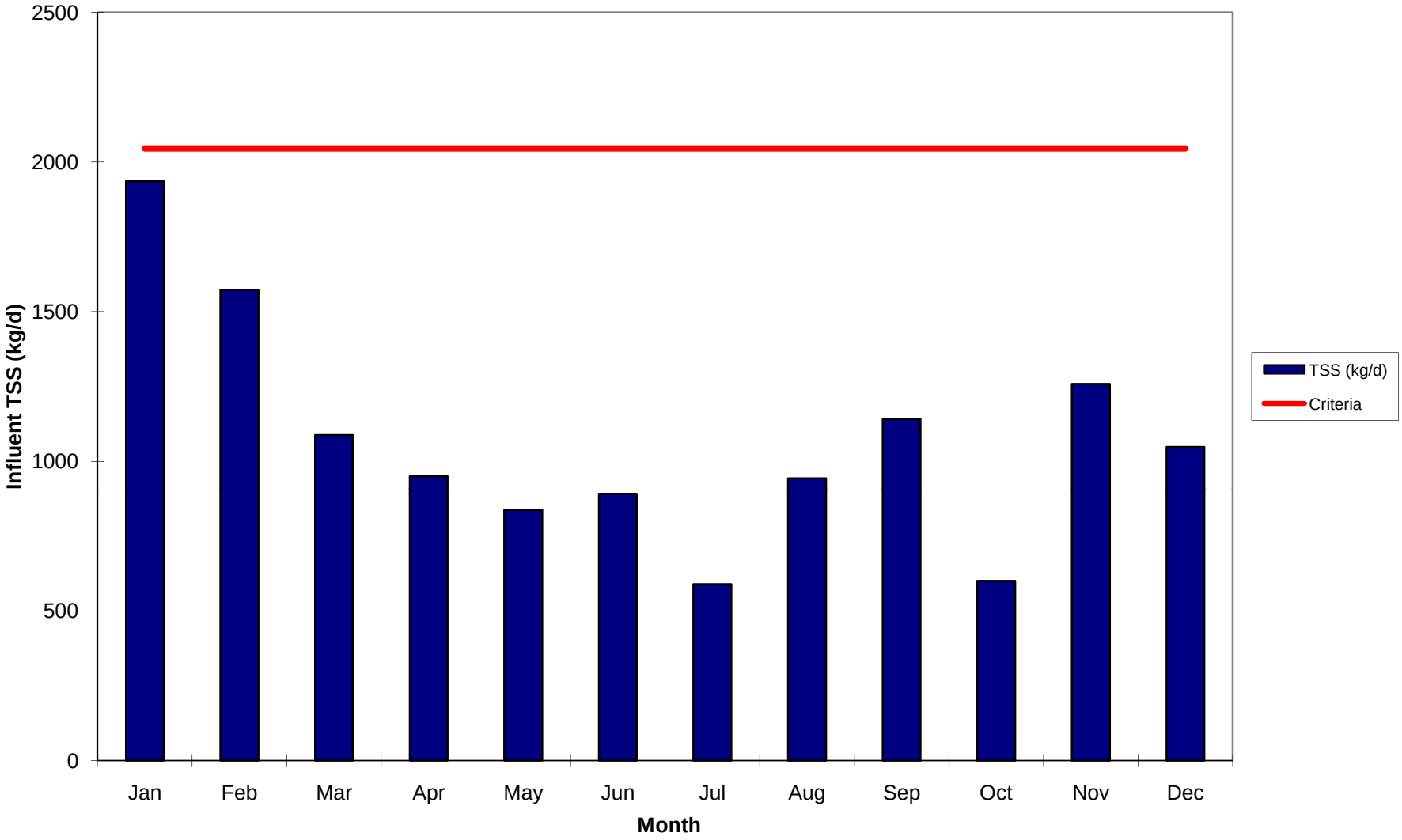
Digester upgrades began in 2011, and included the primary digester and secondary digester roof replacement and a new primary digester heating and mixing system. The digesters began operation again in July 2012.

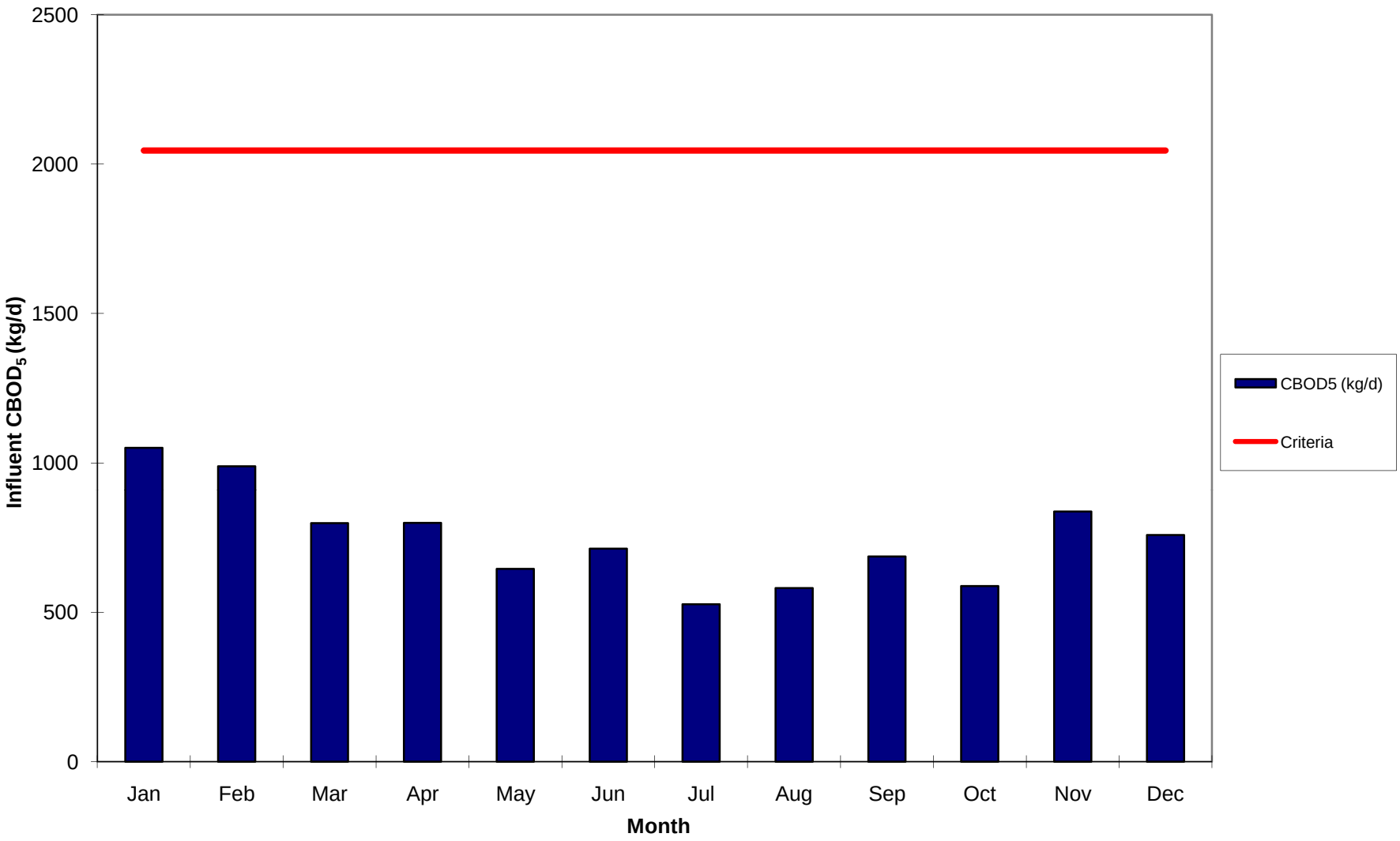
Following this project, Oxford County began an upgrade in October of the dewatering facility in Ingersoll which was substantially completed on March 13, 2013.

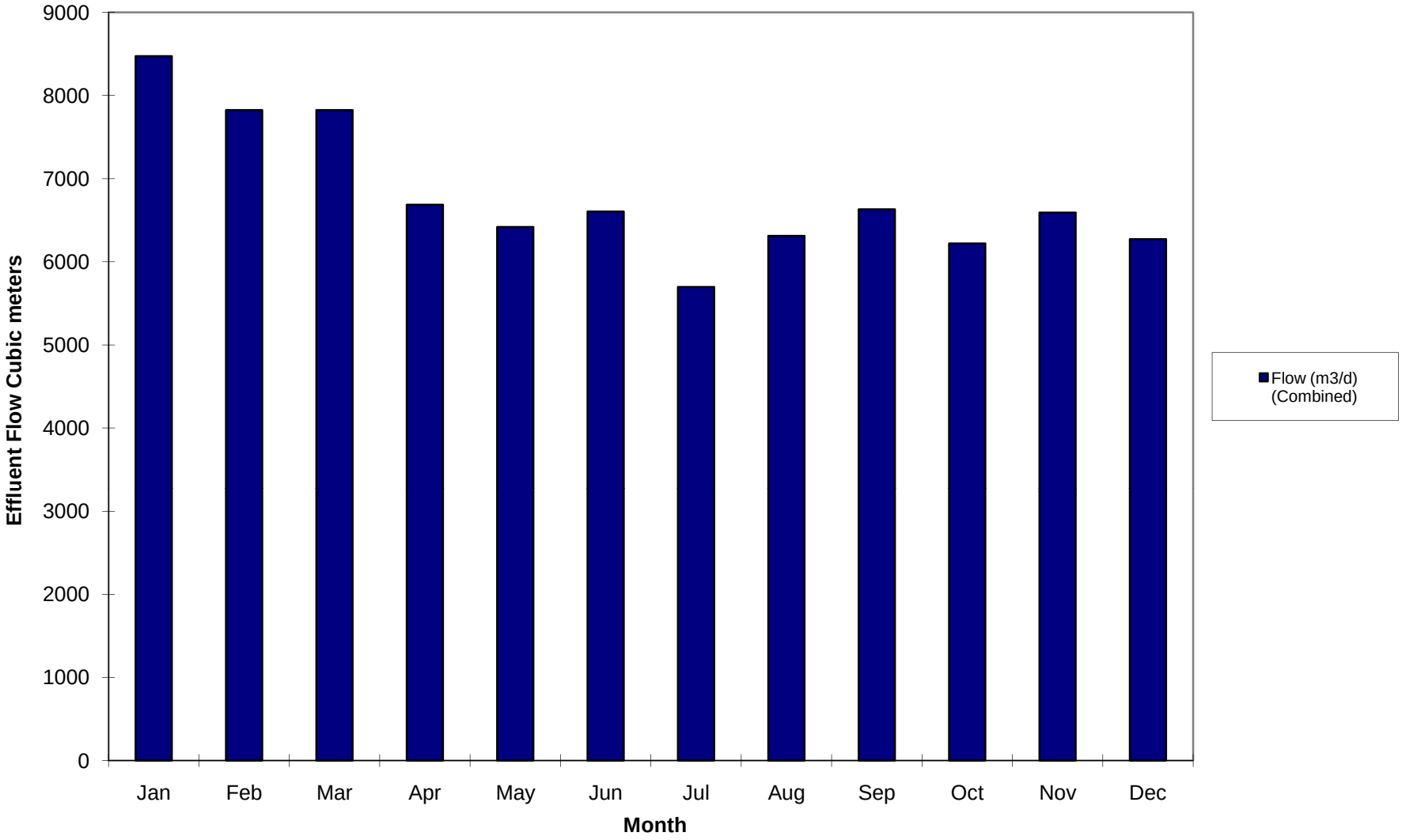
A Class Environmental Assessment was completed in October 2012 recommending upgrades to the Ingersoll WWTP, including the decommissioning of the 1947 Plant, and construction of a new Conventional Activated Sludge (CAS) Plant. Engineering design of the recommended upgrades will commence in 2013.

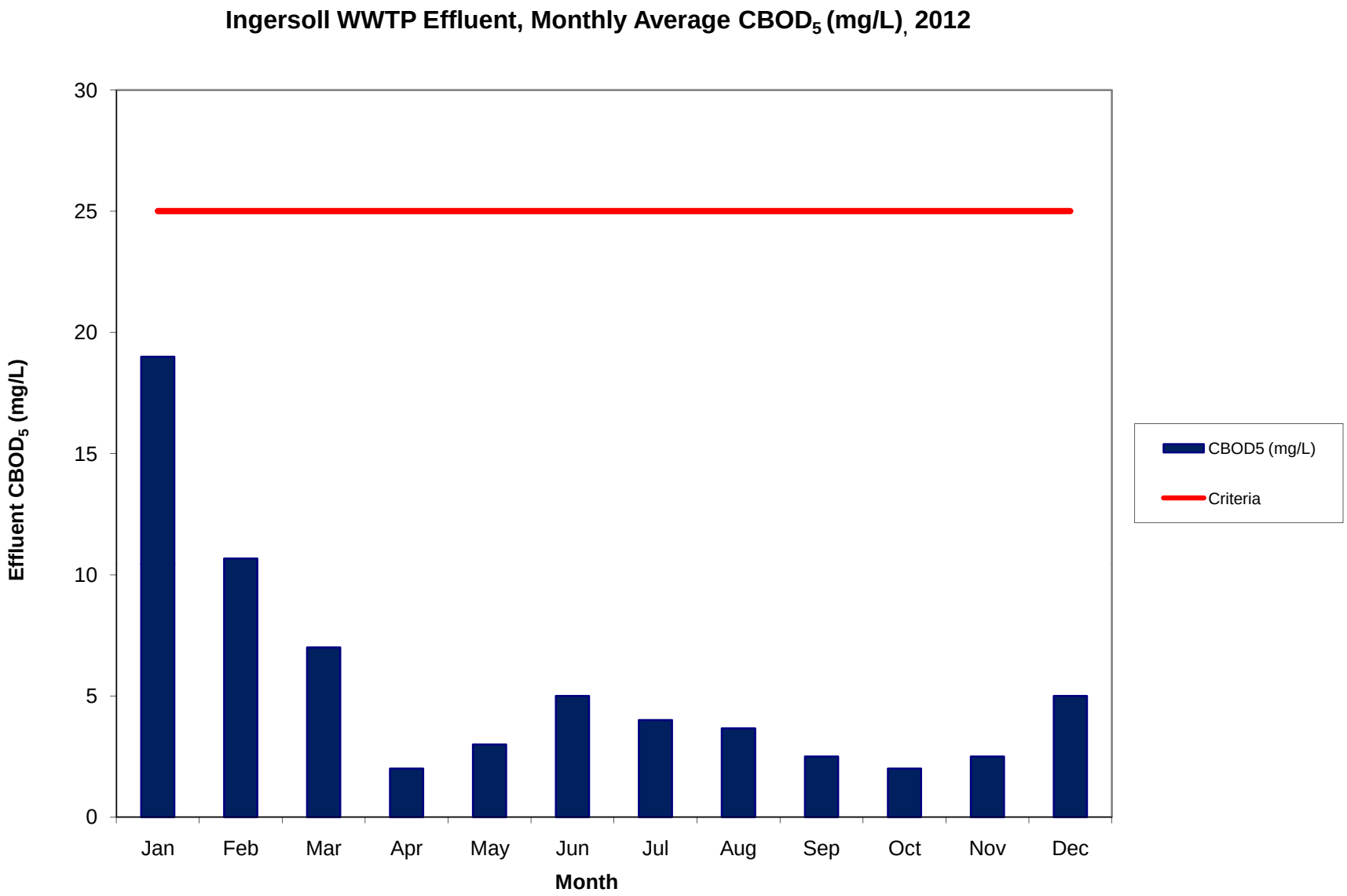
Exhibit 1

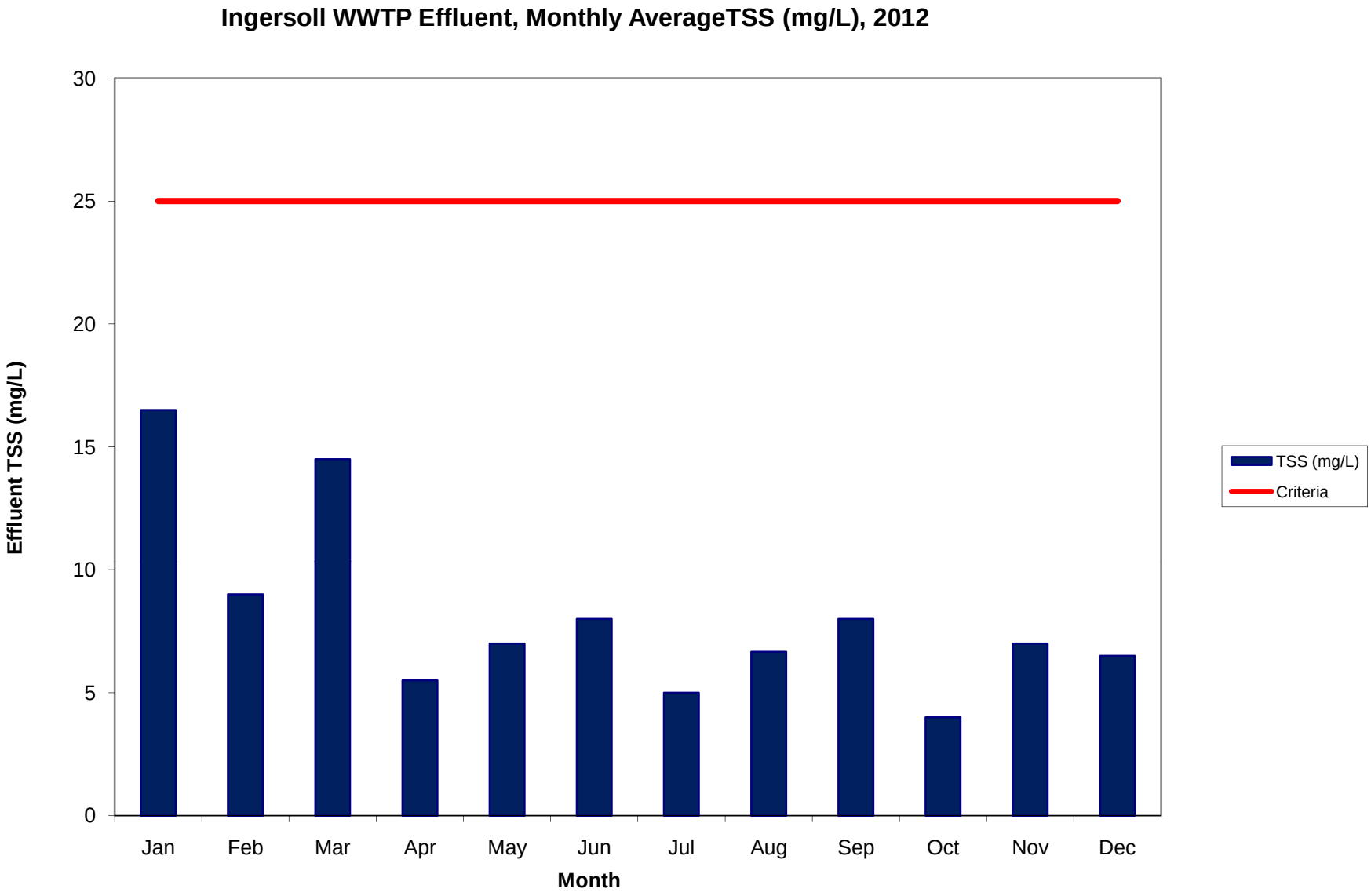
Ingersoll WWTP Influent ,TSS Loading (kg/d), 2012

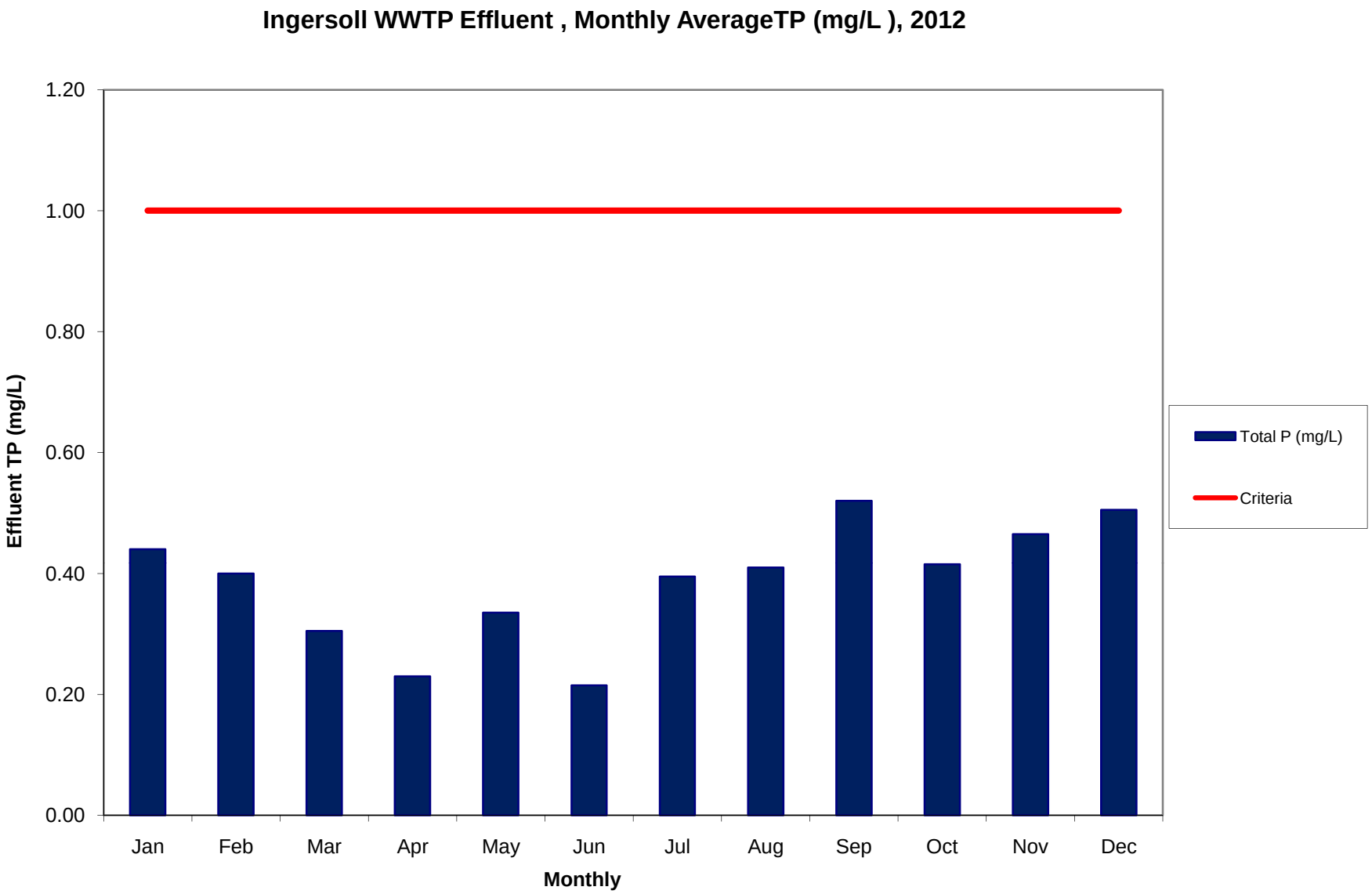



Ingersoll WWTP Influent, CBOD5 Loading (kg/d), 2012
Influent CBOD5 (kg/d)
2500
2000
1500
1000
500
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (kg/d)
Criteria

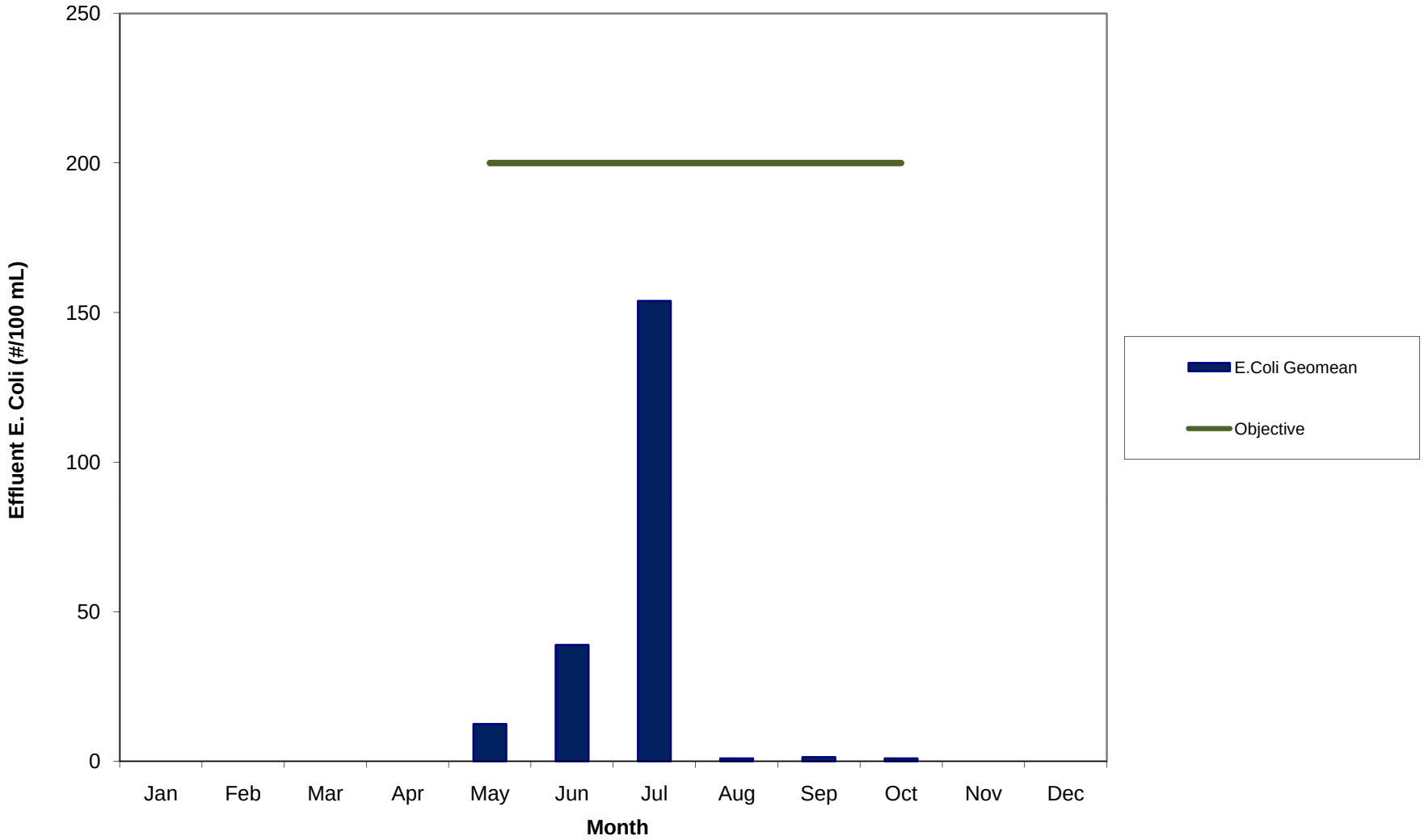

Ingersoll WWTP Effluent Flow (m3/d), 2012
Effluent Flow Cubic meters
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Flow (m3/d) (Combined)

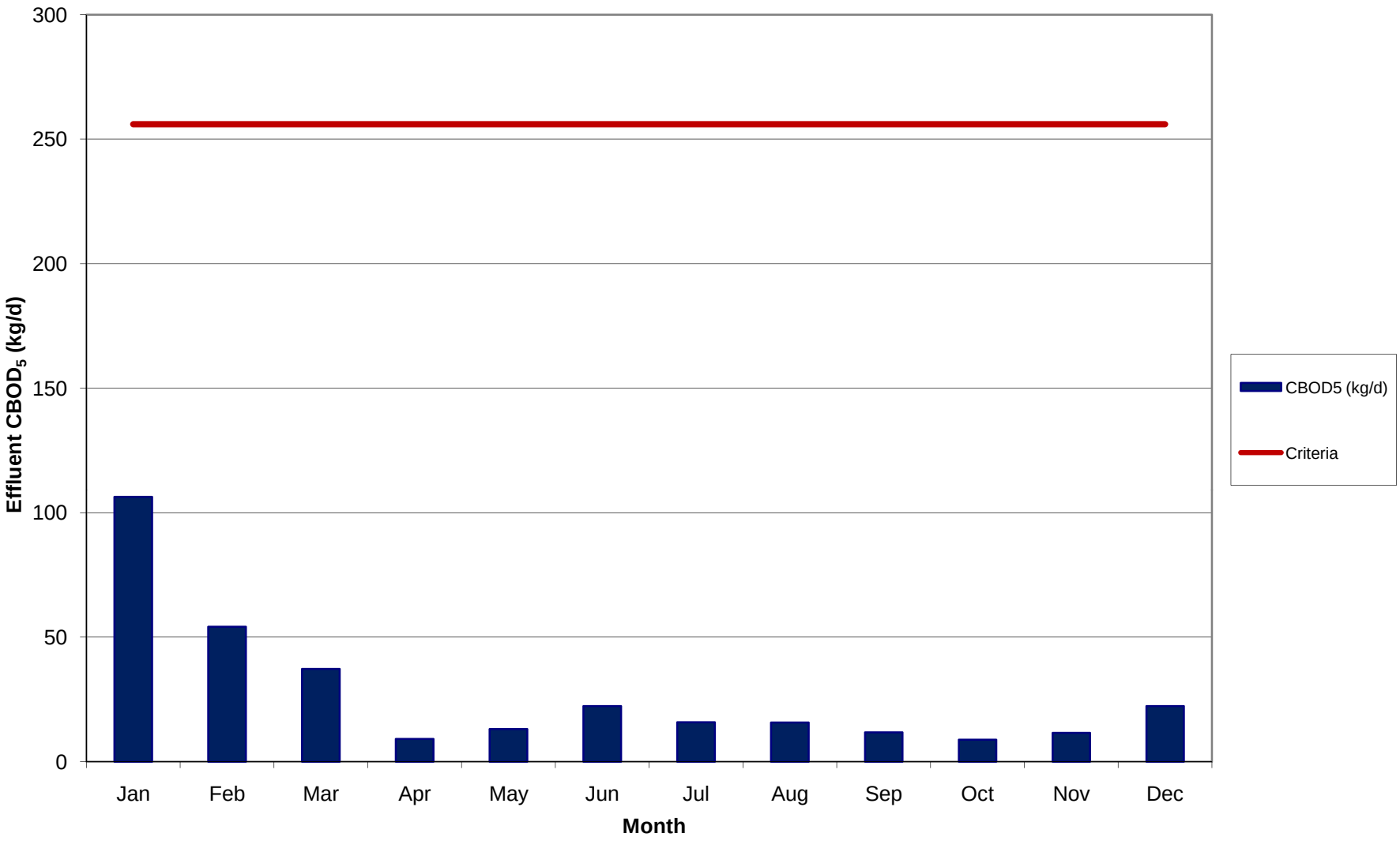

Ingersoll WWTP Effluent, Monthly Average CBOD5 (mg/L), 2012
Effluent CBOD5 (mg/L)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Ingersoll WWTP Effluent, Monthly AverageTSS (mg/L), 2012
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

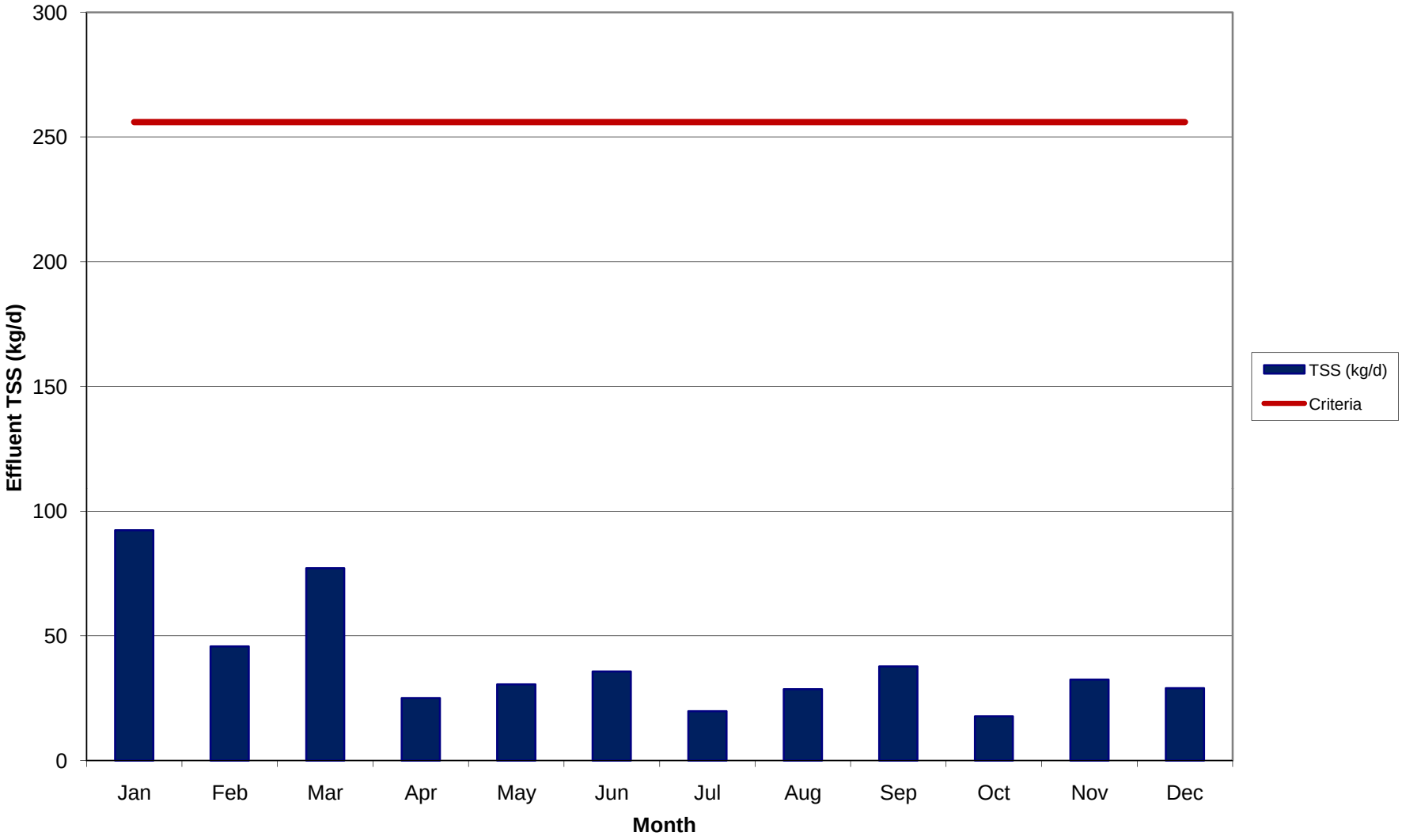

Ingersoll WWTP Effluent , Monthly AverageTP (mg/L), 2012
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Effluent TP (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Monthly
Total P (mg/L)
Criteria

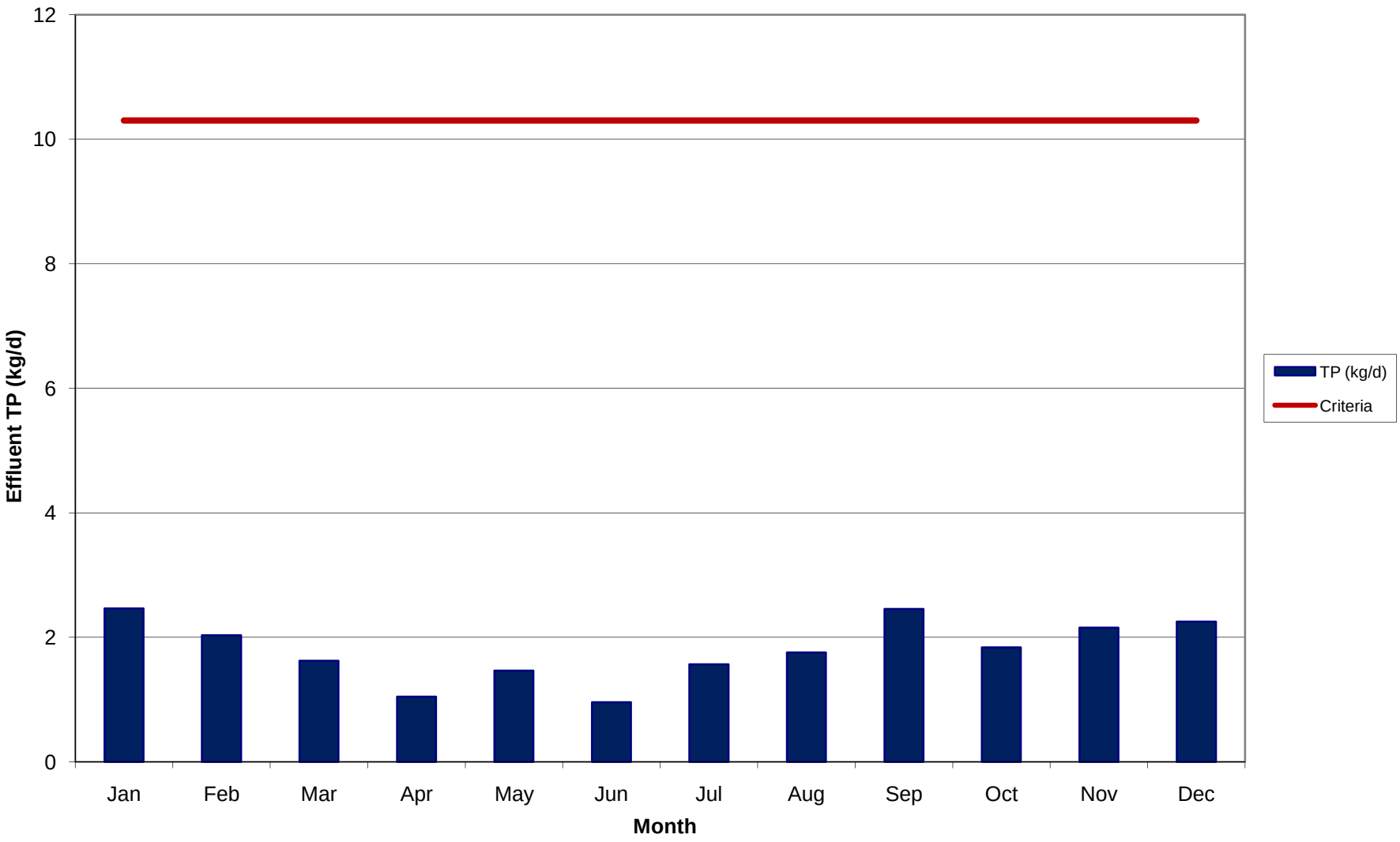
Ingersoll WWTP Effluent , Monthly Geometric Mean Density E. Coli (#/100 mL), 2012




Ingersoll WWTP Effluent, CBOD5 (kg/d) Loadings to Thames River, 2012
300
250
200
150
100
50
0
Effluent CBOD5 (kg/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (kg/d)
Criteria

Ingersoll WWTP Effluent, TSS (kg/d) Loading to Thames River, 2012




Ingersoll WWTP Effluent, TP (kg/d) loading to Thames River, 2012
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)
Criteria

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

2012

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Total 1000m3
Total Flow m3	262635	226939	242577	200561	198941	198066	176540	195665	198934	192795	197694	194426				2485773	2485.773
Flow (m^3/d) (New)	5599	5085	5321	4552	4370	4462	3967	4290	4721	4433	4636	4460.74	4658	3966.6	5598.6	Design	
Flow (m^3/d) (Old)	2874	2741	2504	2134	2048	2141	1728	2022	1910	1786	1954	1811.06	2138	1728.3	2873.5	Criteria	
Flow (m^3/d) (Combined)	8472	7825	7825	6685	6417	6602	5695	6312	6631	6219	6590	6272	6796	5694.8	8472.1	10230	
Max Daily Flow	10816	10331	9478	8032	7918	8310	7174	8073	8666	8630	7812	7734	8581	7174	10816		
Min Daily Flow	5895	5877	6159	5310	4574	5006	4461	4832	4444	3671	5330	4441	5000	3671	6159		
Common Influent																	
$CBOD_5$ (mg/L)	124	126	102	120	101	108	93	92	104	95	127	121	109	92	127		
TSS (mg/L)	229	201	139	142	131	135	104	149	172	97	191	167	155	96.5	228.5		
Total P (mg/L)	2.4	2.7	2.1	1.5	2.4	3.0	2.0	2.9	3.2	1.7	4.2	2.9	2.6	1.465	4.175		
NH3+NH4-N (mg/L)	13.40	14.23	19.45	17.55	16.00	11.85	12.30	15.43	17.65	14.70	24.70	20.60	16.5	11.85	24.7		
TKN (mg/L)	16.85	18.40	21.40	20.70	20.30	19.30	21.90	22.60	25.10	19.65	35.70	25.10	22.3	16.85	35.7		
NITRITE (mg/L)	0.05	0.40	0.10	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.18	0.03	0.08	0.0165	0.3967		
NITRATE (mg/L)	0.038	0.193	0.025	0.025	0.025	0.068	0.025	0.025	0.025	0.025	0.025	0.025	0.04	0.025	0.1933		
pH (mg/L)	7.76	7.63	7.69	7.52	7.45	7.32	7.45	7.48	7.19	7.95	7.54	7.93	7.57	7.19	7.945		
Effluent Combined	Old and New Plant Combined Effluent after UV System Upgrade															Objectives	Limits
$CBOD_5$ (mg/L)	19.0	11	7.0	2	3.0	5	4.0	3.7	3	2	3	5	6	2	7	15	25
TSS (mg/L)	16.5	9	15	5.5	7.0	8.0	5.0	6.7	8.0	4	7.0	6.5	8	4.00	14.50	15	25
Total P (mg/L)	0.44	0.40	0.31	0.23	0.34	0.22	0.40	0.41	0.52	0.42	0.47	0.51	0.4	0.2	0.5	0.75	1
NH3+NH4-N (mg/L)	1.40	0.38	0.85	0.05	0.08	0.13	0.15	1.32	0.90	0.20	0.13	0.55	0.5	0.1	1.3		
TKN (mg/L)	2.15	2.50	2.88	0.68	0.73	2.80	4.80	2.68	1.23	1.23	2.70	2.90	2.272	0.675	4.800		
NITRITE (mg/L)	2.43	1.76	0.75	0.03	0.03	0.31	0.19	0.76	1.03	0.21	0.08	0.87	0.70	0.03	1.03		
NITRATE (mg/L)	8.24	10.04	20.70	19.95	23.30	16.85	15.70	22.10	22.35	21.30	20.25	22.75	18.627	10.042	23.300		
pH	7.28	7.52	7.62	6.95	7.57	7.29	7.30	7.29	7.32	7.84	7.37	7.41	7.4	6.9	7.8		
E.Coli Geomean					12	39	154	1	1	1			35	1.00	154	200	NA
unionized ammonia (mg/L)	0.0363	0.0050	0.0043	0.0025	0.0025	0.0025	0.003	0.013	0.007	0.008	0.0025	0.0025					

Influent Loadings

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Design
$CBOD_5$ (kg/d)	1051	989	798	799	645	713	527	581	686	588	837	759	742	527	837		2045
TSS (kg/d)	1936	1573	1088	949	837	891	589	943	1141	600	1259	1047	1051	589	1259		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)	106	54	37	9	13	22	16	16	12	9	12	22	27	9	106		256
TSS (kg/d)	92	46	77	25	31	36	20	29	38	18	32	29	39	18	92		256
TP (kg/d)	2	2	2	1	1	1	2	2	2	2	2	2	2	1	2		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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Tillsonburg Wastewater Treatment Plant (WWTP), 2012

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 Wastewater Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Tillsonburg Wastewater Treatment Plant (WWTP) is a conventional activated sludge system that provided effective wastewater treatment in 2012. The 2012 average flow for the plant of 5,542 m^3/day represents 67.8% of the design capacity of 8,180 m^3/day. The total flow for 2012 was 2,027,935 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 -	5,542 m3/day
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	25 mg/L	203 kg/d	15 mg/L
SS	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 gathers samples over a 24-hour duration on a bi-weekly basis.

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

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 2012 was 2,027,935 m^3. The daily average flow was 5,542 m^3/day which represents 67.8% 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 190 mg/L which corresponds to an average influent loading of 1053 kg/day. The average suspended solids concentration was 214 mg/L that corresponds to 1186 kg/d. Average nitrogen level, as TKN, was 48 mg/L which represents a loading of 266 kg/d. Total phosphorus was 4.8 mg/L, which represents a loading of 27 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 1.7 mg/L. This is a 99% reduction. The suspended solids average concentration was 6.2 mg/L, which represents a 97% reduction. Ammonia averaged 1.0 mg/L. Total phosphorus average was 0.4 mg/L, which resulted in a 92% 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 2012.

The effluent from the Tillsonburg WWTP met all discharge criteria for 2012.

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 at the Tillsonburg WWTP.

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 regular 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

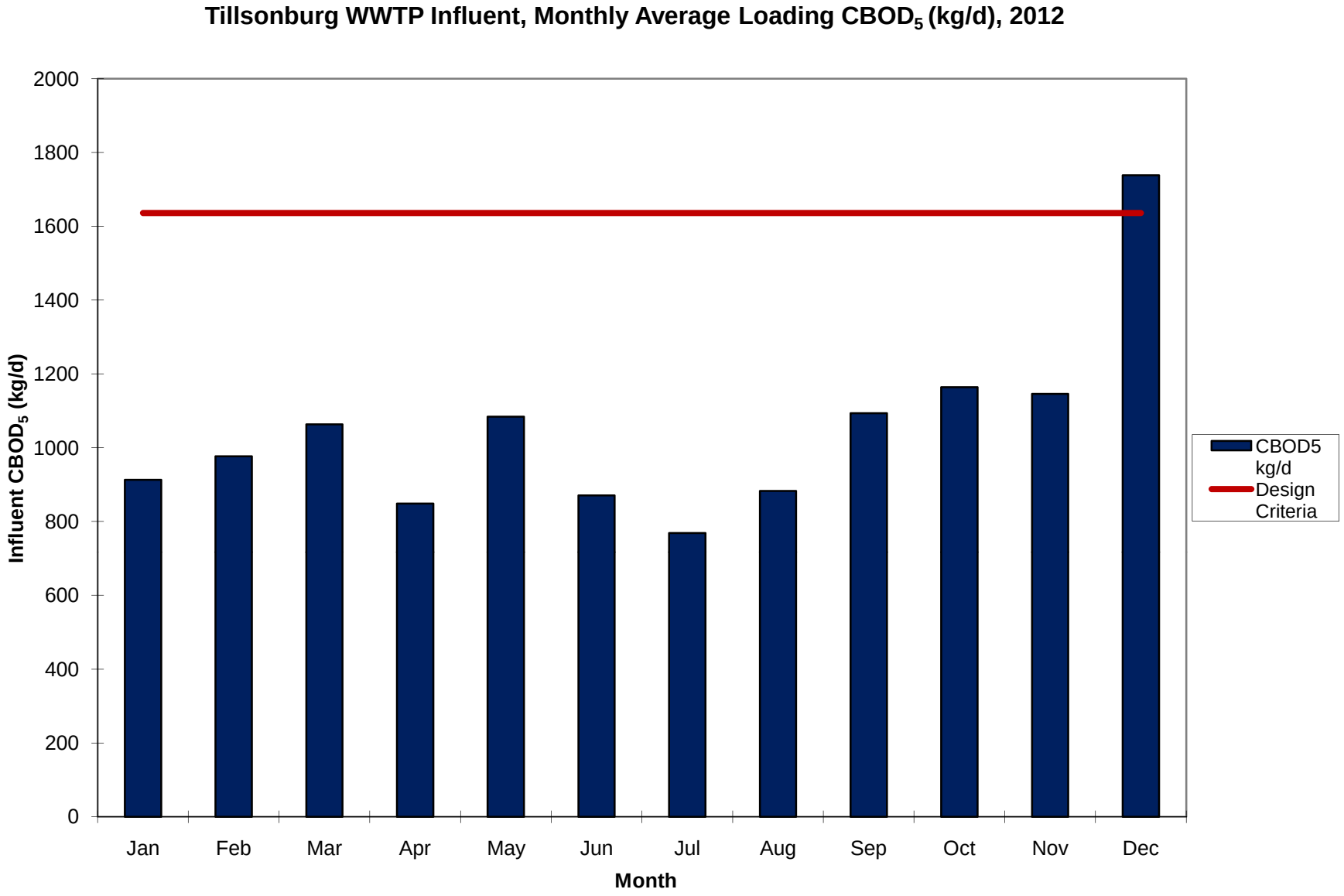
The biosolids are aerobically digested and dewatered, then taken to the Oxford County's Biosolids Centralized Storage Facility (BCSF) after which they are land applied.

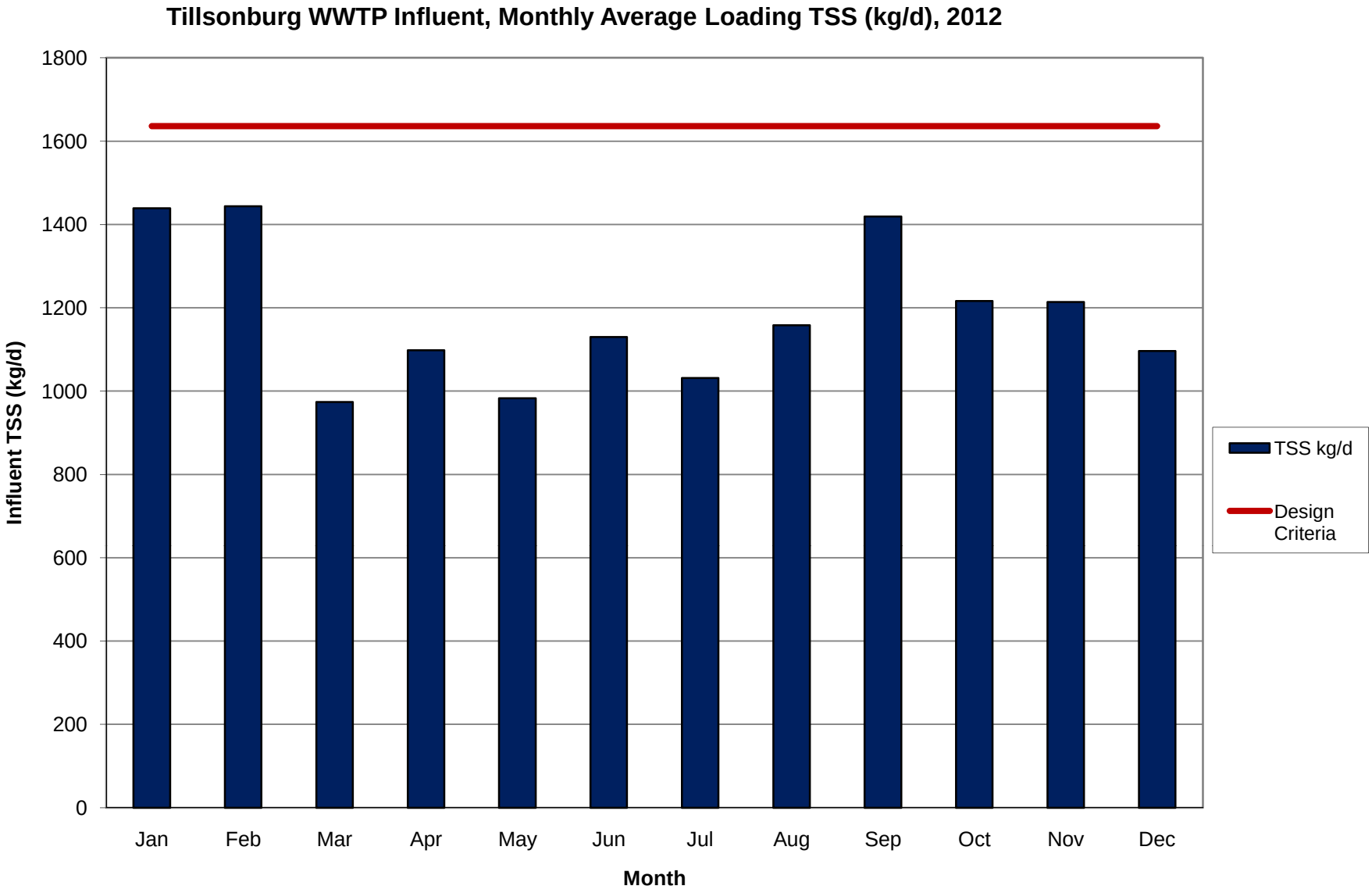
Details of the Biosolids and the land application program are contained in a separate Biosolids report.

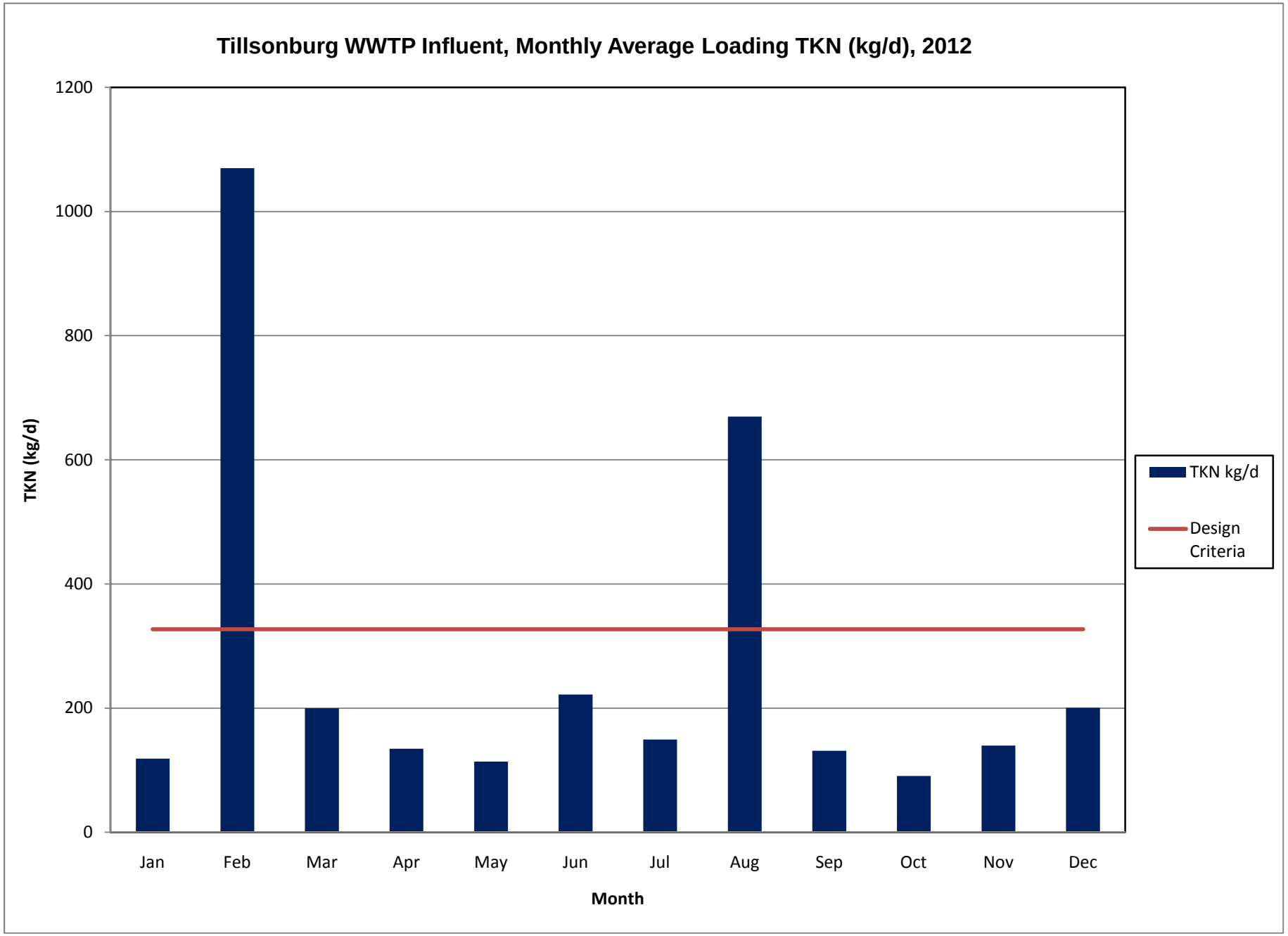
Summary

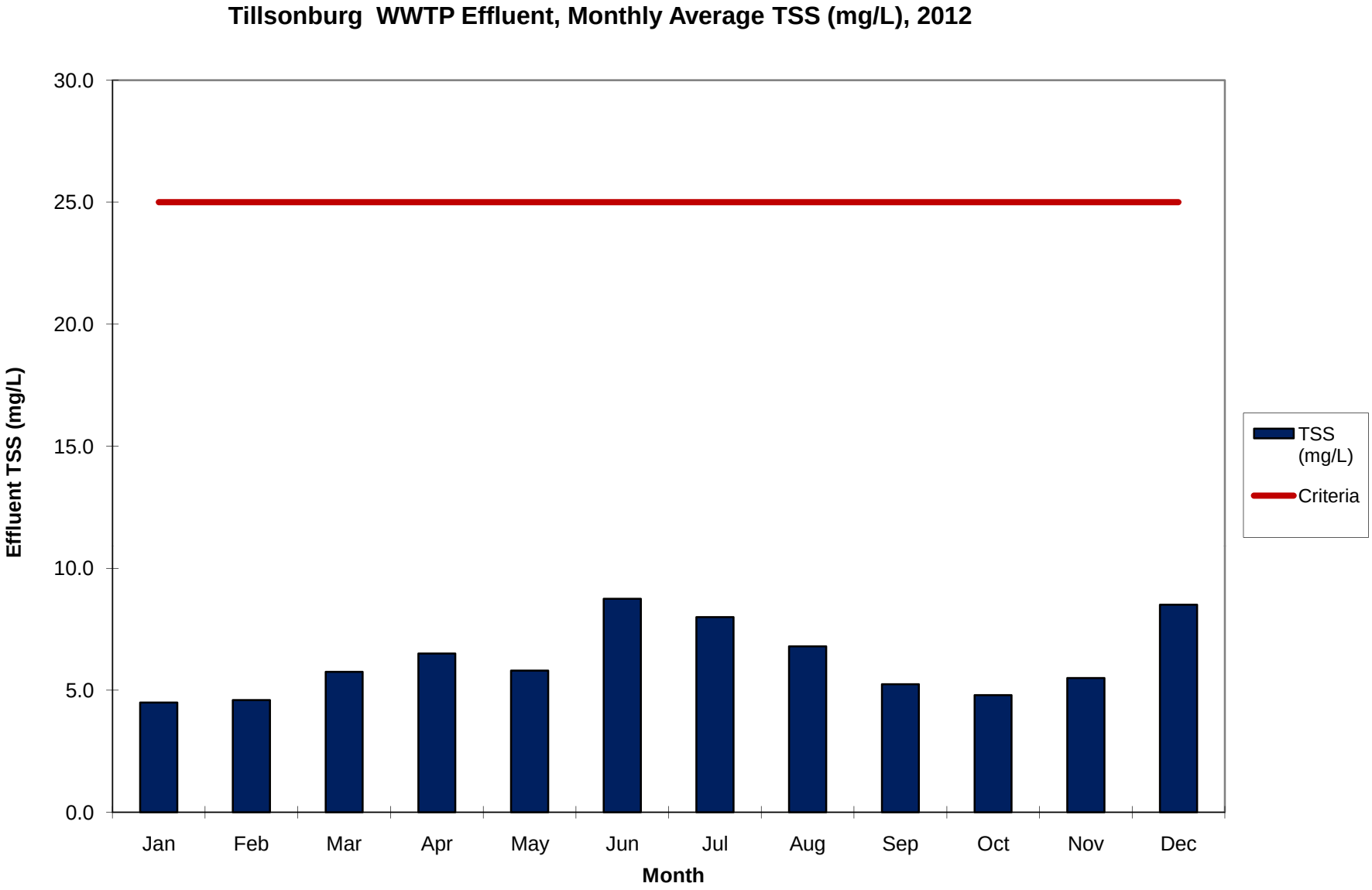
A Class Environmental Assessment is on-going for the Tillsonburg WWTP, evaluating the future capacity needs and alternative treatment options.

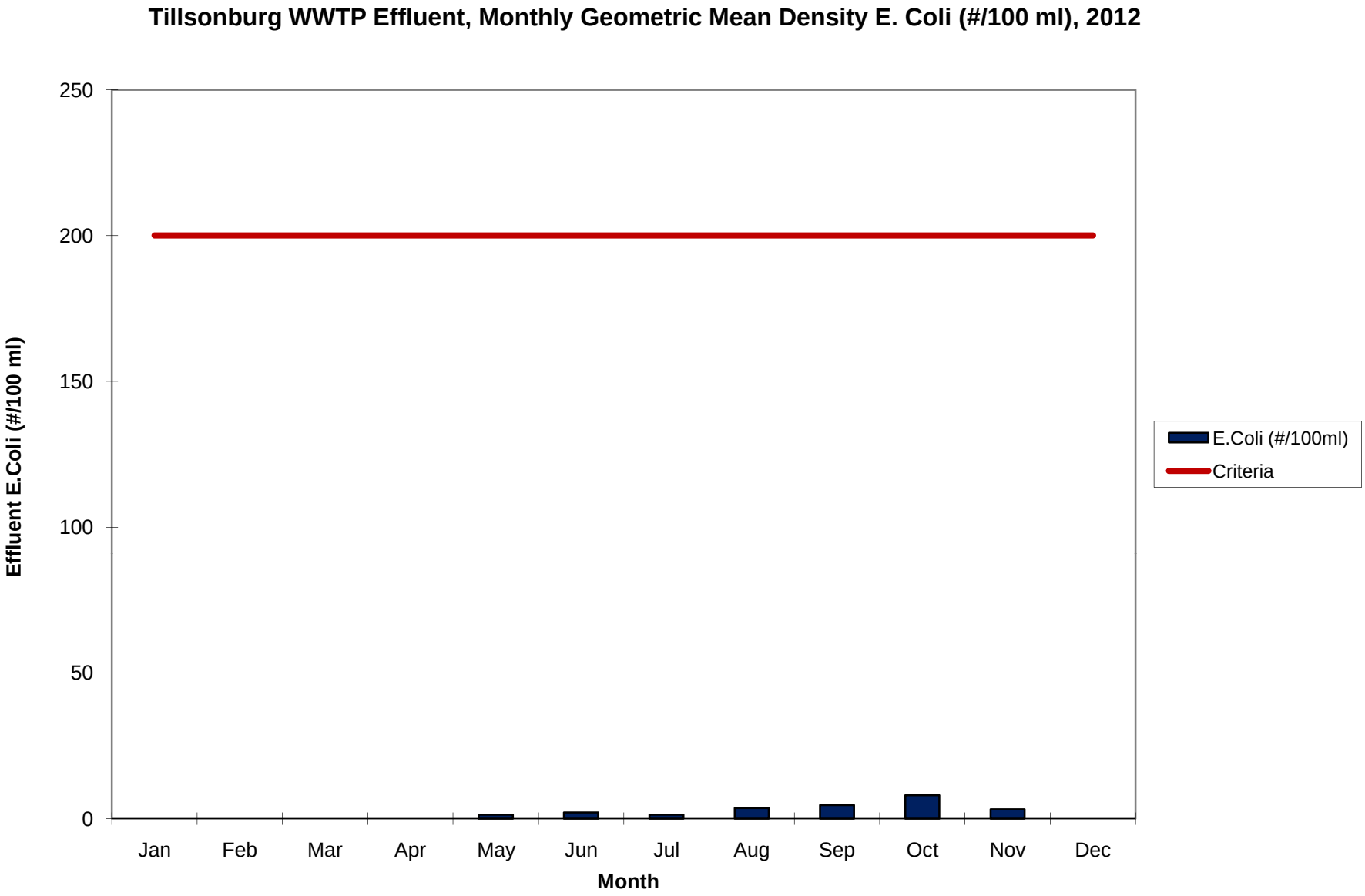
Exhibit 1

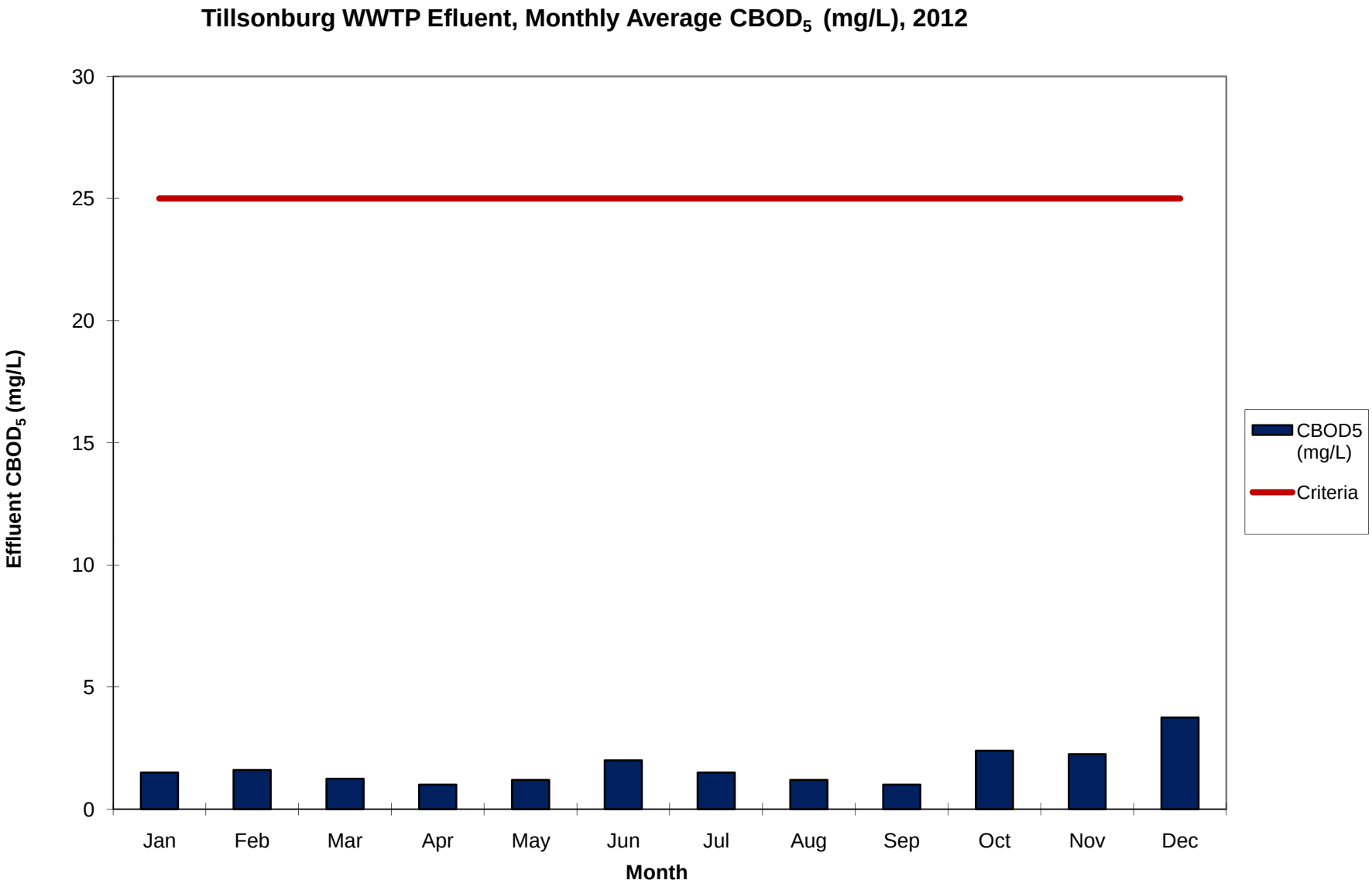

Tillsonburg WWTP Influent, Monthly Average Loading CBOD5 (kg/d), 2012
Influent CBOD5 (kg/d)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 kg/d
Design Criteria

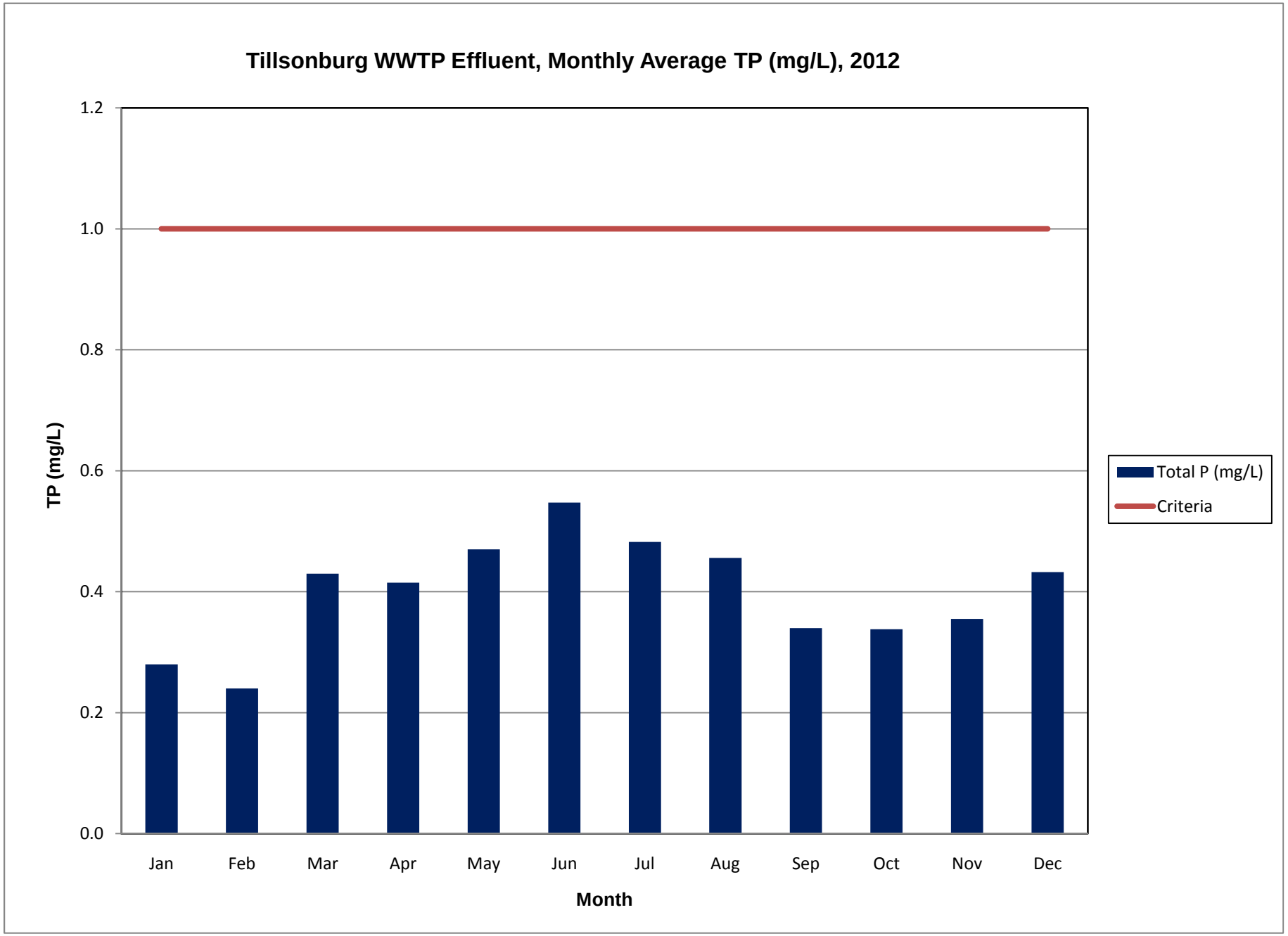

Tillsonburg WWTP Influent, Monthly Average Loading TSS (kg/d), 2012
Influent TSS (kg/d)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS kg/d
Design Criteria


Tillsonburg WWTP Influent, Monthly Average Loading TKN (kg/d), 2012
1200
1000
800
600
400
200
0
TKN (kg/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TKN kg/d
Design Criteria


Tillsonburg WWTP Effluent, Monthly Average TSS (mg/L), 2012
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 (#/100 ml), 2012
Effluent E.Coli (#/100 ml)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
E.Coli (#/100ml)
Criteria


Tillsonburg WWTP Efluent, Monthly Average CBOD5 (mg/L), 2012
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), 2012
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

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

2012

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Criteria
Total Flow (m^3)	210382	181610	191662	161070	158954	154108	149411	156811	157715	169070	163316	173826				2027935	
Flow (m^3/d)	6787	6262	6183	5369	5128	5137	4820	5058	5257	5454	5444	5607	5542	4819.7	6786.5		8180
Min Daily Flow (m3/d)	6120	5723	5698	4477	4664	4532	4359	4478	4540	4841	4813	4901	4929	4359	6120		
Max Daily Flow (m3/d)	8351	6998	6794	5996	5655	6380	5313	6030	7829	7209	6259	7030	6654	5313	8351		
Influent																	
BOD_5 (mg/L)																	
$CBOD_5$ (mg/L)	135	156	172	158	211	170	160	175	208	213	211	310	190	135	310		
TSS (mg/L)	212	231	158	205	192	220	214	229	270	223	223	196	214	158	270		
Total P (mg/L)	5.3	4.2	3.9	4.4	4.9	5.3	5.0	7.1	3.8	3.4	5.4	5.4	4.8	3.4	7.1		
Ammonia (mg/L)																	
TKN (mg/L)	17.5	170.9	32.4	25.1	22.2	43.20	31.0	132.4	25.0	16.7	25.7	35.80	48	17	170.85		
NITRITE (mg/L)																	
NITRATE (mg/L)																	
pH	7.50	7.55	7.57	7.52	7.46	7.55	7.66	7.64	7.55	7.49	7.40	7.71	7.55	7.40	7.705		
Temp (C)	13.95	13.00	13.30	15.15	17.30	19.70	22.40	22.10	23.50	20.70	17.70	15.35	17.8	13.0	23.5		
Effluent																	Criteria
BOD_5 (mg/L)																	
TSS (mg/L)	4.5	4.6	5.8	6.5	5.8	8.8	8.0	6.8	5.3	4.8	5.5	8.5	6.23	4.60	8.75		25
Total P (mg/L)	0.28	0.24	0.43	0.42	0.47	0.55	0.48	0.46	0.34	0.34	0.36	0.43	0.40	0.2	0.5		1
Ammonia (mg/L)	0.05	0.28	0.25	0.10	0.27	2.05	2.19	0.08	0.08	0.27	0.44	6.00	1.0	0.1	6.0		
TKN (mg/L)																	
NITRITE (mg/L)																	
NITRATE (mg/L)																	
pH	7.74	7.89	7.71	7.95	7.90	7.87	7.69	7.96	8.05	7.33	7.29	7.45	7.7	7.3	8.1		6-9.5
Temp (C)	13.6	12.9	13.4	14.5	16.7	19.9	21.6	21.6	21.4	19.7	17.6	15.68	17.4	12.9	21.6		
E.Coli (#/100ml)					1	2	1	4	5	8	3		3	1	8		200
$CBOD_5$ (mg/L)	1.5	1.6	1.3	1.0	1.2	2.0	1.5	1.2	1.0	2.4	2.3	4	1.7	1.0	4		25
Un-ionized Ammonia Calculated	0.0025	0.0025	0.0025	0.0025	0.0025	0.0530	0.0230	0.0025	0.0030	0.0025	0.0031	0.080	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	913	977	1063	848	1084	871	769	883	1093	1163	1146	1738	1052	769	1738		1636
TSS kg/d	1439	1443	974	1098	983	1130	1031	1158	1419	1216	1214	1096	1187	974	1443		1636
TKN kg/d	119	1070	200	135	114	222	149	670	131	91	140	201	267	91	1070		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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.

Dear Sir:

RE: Year-End Monitoring Report 2012 for Thamesford Wastewater Treatment Plant

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 Wastewater Services, Oxford County
Mr. Mark Maxwell, P.Eng.
Project Engineer, Oxford County

Overview

The Thamesford Wastewater Treatment Plant (WWTP) provided effective wastewater treatment in 2012. The average daily flow for 2012 was 1,492 m^3/d. This represents 60% of the design criteria of 2,500 m^3/d. The total annual flow was 546,301 m^3 with an average monthly flow of 45,525 m^3.

Figure 1 Thamesford WWTP Aerial Photo

Plant Description

The Thamesford WWTP forms part of the Oxford County Wastewater Treatment System, which includes nine wastewater treatment facilities.

The main customer is a local major meat processing plant; however, the treatment plant also receives domestic wastewater via the sanitary sewer line and a dedicated lift station. The wastewater from the processing plant is collected from their 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. It is 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. 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 530 mg/L. This corresponds to an average BOD_5 loading of 825 kg/d, which is 62% of the design value of 1,333 kg/d. The average annual Influent TSS concentration to the plant was 281 mg/L. This corresponds to an average TSS loading of 437 kg/d which is 56% of the design criteria of 779 kg/d. The annual average TKN concentration was 73.3 mg/L. This corresponds to 114 kg/d which is 57% of the design value of 199 kg/d. The annual average TP concentration was 11.4 mg/L. This corresponds to 18 kg/d which is 78% of the design value of 23 kg/d. The annual average O&G loading is 46 mg/L. This corresponds to 72 kg/d.

The annual average BOD_5 concentration was 1.3 mg/L. This represents a 99.8% removal efficiency. The annual average TSS concentration was 2.1 mg/L which represents a 99.3% removal efficiency. The annual average Ammonia concentration was 0.2 mg/L. The annual average TP concentration was 0.12 mg/L which represents a 98.9% 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 2012. 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 2012 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.

There were seven out of twelve months of TP results where the TP objective was met at the plant. The TP objective is set at 0.1 mg/L which is approaching the highest potential removal efficiency for the TP treatment technology employed.

Eleven out of twelve months met the ammonia objective, and 100% of all results met the TSS and the BOD objectives set for the plant.

All discharge criteria were met at the Thamesford WWTP in 2012.

Bypass, Overflow and Upset Events

There were no bypasses, overflows or upset events at the Thamesford WWTP in 2012.

There were no overflows from the wastewater collection system in 2012.

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 2012.

Biosolids 2012

Discussion:

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

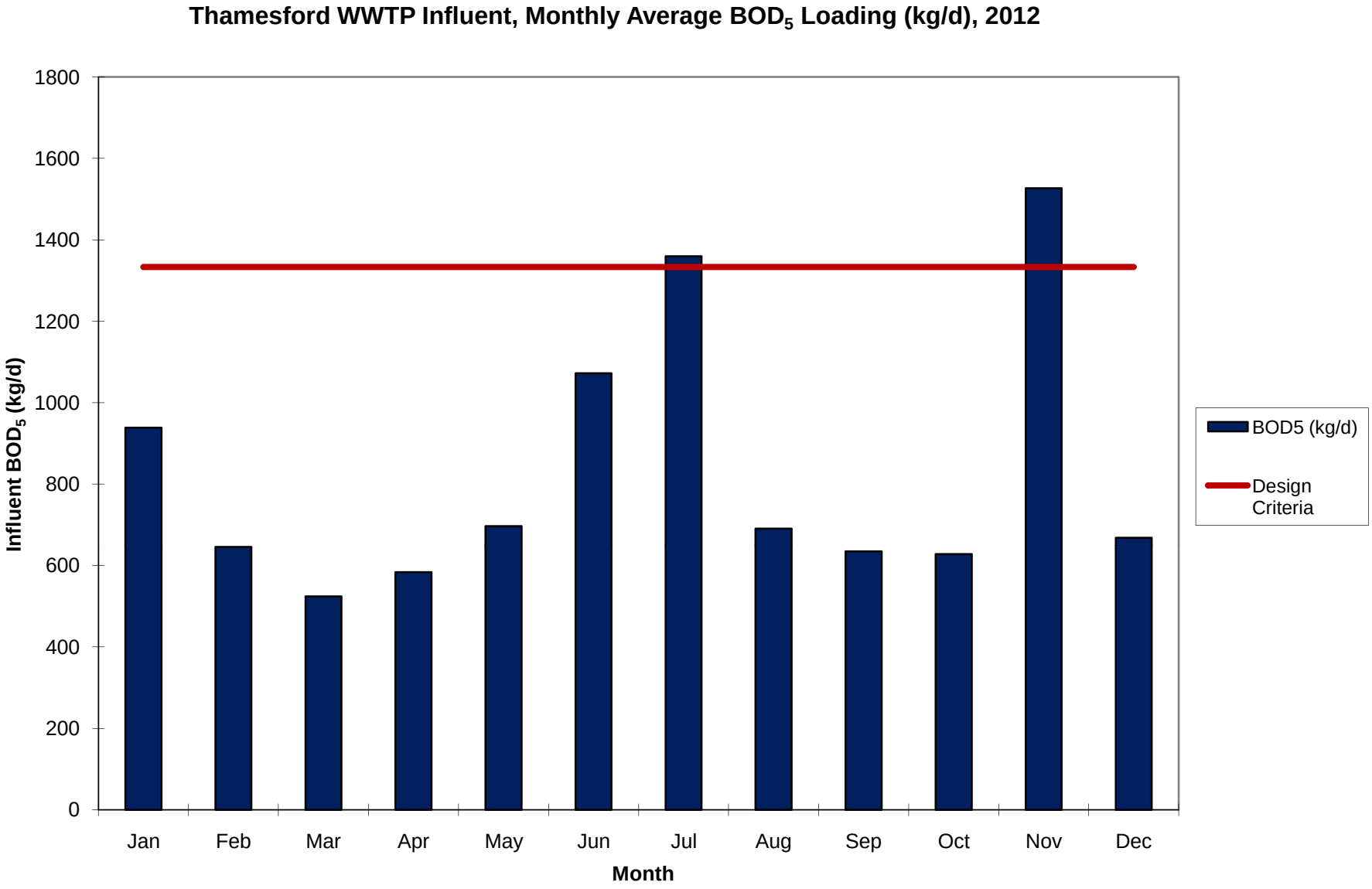
DAF Bio-Solids Activity

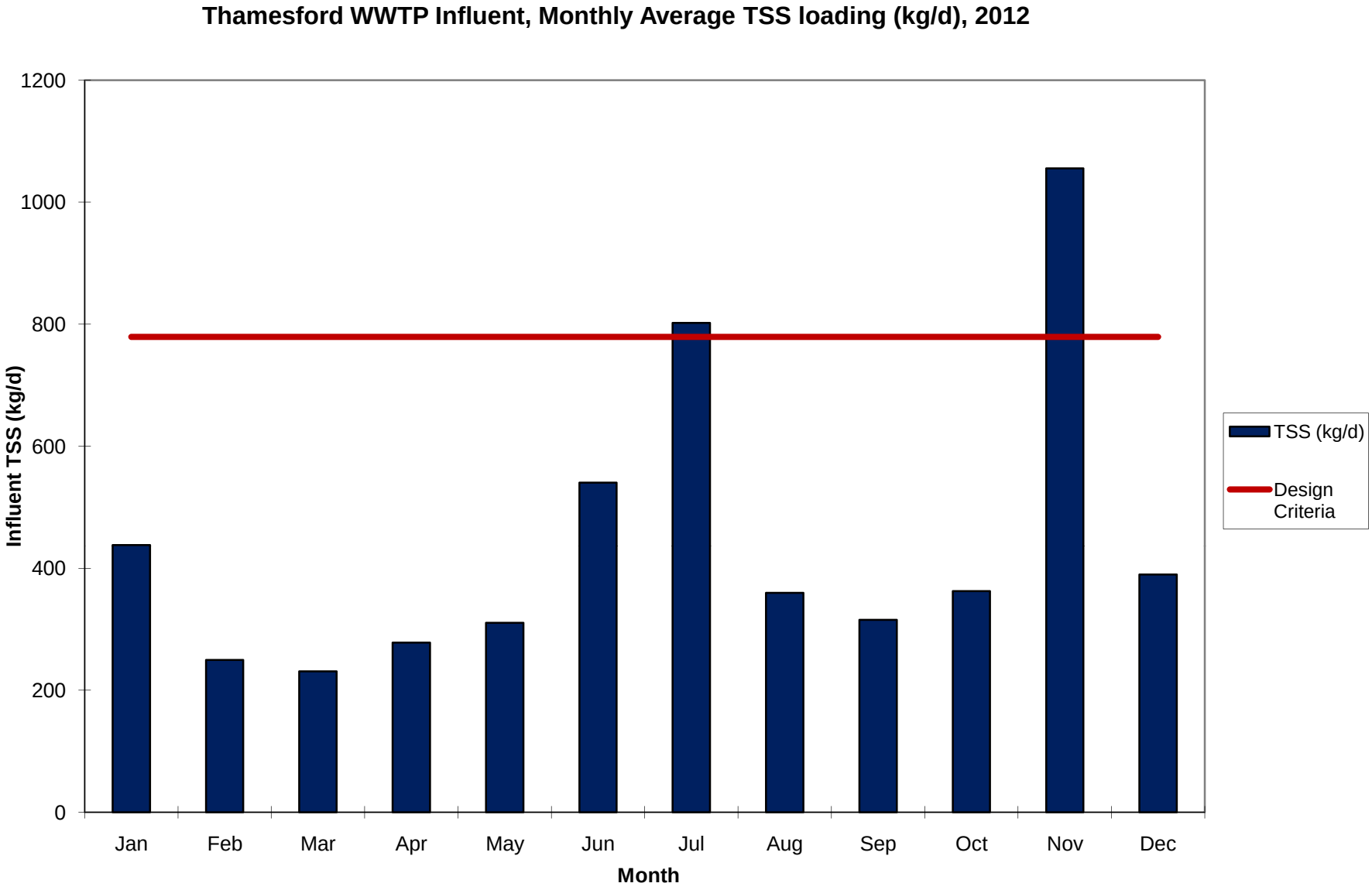
January to December 2012

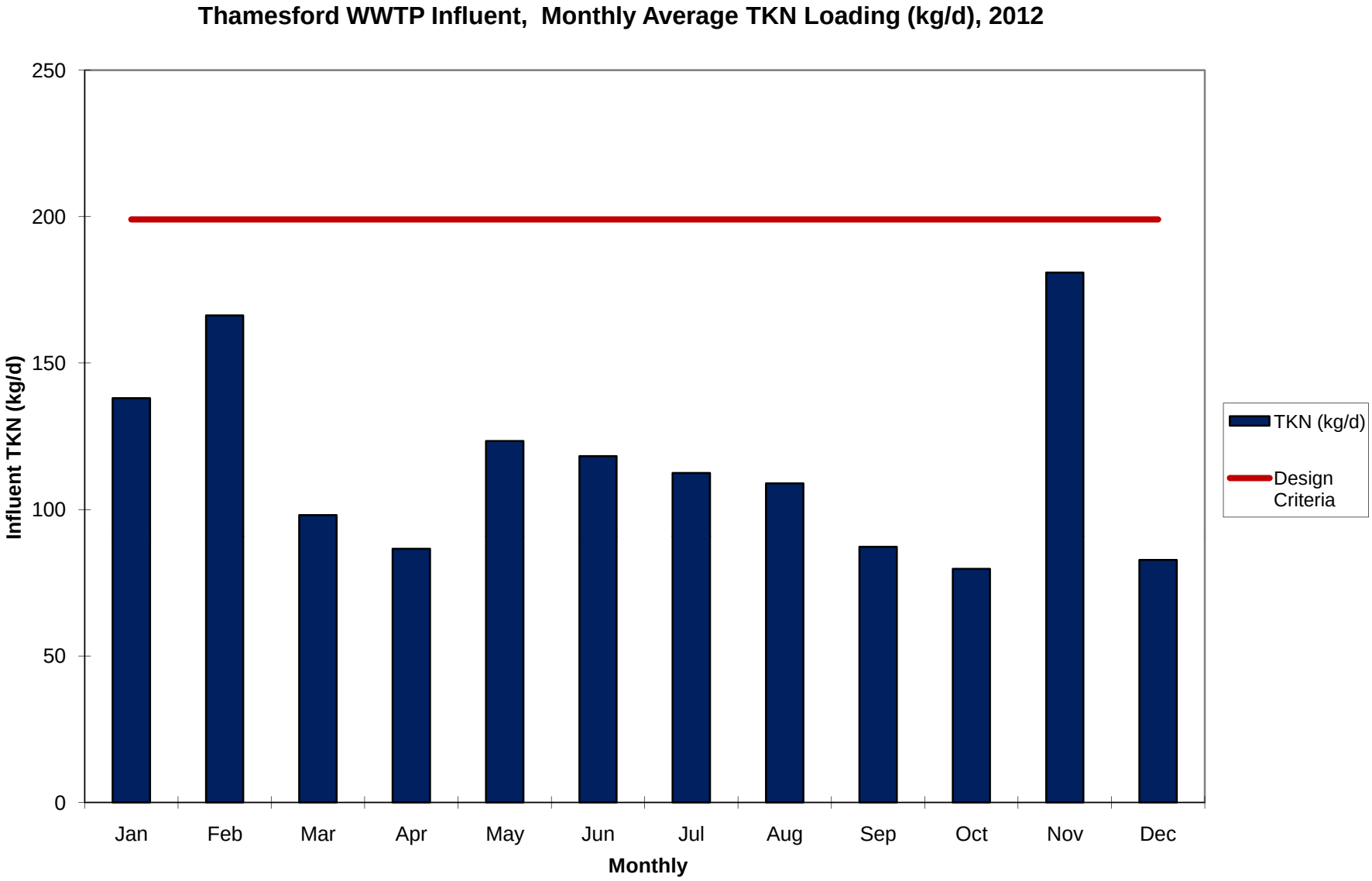
The major meat processing plant operates its own wastewater pretreatment system which includes a Dissolved Air Flotation (DAF) treatment unit where sludge is generated. The material is transported to the Thamesford WWTP where it is combined with the WWTP stored Biosolids. There is an existing letter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

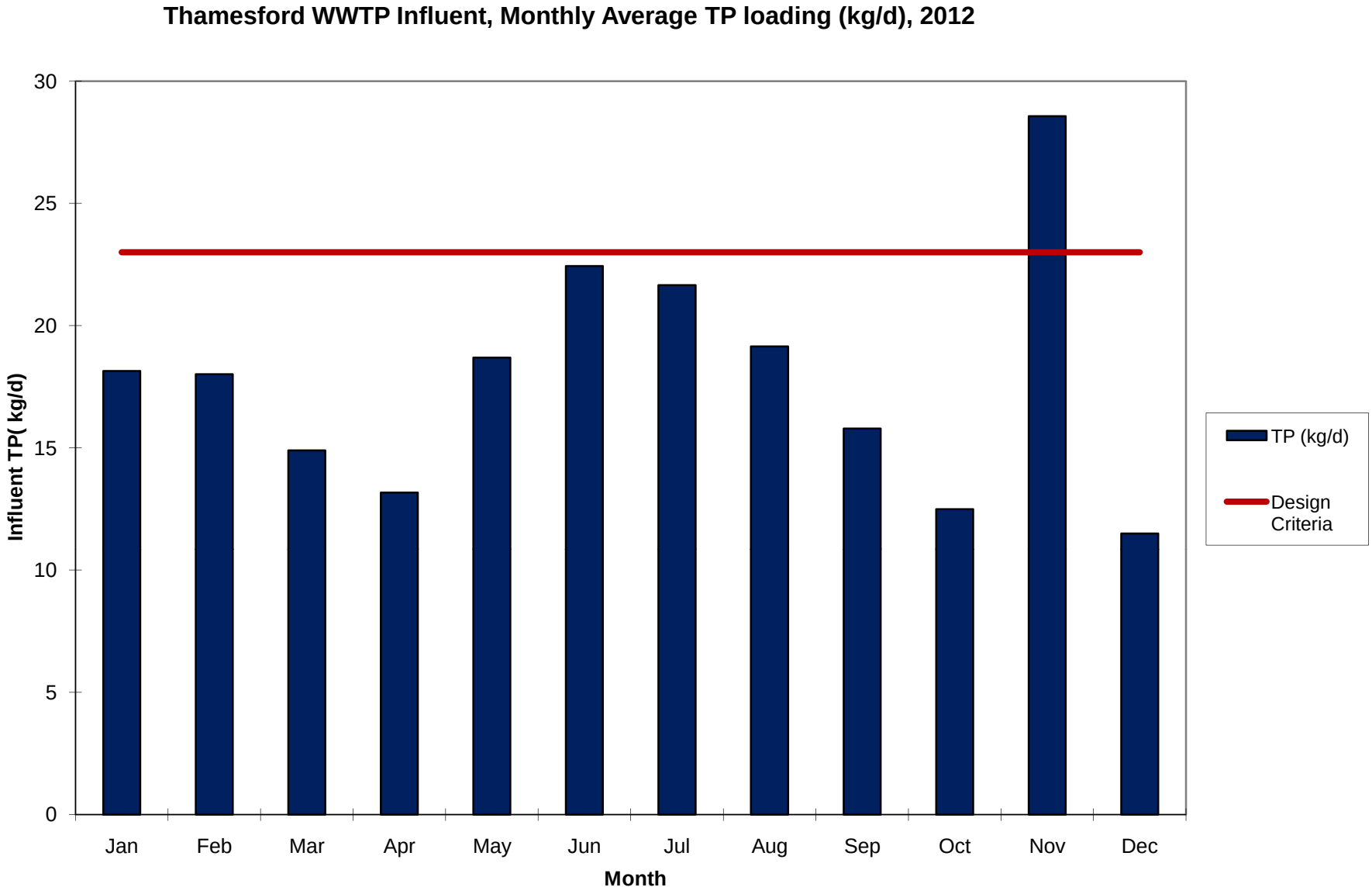
D.A.F. Sludge	
Month	m^3
January	183
February	166
March	173
April	168
May	206
June	68
July	9
August	102
September	142
October	91
November	73
December	81
Total	1462

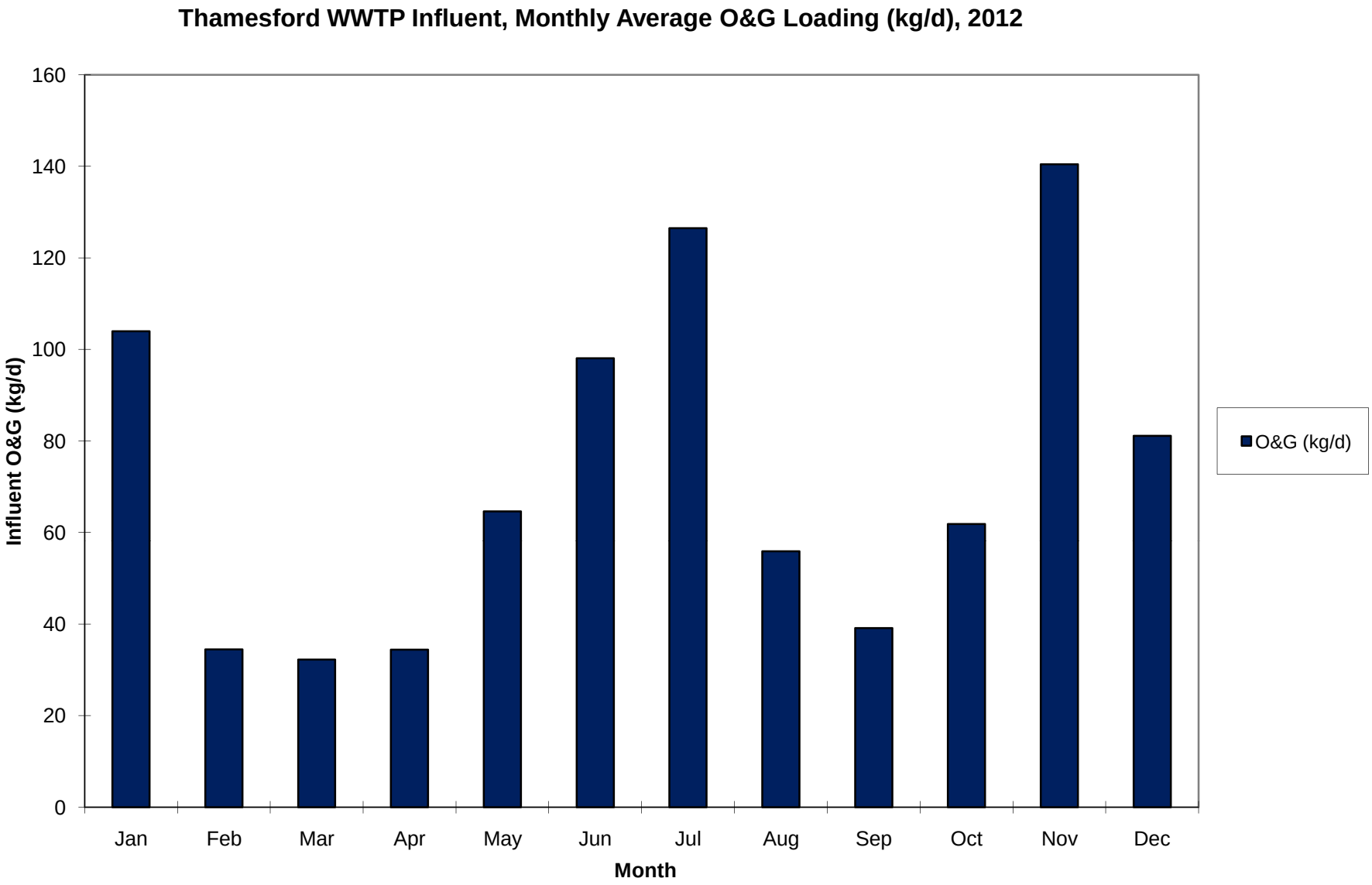
EXHIBIT 1

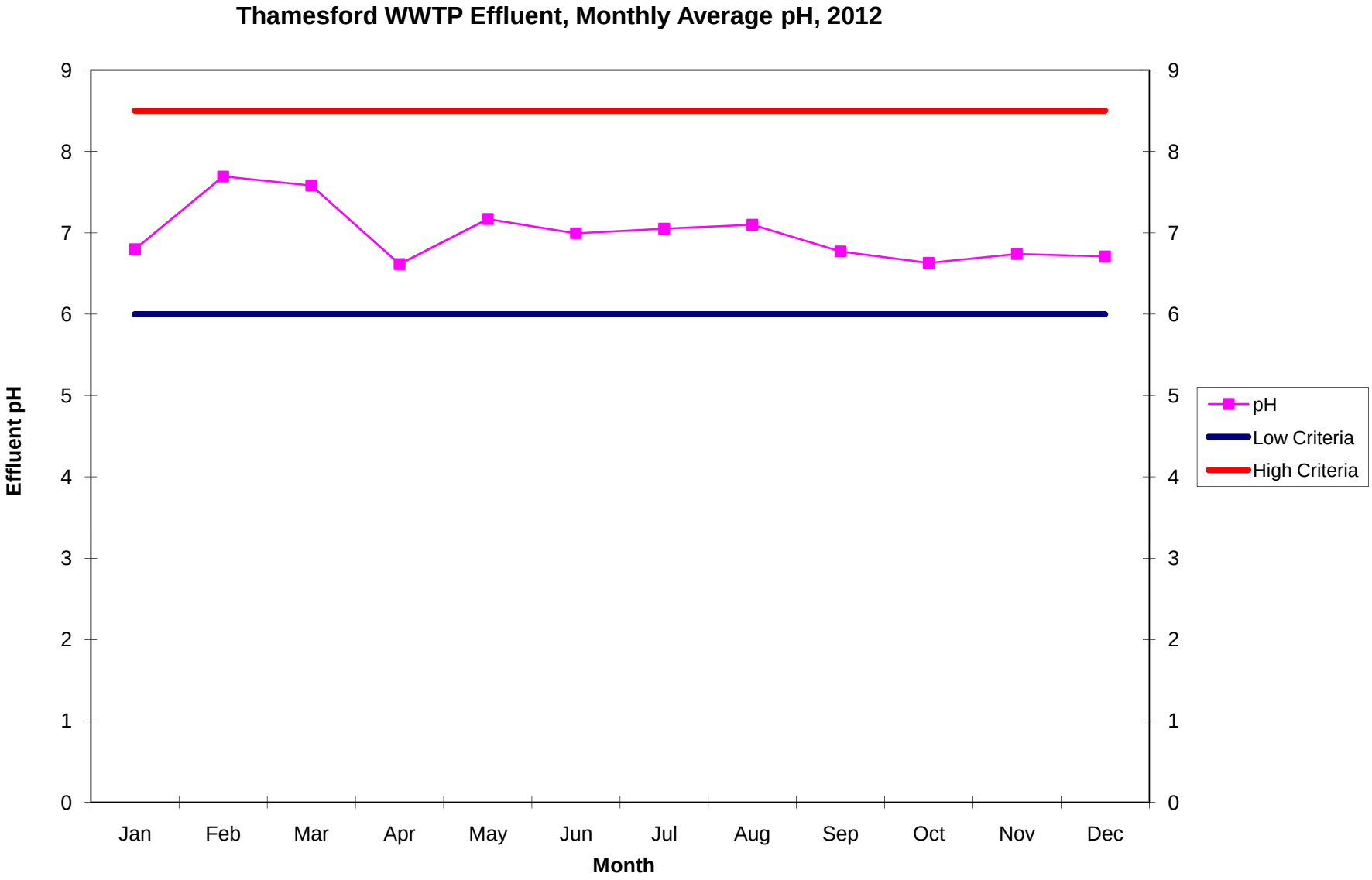

Thamesford WWTP Influent, Monthly Average BOD5 Loading (kg/d), 2012
Influent BOD5 (kg/d)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
BOD5 (kg/d)
Design Criteria

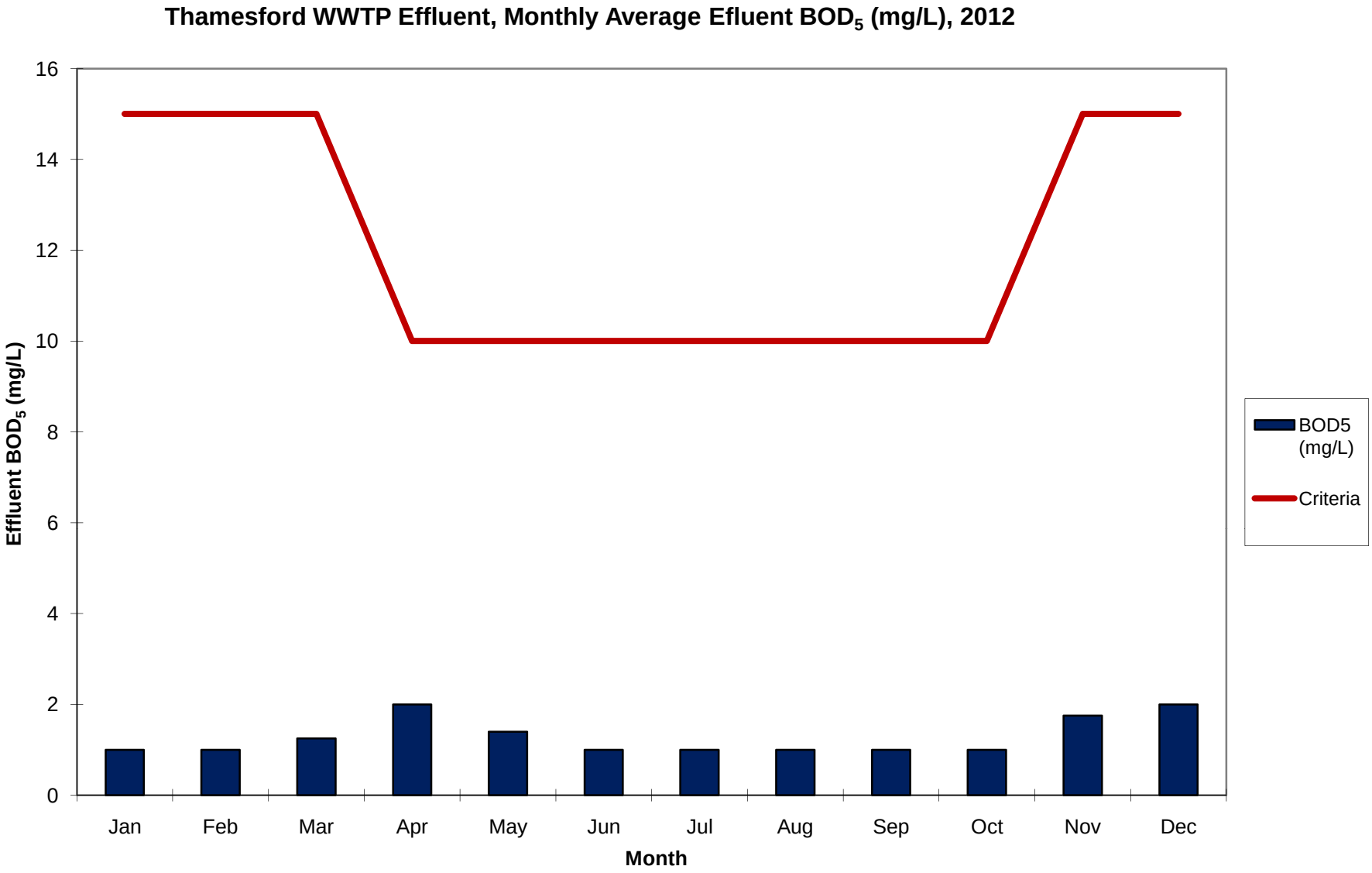

Thamesford WWTP Influent, Monthly Average TSS loading (kg/d), 2012
Influent TSS (kg/d)
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (kg/d)
Design Criteria

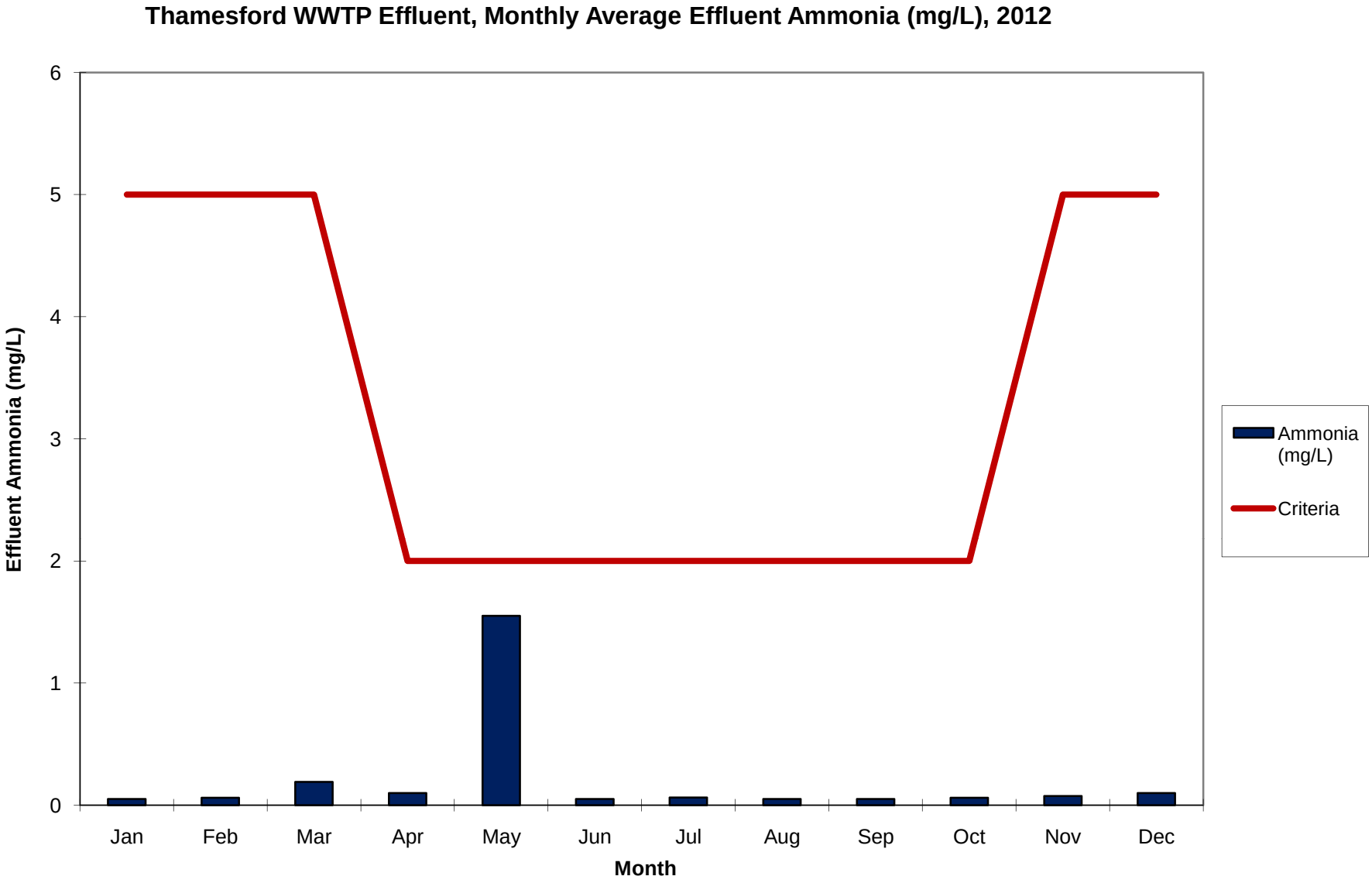

Thamesford WWTP Influent, Monthly Average TKN Loading (kg/d), 2012
Influent TKN (kg/d)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Monthly
TKN (kg/d)
Design Criteria

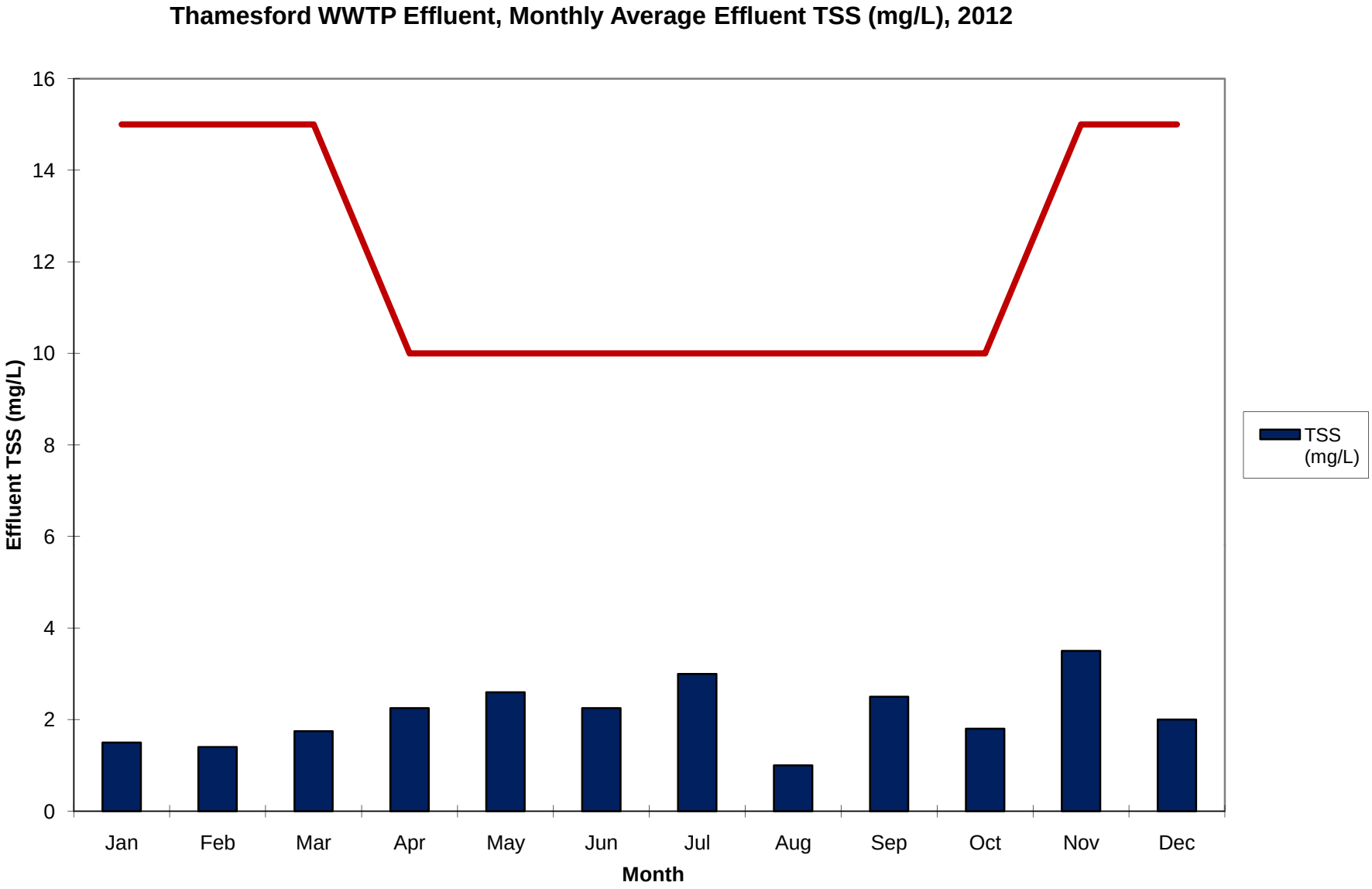

Thamesford WWTP Influent, Monthly Average TP loading (kg/d), 2012
Influent TP(kg/d)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (kg/d)
Design Criteria

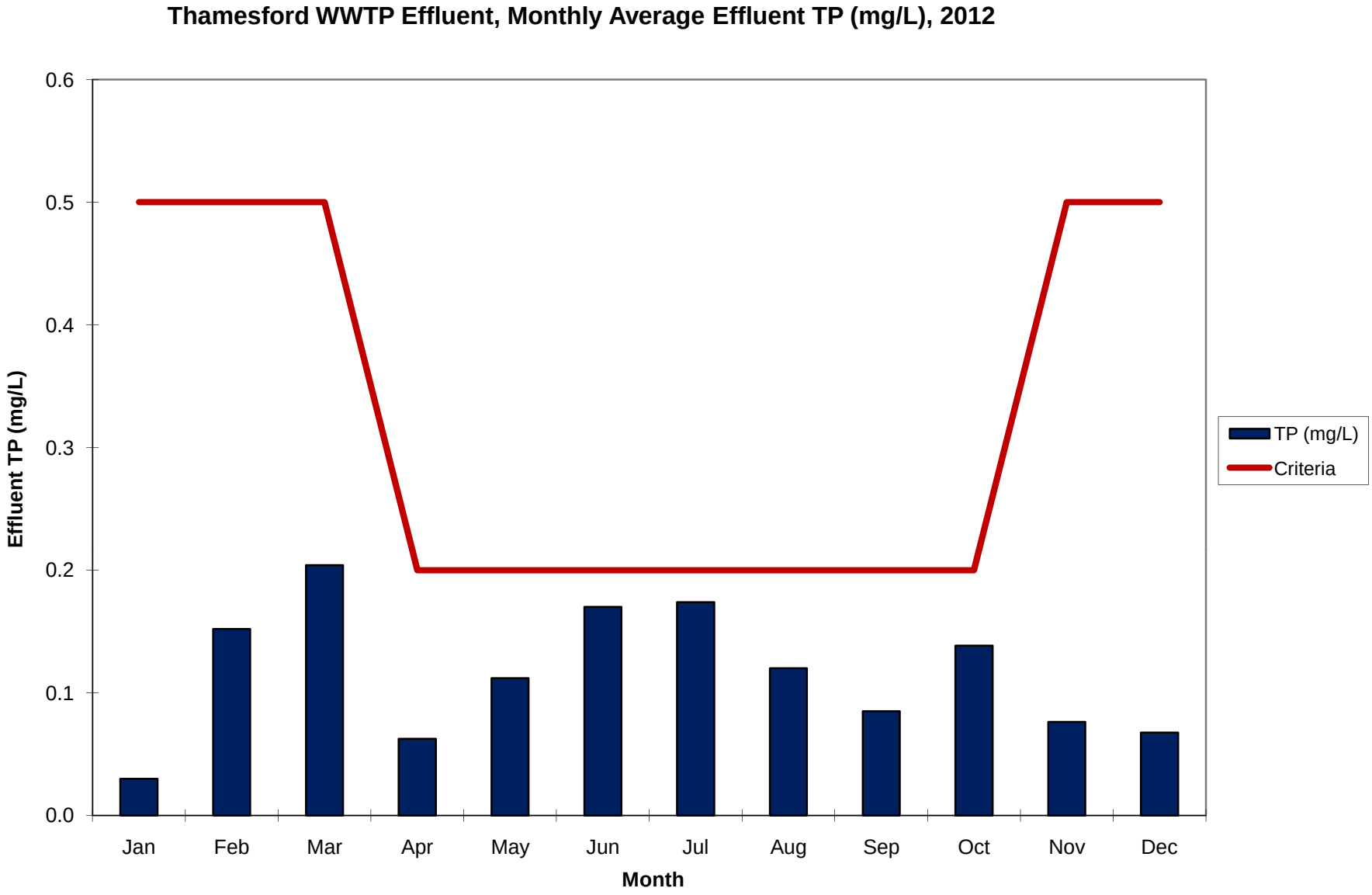

Thamesford WWTP Influent, Monthly Average O&G Loading (kg/d), 2012
160
140
120
100
80
60
40
20
0
Influent O&G (kg/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
O&G (kg/d)

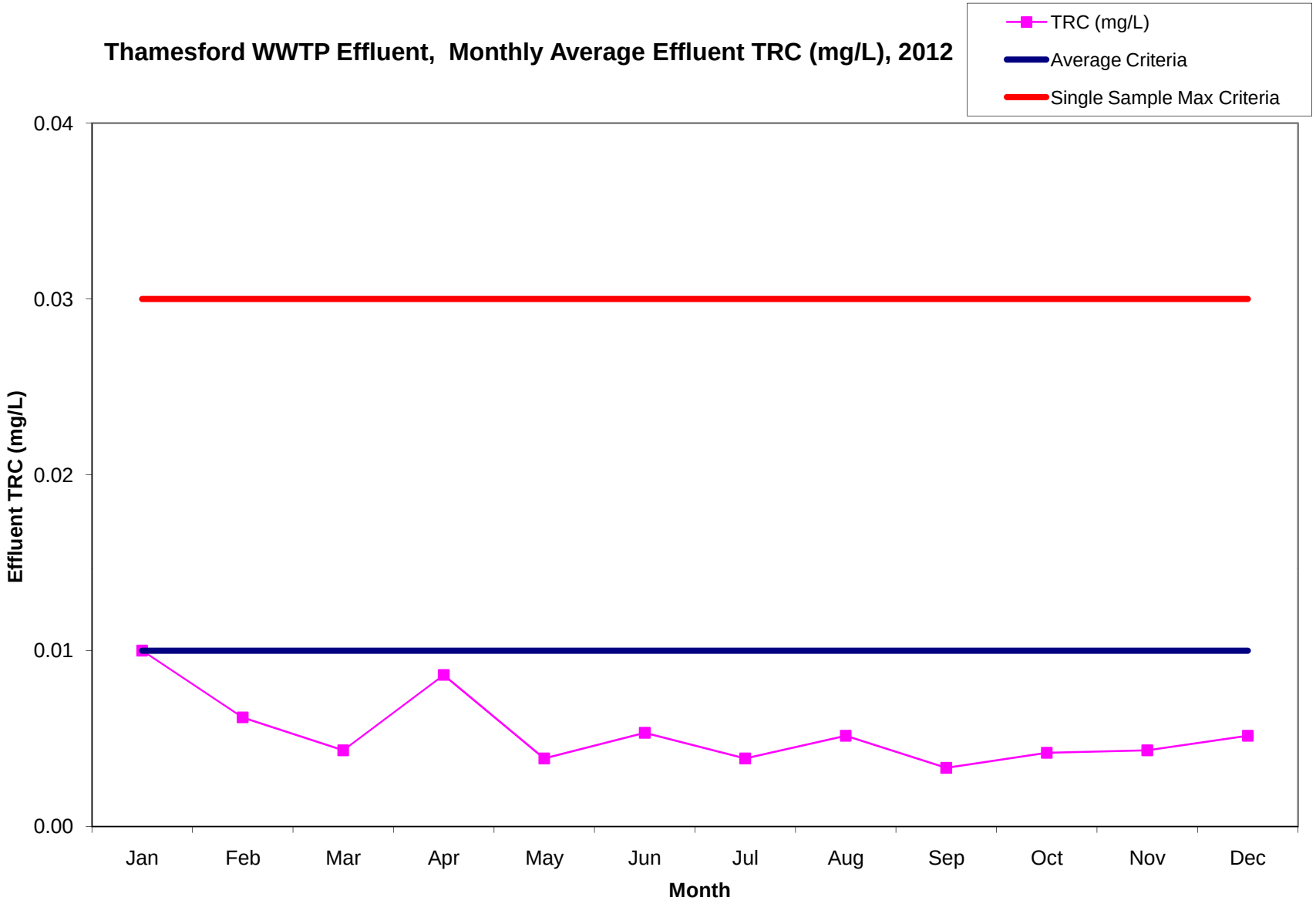

Thamesford WWTP Effluent, Monthly Average pH, 2012
Effluent pH
Month
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
1
2
3
4
5
6
7
8
9
pH
Low Criteria
High Criteria

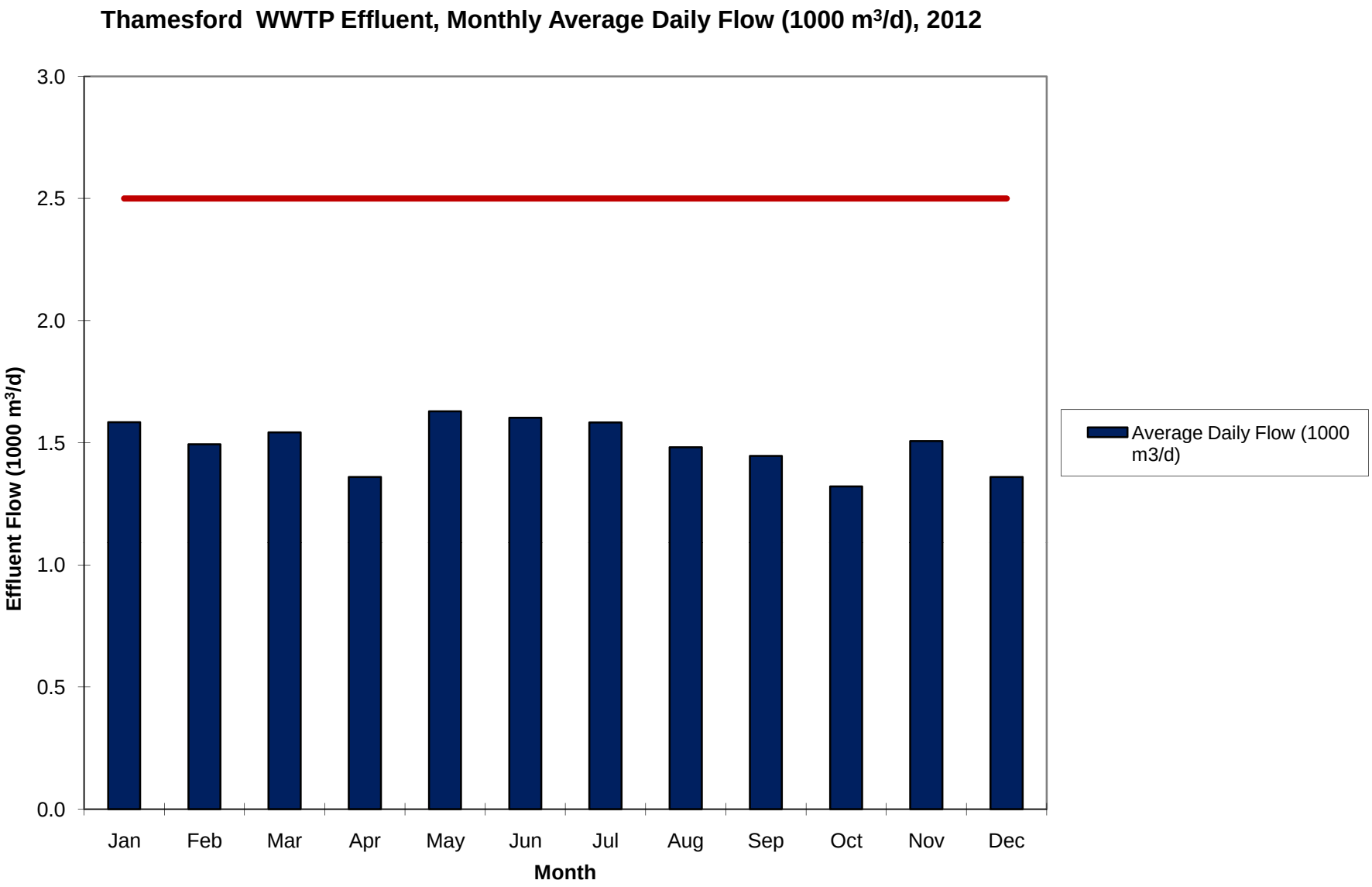

Thamesford WWTP Effluent, Monthly Average Efluent BOD5 (mg/L), 2012
Effluent BOD5 (mg/L)
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
BOD5 (mg/L)
Criteria


Thamesford WWTP Effluent, Monthly Average Effluent Ammonia (mg/L), 2012
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 Effluent TSS (mg/L), 2012
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 Effluent TP (mg/L), 2012
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Effluent TP (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (mg/L)
Criteria


Thamesford WWTP Effluent, Monthly Average Effluent TRC (mg/L), 2012
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), 2012
3.0
2.5
2.0
1.5
1.0
0.5
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)

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

2012

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)	49.118	43.323	47.813	40.789	50.495	48.064	49.086	45.926	43.386	40.953	45.208	42.140	45.525	40.789	50.495	546.301	
Average Daily Flow (1000 m^3/d)	1.584	1.494	1.542	1.360	1.629	1.602	1.583	1.481	1.446	1.321	1.507	1.359	1.492	1.321	1.629		2.5
Maximum Daily Flow (1000 m^3/d)	2.365	2.066	2.112	2.059	2.254	2.098	2.094	2.196	1.992	1.975	2.162	2.384	2.146	1.975	2.384		
Daily Average Influent (m3/d)																	
CSF Flow (m3/d)	1416	1240	1176	1040	1098	1125	1059	967	971	866	1861	893	1143	866	1861		
Municipal (m3/d)	483	424	425	413	393	437	412	421	443	388	404	413	422	388	483		
Combined Flow (m3/d)	1899	1665	1601	1454	1491	1487	1472	1389	1413	1254	2266	1306	1558	1254	2266		
Production Average Influent																	
CSF Flow (m3/d)	1227	1198	1284	1154	1331	1607	1564	1363	1533	1220	2538	1457	1456	1154	2538		
Municipal (m3/d)	499	413	433	405	390	624	609	594	699	547	551	674	537	390	699		
Combined Flow (m3/d)	1726	1611	1716	1559	1721	2231	2173	1957	2231	1767	2409	2131	1936	1559	2409		
Combined Influent																	
pH	6.88	7.23	7.46	7.49	7.51	7.44	7.46	7.62	7.47	7.39	7.49	7.51	7.41	7.23	7.62		
$BOD_{5\ (mg/L)}$	494.05	387.95	327.49	401.77	467.31	721.00	923.60	497.58	449.30	500.87	673.95	511.49	530	327	924		
TSS (mg/L)	230.68	149.93	144.27	191.23	208.16	363.23	545.05	259.00	223.02	288.99	465.81	298.31	281	144	545		
TKN (mg/L)	72.65	99.86	61.29	59.56	82.72	79.50	76.43	78.45	61.76	63.62	79.83	63.43	73.3	59.6	82.7		
TP (mg/L)	9.55	10.82	9.30	9.06	12.53	15.08	14.71	13.79	11.17	9.96	12.61	8.80	11.4	8.8	15.1		
O&G (mg/L)	54.73	20.70	20.16	23.69	43.34	65.95	85.94	40.25	27.69	49.33	61.98	62.14	46	20	86		
River Temperatures (celcius)	0	0	4.9	9.9	19	22.4	26.5	22.9	19.5	14.1	4.4	4.5					
Effluent																	
pH	6.80	7.69	7.58	6.62	7.17	6.99	7.05	7.10	6.77	6.63	6.74	6.71	6.99	6.62	7.58		6.0-9.5
$BOD_{5\ (mg/L)}$	1.00	1.00	1.25	2.00	1.40	1.00	1.00	1.00	1.0	1.0	1.8	2	1.3	1.0	2.0		10/15
TSS (mg/L)	1.50	1.40	1.75	2.25	2.60	2.25	3.00	1.00	2.5	1.8	3.5	2.0	2.1	1.0	3.5		10/15
Ammonia (mg/L)	0.05	0.06	0.19	0.10	1.55	0.05	0.06	0.05	0.05	0.06	0.08	0.10	0.200	0.050	1.550		2/5
TP (mg/L)	0.03	0.15	0.20	0.06	0.11	0.17	0.17	0.12	0.09	0.14	0.08	0.07	0.12	0.06	0.20		0.2/0.5
TRC (mg/L)	0.01	0.01	0.004	0.01	0.004	0.005	0.00	0.01	0.00	0.00	0.00	0.01	0.005	0.003	0.01		0.01
Temp	15.40	22.16	14.23	15.79	19.06	22.39	25.09	24.30	22.3	19.9	16.6	15.4	19.4	14.2	25.1		
DO (mg/L)	6.78	7.58	6.60	6.74	5.96	5.06	5.00	5.28	5.97	5.72	6.33	6.00	6.08	5.00	7		5
E. Coli (#/100mL)	1.00	2.00	1.00	1.19	1.00	1.50	1.19	2.27	4.08	1.85	3.03	1	2	1	4		200
Unionized Ammonia (mg/L)	0.0025	0.0025	0.0044	0.0025	0.0310	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0050	0.0025	0.0310		
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)	938	646	524	584	697	1072	1360	691	635	628	1527	668	825	524	1527		1333
TSS (kg/d)	438	250	231	278	310	540	802	360	315	362	1055	390	437	231	1055		779
TKN (kg/d)	138	166	98	87	123	118	112	109	87	80	181	83	114	80	181		199
TP (kg/d)	18	18	15	13	19	22	22	19	16	12	29	11	18	11	29		23
O&G (kg/d)	104	34	32	34	65	98	126	56	39	62	140	81	72	32	140		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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Tavistock Lagoon, 2012

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, County of Oxford

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

Overview

The Tavistock Lagoon System provided effective wastewater treatment in 2012 and all effluent concentration limits as specified by the ECA were met.

ECA # 7789-8AKJL5 took effect following the substantial completion of the plant upgrades in February 2012. Interim discharge limits governed for a period of nine months after substantial completion.

The annual average daily flow in 2012 was 1,548 m^3/d, which represents 61% of the rated capacity of 2,525 m^3/d.

Plant Description

The Tavistock Wastewater Treatment Plant (WWTP) 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.

Construction began in the fall of 2010 for the new lagoon cell and filter system with substantial completion occurring in February 2012. 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 -	1,548 m^3/day
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;

CBOD	25 mg/L
Suspended Solids	25 mg/L
Total Phosphorus	1 mg/L

After first 9 months following substantial completion;

CBOD	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 1,548 m^3/d this represents 61% of the rated capacity of 2,525 m^3/d included in ECA #7789-8AKJL5.

Plant treated effluent volume of 438,418 m^3 was released in 2012.

Raw Sewage Quality

The annual average raw sewage $CBOD_5$ concentration to the plant was 349 mg/L. This corresponds to an average $CBOD_5$ loading of 540 kg/day. The average suspended solids loading was 291 mg/L (or 451 kg/day). The annual raw sewage nitrogen levels as TKN were 40 mg/L (or a loading of 62 kg/day). Phosphorous levels averaged 11 mg/L, which correspond to 17 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 2.7 mg/L with a removal efficiency of 99.2%. The annual suspended solids effluent concentration was 7 mg/L with a removal efficiency of 97.6%. The annual average TKN effluent concentration was 2.4 mg/L with a removal efficiency of 94%. The annual average total phosphorous effluent concentration was 0.04 mg/L, which represents a removal efficiency of 99.6%.

.

All pH is measured in the effluent by the operator at a minimum on a weekly basis during discharge and there was no single sample with pH outside of the required range of 6-9.5 in 2012.

The Tavistock WWTP met all the discharge criteria within its ECA in 2012.

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.

With the exception of three months of suspended solids at the start up of the new facility that were slightly over the objective for that single parameter of 10 mg/L, all effluent discharge objectives listed in the ECA were met at the Tavistock WWTP.

Bypassing, Overflows and Abnormal Conditions

There were no bypasses, overflows or abnormal events at the wastewater lagoons in 2012.

Maintenance and Calibration Activities

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

R & R Instrumentation calibrated all flow measuring equipment.

Summary

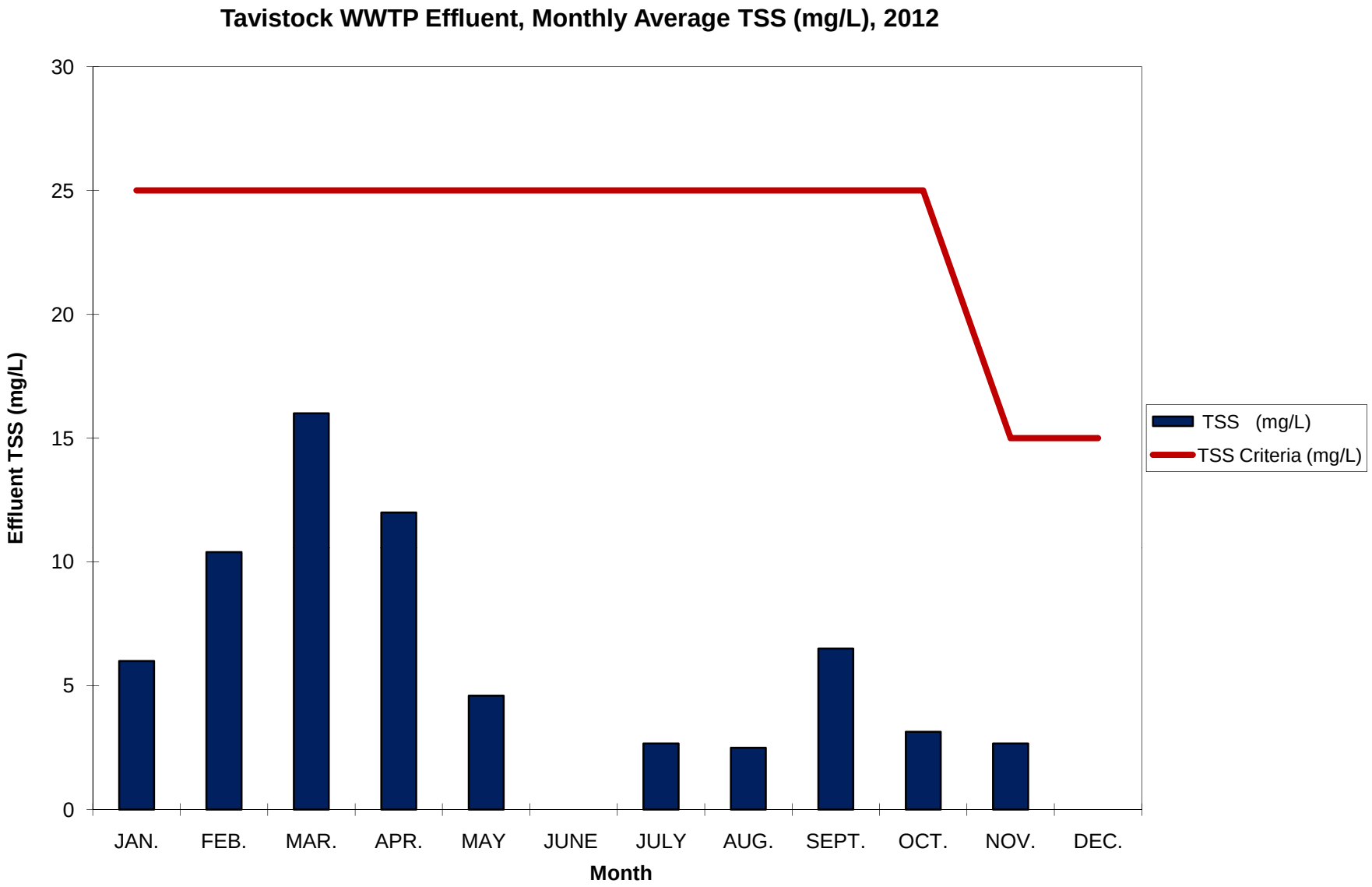
The Tavistock WWTP met all the discharge criteria within its ECA in 2012.

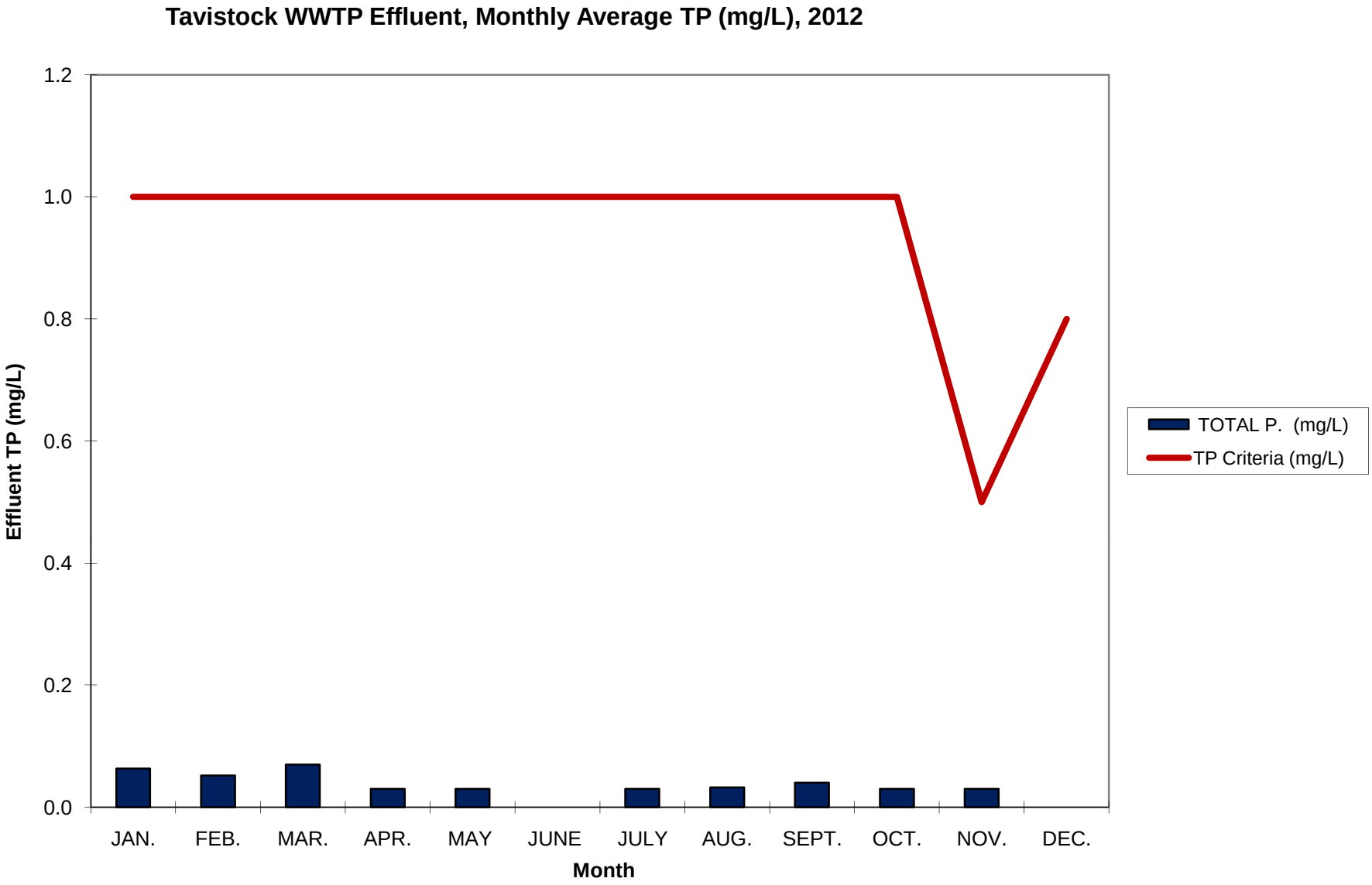
The substantial completion date for the Tavistock WWTP was February 6th, 2012.

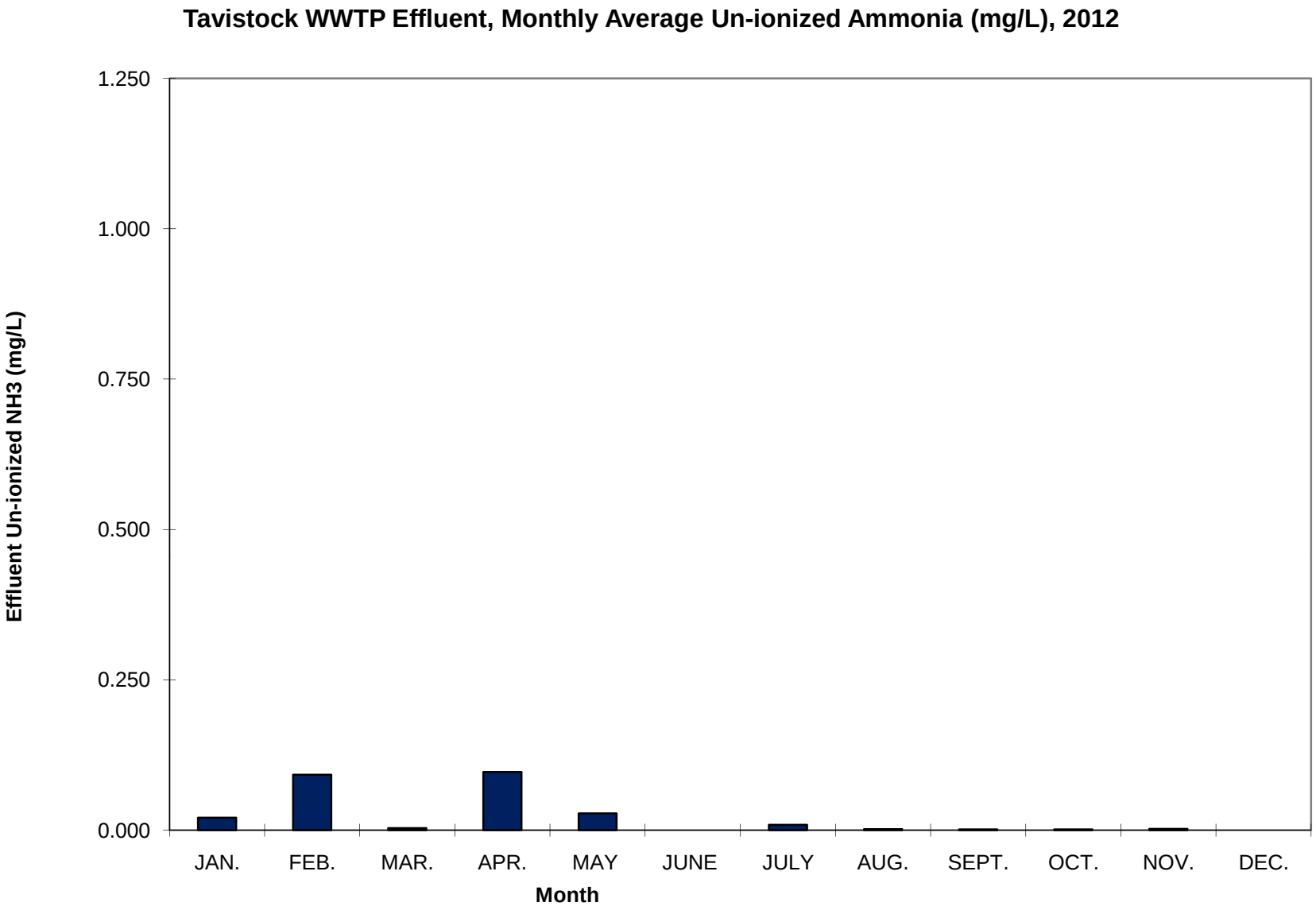
Miscellaneous

As part of this upgrade project undertaken by the County, a groundwater monitoring well report was also prepared and is included in this report under Exhibit 2.

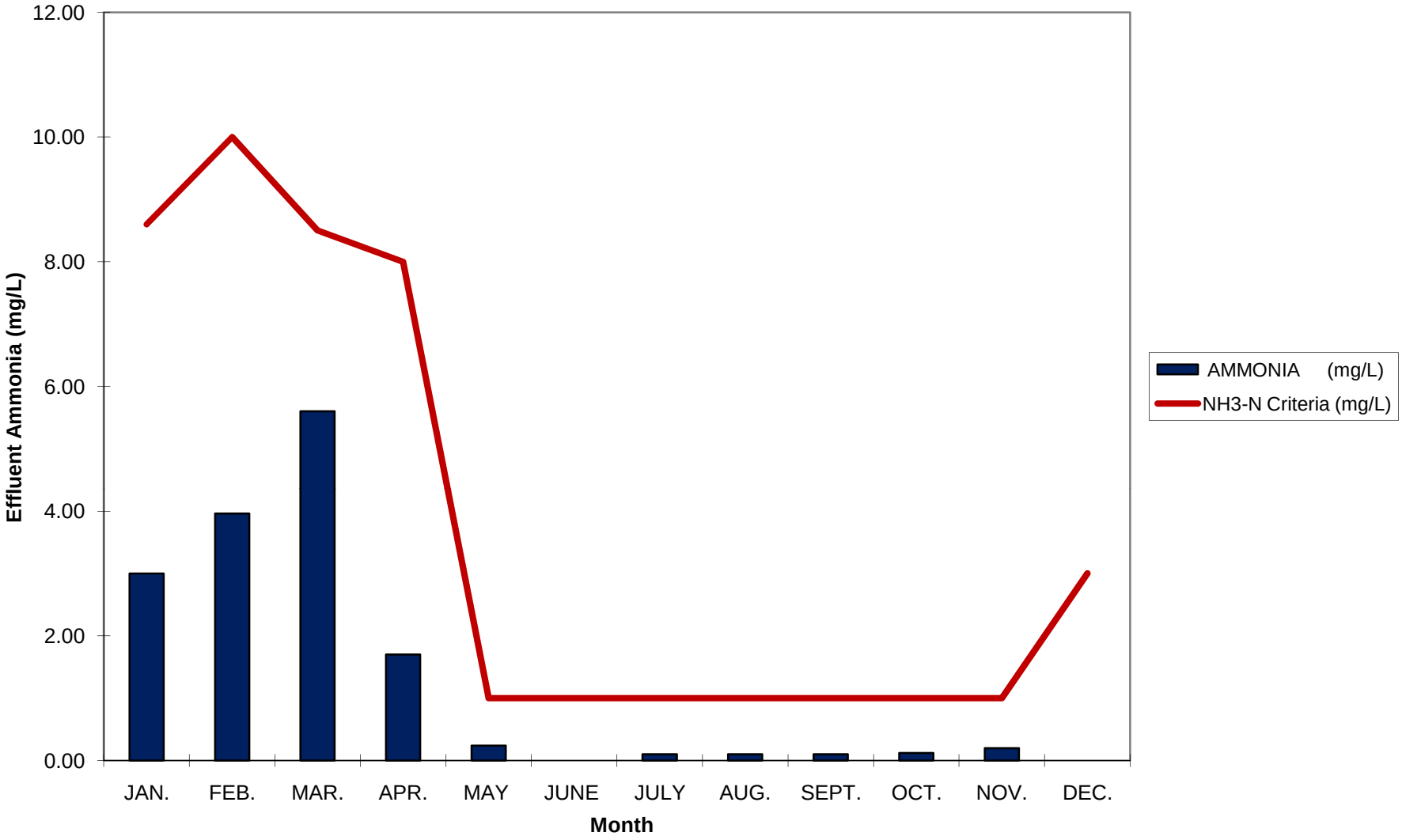
EXHIBIT 1

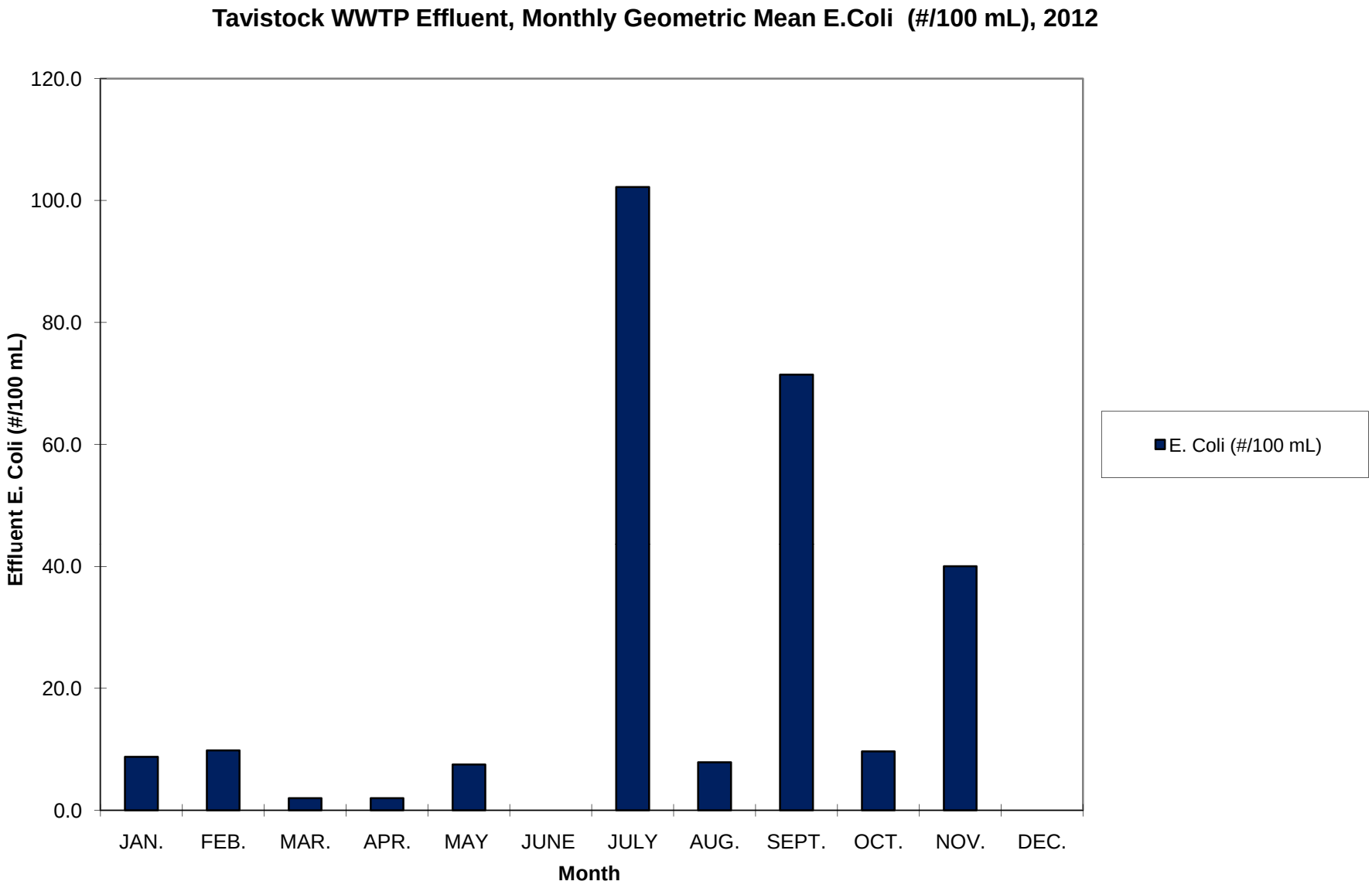

Tavistock WWTP Effluent, Monthly Average TSS (mg/L), 2012
Effluent TSS (mg/L)
30
25
20
15
10
5
0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
TSS (mg/L)
TSS Criteria (mg/L)

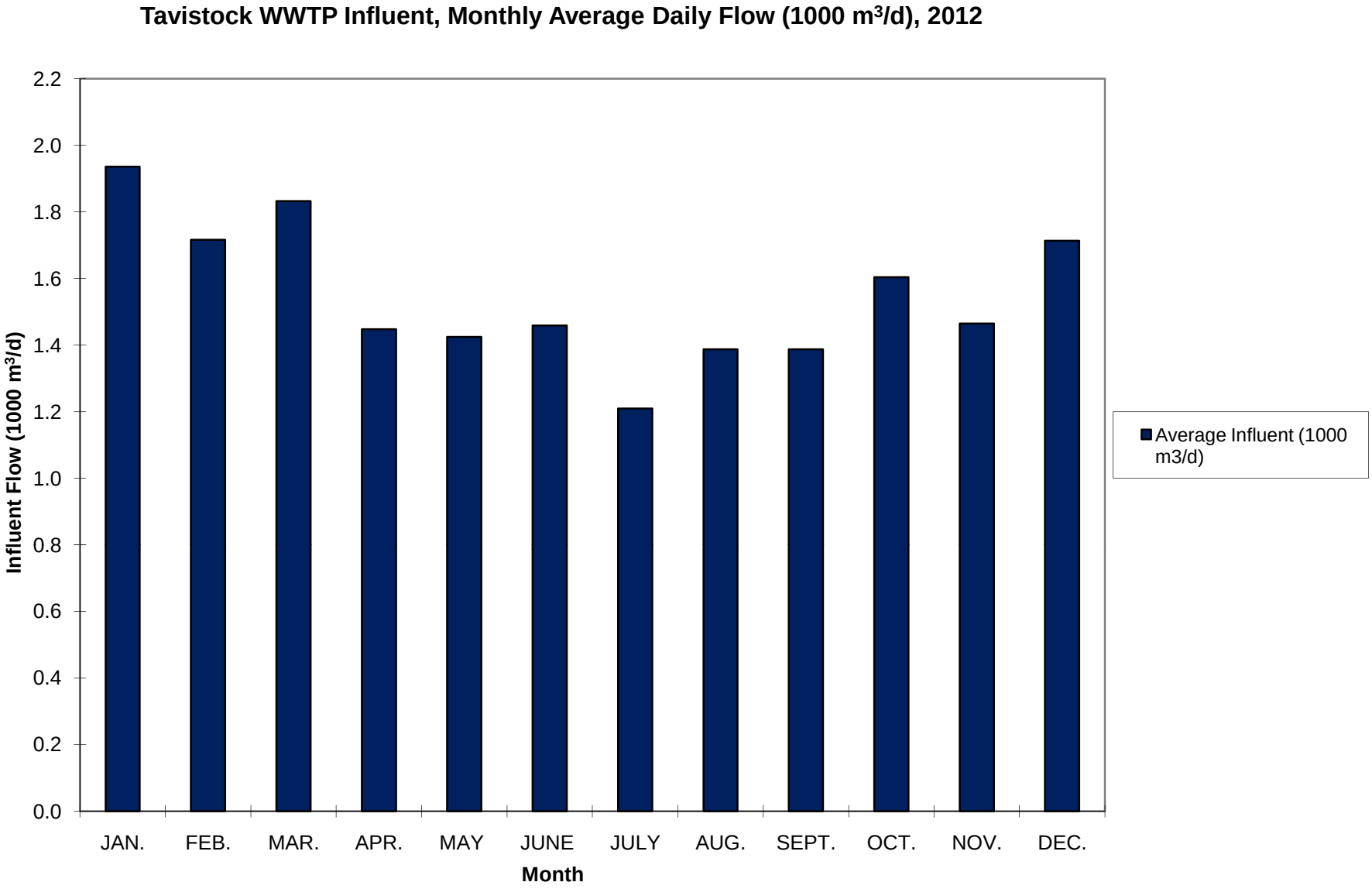

Tavistock WWTP Effluent, Monthly Average TP (mg/L), 2012
Effluent TP (mg/L)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
TOTAL P. (mg/L)
TP Criteria (mg/L)

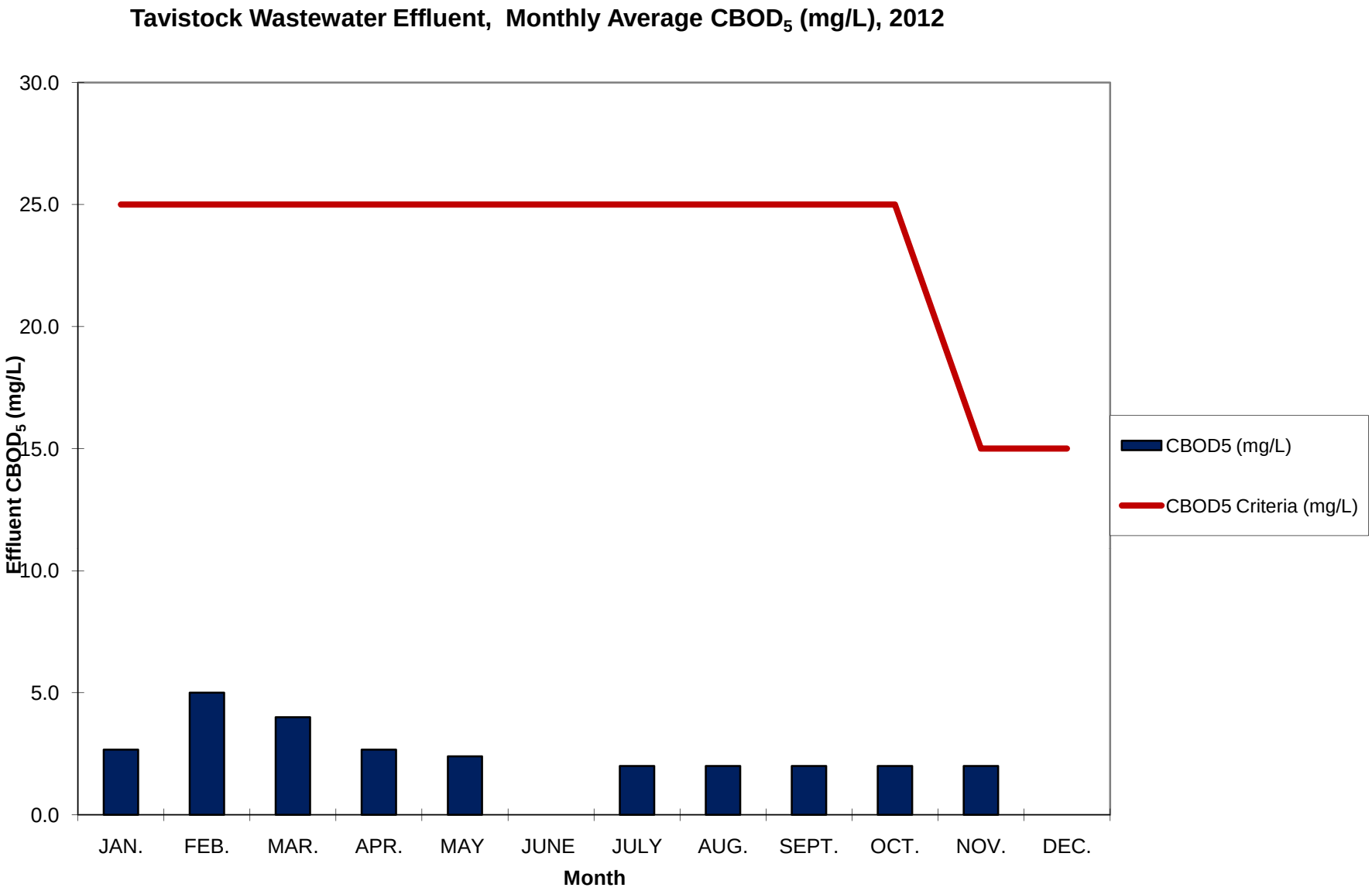

Tavistock WWTP Effluent, Monthly Average Un-ionized Ammonia (mg/L), 2012
Effluent Un-ionized NH3 (mg/L)
1.250
1.000
0.750
0.500
0.250
0.000
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month

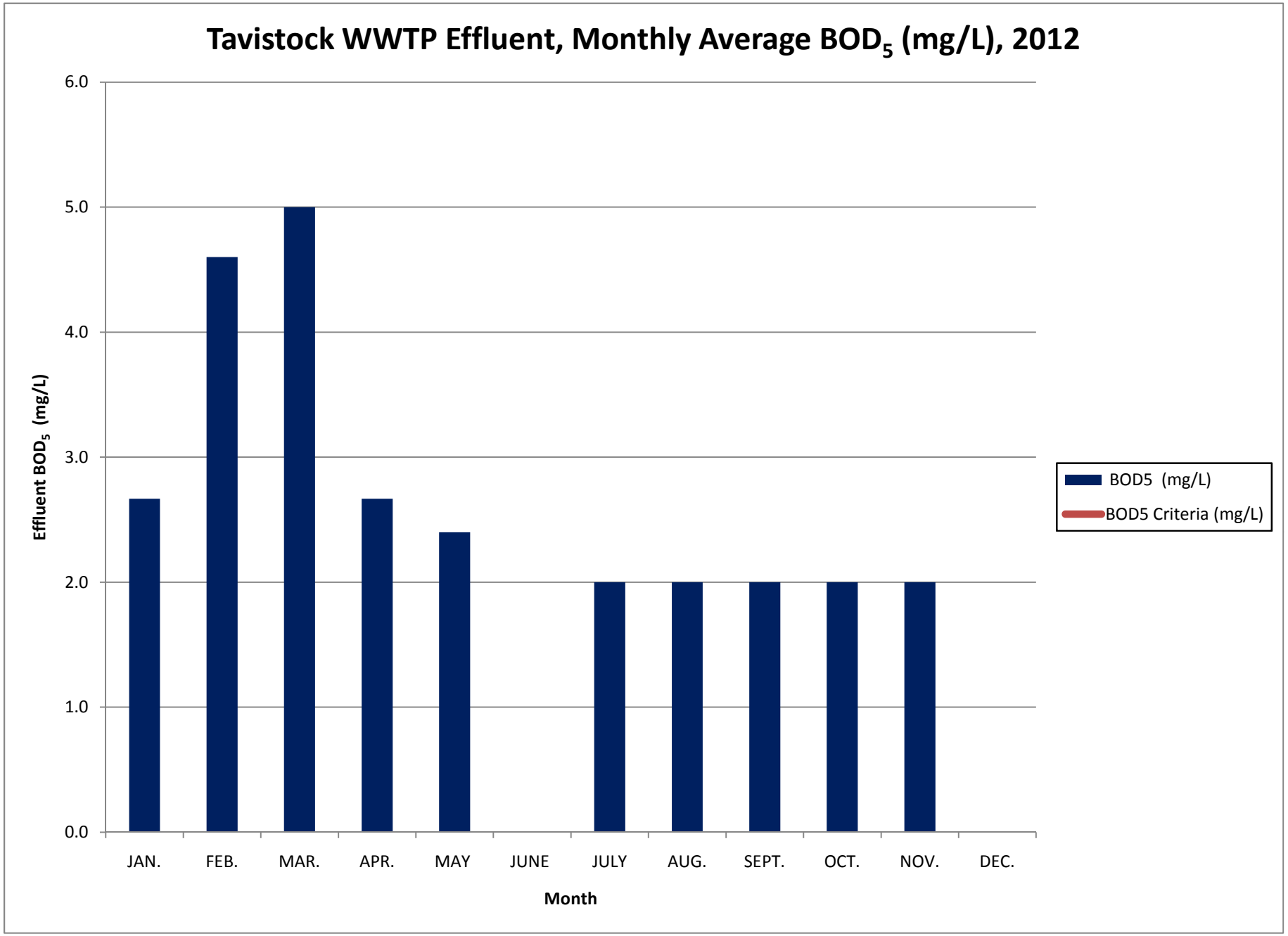
Tavistock WWTP Effluent, Monthly Average Ammonia (mg/L), 2012



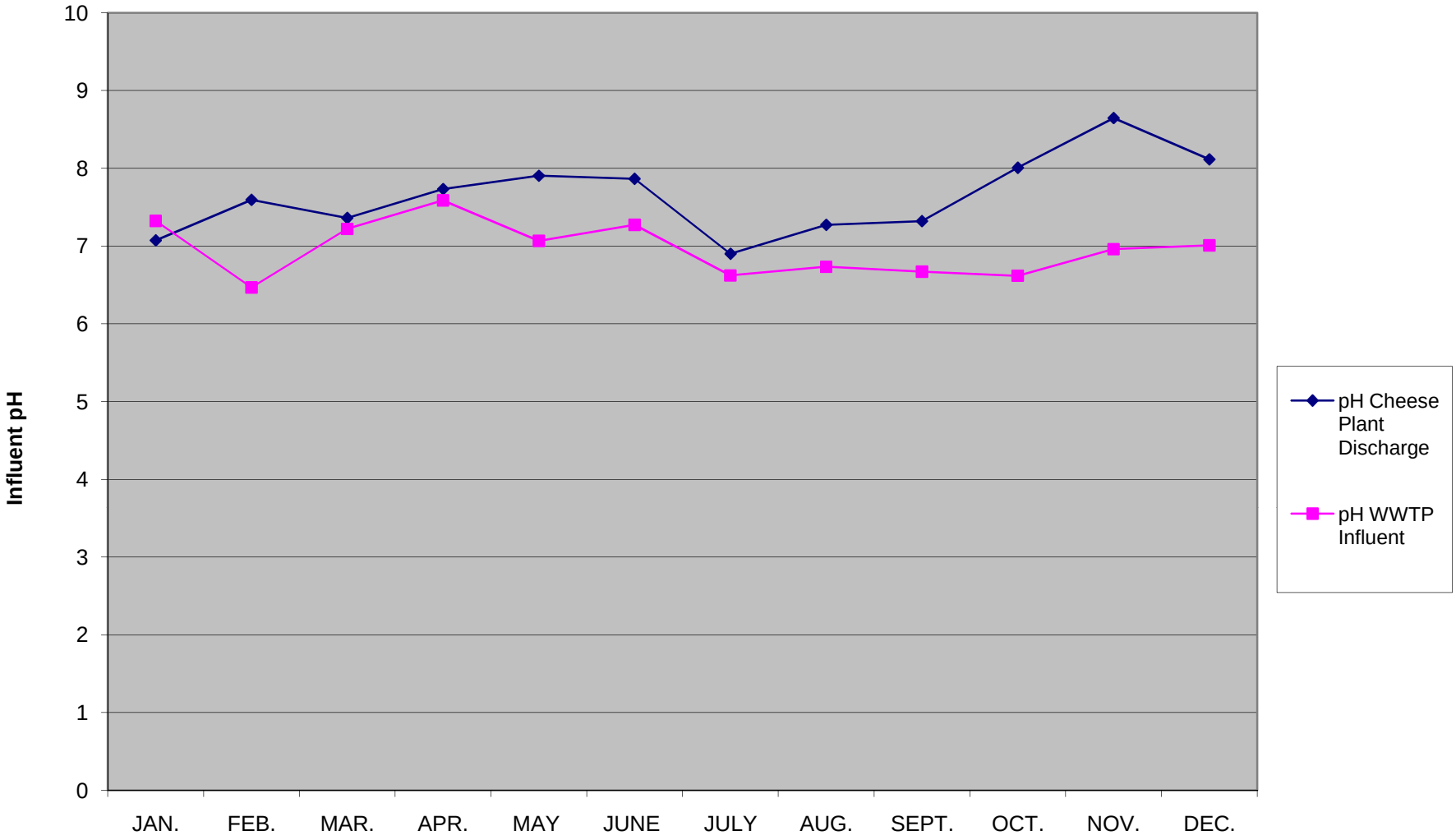

Tavistock WWTP Effluent, Monthly Geometric Mean E.Coli (#/100 mL), 2012
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Effluent E. Coli (#/100 mL)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
E. Coli (#/100 mL)

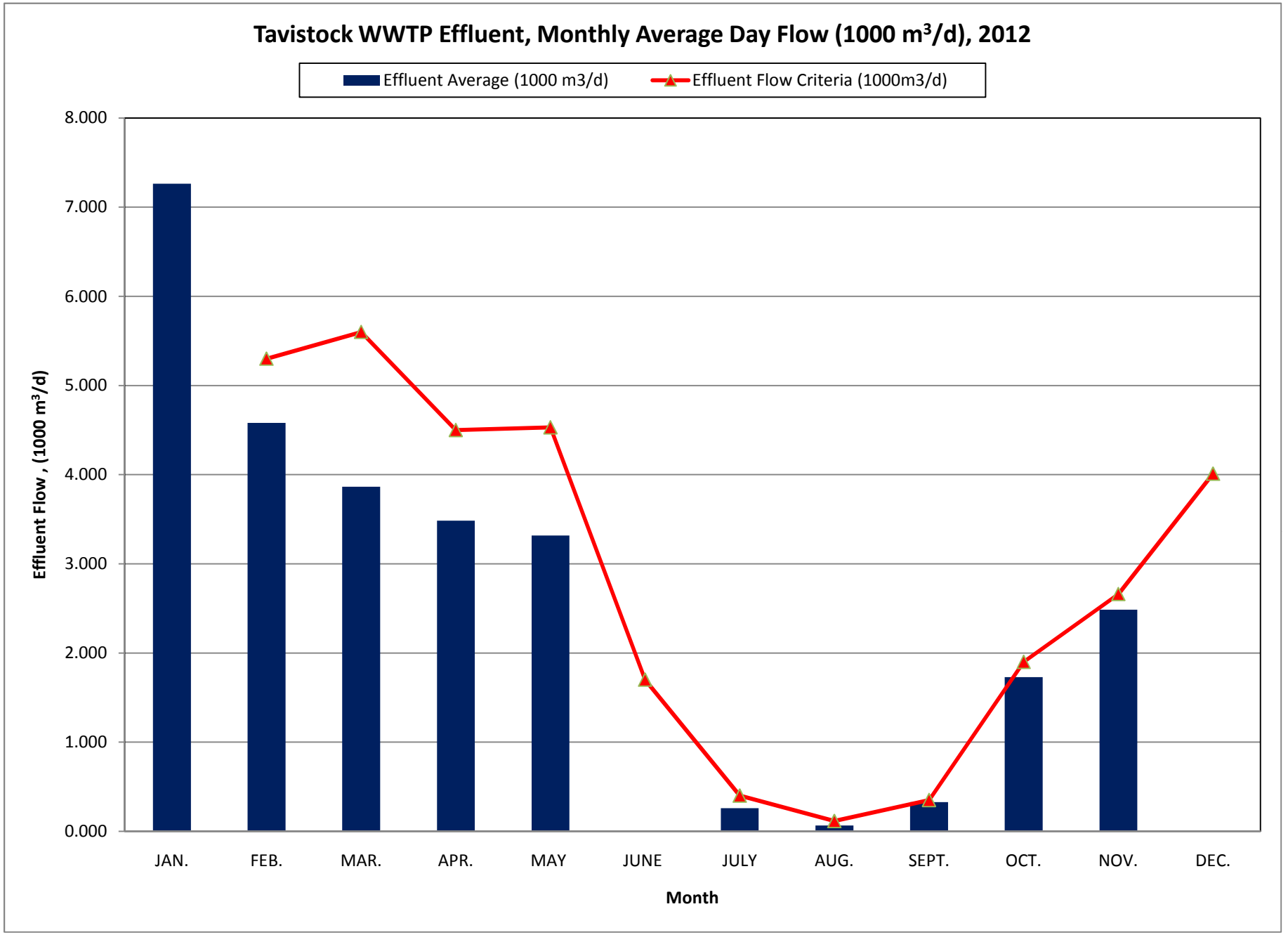

Tavistock WWTP Influent, Monthly Average Daily Flow (1000 m3/d), 2012
Influent Flow (1000 m3/d)
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
Average Influent (1000 m3/d)


Tavistock Wastewater Effluent, Monthly Average CBOD5 (mg/L), 2012
30.0
25.0
20.0
15.0
10.0
5.0
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), 2012
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)
BOD5 Criteria (mg/L)

Cheese Plant pH vs Lagoon Influent pH 2012




Tavistock WWTP Effluent, Monthly Average Day Flow (1000 m3/d), 2012
Effluent Average (1000 m3/d)
Effluent Flow Criteria (1000m3/d)
8.000
7.000
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 2012

Month		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL	AVE.	Criteria
Total Influent	($1000\ m^3$)	60.014	49.774	56.795	43.41499	44.162	43.765	37.489	42.991	41.611	49.713	43.931	53.102	**566.76**	**47.230**	
Average Influent	($1000\ m^3/d$)	1.936	1.716	1.832	1.447	1.425	1.459	1.209	1.387	1.387	1.604	1.464	1.713		**1.548**	**2.525**
Max Raw	($1000\ m^3/d$)	2.486	2.342	2.834	1.738	1.714	1.925	1.705	1.766	1.641	2.517	2.036	2.462		**2.097**	
Min Raw	($1000\ m^3/d$)	1.439	1.347	1.390	1.157	1.024	1.113	0.869	0.977	0.966	1.021	1.153	1.322		**1.148**	
Cheese Total	($1000\ m^3$)	15.462	15.523	16.696	19.870	21.801	27.156	23.366	16.975	14.052	13.255	11.191	11.351	**206.70**	**17.22**	
Cheese Average	($1000\ m^3/d$)	0.499	0.535	0.539	0.662	0.703	0.876	0.754	0.566	0.468	0.428	0.373	0.366		**0.56**	
Cheese Max	($1000\ m^3/d$)	0.675	0.736	0.800	0.980	1.040	1.301	1.330	1.038	0.690	0.667	0.522	0.543		**0.86**	
Cheese Min	($1000\ m^3/d$)	0.196	0.291	0.277	0.316	0.340	0.000	0.000	0.166	0.166	0.116	0.130	0.099		**0.17**	
Effluent Total	($1000\ m^3$)	108.96	59.537	34.781	34.844	82.935		4.429	1.493	9.855	51.871	49.718		**438.418**	**43.84**	
Effluent Average	($1000\ m^3/d$)	7.264	4.580	3.865	3.484	3.3174		0.261	0.065	0.329	1.729	2.486			**2.74**	
Effluent Max	($1000\ m^3/d$)	9.693	5.324	5.570	4.436	4.981		0.400	0.101	0.350	1.902	2.551			**3.53**	
Effluent Min	($1000\ m^3/d$)	1.954	1.892	0.007	0.061	0.331		0.001	0.016	0.115	0.020	1.538			**0.59**	

Tavistock Cheese Influent

BOD_5	(mg/L)	826.0	695.8	774.5	762.0	803.4	1008.3	919.8	657.8	984.0	728.2	825.0	861.7		**821**	
SS	(mg/L)	272.0	314.3	259.0	234.5	290.4	440.8	320.3	205.4	257.8	231.0	276.0	258		**280**	
AMMONIA	(mg/L)	11.36	8.28	10.75	12.95	10.30	7.28	6.65	10.18	10.13	9.38	9.00	9.1		**10**	
TKN	(mg/L)	58.74	45.53	50.35	50.45	46.54	82.53	41.83	47.22	52.60	39.58	52.93	63.8		**53**	
NITRITE	(mg/L)	1.79	4.57	5.70	6.22	2.53	1.11	2.50	8.80	2.36	2.72	0.12	0.34		**3**	
NITRATE	(mg/L)	18.14	20.28	17.66	10.30	7.01	8.29	7.24	10.22	15.43	26.95	38.26	36.9		**18**	
TOTAL P.	(mg/L)	27.02	22.84	24.20	26.23	28.48	31.58	27.25	20.18	25.73	22.86	31.90	27.1		**26**	
pH Cheese Plant Discharge		7.07	7.60	7.36	7.73	7.90	7.87	6.90	7.27	7.32	8.01	8.65	8.12		**7.65**	

Tavistock Lagoon Influent

$CBOD_5$	(mg/L)	311.0	252.3	249.5	404.5	298.5	290.0	414.0	301.0	671.0	301.0	430.3	349.0		**356.01**	
BOD_5	(mg/L)	358.0	239.0	265.0	352.5	309.0	318.0	406.5	321.3	661.0	297.5	432.0	373.0		**361.07**	
SS	(mg/L)	223.5	262.0	253.0	246.5	317.0	222.5	315.0	297.7	445.0	190.5	394.0	330		**291.4**	
AMMONIA	(mg/L)	19.65	28.23	16.20	26.75	22.45	30.40	28.50	23.07	23.10	18.65	21.57	19.9		**23**	
TKN	(mg/L)	29.5	37.5	38.7	31.90	33.00	45.0	50.50	46.67	53.15	37.00	41.67	38.50		**40.2**	
NITRITE	(mg/L)	0.07	1.00	0.06	0.06	6.23	0.06	0.39	0.06	0.08	1.31	0.06	0.18		**1**	
NITRATE	(mg/L)	0.05	1.35	0.10	0.08	0.05	0.05	0.33	0.05	0.05	0.05	0.05	3.16		**0**	
TOTAL P.	(mg/L)	7.39	6.28	7.38	6.81	7.54	8.94	16.70	15.17	16.60	8.25	15.47	10.44		**11**	
pH WWTP Influent		7.32	6.47	7.22	7.59	7.07	7.27	6.62	6.73	6.67	6.62	6.96	7.01		**6.96**	
Temperature (celcius)		10.6	10.5	13.8	13.4	17.8	21.6	24.9	23.0	20.0	17.1	13.7	13.4		**16.6**	

Tavistock Lagoon Effluent

														TOTAL	AVE.	Criteria
$CBOD_5$	(mg/L)	2.7	5.0	4.0	2.7	2.4		2.0	2.0	2.0	2.0	2.0			**2.67**	**25/15**
BOD_5	(mg/L)	2.7	4.6	5.0	2.7	2.4		2.0	2.0	2.0	2.0	2.0			**2.73**	
TSS	(mg/L)	6.0	10.4	16.0	12.0	4.6		2.7	2.5	6.5	3.1	2.7			**7**	**25/15**
AMMONIA	(mg/L)	3.00	3.96	5.60	1.70	0.24		0.10	0.10	0.10	0.12	0.20			**1.51**	**1 - 10**
TKN	(mg/L)	3.73	5.42	7.30	2.30	0.50		0.50	0.60	0.63	0.80	2.07			**2.38**	
NITRITE	(mg/L)	0.12	0.11	0.08	0.06	0.06		0.06	0.06	0.06	0.06	0.06			**0.1**	
NITRATE	(mg/L)	1.22	1.51	1.52	2.25	6.35		3.71	3.12	2.03	0.59	1.64			**2.4**	
TOTAL P.	(mg/L)	0.06	0.05	0.07	0.03	0.03		0.03	0.03	0.04	0.03	0.03			**0.04**	**0.5 - 1**
pH		7.85	8.20	7.86	8.29	8.19		8.23	7.88	7.50	7.70	7.83			**7.95**	**6.0-9.5**
E. Coli	(#/100 mL)	8.8	9.8	2.0	2.0	7.5		102.2	7.9	71.5	9.7	40.0			**26**	
Temp.	Celcius	4.9	5.0	5.0	9.2	14.4		24.5	22.1	19.0	13.2	7.2			**12.45**	
D.O.	(mg/L)	7.7	8.2	7.6	8.5	8.3		8.3	7.6	7.5	7.7	7.8			**7.9**	**(4.0)**
Un-ion'd Ammonia	(mg/L)	0.021	0.092	0.003	0.097	0.028		0.009	0.002	0.001	0.001	0.002			**0.026**	

Criteria per Month

		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
$CBOD_5$ Criteria	(mg/L)	25	25	25	25	25	25	25	25	25	25	15	15
TSS Criteria	(mg/L)	25	25	25	25	25	25	25	25	25	25	15	15
TP Criteria	(mg/L)	1	1	1	1	1	1	1	1	1	1	0.5	0.8
NH3-N Criteria	(mg/L)	8.6	10	8.5	8	1	1	1	1	1	1	1	3
DO	(mg/L)	4	4	4	4							4	4
Influent Flow Design	(1000m3/d)	2.07	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)		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 2011

		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		AVE.
BOD_5 Loading	(kg/d)	433	450	486	510	440	325	492	417	917	477	633	639		**559**
TSS Loading	(kg/d)	38	48	464	357	452	44	381	413	617	305	577	565		**451**
Cheese BOD Loading	(kg/d)	1599	372	417	505	565	195	693	372	461	311	308	316		**510**
Cheese TS Loading	(kg/d)	527	168	139	155	204	27	241	116	121	99	103	94		**166**
Cheese TKN Loading	(kg/d)	114	24	27	33	33	0	32	27	25	17	20	23		**31**
Cheese TP Loading	(kg/d)	52	12	13	17	20	#REF!	21	11	12	10	12	10		**#REF!**

EXHIBIT 2

December 21, 2012
MTE File No.: 36007-100

Mr. Frank Gross, C.Tech.
County of Oxford
Department of Public Works
21 Reeve Street, 2nd Floor
Woodstock, ON N4S 7Y3

Dear Mr. Gross:

Re: Summary Report, 2012 Groundwater Monitoring Summary, Tavistock Wastewater Treatment Plant, Tavistock, ON

BACKGROUND

MTE Consultants Inc. was retained by the County of Oxford (the "County") to conduct a groundwater monitoring program to support upgrades of the Tavistock Wastewater Treatment Plant located in Tavistock, Ontario. The project involved the sampling of five groundwater monitoring wells, which were installed by MTE in 2011. A total of three sampling events were carried out in 2012 on May 10, August 23 and November 8, 2012. The following table summarizes the details of each monitoring well.

Table 1 – Borehole and 32.5 mm ID Monitoring Well Installation Detail

Well ID	Depth (m, ft)	Screened Interval (m)	Screened Material
MW1-11	13.56 m, 44.5'	13.41 – 11.89	SAND
MW2-11	13.26 m, 43.5'	13.26 – 10.21	SAND
MW3S-11	6 m, 20'	6 – 3.04	CLAY – Sandy Seams
MW3D-11	11.28 m, 37'	10.67 – 9.15	SAND
BH4-11	15.09 m, 49.5'	N/A	N/A
MW5-11	12.8 m, 41.9'	9.75 – 8.23	SAND & CLAY

MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, Ontario N2B 3X9
Phone: 519-743-6500
Fax: 519-743-6513
www.mte85.com

2012 GROUNDWATER SAMPLING

Groundwater samples were collected from each of the monitoring wells on May 10, August 23 and November 8, 2012 using bottles supplied by the County. The sampling analysis conducted by SGS Lakefield included the following parameters:

- Turbidity (measured in the field);
- Colour;
- Hardness;
- Alkalinity;
- Bicarbonate;
- Total dissolved solids;
- Total organic carbon;
- Dissolved organic carbon;
- Ammonia / ammonium;
- Total Kjeldahl Nitrogen (TKN);
- Phosphorus;
- Major anions; and
- Metals.

Each monitoring well was purged prior to sampling to ensure representative groundwater samples were taken. A minimum of approximately three well volumes were purged from each monitoring well using HDPE tubing and foot valves. A Horiba U-10 multi parameter handheld water quality meter was used to collect field water quality measurements over each well volume purged.

Samples for metal analysis were field filtered using single use filters and preserved in the field with nitric acid provided by the laboratory. Stabilized field parameter measurements from the three sampling events are found in the table below.

Table 2 – Summary of Field Parameter Measurements

May 10, 2012

Well ID	pH	Turbidity NTU	Conductivity (ms/cm)	Dissolved Oxygen (mg/L)	Temperature (°C)	Purge Volume (L)
MW1-11	7.46	1000	0.542	0.47	11.73	290
MW2-11	7.38	497	0.502	1.34	11.62	260
MW3S-11	7.17	N/A	0.737	10.90	9.82	46
MW3D-11	7.36	1000	0.616	10.21	11.30	245
MW5-11	7.17	459	0.737	10.90	9.88	100

August 23, 2012

Well ID	pH	Turbidity NTU	Conductivity (ms/cm)	Dissolved Oxygen (mg/L)	Temperature (°C)	Purge Volume (L)
MW1-11	7.19	625	0.535	0.35	11.10	100
MW2-11	7.27	824	0.438	0.08	11.50	100
MW3S-11	7.01	999	0.475	0.16	11.50	21
MW3D-11	7.00	999	0.426	0.08	10.50	75
MW5-11	7.52	163	0.273	1.18	11.50	27

November 8, 2012

Well ID	pH	Turbidity NTU	Conductivity (ms/cm)	Dissolved Oxygen (mg/L)	Temperature (°C)	Purge Volume (L)
MW1-11	7.20	552	0.395	0.75	10.50	110
MW2-11	7.31	945	0.440	0.77	13.10	120
MW3S-11	6.96	999	0.545	1.05	10.05	33
MW3D-11	7.12	950	0.604	1.30	10.30	120
MW5-11	8.07	158	0.264	2.74	10.40	40

It is noted that some of the field parameters for turbidity and dissolved oxygen were found to be abnormal during the May 2012 sampling event as compared to previous sampling conducted in 2011. The abnormal readings recorded were due to mechanical issues with the Horiba U-10 which was used to collect the field parameter measurements.

WATER LEVELS

Water levels were recorded at each of the monitoring wells on May 10, August 23, and November 8, 2012. The water levels were referenced to the top of the PVC riser pipe. A summary of the water levels obtained are shown below. Geodetic reference elevations were provided by the County of Oxford.

Table 3 – Summary of Water Level Measurements

May 10, 2012

Well ID	TOC Elevation (mASL)	Ground Elevation (mASL)	Water Level (mbTOC)	Water Level (mbgs)	Water Level Elevation (mASL)
MW1-11	342.12	341.18	Artesian	N/A	N/A
MW2-11	340.00	340.15	Artesian	N/A	N/A
MW3S-11	342.52	341.70	1.88	1.06	340.64
MW3D-11	342.54	341.70	Artesian	N/A	N/A
MW5-11	338.22	337.38	1.22	0.38	337.00

August 23, 2012

Well ID	TOC Elevation (mASL)	Ground Elevation (mASL)	Water Level (mbTOC)	Water Level (mbgs)	Water Level Elevation (mASL)
MW1-11	342.12	341.18	Artesian	N/A	N/A
MW2-11	340.00	340.15	Artesian	N/A	N/A
MW3S-11	342.52	341.70	4.31	3.49	338.21
MW3D-11	342.54	341.70	Artesian	N/A	N/A
MW5-11	338.22	337.38	1.79	0.95	336.43

November 8, 2012

Well ID	TOC Elevation (mASL)	Ground Elevation (mASL)	Water Level (mbTOC)	Water Level (mbgs)	Water Level Elevation (mASL)
MW1-11	342.12	341.18	Artesian	N/A	N/A
MW2-11	340.00	340.15	Artesian	N/A	N/A
MW3S-11	342.52	341.70	4.00	3.18	338.52
MW3D-11	342.54	341.70	Artesian	N/A	N/A
MW5-11	338.22	337.38	1.63	0.79	336.59

Notes:

- TOC refers to top of monitoring well casing
- mbgs - Metres below ground surface
- mbTOC - Metres below top of casing
- mASL - Metres above sea level
- Monitoring wells surveyed by Oxford County
- Artesian refers to water free flowing over TOC

We trust that this summary report is suitable for your requirements.

In order to control the artesian flowing conditions, removable rubber packers were installed at depths greater than 1.5 m below grade in monitoring wells found to be under flowing/artesian conditions (MW1-11, MW2-11, MW3D-11) to prevent damage from freezing.

It is recommended for the 2013 monitoring season that temporary riser pipe extensions maybe installed at MW1, MW2 and MW3D during each monitoring event to allow for the measurement of water levels due to historical artesian conditions.

Please feel free to contact either of the undersigned directly should you have any questions to the work completed. We are pleased to be of service to the County of Oxford on this project.

Yours truly,

MTE CONSULTANTS INC.

Andrew Bingeman, C.E.T.
Manager, Water Resources

Robert Maric, P.Geo.
Hydrogeologist

MTF:plw
M:\36007\36007-100 Report-Dec-21-12.docx

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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Monitoring Report 2012 for Norwich Wastewater Treatment Plant

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, County of Oxford

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

Overview of Norwich Wastewater Treatment Plant

The Norwich Wastewater Treatment Plant (WWTP) provided effective wastewater treatment in 2012. The average daily flow for 2012 was 908 m^3/d. This represents 59.3% of the design criteria 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 one of two pump stations to a splitter box; then to either of two lagoon cells as determined by the operator. The lagoons are operated in series 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 -	908 m^3/day
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.

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 here 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 908 m^3/d representing 59.3% of the design criteria of 1,530 m^3/d. The average annual influent BOD_5 concentration to the plant was 191 mg/L. This corresponds to an average BOD_5 loading of 173 kg/d. The average annual influent TSS concentration to the plant was 206 mg/L which corresponds to an average SS loading of 187 kg/d. The annual average TKN concentration was 48 mg/L which corresponds to 43.6 kg/d. The annual average TP concentration was 5.7 mg/L which corresponds to 5.2 kg/d.

The annual average effluent BOD_5 concentration was 2.3 mg/L. This represents a 98.8% removal efficiency. The annual average SS concentration was 2 mg/L. This represents a 99% removal efficiency. The annual average Ammonia concentration was 0.4 mg/L. The annual average TP concentration was 0.19 mg/L which represents a 96.7% 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 2012. 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 2012 with the exception of one E.Coli result. Operation staff opened the lagoon in the fall to prepare for the construction of an improved inlet structure to relieve a bottleneck for the main lift station, this lead to a shortened holding time and a single high E.Coli result on September 26th. The result was reported to the MOE and the discharge stopped. The improved inlet structure was not constructed due to logistics and was delayed to 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 Plants ECA were met with the exception of one E.Coli sample result at the Norwich WWTP.

Bypasses, Overflows, and Upset Conditions 2012

There were no bypass or overflow events during the year; however, operation staff opened the lagoon in the fall to prepare for the construction of an improved inlet structure to relieve a bottleneck for the main lift station, this lead to a shortened holding time and a single high E.Coli result on September 26th. The result was reported to the MOE and the discharge stopped. The improved inlet structure was not constructed due to logistics and was delayed to 2013.

A large regional storm on October 30th resulted in widespread power outages in the County. The Lossing Drive SPS in Norwich experienced an overflow of approximately 5 m^3 before a portable genset could be brought to the station. The overflow was reported to the MOE at the time of the event.

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 the Oxford County and is supervised as one 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.

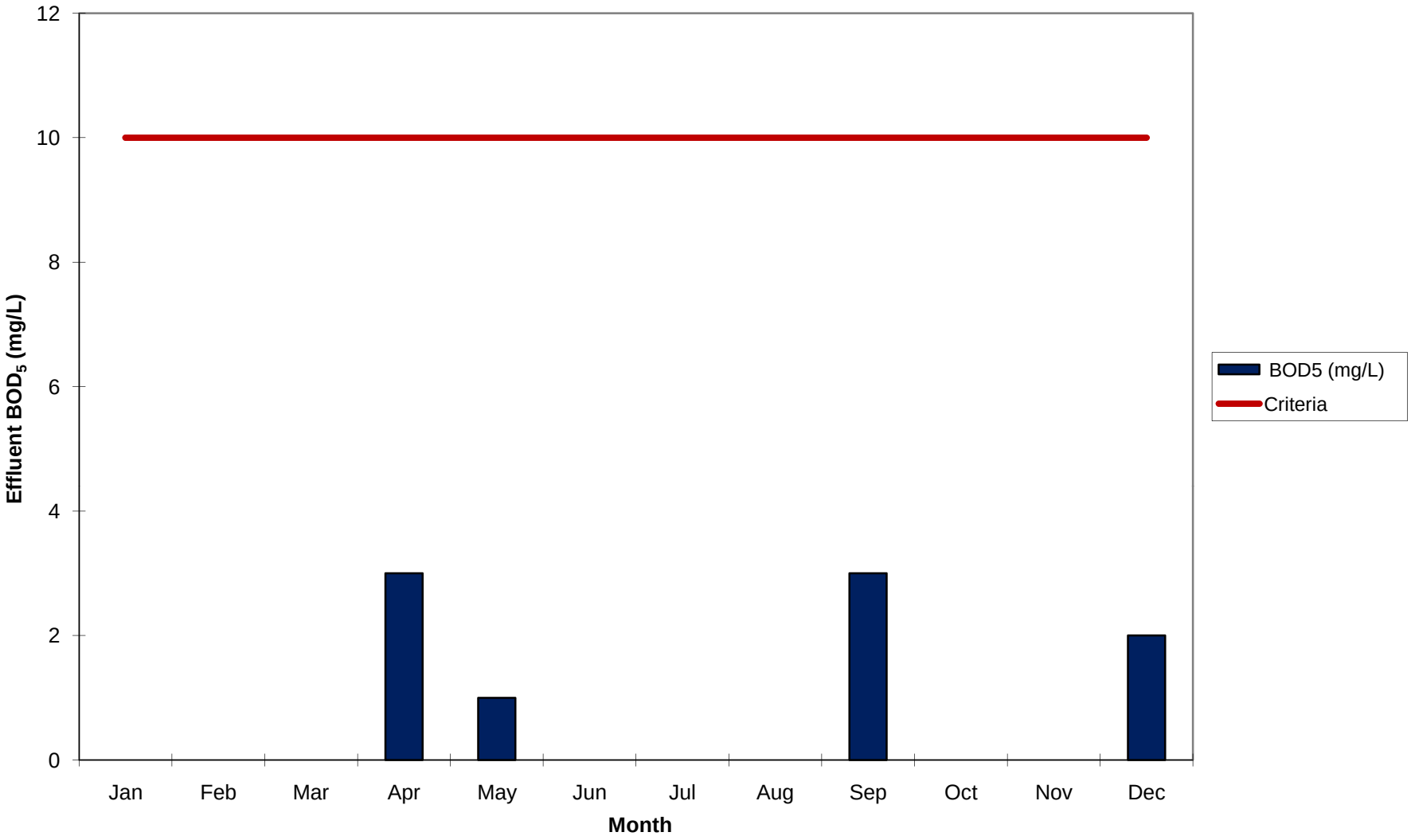
Summary

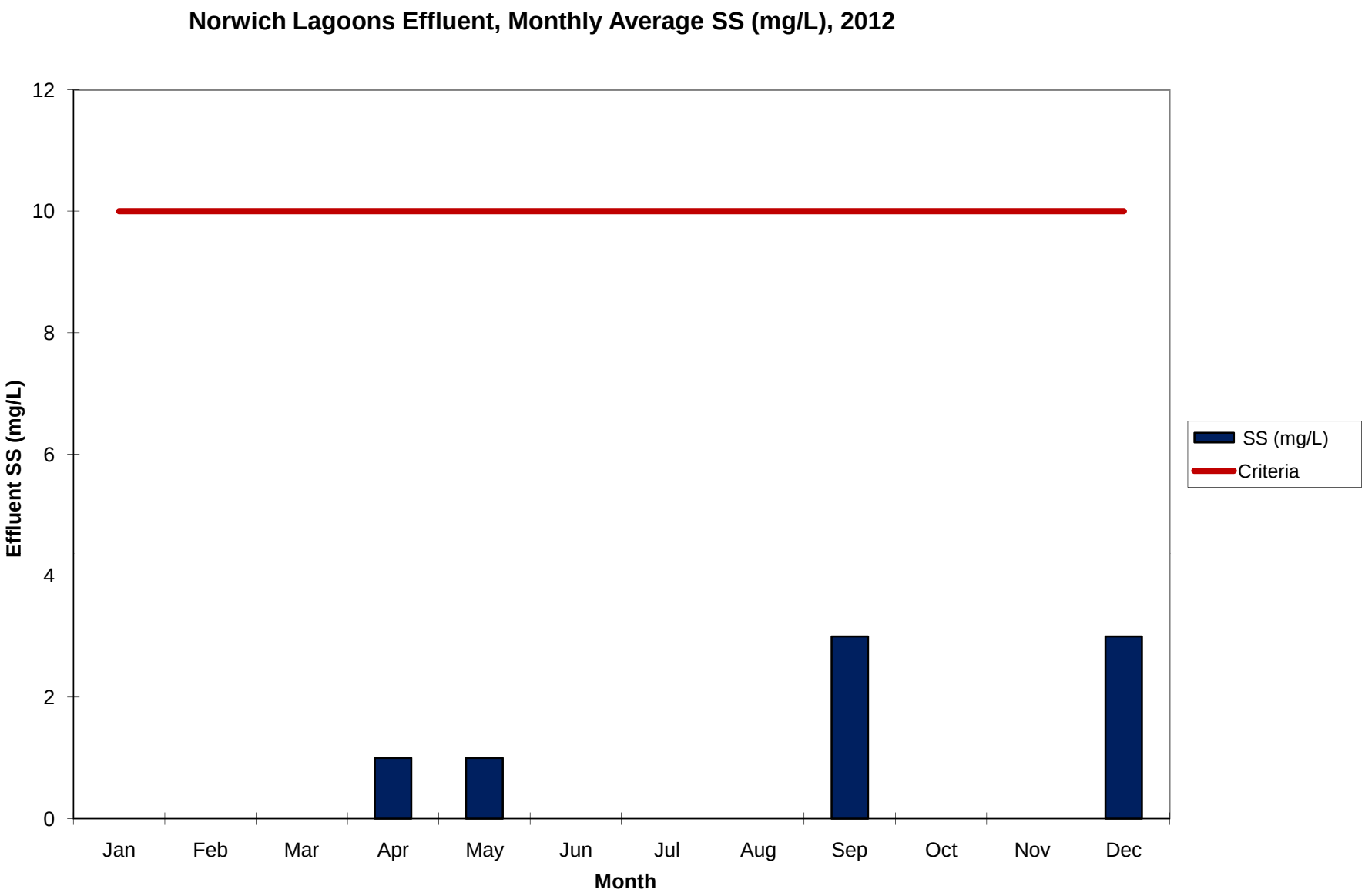
The Norwich WWTP was operating within its design flow criteria and was within its discharge limits for 2012 with the exception of one E.Coli result.

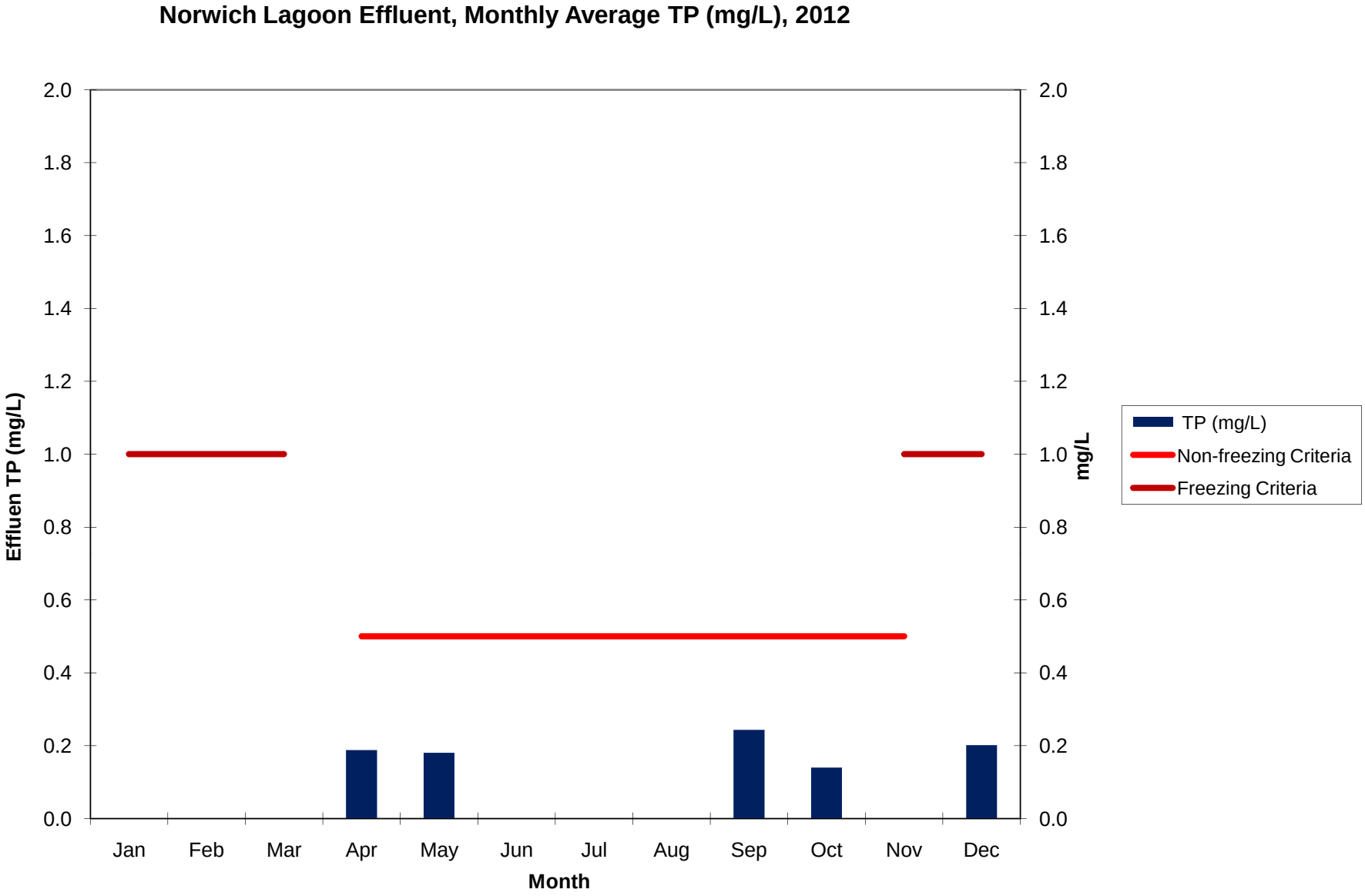
There is a Class Environmental Assessment study underway for the Norwich WWTP to determine the preferred alternative to upgrade the plant to meet the wastewater treatment needs of the community.

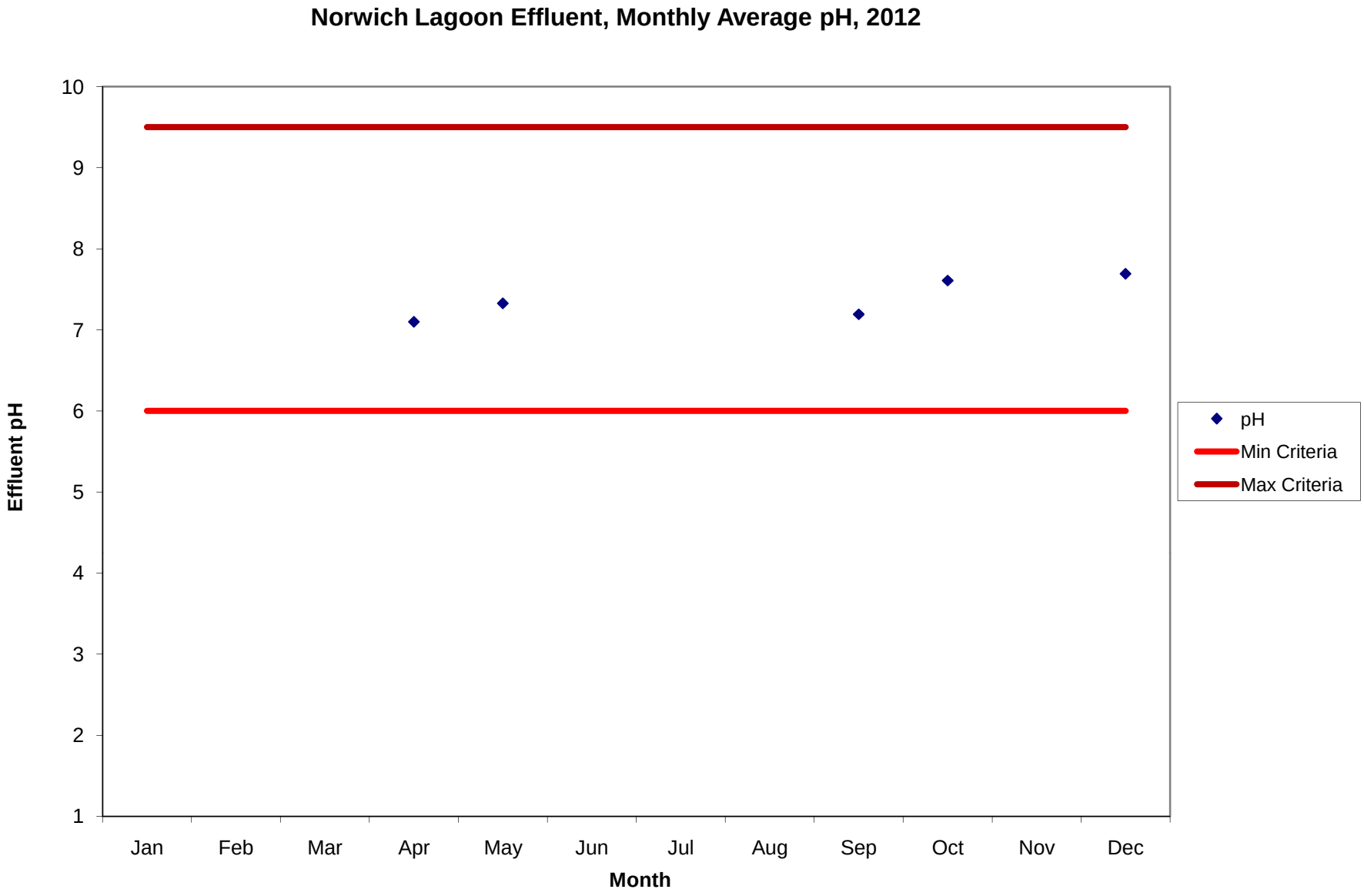
EXHIBIT 1

Norwich Lagoons Effluent, Monthly Average BOD_5 (mg/L), 2012

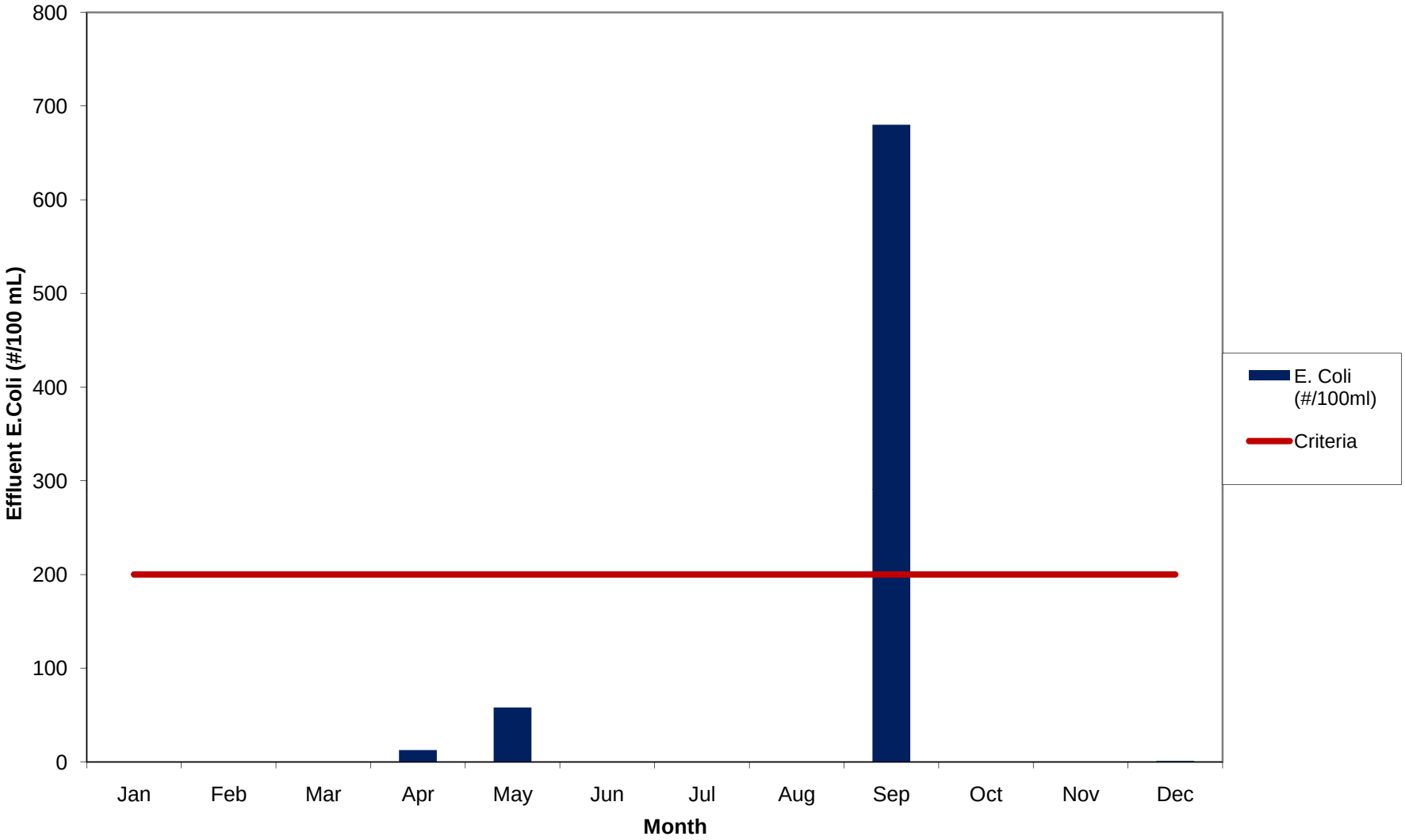


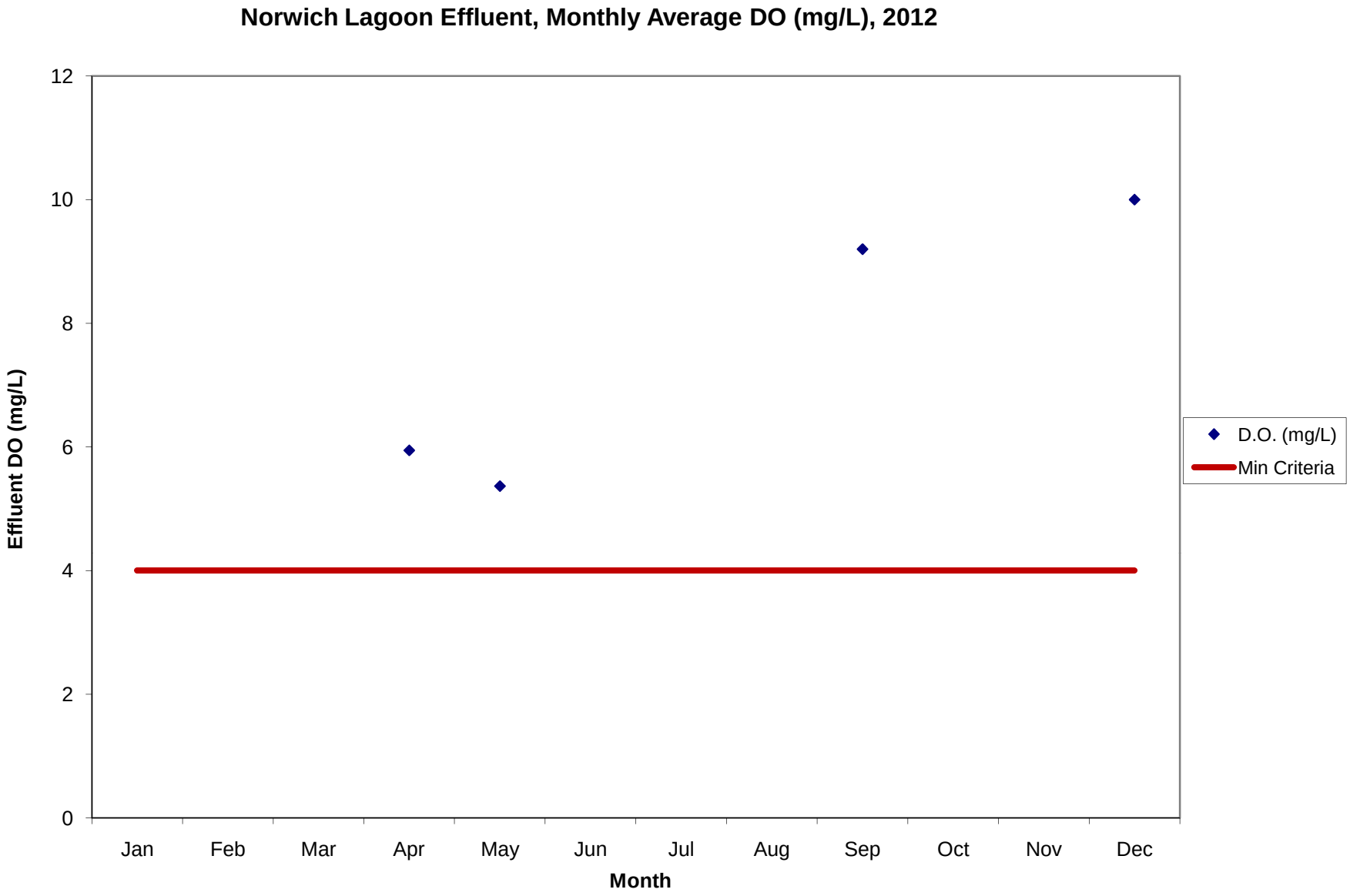

Norwich Lagoons Effluent, Monthly Average SS (mg/L), 2012
Effluent SS (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
SS (mg/L)
Criteria


Norwich Lagoon Effluent, Monthly Average TP (mg/L), 2012
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

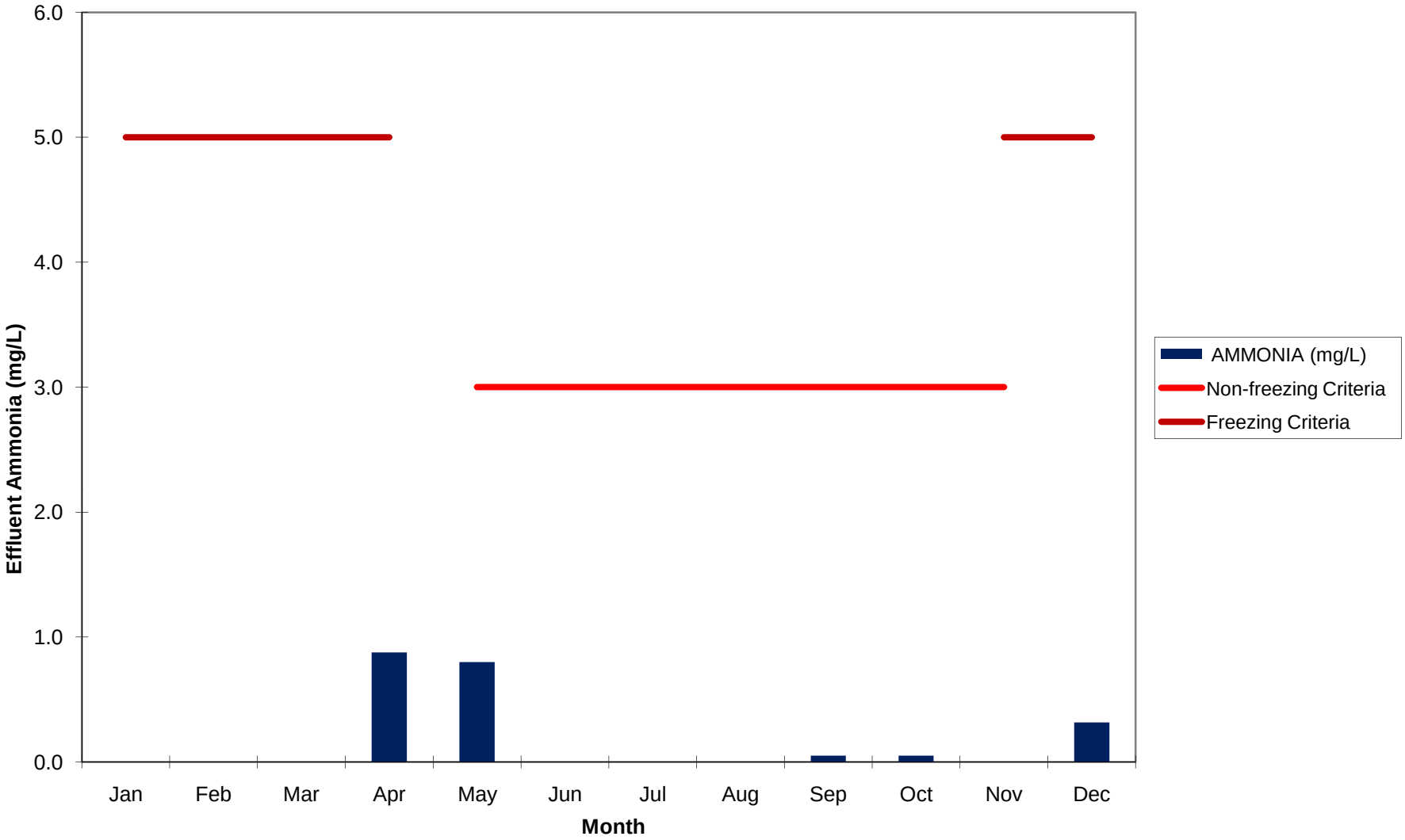

Norwich Lagoon Effluent, Monthly Average pH, 2012
Effluent pH
10
9
8
7
6
5
4
3
2
1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
pH
Min Criteria
Max Criteria

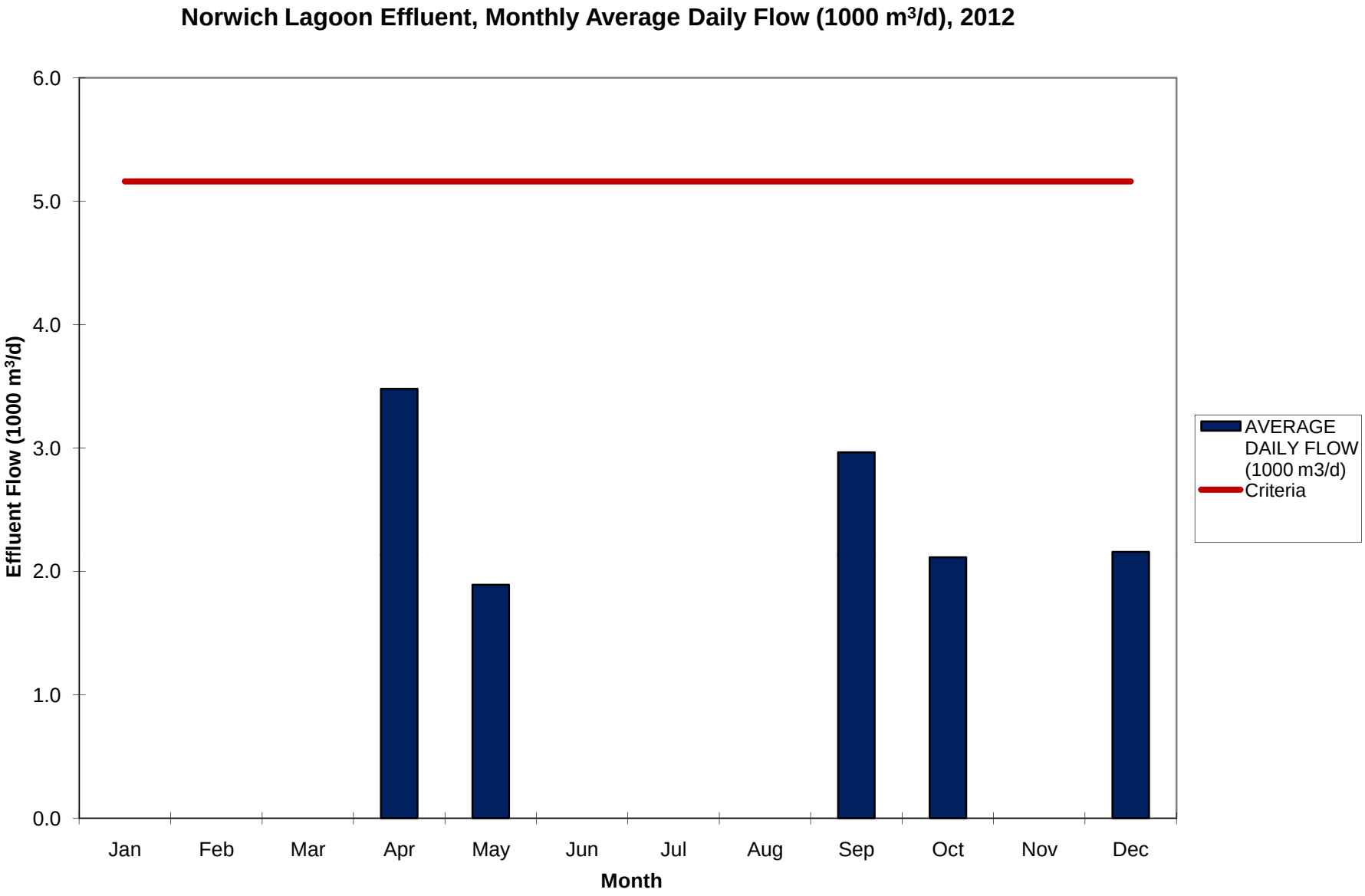
Norwich Lagoon Effluent, Monthly Geometric Mean Density E.Coli (#/100ml), 2012




Norwich Lagoon Effluent, Monthly Average DO (mg/L), 2012
Effluent DO (mg/L)
12
10
8
6
4
2
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), 2012




Norwich Lagoon Effluent, Monthly Average Daily Flow (1000 m3/d), 2012
Effluent Flow (1000 m3/d)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
AVERAGE DAILY FLOW (1000 m3/d)
Criteria

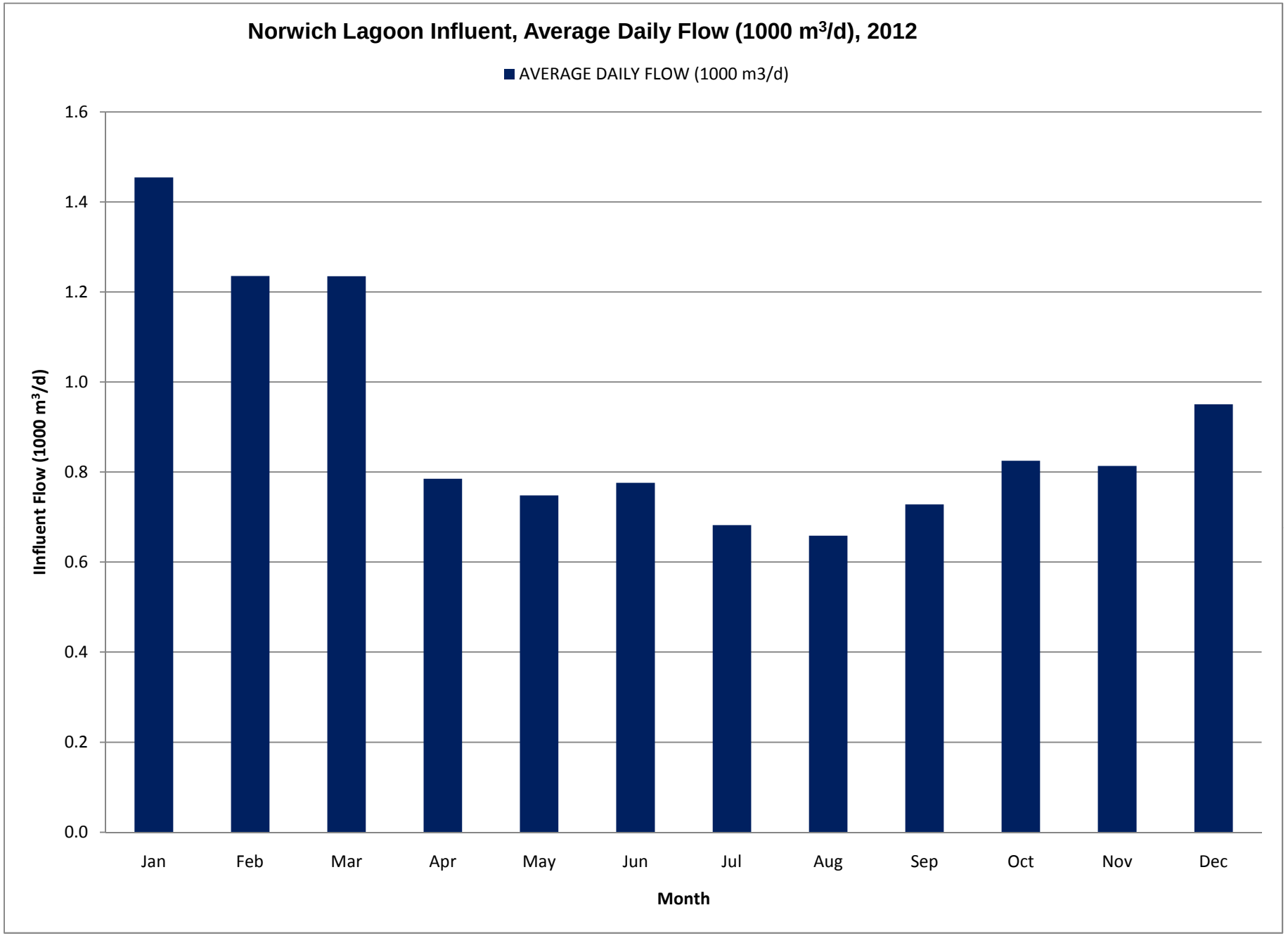

Norwich Lagoon Influent, Average Daily Flow (1000 m3/d), 2012
AVERAGE DAILY FLOW (1000 m3/d)
Influent Flow (1000 m3/d)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

TABLE A	NORWICH LAGOONS			WORKS # 110001480			YEAR 2012										
LAGOON INFLUENT FLOW	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		ANNUAL	DESIGN CRITERIA	CofA Criteria	% Capacity
TOTAL (1000 m3)	45.091	35.827	38.289	23.549	23.189	23.278	20.468	20.416	21.844	25.582	24.406	29.472	TOTAL	331.411			
AVERAGE DAILY FLOW (1000 m3/d)	1.455	1.235	1.235	0.785	0.748	0.776	0.682	0.659	0.728	0.825	0.814	0.951	AVERAGE DAILY FLOW	0.908		1.53	59.3%
MAX. DAILY FLOW (1000 m3/d)	2.582	1.847	1.925	1.052	1.022	1.159	1.259	1.102	1.252	1.983	1.373	1.551	MAX. DAILY FLOW	2.582			
MIN. DAILY FLOW (1000 m3/d)	0.870	0.771	0.763	0.506	0.466	0.511	0.361	0.453	0.478	0.468	0.425	0.302	MIN. DAILY FLOW	0.302			
LAGOON INFLUENT RESULTS														ANNUAL AVERAGE		ANNUAL MAXIMUM	ANNUAL MINIMUM
BOD (mg/L)	110	140	118	199	296	150	220	293	236	191	200	143		191		296	110
SS (mg/L)	122	220	220	237	246	294	134	76	300	244	278	102		206		300	76
AMMONIA (mg/L)																	
TKN (mg/L)	34.58	38.18	37.40	50.10	54.42	47.08	53.22	46.55	53.80	59.42	47.38	54.28		48		59.4	34.6
NITRITE (mg/L)																	
NITRATE (mg/L)																	
TOTAL P. (mg/L)	3.87	4.33	4.58	6.35	4.83	4.90	5.64	7.20	7.16	6.29	7.40	5.86		5.7		7.4	3.9
pH	7.29	7.31	7.53	7.52	7.55	7.07	7.20	7.23	7.60	7.74	7.76	7.79		7.47		7.79	7.07

LAGOON EFFLUENT FLOW													TOTAL ANNUAL FLOW	Monthly AVERAGE	DESIGN CRITERIA	CofA Criteria	CofA 236 day
TOTAL (1000 m3)				66.123	35.957				17.797	4.231		32.389	156.497	31.299			
AVERAGE DAILY FLOW (1000 m3/d)				3.480	1.892				2.966	2.116		2.159		2.523			
MAX. DAILY FLOW (1000 m3/d)				4.509	2.598				3.521	3.518		3.071		3.443			
MIN. DAILY FLOW (1000 m3/d)				0.686	0.107				0.800	0.713		0.288		0.519			
LAGOON EFFLUENT RESULTS														Yearly AVERAGE	DISCHARGE CRITERIA	ANNUAL MAXIMUM	ANNUAL MINIMUM
$BOD_{5\ (mg/L)}$				3.0	1				3.0			2		2.3	10	3	1.0
SS (mg/L)				1.0	1				3.0			3		2.0	10	3.0	1
AMMONIA (mg/L)				0.88	0.80				0.05	0.05		0.32		0.4	3.0 non freezing	0.9	0.05
TKN (mg/L)															& 5.0 freezing		
NITRITE (mg/L)																	
NITRATE (mg/L)																	
TP (mg/L)				0.19	0.18				0.24	0.14		0.20		0.19	0.5 non freezing	0.24	0.14
															& 1.0 freezing		
pH				7.10	7.33				7.19	7.61		7.69		7.38	6.00-9.00	7.69	7.10
E. Coli (#/100ml)				13	58				680			1		188	200	680	1
Temp. Celcius				9	17				14.0	11.2		4		10.9		16.9	3.6
D.O. (mg/L)				5.9	5.4				9.2			10.0		7.6	(4.0)	10.0	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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report for Plattsville Lagoons 2012

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, County of Oxford

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

Overview

The Plattsville Lagoon System provided effective wastewater treatment in 2012 and all effluent concentration limits as specified by MOE ECA # 3133-7QWH4N were met on an annual basis. The annual average daily flow rate was 463 m^3/d; this represents 58% of the WWTP rated capacity of 800 m^3/d.

Figure 1 Plattsville WWTP Aerial Photo

Plant Description

Wastewater is treated at the Plattsville Wastewater Treatment Plant (WWTP), 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 - 463 m^3/day
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 colonies per 100 ml
Effluent is discharged according to a discharge table (Table 3) within the ECA.

Sampling Procedures

Sampling is done on a monthly basis of the raw influent wastewater and analyzed for BOD_5, TSS, TKN, TP and pH. Effluent discharge samples are gathered 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 referred to as the shallow well and deep well. The results are included in an attached Table under Exhibit 2.

Flows

The total flow treated in 2012 was 169,348 m^3. The average daily flow of 463 m^3/day was 58% 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 2012 was 118,788 m^3.

Raw Sewage Quality

The annual average raw sewage BOD_5 concentration to the plant was 157 mg/L. This corresponds to an average BOD_5 loading of 73 kg/day. The average suspended solids loading was 171 mg/L equivalent to 79 kg/day loading. The annual raw sewage nitrogen levels (as TKN) were 42 mg/L. Phosphorous levels averaged 4.8 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 2012. pH was within the required range for all effluent samples in 2012.

Over the reporting period, the annual average effluent $CBOD_5$ concentration was 4.4 mg/L with a removal efficiency of 97%. The annual suspended solids concentration was 5.7 mg/L with a removal efficiency of 97%. The annual average ammonia nitrogen concentration was 0.24 mg/L with a removal efficiency of 99%. The annual total phosphorous level was 0.04 mg/L, which represents a removal efficiency of 99.2%.

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.

Effluent TP, and Ammonia monthly average objectives were met for 2012. The TSS and CBOD objectives were met 50% of the time in 2012.

The plant met all effluent discharge limits contained in the ECA for 2012.

Bypassing and Abnormal Conditions

There were no bypass or overflow events to the Nith River at the Plattsville Lagoons in 2012.

There were no collection overflows in 2012.

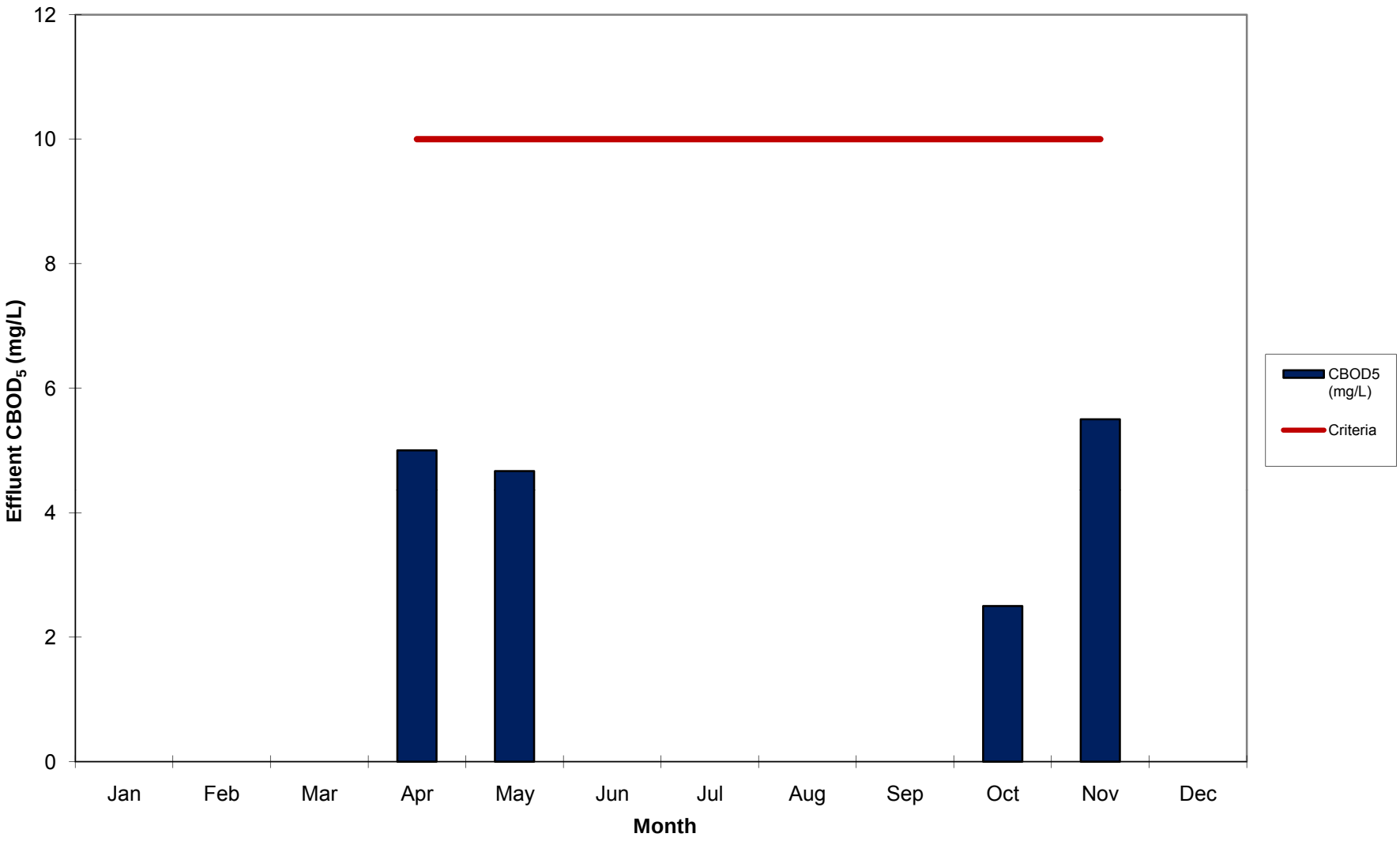
Maintenance Activities

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.

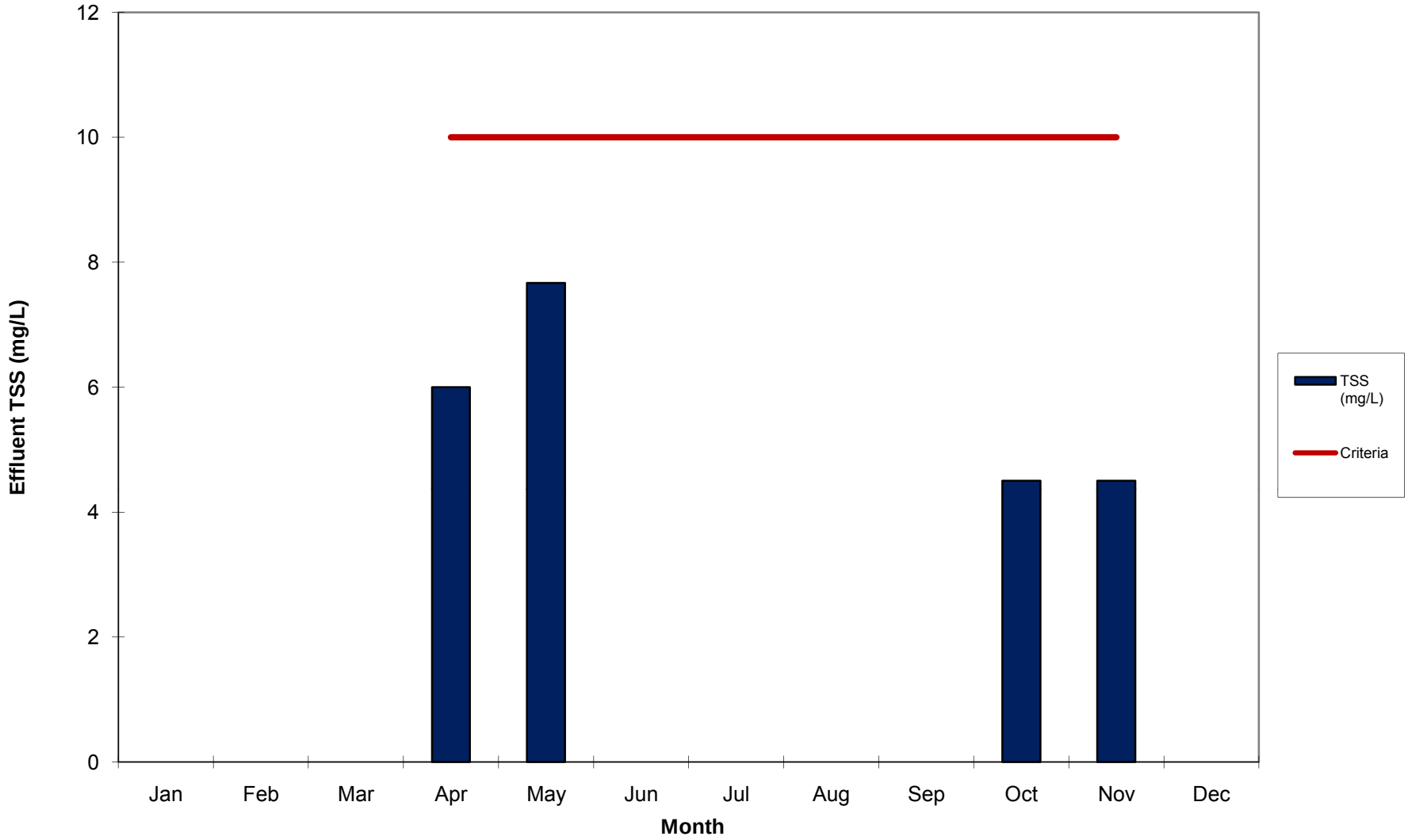
Summary and Recommendations

The wastewater treatment plant performed well during 2012 and met all discharge requirements.

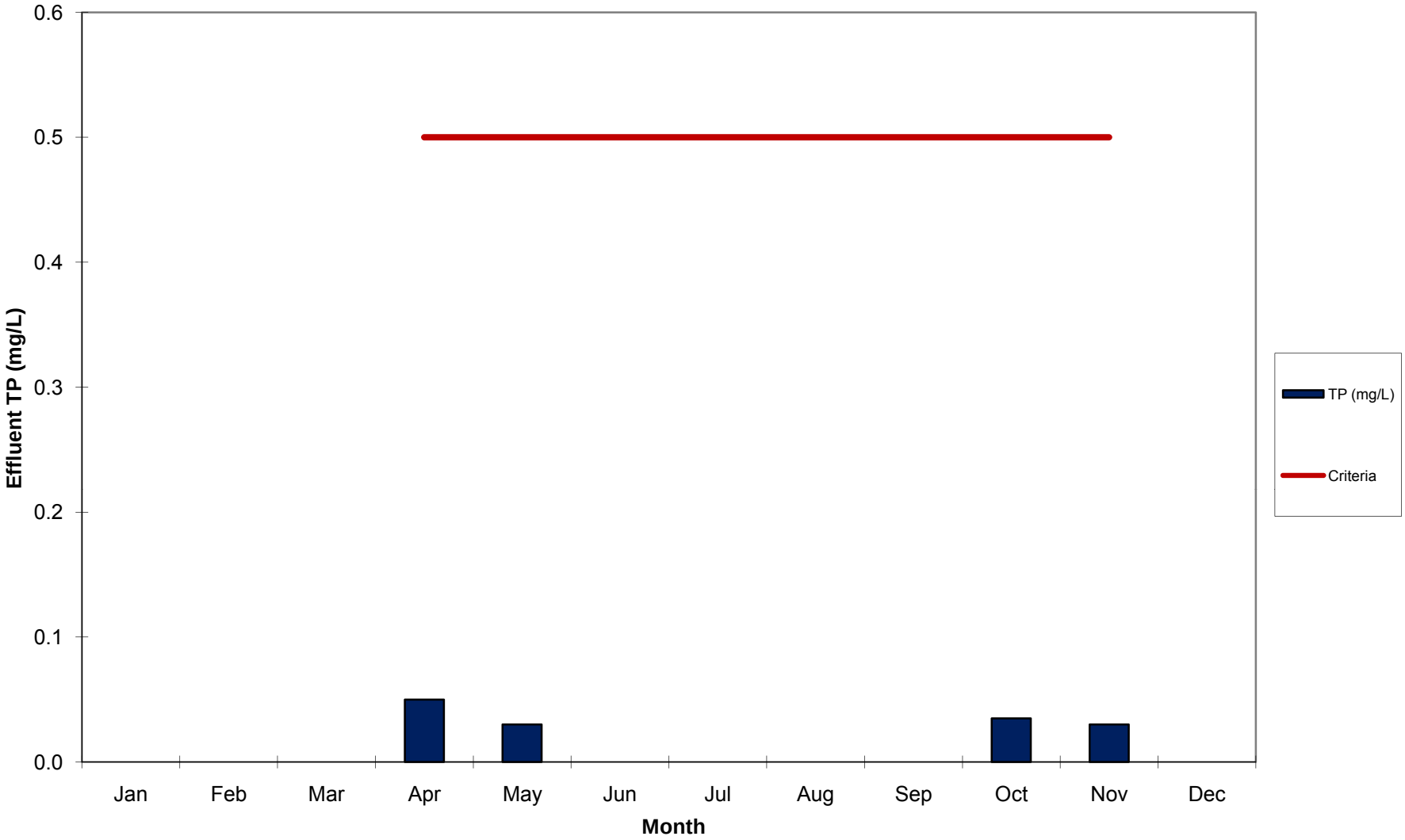
EXHIBIT 1


Plattsville WWTP Effluent, Monthly Average CBOD5 (mg/L), 2012
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

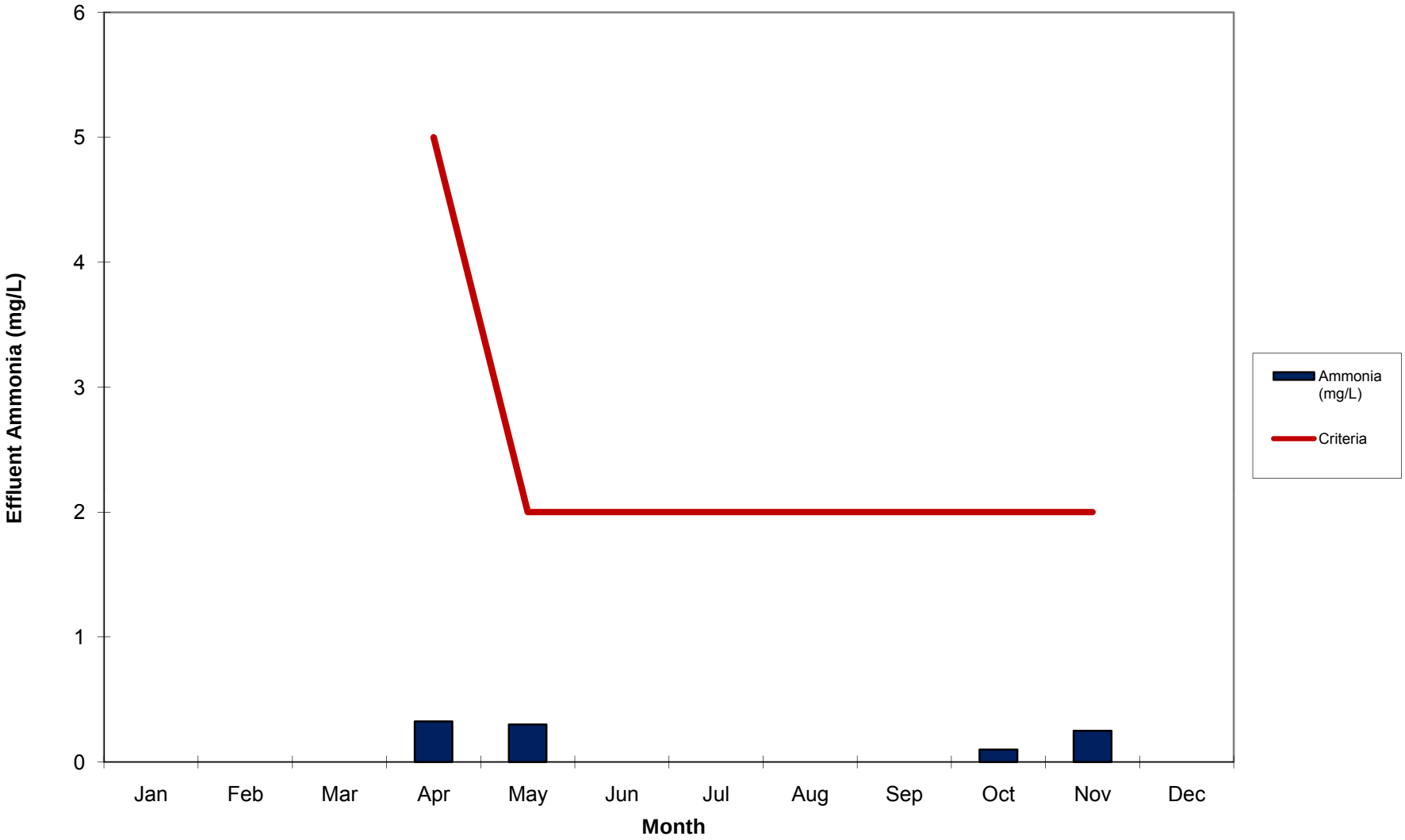
Plattsville WWTP Effluent, Monthly Average TSS (mg/L), 2012



Plattsville WWTP Effluent, Monthly Average TP (mg/L), 2012



Plattsville WWTP Effluent, Monthly Average Ammonia Discharge (mg/L), 2012



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

2012

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Min	Max	Total	
Influent																	
Total Flow (1000m^3)	16.778	14.685	15.818	14.035	14.003	12.812	12.809	11.605	12.963	14.226	15.142	14.472				169.348	Criteria
Flow (1000m^3/d)	0.541	0.506	0.510	0.468	0.452	0.427	0.413	0.374	0.432	0.4589	0.505	0.467	0.463	0.374	0.541		0.8
Max Flow (1000m^3/d)	1.031	0.573	0.657	0.536	0.580	0.510	0.497	0.507	0.501	1.095	0.640	0.559	0.641	0.497	1.095		2.98
Min Flow (1000m3/d)	0.404	0.419	0.383	0.384	0.345	0.344	0.266	0.290	0.318	0.332	0.381	0.365	0.353	0.266	0.419		
Influent																	
BOD_5 (mg/L)	150.0	119.0	136.0	185.0	167.0	134.0	177.0	96.0	140.0	192.0	192.0	200.0	157	96	200		
TSS (mg/L)	205.0	100.0	186.0	149.0	158.0	124.0	193.0	160.0	179.0	186.0	188.0	222.0	171	100	222		
AMMONIA (mg/L)	44.3	22.0	37.2	32.2	36.0	35.6	49.1	30.7	28.8	53.2	45.8	44.9	38.3	22.0	53.2		
TKN (mg/L)	41.7	24.2	34.8	45.5	33.9	42.7	52.9	30.5	28.6	63.8	51.7	53.6	42.0	24.2	63.8		
NITRITE (mg/L)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06		
NITRATE (mg/L)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		
TP (mg/L)	4.9	2.8	3.7	3.6	4.6	3.7	5.9	3.1	3.9	7.6	7.7	6.0	4.8	2.8	7.7		
Temp	10.4	10.8	12.6	12.8	17.2	19.8	21.5	20.8	21.0	16.6	13.9	12.3	15.81	10.40	21.52		
pH	7.85	7.91	7.54	8.44	8.20	7.52	8.55	7.68	7.64	7.80	8.08	8.25	7.95	7.52	8.55		
Effluent																	
Total Flow (1000m3)				76.456	21.870					7.173	13.289					118.788	
Flow (1000m3/d)				2.832	1.367					0.7173	1.107		1.506	0.717	2.832		
Criteria (1000m3/d)	0.0	0.0	0.0	2.920	2.170	1.447	0.727	0.727	0.727	0.964	1.472	0.0					

Plant Effluent	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Min.	Max.	Compliance Criteria	
$CBOD_{5\ (mg/L)}$				5.0	4.7					2.5	5.5		4.4	2.5	5.5	Average*	≤ 10
TSS (mg/L)				6.0	7.7					4.5	4.5		5.7	4.5	7.7	Average**	≤ 10
Ammonia (mg/L)				0.33	0.30					0.10	0.25		0.24	0.10	0.33	Average[1]	2 / 5
TKN (mg/L)				0.85	0.83					0.50	1.10		0.82	0.50	1.10		
NITRITE (mg/L)				0.06	0.06					0.06	0.06		0.06	0.06	0.06		
NITRATE (mg/L)				2.22	5.81					29.20	5.84		10.77	2.22	29.20		
TP (mg/L)				0.05	0.03					0.04	0.03		0.04	0.03	0.05	Average***	≤ 0.5
pH				8.23	8.05					7.47	7.90		7.91	7.47	8.23		
E. Coli (#/100ml)				2	6					26	4		6	2	26	Geomean	200
Temp. Celcius				9.9	14.7					13.2	7.7		11.3	7.66	14.7		
D.O. (mg/L)				10.4	7.3					10.3	11.8		10.0	7.32	11.8		

Influent Loadings **Month**	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Min	Max		Criteria
BOD5 kg/d	81.184	60.259	69	86.549	75.436	57.227	73.135	35.938	60.494	88.109	96.909	93.368	73	36	97		
TSS kg/d	110.951	50.638	95	69.71	71.370	52.956	79.746	59.90	77.346	85.356	94.890	103.638	79	51	104		
Effluent Loadings																	
CBOD5 kg/d				14	6					2	6		7	2	14		
TSS kg/d				17	10					3	5		9	3	17		
TP kg/d				0.142	0.041					0.025	0.033		0.060	0.025	0.142		
Total Ammonia kg/d				0.920	0.410					0.072	0.277		0.420	0.072	0.920		
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	
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**
	Shallow - Raw, Decant	**Shallow** - Raw, Decant	**Shallow** - Raw, Decant	**Shallow** - Raw, Decant	**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
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
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
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
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
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
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
Chloride (mg/L)					4.4	4.0	3.1	4.6
	Deep - Raw, Decant	**Deep** - Raw, Decant	**Deep** - Raw, Decant	**Deep** - Raw, Decant	**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
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
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
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
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
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
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
Chloride (mg/L)					17	17	18	18

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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Drumbo Sequencing Batch Reactor (SBR) 2012

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, County of Oxford

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

Overview

The Drumbo Sequencing Batch Reactor (SBR) provided effective wastewater treatment in 2012 with an average flow for the plant of 250 m^3/d which represents 92% of the design capacity of 272 m^3/d. The total flow in 2012 was 91,575 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
Average Daily Flow -	250 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 2012 was 91,575 m^3. The daily average flow was 250 m^3/day which represents 92% 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 147 mg/L; equivalent to a loading of 37 kg/day. The average suspended solids concentration was 111 mg/L; equivalent to 28 kg/day of loading. Average nitrogen levels, as TKN, were 36 mg/L; equivalent to a loading of 9 kg/day. Total phosphorus was 5 mg/L, which represents a loading of 1.25 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 2012.

Over the reporting period, the annual average effluent BOD_5 concentration was 4.3 mg/L or an equivalent reduction of 97%. The suspended solids average was 4.6 mg/L, which

represents a 95% reduction. Ammonia averaged 1.15 mg/L (a 96% reduction); total effluent phosphorus average concentration was 0.2 mg/L: a 96% 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.

Effluent TP, Ammonia, and BOD_5 monthly average objectives were met 11 out of 12 months and TSS monthly average objective was met 8 out of 12 months in 2012.

The plant met all effluent discharge limits contained in the ECA in 2012.

Bypassing, Upset and Abnormal Conditions

There were no overflows from the Drumbo SBR in 2012.

On February 10, 2012, there was a leak from the collection system that occurred when a contractor hit the sewage forcemain which was immediately valved off and routed through a new forcemain; however, approximately 1-2 m^3 of wastewater leaked into the ditch which was then collected by a vacuum truck and removed. This event was reported to the MOE at the time it occurred.

Maintenance

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

Summary

The Drumbo SBR operated within its design and discharge criteria through 2012. A technical evaluation was completed by XCG consultants in 2012 to evaluate the hydraulic capability of the plant.

Oxford County will initiate a Class EA study to increase the rated capacity of the Drumbo SBR in 2013.

BIOSOLIDS REPORT 2012

Discussion:

The 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.

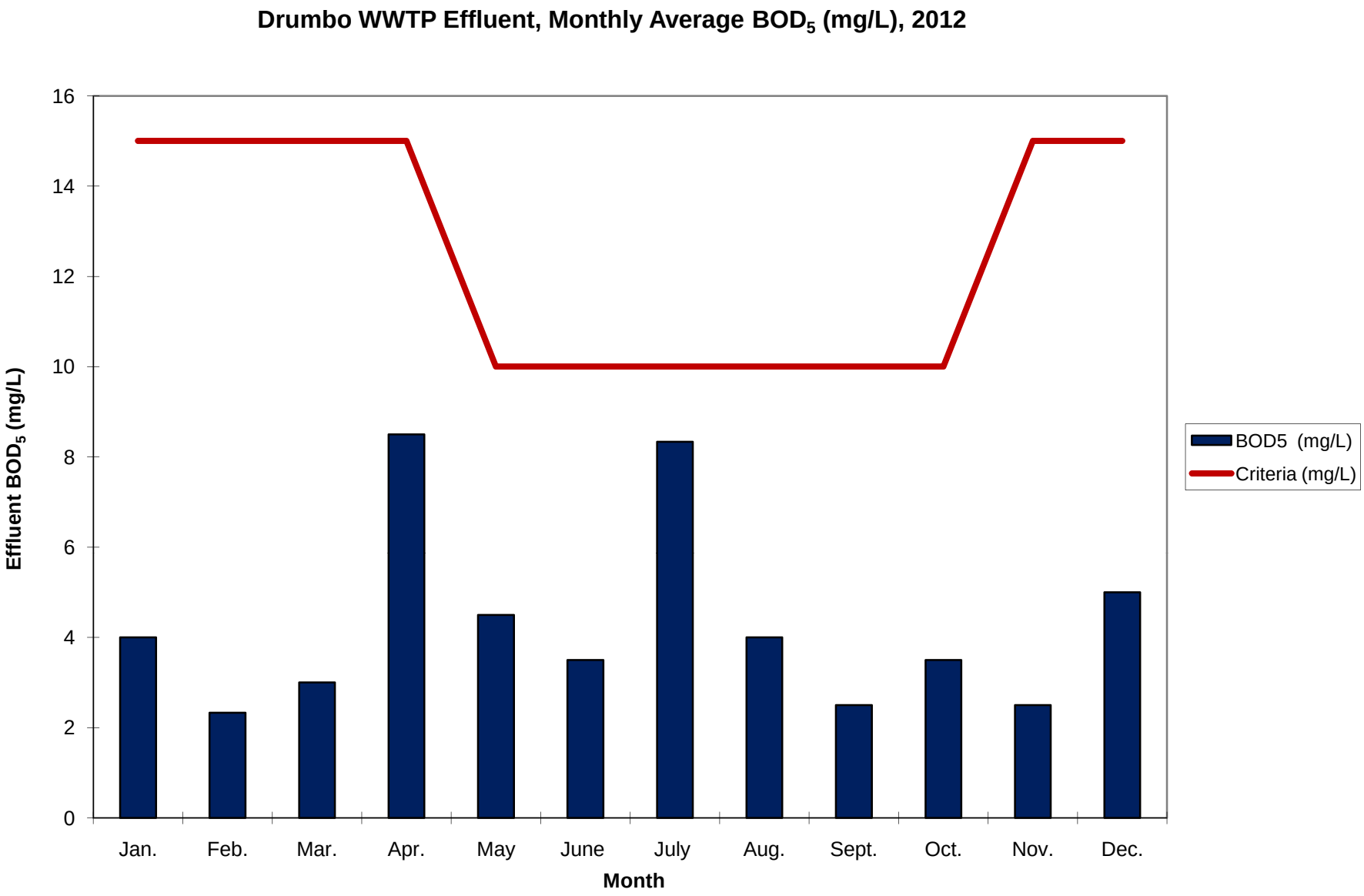
The biosolids are then transported to the Woodstock WWTP for digestion.

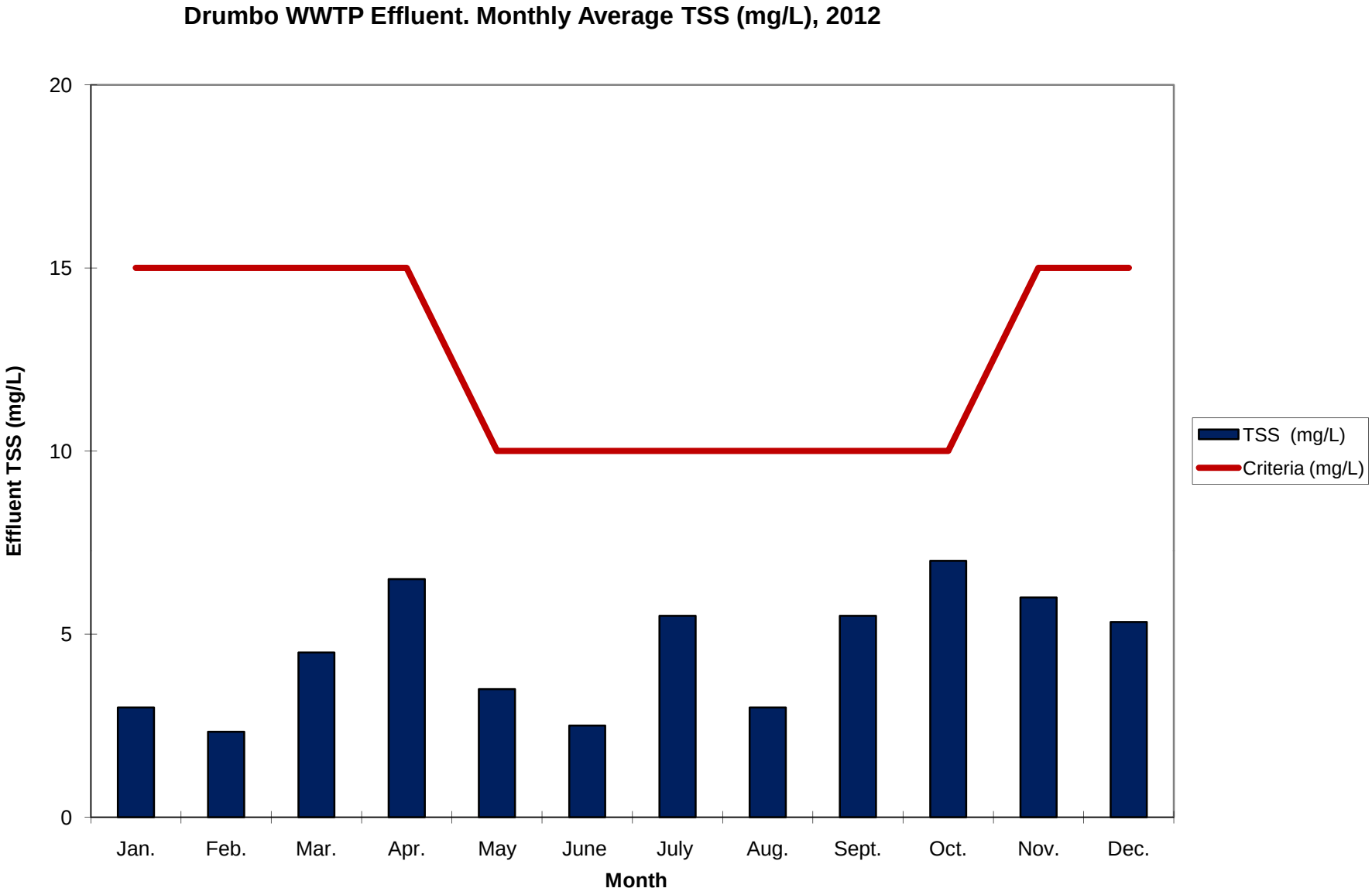
The total volume of biosolids from the Drumbo WWTP in 2012 was 1,827 m^3. Below are the monthly volumes of biosolids transported to the Woodstock WWTP in 2012.

SUMMARY OF ALL BISOLIDS REMOVAL

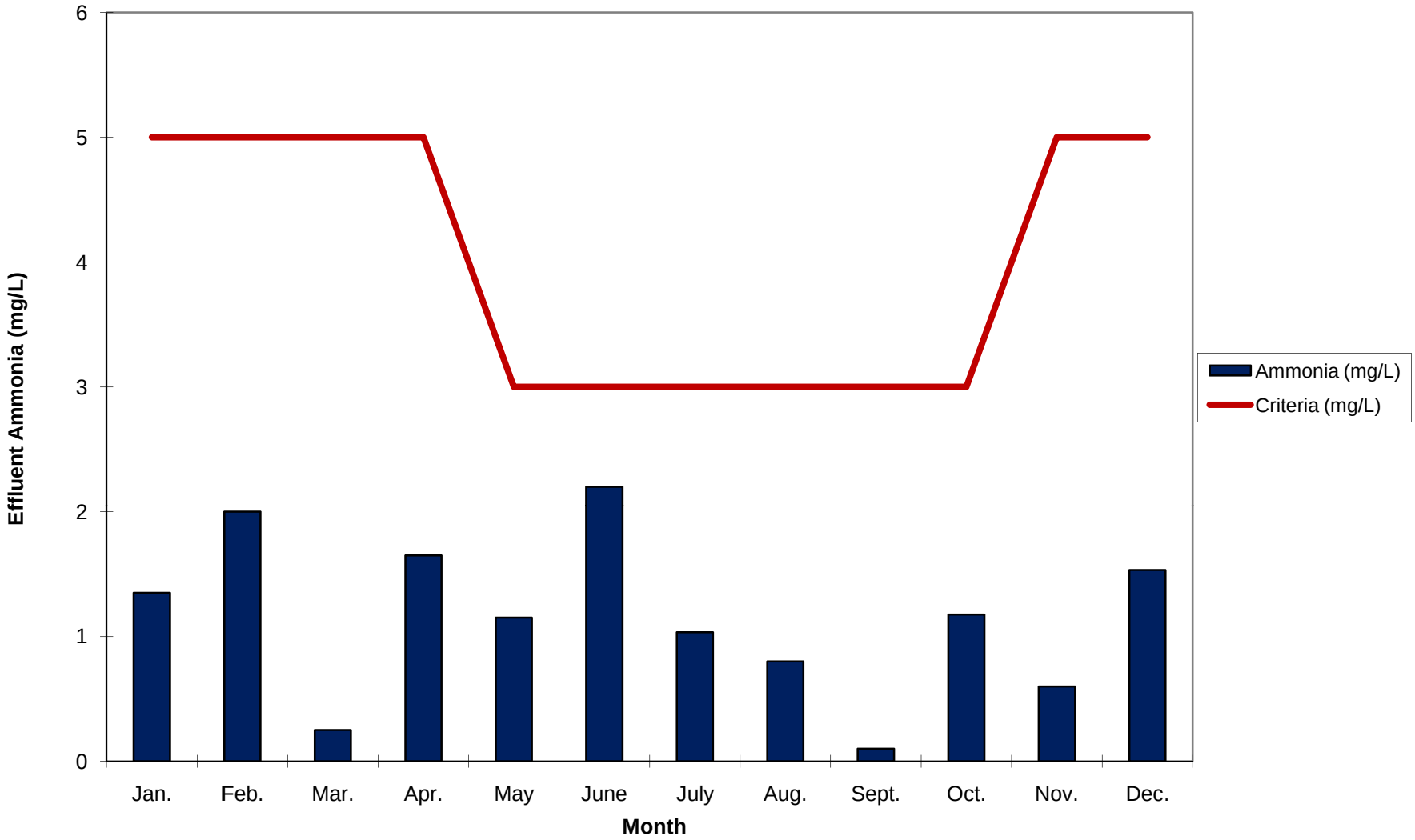
DATE	BIOSOLIDS QUANTITY(m^3)
January	127
February	127
March	115
April	89
May	140
June	143
July	216
August	247
September	226
October	132
November	151
December	113
2012 Total	1,827

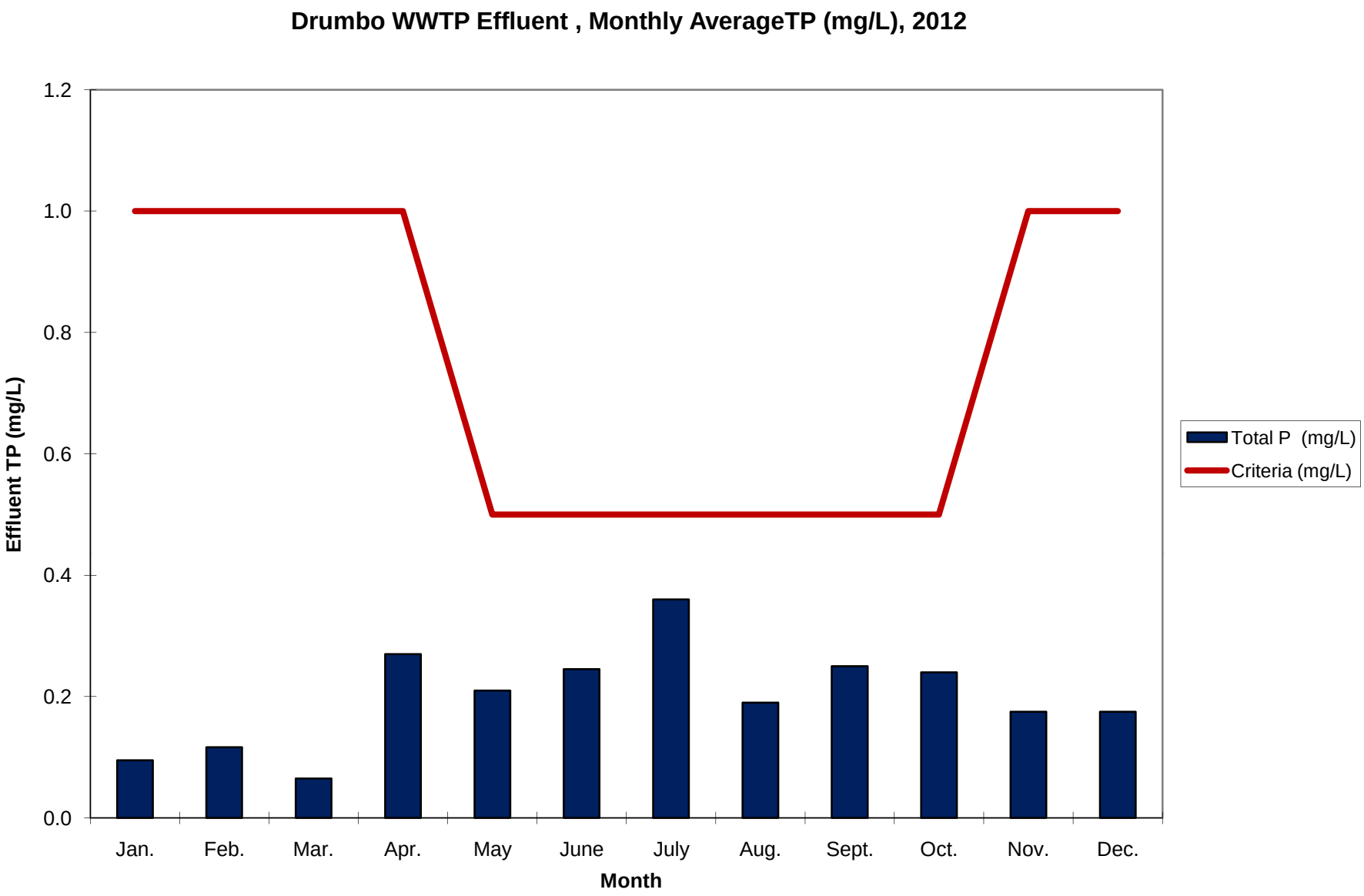
Exhibit 1

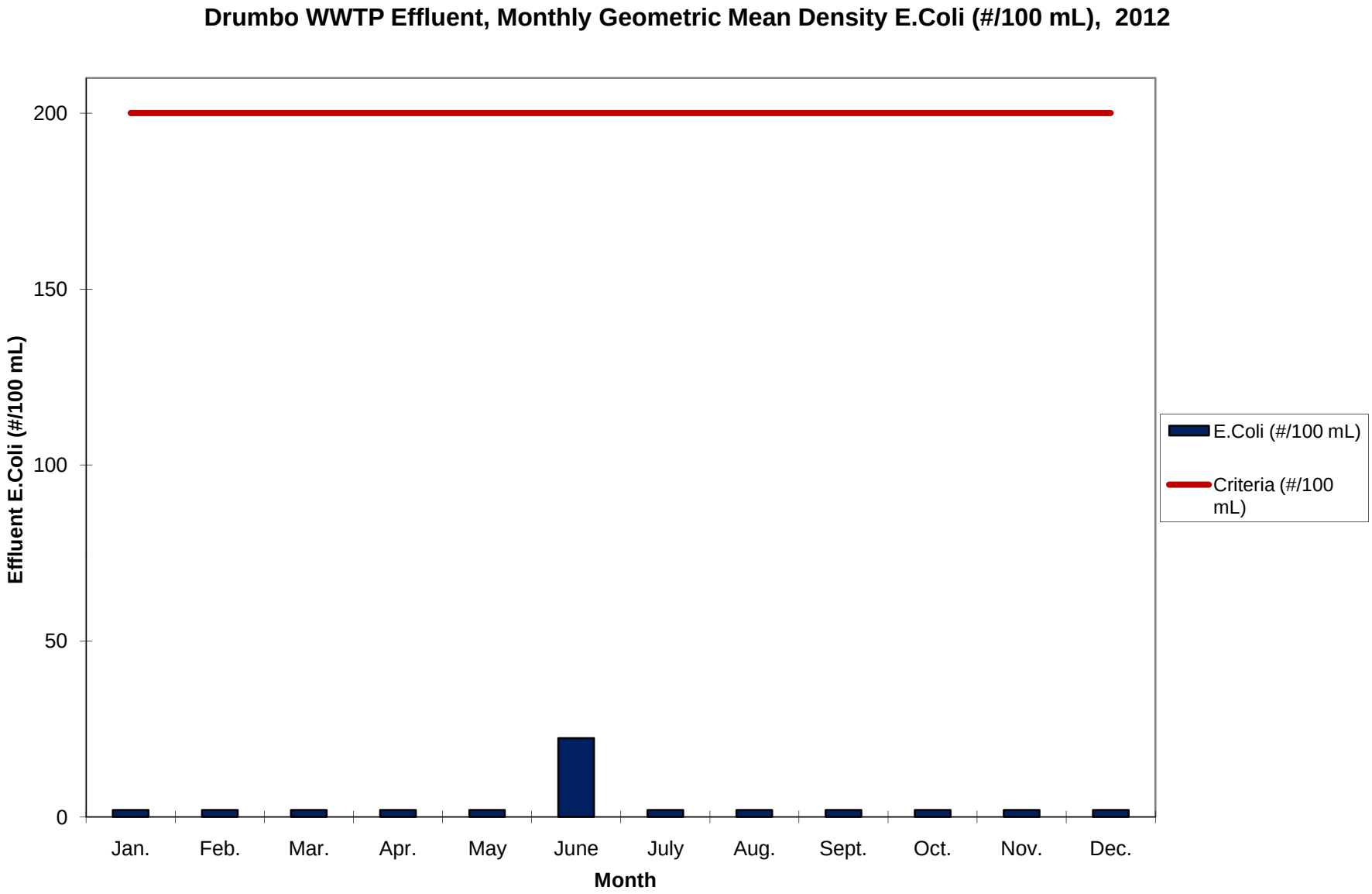

Drumbo WWTP Effluent, Monthly Average BOD5 (mg/L), 2012
Effluent BOD5 (mg/L)
16
14
12
10
8
6
4
2
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
BOD5 (mg/L)
Criteria (mg/L)

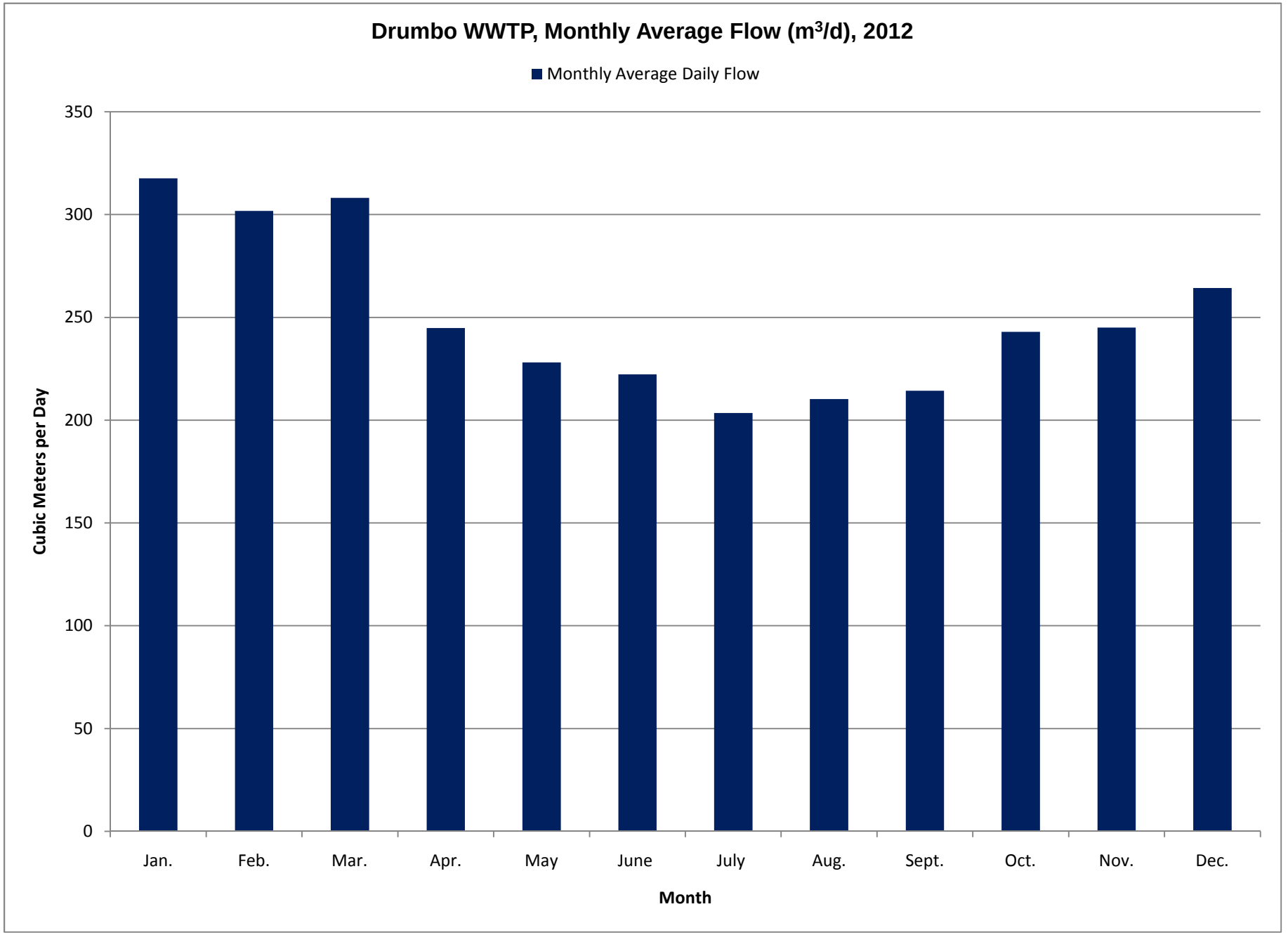

Drumbo WWTP Effluent. Monthly Average TSS (mg/L), 2012
Effluent TSS (mg/L)
20
15
10
5
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
TSS (mg/L)
Criteria (mg/L)

Drumbo WWTP Effluent, Monthly Average Ammonia Discharge (mg/L), 2012




Drumbo WWTP Effluent , Monthly AverageTP (mg/L), 2012
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), 2012
Effluent E.Coli (#/100 mL)
200
150
100
50
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
E.Coli (#/100 mL)
Criteria (#/100 mL)


Drumbo WWTP, Monthly Average Flow (m3/d), 2012
Monthly Average Daily Flow
350
300
250
200
150
100
50
0
Cubic Meters per Day
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month

DRUMBO RAW INFLUENT 2012

Month		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Ave.	Criteria
Volume	(m3)	9847	8751	9554	7345	7070	6670	6309	6520	6430	7533	7352	8194	**91,575**	**7631**	
Monthly Average Daily Flow	(m3/d)	318	302	308	245	228	222	204	210	214	243	245	264		**250**	**272**
Min	(m3/d)	280	258	259	211	210	205	168	133	190	187	213	233		**212**	
Max	(m3/d)	360	354	355	267	247	240	233	246	238	379	302	286		**292**	**774**
BOD_5	(mg/L)	124	98	144	140	207	227	173	132	113	153	106	150		**147**	
CBOD	(mg/L)	89	91	101	123	178	179	136	110	82	122	93	96		**116**	
TSS	(mg/L)	85	91	206	109	185	230	86	62	77	78	56	67		**111**	
Total Phosphorus	(mg/L)	2.6	4.6	3.8	4.0	10.9	9.0	5.2	3.2	4.2	2.7	2.9	2.6		**5**	
ALKALINITY	(mg/L)	372.5	390.7	398.5	368.0	394.0	407.0	421.0	361.0	365.0	347.5	332.5	386.0		**379**	
TKN	(mg/L)	20.95	44.53	23.45	36.25	75.85	39.25	38.00	33.13	35.35	31.25	29.90	26.45		**36**	
AMMONIA	(mg/L)	19.5	26.9	23.75	30.8	30.4	26.95	31.20	30.00	30.75	26.10	21.75	24.60		**27**	
NITRATE	(mg/L)	0.24	0.17	0.20	0.05	0.05	0.08	0.05	0.05	0.05	0.05	0.05	0.05		**0**	
NITRITE	(mg/L)	0.30	0.73	0.29	0.33	0.06	0.06	0.06	0.06	0.09	0.06	0.06	0.06		**0**	
pH		7.67	7.69	7.71	7.87	7.96	7.61	7.68	7.02	6.98	6.93	7.53	7.51		**8**	
Temp		10.5	10.6	11.8	13.3	15.8	19.6	18.5	21.7	21.8	17.2	14.4	13.7		**16**	

DRUMBO FINAL EFFLUENT 2012

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		**Ave**	**Criteria A**	**Criteria B**
BOD_5	(mg/L)	4.0	2.3	3.0	8.5	4.5	3.5	8.3	4.0	2.5	3.5	2.5	5.0		**4.3**	**10**	**15**
CBOD	(mg/L)	2.0	2.0	3.0	3.0	3.0	2.0	2.7	2.0	2.0	2.0	2.0	2.0		**2.3**		
TSS	(mg/L)	3.0	2.3	4.5	6.5	3.5	2.5	5.5	3.0	5.5	7.0	6.0	5.3		**4.6**	**10**	**15**
Total P	(mg/L)	0.10	0.12	0.07	0.27	0.21	0.25	0.36	0.19	0.25	0.24	0.18	0.18		**0.20**	**0.5**	**1**
ALKALINITY	(mg/L)	230	223	195	223	211	249	219	167	154	190	196	214		**206**		
TKN	(mg/L)	1.25	2.07	0.5	2.25	2.90	2.10	2.35	1.40	3.20	1.75	0.90	2.50		**1.93**		
Ammonia	(mg/L)	1.35	2.00	0.25	1.65	1.15	2.20	1.03	0.80	0.10	1.18	0.60	1.53		**1.153**	**3**	**5**
NITRATE	(mg/L)	7.72	10.19	13.60	15.80	15.40	8.50	13.02	19.40	22.75	13.74	13.6	12.2		**13.8**		
NITRITE	(mg/L)	3.71	4.22	1.31	0.23	0.84	1.15	0.30	0.07	0.09	0.12	0.20	0.7		**1.08**		
PH	(mg/L)	7.49	7.65	7.81	7.95	8.14	8.04	8.27	7.24	7.35	7.22	7.54	7.56		**7.69**		
Dissolved Phosphorus	(mg/L)	0.06	0.08	0.04	0.13	0.14	0.19	0.22	0.08	0.15	0.10	0.09	0.08		**0.11**		
Dissolved Oxygen	(mg/L)	9.9	9.3	9.25	9.0	8.4	7.9	7.9	8.1	7.4	8.6	7.7	8.2		**8.5**	**Min= 5**	**Min= 5**
E.Coli	#/100 mL	2	2	2	2	2	22	2	2	2	2	2	2		**3.7**	**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 2012

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		**Ave.**	**Criteria A**	**Criteria B**
BOD_5	(kg/d)	1.3	0.7	0.9	2.1	1.0	0.8	1.7	0.8	0.5	0.9	0.6	1.3		**1.1**	**2.8**	**4.0**
TSS	(kg/d)	1.0	0.7	1.4	1.6	0.8	0.6	1.1	0.6	1.2	1.7	1.5	1.4		**1.1**	**2.8**	**4.0**
TP	(kg/d)	0.03	0.04	0.02	0.07	0.05	0.05	0.07	0.04	0.05	0.06	0.04	0.05		**0.05**	**0.1**	**0.3**
NH4	(kg/d)	0.43	0.60	0.08	0.40	0.26	0.49	0.21	0.17	0.02	0.29	0.15	0.41		**0.29**	**0.80**	**1.36**

Drumbo SBR Influent Loading kg/d 2012

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		**Ave.**		
BOD	(kg/d)	39	29	44	34	47	50	35	28	24	37	26	40		37		
TSS	(kg/d)	27	27	63	27	42	51	17	13	17	19	14	18		28		
TP	(kg/d)	1	1	1	1	2	2	1	1	1	1	1	1		1		
TKN	(kg/d)	7	13	7	9	17	9	8	7	8	8	7	7		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

March 15, 2013

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Bob Slivar
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Monitoring Report 2012 for Mount Elgin Wastewater Treatment Plant

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 Wastewater 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 2012. The average daily flow for 2012 was 31 m^3/d. This represents 32.5% 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 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. The dosing tank is where the effluent sample is collected and pumped to the shallow buried trench drain field that provides the subsurface discharge.

SAMPLING DESCRIPTION

Grab samples were taken from the influent lift station, the minimum sampling frequency is quarterly and samples are tested for Carbonaceous Biochemical Oxygen Demand (CBOD), Suspended Solids (SS), Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN).

Effluent grab samples are taken and 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 2012 was 164 mg/L, with an average flow of 31 m^3/d; this corresponds to an average CBOD loading of 5 kg/d. The average annual influent SS concentration to the plant was 103 mg/L. This

corresponds to an average SS loading of 3.2 kg/d. The annual average TKN concentration was 45.7 mg/L. This corresponds to 1.4 kg/d. The annual average TP concentration was 7.6 mg/L which corresponds to 0.24 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 2012.

The annual average effluent CBOD concentration was 1.8 mg/L. This represents a 98.9% removal efficiency. The annual average SS concentration was 2.2 mg/L. This represents a 97.8% removal efficiency. The annual average Ammonia concentration was 1.4 mg/L. The annual average TP concentration was 7.1 mg/L which represents a 6.6% 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.

There was an upset condition at the treatment plant on August 10th and 14th when large amounts of dirt entered the plant which then needed removal by a vacuum truck. This was due to rain events carrying dirt into the collection system in the newly built subdivision via openings in the pipework. These openings were identified and corrective action was taken by the contractor.

There was an overflow from the collection system on November 5th, 2012 when a filter plugged in a local septic tank causing approximately 1 m^3 to overflow to the surface. A vacuum truck was used to remove the contents of the tank and clean the filter. This was reported to the MOE at the time the event occurred.

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. 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 influent meter and records are kept at the Ingersoll WWTP.

Other Activities

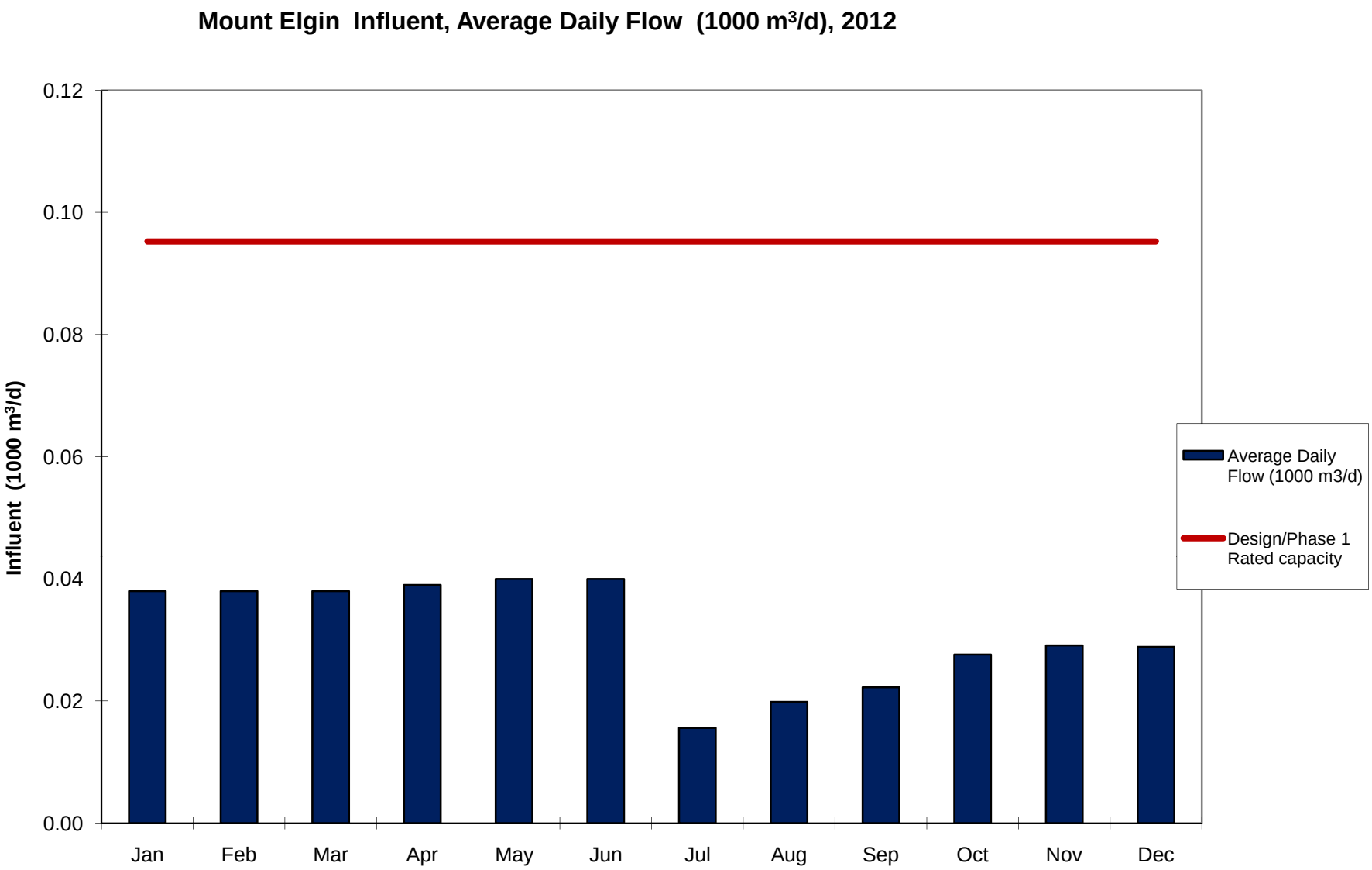
Under Exhibit 2, included in this report, are the results from groundwater monitoring for 2012 in a table format. In addition, the original monitoring report from 2006 detailing the monitoring wells is included which contains a sketch of their locations.

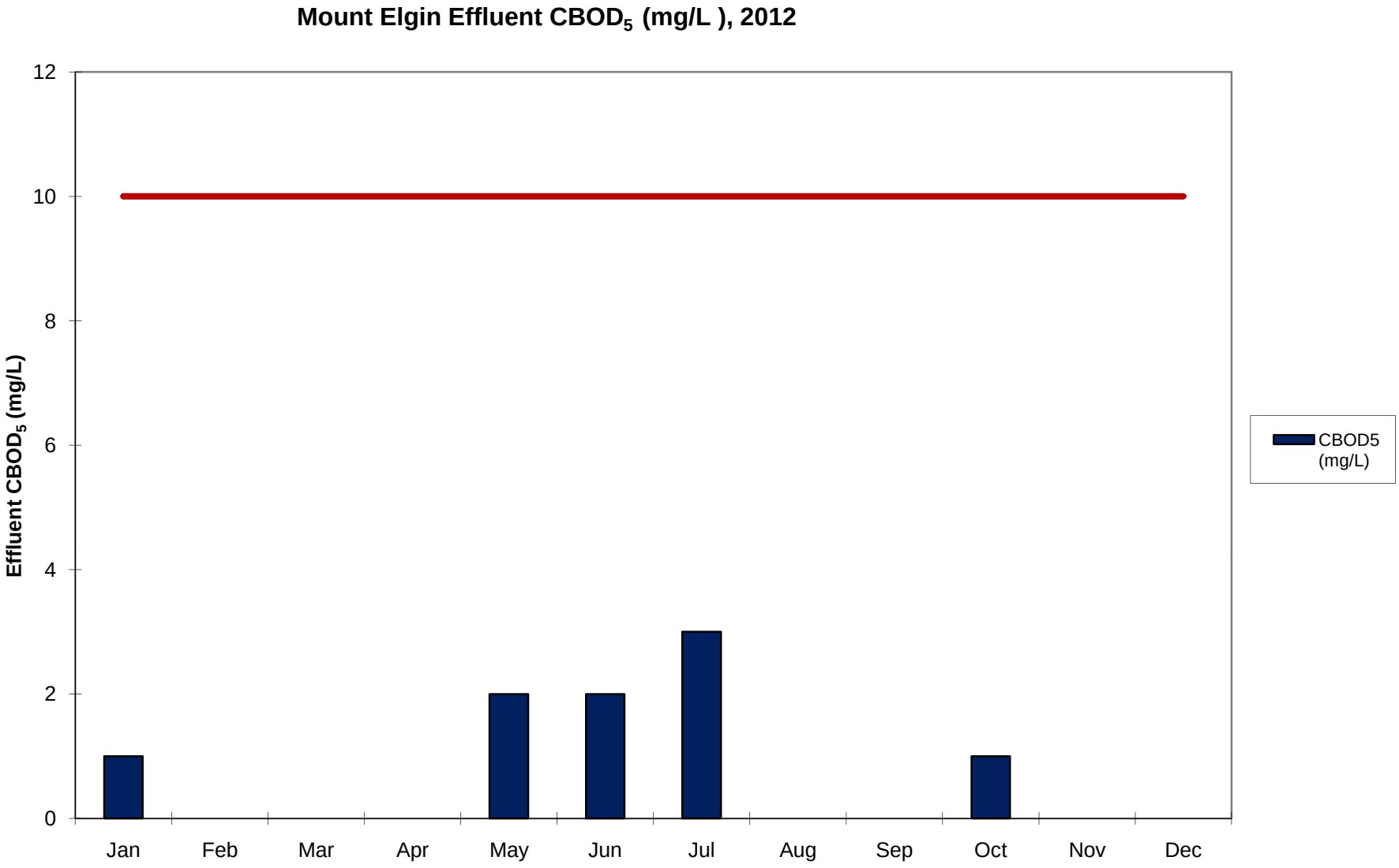
Summary

The Mount Elgin wastewater treatment system was operating within its design flow criteria and was within its objectives for 2012.

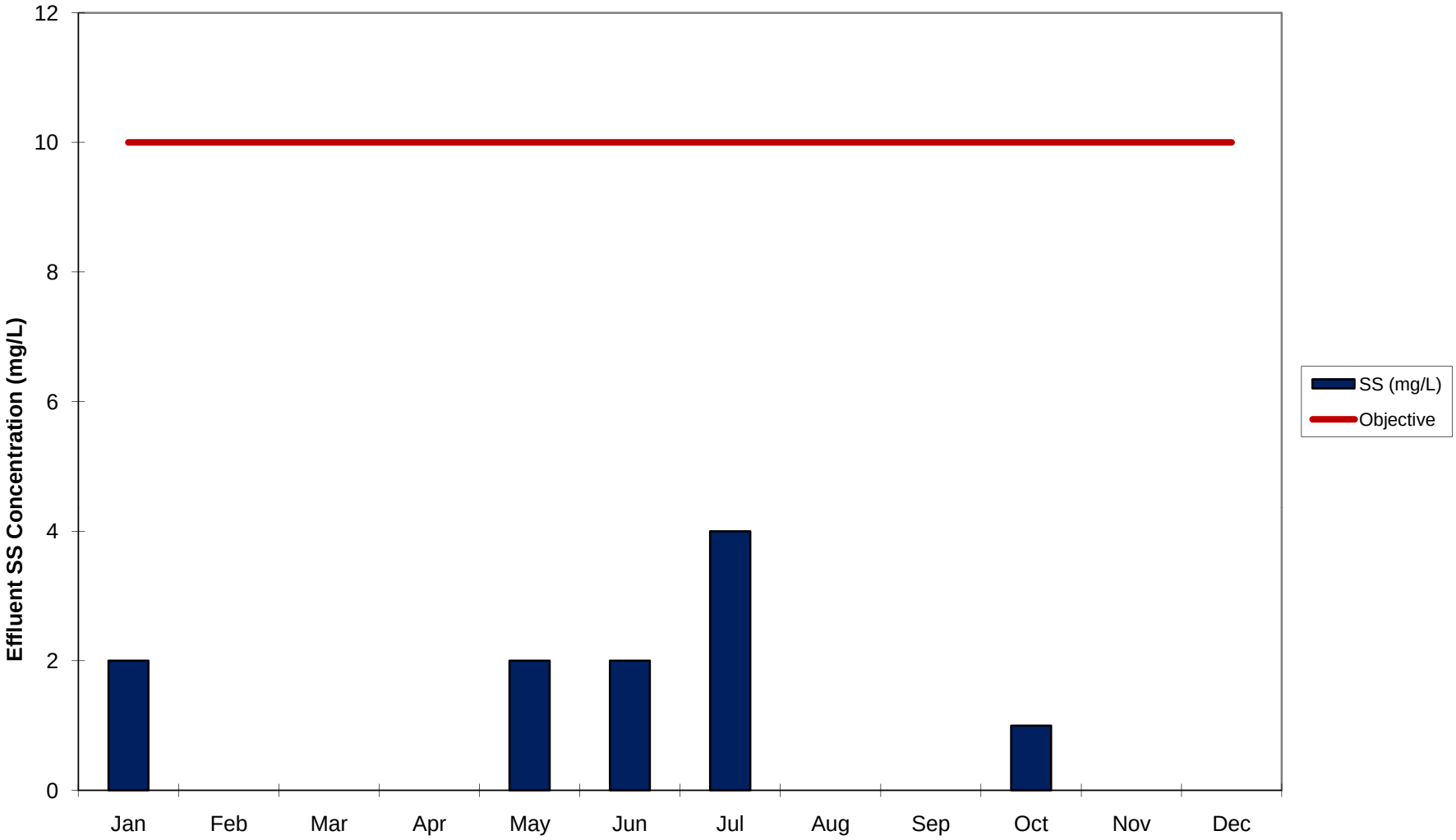
Due to growth within the community, Oxford County is proceeding with design considerations for the next phase (Phase 2) which is already included within the current ECA.

EXHIBIT 1


Mount Elgin Influent, Average Daily Flow (1000 m3/d), 2012
Influent (1000 m3/d)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Average Daily Flow (1000 m3/d)
Design/Phase 1 Rated capacity


Mount Elgin Effluent CBOD5 (mg/L), 2012
Effluent CBOD5 (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
CBOD5 (mg/L)

Mount Elgin Effluent, SS Concentration (mg/L), 2012



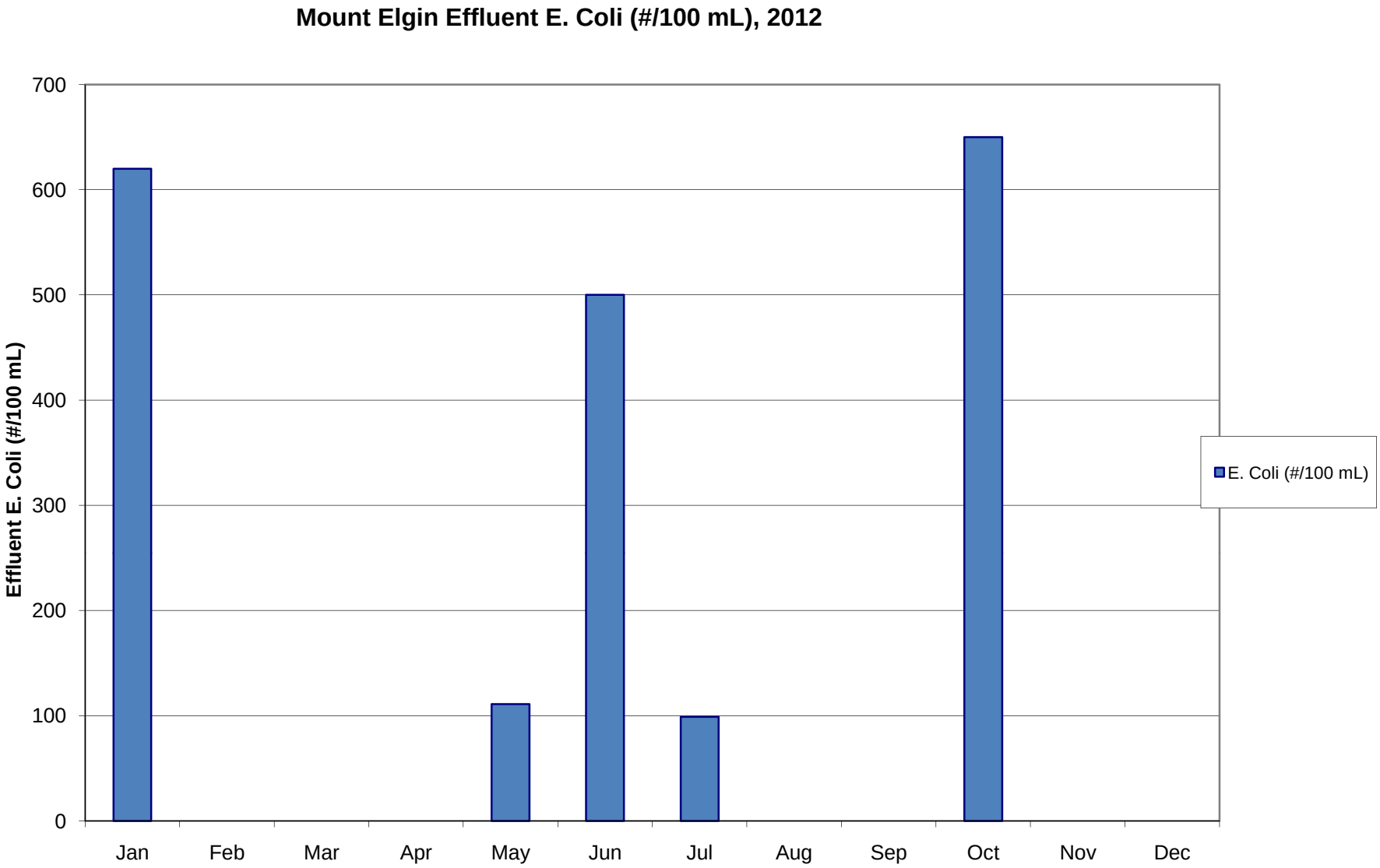

Mount Elgin Effluent E. Coli (#/100 mL), 2012
Effluent E. Coli (#/100 mL)
700
600
500
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
E. Coli (#/100 mL)

TABLE A	Mt Elgin Wastewater Draft			WORKS # 120002870			YEAR 2012										
INFLUENT FLOW	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		AVERAGE	DESIGN CRITERIA	DESIGN CRITERIA	
															Phase 1	All Phases	
TOTAL (1000m^3)	1.178	1.102	1.178	1.170	1.240	1.200	0.483	0.615	0.667	0.856	0.873	0.895	TOTAL	11.456			
Average Daily Flow (1000 m^3/d)	0.038	0.038	0.038	0.039	0.040	0.040	0.016	0.020	0.022	0.028	0.029	0.029	AVERAGE DAILY FLOW	0.031	0.09525	0.381	
MAX. DAILY FLOW (1000 m^3/d)	0.038	0.038	0.038	0.039	0.040	0.040	0.019	0.023	0.024	0.034	0.033	0.031	MAX. DAILY FLOW	0.040			
																Results	Results
INFLUENT RESULTS														AVERAGE		MAXIMUM	MINIMUM
CBOD5 mg/L	143				174	176	232			97				164.4		232	97
SS (mg/L)	116				252	48	50			50				103.2		252	48
TKN (mg/L)	56.6				45.5	59.9	23.8			42.6				45.7		59.9	23.8
TOTAL P. (mg/L)	6.03				9.21	6.86	7.80			7.92				7.6		9.21	6.03
																Results	Results
EFFLUENT RESULTS														AVERAGE		MAXIMUM	MINIMUM
$CBOD_5$ (mg/L)	1				2	2	3			1				1.8		3	1.0
SS (mg/L)	2				2	2	4			1				2.2		4	1.0
Ammonia (mg/L)	0.60				1.10	1.60	3.2			0.70				1.4		3.2	0.6
TKN (mg/L)	0.25				3.60	1.20	7.90			0.25				2.6		7.9	0.3
TP (mg/L)	5.2				7.7	6.6	9.4			6.4				7.1		9.39	5.2
E. Coli (#/100 mL)	620				111	500	99			650				294	Geomean	650	99.0
Nitrates (mg/L)	26.1				23.1	20.8	19.1			40.5				25.9		40.5	19.1
Nitrites (mg/L)	0.11				0.13	0.26	0.24			0.16				0.2		0.26	0.1

EXHIBIT 2

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

		2012					
		Well 1	**Well 2**	**Well 3**	**Well 1**	**Well 2**	**Well 3**
Parameter		**January 26-12**	**January 26-12**	**January 26-12**	**April 19-12**	**April 19-12**	**April 19-12**
Well Level (metres)		0.36	0.58	0.16	0.75	1.05	0.68
Nitrite (mg/L N)		< .06	< .06	< .06	< .06	< .06	< .06
Nitrate (mg/L N)		< .05	0.12	< .05	<. .05	2.32	<.05
Nitrate+Nitrite (mg/L N)		< .06	0.12	< .06	< .06	2.32	< .06
pH		7.66	7.7	7.65	7.63	7.72	7.95
		Well 1	**Well 2**	**Well 3**	**Well 1**	**Well 2**	**Well 3**
Parameter		**July 30-12**	**July 30-12**	**July 30-12**	**Nov-21-12**	**Nov-21-12**	**Nov-21-12**
Well Level (metres)		Well Dry	1.39	1.11	0.64	0.77	0.45
Nitrite (mg/L N)		N/A	< .06	< .06	< .06	< .06	< .06
Nitrate (mg/L N)		N/A	0.29	< .05	< .05	1.93	< .05
Nitrate+Nitrite (mg/L N)		N/A	0.29	< .06	< .06	1.93	< .06
pH		N/A	8.06	7.66	7.76	7.69	7.92

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*

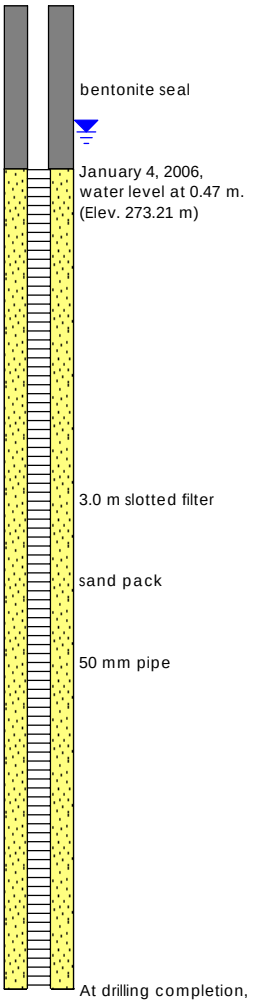
Job No.: *5849E1*

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*

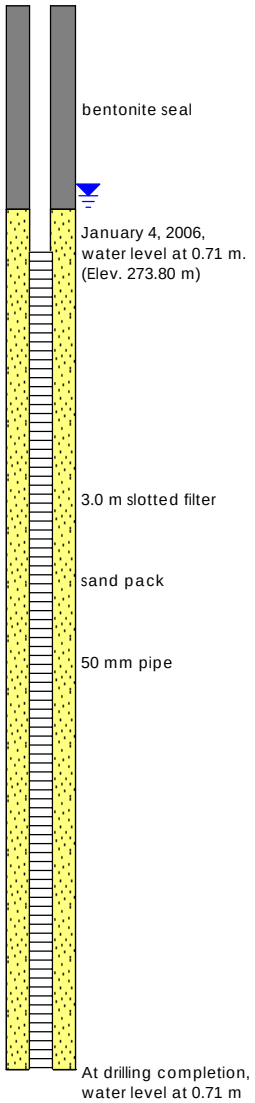
Job No.: *5849E1*

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*

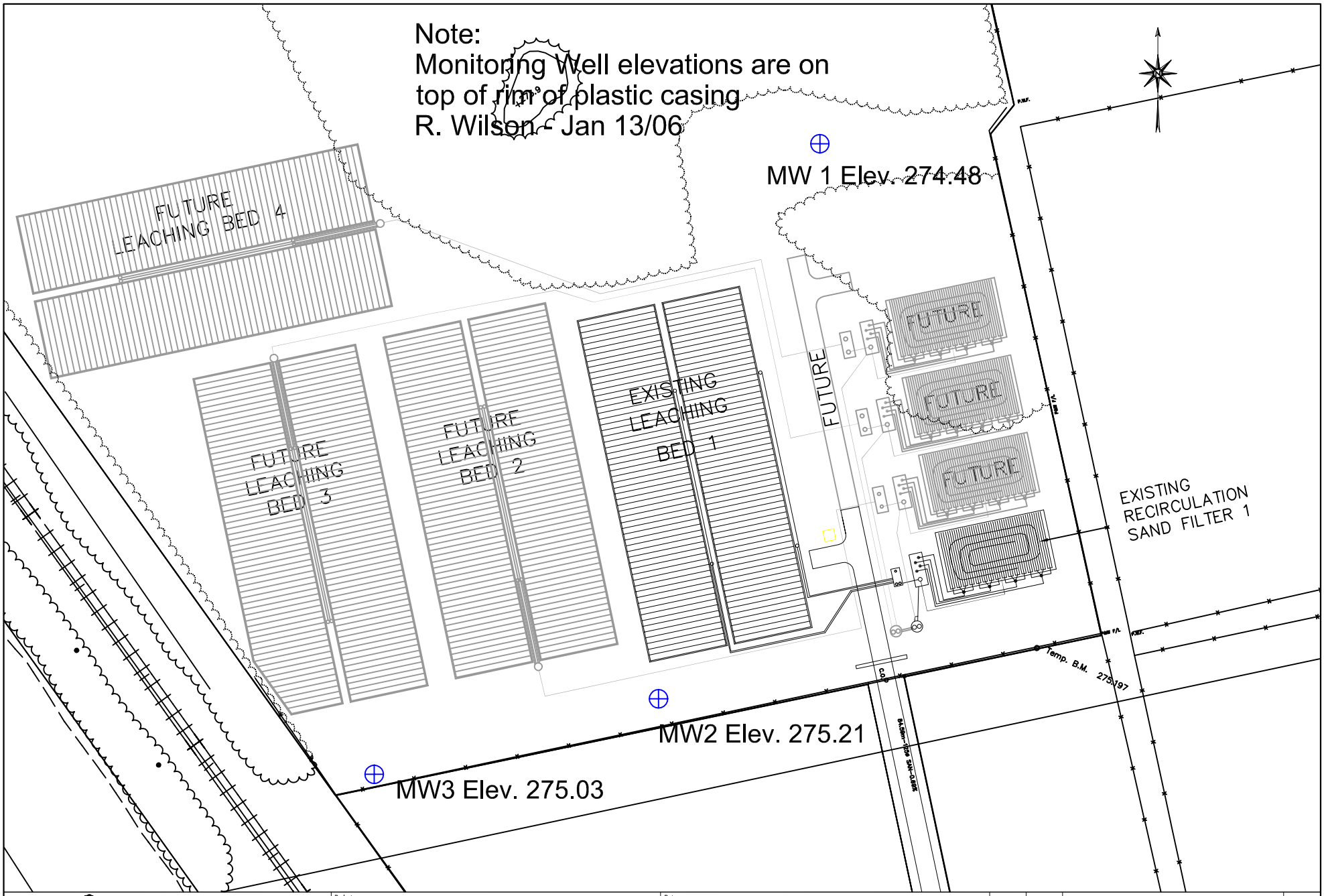
Field Tech.: *BL*

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