NORTH HURON

Blyth Sewage Treatment Plant

Annual Report 2015

Blyth Sewage Treatment Plant
2015 Annual Report
Certificate of Approval #8687-826L6Z issued February 9, 2010

The following is a summary and discussion of the 2015 operating year of the Blyth Sewage Treatment plant and a summary of compliance limits as set forth in the Certificate of Approval.

There are many concepts used to monitor the process and efficacy of sewage treatment plants that are analysis driven. The simplistic approach used at the Blyth plant is based on dissolved oxygen, final effluent total ammonia and dissolved phosphorous concentrations to determine process conditions. Since the nitrifying biology is sensitive, they are used as an indicator and an upset of the plant can be quickly identified through an increase in ammonia levels and either a sharp drop or increase in the respiration rate as indicated by the dissolved oxygen. Dissolved phosphorous concentrations are monitored to determine appropriate ferric chloride dosages and periodic mixed liquor suspended solids are performed to adjust available biomass for treatment.

The Rated Capacity of the Treatment unit at 730m3/ day

Based on Raw sewage flows, the 2015 annual average flows were 393.7m3/day which represents 54% of the annual average 730m3/day capacity. This represents a 9.5% decline compared to last year

By- pass Events

There were five by-pass events in 2015 at the Blyth sewage treatment plant where secondary by-passes needed to take place, all five by-pass events were measured events. The longest by-pass event was in November for a total of 56 hours which was for the replacement of an aeration pipe and cleanout. The total number of bypass hours for the year was 101.25 hours with a cumulative volume of 4351m3

Compliance limits

The plant operated within Regulatory Compliance limits throughout the year.

Operational problems

Aeration basin #1 required a diffuser header to be repaired in which it was removed from service creating a secondary bypass event due to bypassing a small portion of the treatment which was reported to MOECC. The pipe was repaired and has been working efficiently since with the root cause of the break found to be an unexpected accumulation of rags on the headers. The maintenance frequency of cleaning the basins is going to be increased to no more than a 2 year period to minimize the risk of reoccurrence.

Maintenance

Routine maintenance was performed such as oil changes in the gear drives, emergency generator and inspection of the pumps. Aeration basin 1 was cleaned and inspected. A new pH probe was purchased and installed for final effluent monitoring. Return pump 2 had failed and found to be a wiring issue where it was repaired, tested and placed back in service. An extension was added to the flowmeter level transmitter to minimize erroneous readings.

Quality control monitoring

Monitoring includes an online dissolved oxygen sensor which indicates loading, raw sewage quality, aeration basin content and proper operations of the aerators. Secondary clarifier effluent is monitored for dissolved phosphorous and ammonia to determine adequate ferric chloride dosage and nitrification in the aeration basins as well as general clarity and surface debris which indicated proper solids removal, adequate solids return to the aeration and wasting rates.

Results of monitoring activities can be viewed on the monthly spreadsheets.

Calibration and Maintenance

Calibration of the flowmeter was completed by ICS Instrumentation (after transducer extension was installed. pH analyzer calibration is checked on a monthly basis.

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Efforts to Meet Effluent Objectives

As described in the Quality Control Monitoring section, analytic and visual parameters are used as indicators of process efficiency and should fall within the Critical Control Points. A summary of these values was developed and is in the Blyth Sewage Treatment Facility Operations Manual for reference and historically have been adequate to maintain compliance.

With the exception of a partial treatment bypass to repair air header in basin 1, there were a number of tertiary bypasses as a result of extraordinary precipitation and suspected sump pump connections. During high flows that exceed the solids removal capacity of the clarifier, the air is shut off in the second aeration section to greatly reduce the solids loading on the clarifier and to retain the solids.

The filter has been assessed and is in much better shape than the filter that had structural failure. The conclusion of the inspection was that there was no imminent danger of failure but that plans should be put in place for its replacement.

Biosolids Generated

There was 696.2 m^3 of biosolids removed from the storage tank in 2015 and utilized in accordance with NASM approval 5060206 for Farm 1 issued by Ministry of Agriculture, Food and Rural Affairs as developed by Crop Quest (NASMPDC1104) and applied by S&S Trucking.

Complaints

There were no complaints received as a result of the operation of the sewage treatment facility

Included in this report is a Blyth sewage data summary, compliance summary, biosolids removal summary and bypass events summary

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Blyth Sewage Treatment Plant — 2015 Data Summary

Flow s	January	February	March	April	May	June	July	August	September	October	November	December	Total	Avg Flow	Maximum	% Cap
Total Flow s	11333	9333	14828	17054	11254	15300	9945	9020	7677	9135	12368	12229	139476	382	17054	52.3
Avg	366	333	478	568	363	510	321	291	256	295	412	394			568	
Max	496	489	1279	1363	514	1671	433	370	369	472	1302	637			1671	

By-passing				748		2992					611		4351	m3
Type				sec		sec					sec			

See By-pass/Overflow form and Annual By-pass Summary

Raw Sew ag	January	February	March	April	May	June	July	August	September	October	November	December	Average	Max.	Removal Efficiency%
CBOD	137	114	78	206	136	86	175	128	309	125	186	160	153.13	309	98.6
SS	127	104	97	167	124	147	159	133	217	254	111	132	148	254	98.5
TP	3.30	3.44	2.46	3.58	2.95	2.02	3.96	3.80	7.97	4.97	2.87	3.14	3.70	7.97	95.0
TKN	31.35	37.85	22.43	35.10	44.90	26.45	26.05	29.30	48.05	38.30	29.30	27.45	33.04	48.05	95.7
pH	7.75	8.17	8.03	7.62	7.91	7.86	7.67	7.54	7.29	7.97	8.02	7.92	7.81	8.17	

Final Effluent	January	February	March	April	May	June	July	August	September	October	November	December	Average	Max.
CBOD	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	2.7	2.0	2.0	2.14	3
SS	2.0	2.0	4.7	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.26	4.67
Ammonia	0.10	0.10	0.10	0.10	0.10	0.15	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.15
TKN	0.95	1.10	0.67	1.10	0.50	0.85	1.20	2.65	0.75	1.37	0.85	5.15	1.43	5.15
TP	0.18	0.15	0.25	0.21	0.23	0.17	0.22	0.17	0.15	0.06	0.09	0.38	0.19	0.38
NO2	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
NO3	21.35	28.30	15.63	20.35	19.00	15.70	34.85	32.90	30.80	24.33	26.00	28.35	24.80	34.85
pH	7.21	7.77	7.72	7.27	7.27	7.31	7.14	7.19	7.33	7.85	7.67	7.42	7.43	7.85
E Coli	2	14	19	8	3	3	10	6	183	18	9	18	24	183
Tot Cl Res.	0.16	0.18	0.18	0.13	0.12	0.12	0.11	0.11	0.13	0.16	0.15	0.16	0.14	0.19

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Blyth STP Compliance Summary 2015

Flows	January	February	March	April	May	June	July	August	September	October	November	December
Peak Flow	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730	2730
Actual	496	489	1279	1363	514	1671	433	370	369	472	1302	637
Comp.Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Av Day Flow	730	730	730	730	730	730	730	730	730	730	730	730
Actual	366	489	478	568	363	510	321	291	256	295	412	394
Comp. Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CBOD&TSS	15	15	15	15	5	5	5	5	5	5	15	15
CBOD	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	2.7	2.0	2.0
TSS	2.0	2.0	4.7	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Loading Kg	11	11	11	11	3.7	3.7	3.7	3.7	3.7	3.7	3.7	11
CBOD Kg	0.73	0.98	0.96	1.14	0.73	1.02	0.64	0.87	0.51	0.79	0.82	0.79
TSS Kg	0.73	0.98	2.23	1.42	0.73	1.02	0.64	0.58	0.51	0.59	0.82	0.79
Comp. Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tot P	1	1	1	1	0.3	0.3	0.3	0.3	0.3	0.3	1	1
Actual	0.18	0.15	0.25	0.21	0.23	0.17	0.22	0.17	0.15	0.06	0.09	0.46
TP Load Kg	0.7	0.7	0.7	0.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.7
Act. TP Kg	0.07	0.07	0.12	0.12	0.08	0.09	0.07	0.05	0.04	0.02	0.04	0.18
Comp. Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
NH 3&4	17	21	14	6	3	1	1	1	1	3	3	11
Actual	0.10	0.15	0.13	0.12	0.12	0.12	0.14	0.08	0.11	0.10	0.11	0.23
Comp. Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
NH 3	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Actual	0.0002	0.0002	0.0003	0.0003	0.0006	0.0010	0.0004	0.0008	0.0007	0.0069	0.0009	0.0006
Comp. Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tot Cl Res	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Month Max.	0.19	0.18	0.18	0.19	0.18	0.18	0.15	0.18	0.18	0.19	0.18	0.18
Comp. Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
pH	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5	6 - 9.5
Actual	7.21	7.77	7.72	7.27	7.27	7.31	7.14	7.19	7.33	7.85	7.67	7.42
Comp. Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
E. Coli	200	200	200	200	200	200	200	200	200	200	200	200
Actual GMD	2	14	0	8	3	3	10	6	183	18	9	18
Comp. Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

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Quarterly Metals Calculations Report 2015

Parameter							
Date		Mar 31-15	May 27-15	July 8-15	Jul 28-15	Nov 9-15	Average
Total Solids		39100	33300	32500	38300	10300	30700
NH 3&4		101	272	507	540	3.6	284.72
TKN		2110	1610	1940	1980	422	1612.4
NO2		0.8	4.7	0.2	0.2	0.8	1.34
NO3	<	0.3	0.3	0.3	0.3	1.1	0.46
NO2+NO3		0.8	4.7	0.3	0.3	1.9	1.6
Arsenic	<	0.3	0.3	0.2	0.3	0.1	0.24
Cadmium	<	0.058	0.01	0.013	0.035	0.005	0.0242
Cobalt		0.41	0.26	0.25	0.34	0.07	0.266
Chromium		3.8	2.4	2.6	3.5	0.78	2.616
Copper		13	8.8	9.7	14	2.5	9.6
Mercury		0.022	0.016	0.02	0.022	0.002	0.0164
Potassium		170	130	130	150	75	131
Molybden	<	0.31	0.23	0.24	0.1	0.08	0.192
Sodium							#DIV/0!
Nickel		1.2	0.76	0.84	1	0.25	0.81
Phosphorous		1300	920	950	1200	220	918
Lead		1	0.5	0.6	0.5	0.2	0.56
Selenium	<	0.1	0.1	0.1	0.3	0.1	0.14
Zinc		21	13	13	18	3.4	13.68
Ecoli DW		19182	10511	5538	6005	941748	196596.8
Ecoli /100 ml		75000	35000	18000	23000	970000	224200
Tank in " to Top							
Volume in m3		941	941	941	941	941	
Volume at 4%		920	784	765	901	242	0
Solids Kg		36801	31342	30589	36048	9694	0

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Table 1 BYPASS AND OVERFLOW EVENTS

FACILITY NAME: Blyth STP YEAR: 2015

DATE:

Date (dd/ mm/ yy)	Location	Type (See Legend for description)	Start Time	Duration (hours)	Volume (1,000m3)	M/E	Disinfection (Y/N)	Treatment (Y/N)	Reason Code*	Sample Results BOD5 (mg/L)	SS (mg/L)	TP (mg/L)	TKN	E.Coli (/100ml)	Ref #
Apr 2-3 20	STP	SB	2130	11.6	0.748	M	Y	Y	2	4	4	0.22	0.7		123017
8-Jun-15	STP	SB	940	5.5	0.372	M	Y	Y	1	4	2	0.35	1.1	1900	123978
Jun 8-9, 2015	STP	SB	2300	16	0.749	M	Y	Y	1	4	11	0.29	0.5	48	124005
June 16-17, 2015	STP	SB	330	23.75	1.871	M	Y	Y	1	2	11	0.29	1.4	840	124185
Nov 10-12	STP	SB	5:00	56	0.611	M	Y	Y	4	2	2	0.11	2.7	2	12294
				101.25	4.351										

Legend

PB = Primary Bypass M = Measured Y = Yes

SB = Secondary Bypass E = Estimated N = No

STPO = Sewage Treatment Plant Overflow

CSO = Combined Sewer Overflow

SSO = Sanitary Sewer Overflow

STWO = Satellite Treatment Works Overflow

*Reason Codes:

1 = Heavy Precipitation
2 = Spring Runoff
3 = Infiltration
4 = Mechanical/Equipment Failure
5 = Pipe Failures(break/ leak/ plugged)
6 = Process Upsets
7 = Power Outages
8 = Unknown
9 = Other, please comment below.

Comments:

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Table 2 BYPASS AND OVERFLOW SUMMARY FOR 2015*

Blyth STP

	Primary Bypass			Secondary Bypass			Plant Overflows			Collection System Overflows		
MONTH	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (1000m3)
January	0			0			0			0		
February	0			0			0			0		
March	0			0			0			0		
April	0			1	11.6	0.748	0			0		
May	0			0			0			0		
June	0			3	30.2	2.992	0			0		
July	0			0			0			0		
August	0			0			0			0		
September	0			0			0			0		
October	0			0			0			0		
November	0			1	56	0.611	0			0		
December	0			0			0			0		
TOTAL	0	0	0	5	97.8	4.351	0	0	0	0	0	0

*To be submitted quarterly, within 45 days of the end of the quarter.

Note: An 'Event' means an occurrence or occurrences of a bypass or overflow separated by a period of more than 12 hours between the occurrence(s) or the event(s) and the previous event, at each location.