

March 26, 2018

Ministry of the Environment and Climate Change
Kingston District Office
1259 Gardiners Rd.
Kingston, ON K7M 8S5

Attention: Mr. James Mahoney, Supervisor

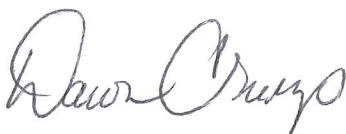
Dear Mr. Mahoney,

SUBJECT: Morrisburg Wastewater Treatment Plant - 2017 Annual Report

Please find attached the 2017 Annual Performance Report for Morrisburg's Wastewater Treatment Plant. This report was completed in accordance with Section 12(6) of Amended Certificate of Approval No. 2147-734L2K. The report was prepared by the Ontario Clean Water Agency on behalf of the Municipality of South Dundas, based on the information provided. The report covers the period from January 1, 2017 to December 31, 2017.

Should you require any further information in relation to this report, please do not hesitate to contact our office.

Yours truly,



Dawn Crump
Process and Compliance Technician
Seaway Valley Cluster

c.c. Shannon Geraghty, C.A.O./Treasurer, Municipality of South Dundas
Denis Villeneuve, Supervisor of Water/Wastewater Operations, Municipality of South Dundas
Brenda Beaudoin, Provincial Officer, MOECC

Morrisburg Wastewater Treatment Plant 2017 Annual Performance Report

The Morrisburg WWTP is a Class II wastewater treatment system owned and operated by the Municipality of South Dundas. Raw sewage is conveyed from the collection system to the plant pumping station which is equipped with four submersible pumps. From the pumping station, wastewater passes through the inlet works, including fine screens with a screw compactor and a grit removal and disposal system. Aluminum Sulphate is added to assist in phosphorous removal. The wastewater then moves through either of two parallel Sequential Batch Reactors (SBR) equipped with individual aeration systems, mixers, decanters and sludge removal pumps. Effluent decanted from the SBRs is treated by UV disinfection and subsequently passes through an outfall pipe to the St. Lawrence River.

The Morrisburg WWTP can receive septage. Septage can be transferred to the influent fine screens from the onsite holding tank by two dry-pit pumps.

Sludge removed from the SBRs is transferred to a 140 m³ storage tank. From the tank, the sludge enters a gravity belt thickener. The thickened sludge is then pumped to an Autothermal Thermophilic Aerobic Digestion (ATAD) system for stabilization. The digested sludge is subsequently pumped to a 1480 m³ biosolids storage tank. From the storage tank, biosolids are hauled off site to be utilized as soil conditioner.

The following report addresses the requirements outlined in Condition 12(6) of Amended Certificate of Approval #2147-734L2K issued on August 28, 2007.

10(6) The Owner shall prepare and submit to the District Manager, a performance report, on an annual basis, within ninety (90) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the Works and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7, including an overview of the success and adequacy of the Works;

The total volume of wastewater conveyed to the treatment facility in 2017 was 1,086,352 m³. The average rate of inflow was 2,974 m³/day which represents 65% of the plant's 4,608 m³/day rated capacity. The calculated percent removal of CBOD₅, TSS and TP in the final effluent described in the following paragraphs was determined using data from weekly effluent samples and monthly raw sewage composite samples collected during the reporting period.

The allowable monthly average concentration of CBOD₅ in the effluent as stated in Condition 7 is 25 mg/L. For 2017, the average CBOD₅ in the effluent was 3.1 mg/L which represents approximately 95% removal of CBOD₅ from the raw sewage.

The allowable monthly average concentration for Total Suspended Solids (TSS) as stated in Condition 7 is 25mg/L. In 2017, the average concentration of TSS in the effluent was 3.8 mg/L which represents approximately 97% removal of TSS from the raw influent.

The monthly average concentration limit for Total Phosphorus (TP) as stated in Condition 7 is 1.0 mg/L. The average monthly concentration during the reporting period was 0.19 mg/L which represents approximately 91% removal of TP from the raw influent.

Condition 7 stipulates that the *E. coli* monthly geometric mean density must not exceed 200 organisms/100 mL of effluent. During 2017, the average monthly geometric mean was 2.9 CFU/100 mL which did not exceed the monthly limit.

Condition 7 also requires the effluent to be non-acutely lethal to Rainbow Trout and Daphnia Magna, with grab samples being collected on a quarterly basis. None of the samples collected in 2017 were acutely lethal.

The pH of the effluent remained within the range of 6.0 - 9.5 specified in Table 2.

A summary of flow rates, monitoring data and laboratory results can be found in Appendix A.

(b) a description of any operating problems encountered and corrective actions taken;

Please see the Call-Out Summary in Appendix B.

(c) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing part of the Works;

Please see the Major Maintenance Project Summary in Appendix C.

(d) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

Effluent samples are collected by the Municipality of South Dundas' licensed operational staff on a weekly basis. All samples are analyzed by a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA). Accreditation ensures that the laboratory has acceptable laboratory protocols and test methods in place. It also requires the laboratory to provide evidence and assurances of the proficiency of the analysts performing the test methods.

(e) a summary of the calibration and maintenance carried out on all effluent monitoring equipment

The reports verifying required annual calibrations and verifications can be found attached in Appendix D.

(f) a description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6;

Condition 6.1 & 6.2 - During the reporting period all monthly average concentrations for CBOD₅, TSS, TP and TAN were well below the effluent objectives. The *E. coli* monthly geometric means were also below the stated objective.

Condition 6.3 (a) - Effluent pH remained within the 6.0 - 9.5 range specified in the Certificate of Approval.

Condition 6.3 (b) - The monthly average day flows remained below the 4,608 m³/day design capacity. In addition, the daily maximum rated capacity of 18,500 m³/day was not exceeded.

Condition 6.3 (c) - Effluent was essentially free of floating or settleable solids and did not contain substances that would cause a film, sheen, foam or discoloration to the receiving stream.

(g) a tabulation of the quantity of septage added to the Works for co-treatment during the reporting period;

No septage was received in 2017.

(h) a summary of chemical characterization data for samples of septage collected in accordance with Table 4 in Condition 11 during the reporting period;

None to report.

(i) a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

In 2017, a total of 1120 m³ of liquid biosolids was utilized as soil conditioner. The sludge was land applied in October (NASM Plan #22900). It is anticipated that approximately the same volume of sludge will be generated in 2018.

(j) a tabulation of the quantity of groundwater pumped from the WWTP building foundation drainage system to the storm sewer system;

Please see a tabulation of the quantity of groundwater pumped from the WWTP drainage system to the storm sewer in the WWTP PAR, attached in Appendix A.

(k) a summary of any complaints received during the reporting period and any steps taken to address the complaints;

There were no complaints received in relation to the Morrisburg WWTP during the reporting period.

(l) a summary of all By-pass, overflow, spill or abnormal discharge events;

Heavy precipitation resulted in approximately 11 m³ of partially treated wastewater being discharged from the WWTP on June 29, 2017. Samples were collected and the bypass was reported in accordance with federal and provincial requirements (SAC reference #901236).

(m) any other information the District Manager requires from time to time.

No requests for additional information have been received.

APPENDIX A:
OPERATIONAL DATA

MORRISBURG WWTP PERFORMANCE ASSESSMENT REPORT

MUNICIPALITY: SOUTH DUNDAS
PROJECT: MORRISBURG WWTP

WORKS NUM.: 120000168
DESCRIPTION: TWO SEQUENTIAL BATCH REACTORS AND AEROBIC SLUDGE DIGESTION

YEAR: 2017
WATER COURSE: ST. LAWRENCE
DESIGN CAPACITY: 4,608 m³/d

MONTH	RAW			RAW				SEPTAGE	GROUNDWATER	SLUDGE
	Total Flow m ³	Avg Day Flow m ³	Max Day Flow m ³ /d	Raw BOD (mg/L)	Raw TSS (mg/L)	Raw PHOS. (mg/L)	Raw TKN (mg/L)	Volume Received m ³	Volume Pumped to Storm Sewer m ³	Liquid Sludge Hauled m ³
JAN	86,924	2,804	6,007	104	148	1.92	0.5	0	2052	0
FEB	70,482	2,517	6,361	87	90	3.18	26.8	0	2228	0
MAR	85,661	2,763	5,262	36	28	0.65	7.6	0	2574	0
APR	130,289	4,343	12,758	32	67	0.65	3.6	0	3605	0
MAY	118,550	3,824	9,554	44	68	0.80	4.7	0	2993	0
JUN	86,342	2,878	8,629	70	184	1.67	9.0	0	2860	0
JUL	135,097	4,358	14,186	29	56	2.05	17.7	0	3282	0
AUG	84,032	2,711	6,242	70	124	3.02	22.3	0	3048	0
SEPT	46,579	1,553	2,112	68	184	1.07	10.6	0	1784	0
OCT	67,591	2,180	14,543	38	92	1.93	17.4	0	903	1120
NOV	111,958	3,732	8,385	45	96	2.72	12.1	0	1835	0
DEC	62,847	2,027	2,997	129	268	4.42	27.2	0	925	0
TOTAL	1,086,352							0		1120
AVG		2,974		63	117	2.01	13.3		28,088	
MAX			14,543							
CRITERIA		4,608	18,500					8.0		
COMPLIANCE		YES	YES							

2017 - MORRISBURG WWTP EFFLUENT SAMPLING MONTHLY AVERAGES

MONTH	DATE	CBOD (mg/L)	TSS (mg/L)	TP (mg/L)	TAN (mg/L)	E. Coli (CFU/100ml)
January	01/05/2017	< 3	7	0.15	< 0.01	4
	01/12/2017	< 3	6	0.22	< 0.01	2
	01/19/2017	< 3	< 3	0.12	< 0.05	2
	01/26/2017	< 3	< 3	0.12	< 0.01	2
	Monthly Average	3.0	4.75	0.15	0.02	2
	Compliant?	YES	YES	YES	N/A	YES
February	02/02/2017	< 3	3	0.19	0.05	< 2
	02/09/2017	< 3	3	0.09	0.01	< 2
	02/17/2017	< 3	< 3	0.06	< 0.01	< 2
	02/23/2017	< 3	6	0.19	0.02	8
	Monthly Average	3.0	3.8	0.13	0.02	3
	Compliant?	YES	YES	YES	N/A	YES
March	03/02/2017	< 3	< 3	0.08	< 0.01	< 2
	03/09/2017	< 3	7	0.28	< 0.01	68
	03/16/2017	< 3	< 3	0.08	0.02	< 2
	03/23/2017	< 3	5	0.16	0.04	< 2
	03/30/2017	< 3	4	0.16	< 0.01	8
	Monthly Average	3.0	4.4	0.15	0.02	5
	Compliant?	YES	YES	YES	N/A	YES
April	04/06/2017	< 3	9	0.3	0.12	4
	04/11/2017	6	3	0.1	0.03	< 2
	04/20/2017	< 3	4	0.18	0.13	2
	04/27/2017	< 3	< 3	0.18	0.04	2
	Monthly Average	3.75	4.75	0.19	0.08	2
	Compliant?	YES	YES	YES	N/A	YES
May	05/04/2017	< 3	< 3	0.11	0.07	< 2
	05/11/2017	< 3	< 3	0.11	0.04	< 2
	05/18/2017	< 3	4	0.09	0.05	< 2
	05/25/2017	< 3	3	0.12	0.05	< 2
	Monthly Average	3.0	3.25	0.11	0.05	2
	Compliant?	YES	YES	YES	N/A	YES
June	06/01/2017	< 3	3	0.11	0.07	< 2
	06/08/2017	< 3	< 3	0.14	0.06	< 2
	06/15/2017	< 3	< 3	0.16	0.12	< 2
	06/22/2017	< 3	3	0.21	0.04	< 2
	06/29/2017	< 3	< 3	0.16	< 0.01	< 2
	Monthly Average	3.0	3.0	0.16	0.06	2
	Compliant?	YES	YES	YES	N/A	YES
July	07/06/2017	< 3	4	0.2	0.03	2
	07/13/2017	< 3	< 3	0.22	0.01	< 2
	07/20/2017	< 3	< 3	0.12	0.02	< 2
	07/27/2017	< 3	< 3	0.09	< 0.01	< 2
	Monthly Average	3.0	3.25	0.16	0.02	2
	Compliant?	YES	YES	YES	N/A	YES
August	08/03/2017	< 3	< 3	0.09	< 0.01	54
	08/10/2017	< 3	< 3	0.09	0.08	< 2
	08/17/2017	< 3	< 3	0.1	0.03	4
	08/24/2017	< 3	< 3	0.14	0.05	< 2
	08/31/2017	< 3	4	0.15	0.06	< 2
	Monthly Average	3.0	3.2	0.11	0.05	4
	Compliant?	YES	YES	YES	N/A	YES
September	9/7/2017	< 3	< 3	0.14	0.08	< 2
	9/14/2017	< 3	3	0.16	0.06	< 2
	9/21/2017	< 3	< 3	0.26	0.06	< 2
	9/28/2017	< 3	< 3	0.39	0.06	< 2
	Monthly Average	3.0	3.0	0.24	0.07	2
	Compliant?	YES	YES	YES	N/A	YES
October	10/05/2017	< 3	< 3	0.44	0.08	38
	10/12/2017	< 3	6	0.33	0.04	42
	10/19/2017	< 3	< 3	0.28	0.05	< 2
	10/26/2017	< 3	< 3	0.33	0.05	2
	Monthly Average	3.0	3.8	0.35	0.06	9
	Compliant?	YES	YES	YES	N/A	YES
November	11/02/2017	< 3	< 3	0.19	0.03	< 2
	11/09/2017	< 3	< 3	0.27	0.01	< 2
	11/16/2017	< 3	< 3	0.29	0.02	< 2
	11/23/2017	< 3	3	0.26	0.01	4
	11/30/2017	< 3	< 3	0.32	< 0.01	< 2
	Monthly Average	3.0	3.0	0.27	0.02	2
	Compliant?	YES	YES	YES	N/A	YES
December	12/07/2017	< 3	3	0.21	< 0.01	< 2
	12/14/2017	< 3	4	0.23	0.01	2
	12/21/2017	< 3	9	0.35	0.10	< 2
	12/27/2017	< 3	4	0.12	0.07	< 2
	Monthly Average	3.0	5.0	0.23	0.05	2
	Compliant?	YES	YES	YES	N/A	YES

2017 - MORRISBURG WWTP LOADING CALCULATIONS

MONTH	Total Effluent Flow (m ³)		BOD	TSS	TP	TAN
January	86,924	Monthly Average (mg/L)	3.0	4.75	0.15	0.02
		Loading (kg/d)	8.41	13.32	0.43	0.06
		Compliant?	YES	YES	YES	N/A
February	70,482	Monthly Average (mg/L)	3.0	3.75	0.13	0.02
		Loading (kg/d)	6.82	8.53	0.30	0.05
		Compliant?	YES	YES	YES	N/A
March	85,661	Monthly Average (mg/L)	3.0	4.4	0.15	0.02
		Loading (kg/d)	8.29	12.16	0.42	0.05
		Compliant?	YES	YES	YES	N/A
April	130,289	Monthly Average (mg/L)	3.8	4.75	0.19	0.08
		Loading (kg/d)	15.76	19.96	0.80	0.34
		Compliant?	YES	YES	YES	N/A
May	118,550	Monthly Average (mg/L)	3.0	3.25	0.11	0.05
		Loading (kg/d)	11.47	12.43	0.41	0.20
		Compliant?	YES	YES	YES	N/A
June	86,342	Monthly Average (mg/L)	3.0	3.0	0.16	0.06
		Loading (kg/d)	8.36	8.36	0.43	0.17
		Compliant?	YES	YES	YES	N/A
July	135,097	Monthly Average (mg/L)	3.0	3.3	0.16	0.02
		Loading (kg/d)	13.07	14.16	0.69	0.08
		Compliant?	YES	YES	YES	N/A
August	84,032	Monthly Average (mg/L)	3.0	3.2	0.11	0.05
		Loading (kg/d)	8.13	8.67	0.31	0.12
		Compliant?	YES	YES	YES	N/A
September	46,579	Monthly Average (mg/L)	3.0	3.0	0.24	0.07
		Loading (kg/d)	4.51	4.51	0.36	0.10
		Compliant?	YES	YES	YES	N/A
October	67,591	Monthly Average (mg/L)	3.0	3.8	0.35	0.06
		Loading (kg/d)	6.54	8.18	0.75	0.12
		Compliant?	YES	YES	YES	N/A
November	111,958	Monthly Average (mg/L)	3.0	3.0	0.27	0.02
		Loading (kg/d)	10.83	10.83	0.96	0.06
		Compliant?	YES	YES	YES	N/A
December	62,847	Monthly Average (mg/L)	3.0	5.0	0.23	0.05
		Loading (kg/d)	6.08	10.14	0.46	0.10
		Compliant?	YES	YES	YES	N/A

2017 - MORRISBURG WWTP EFFLUENT UN-IONIZED AMMONIA

Sample Date	Sample Temperature ° C	Sample Temp. Kelvin	Dissociation Constant pK _a	Effluent Sample pH on-site	Fraction of Un-ionized Ammonia	Total Ammonia (mg/L) (NH ₃ + NH ₄ as N)	Un-ionized Ammonia (mg/L)
01/05/2017	12.8	285.95	9.64	7.7	0.0114	< 0.01	0.0001
01/12/2017	12.7	285.85	9.64	7.7	0.0108	< 0.01	0.0001
01/19/2017	13.9	287.05	9.60	7.6	0.0101	0.05	0.0005
01/26/2017	13.8	286.95	9.60	7.6	0.0103	< 0.01	0.0001
02/02/2017	13.7	286.85	9.61	7.6	0.0097	0.05	0.0005
02/09/2017	12.2	285.35	9.66	7.6	0.0089	0.01	0.0001
02/17/2017	13.2	286.35	9.62	7.6	0.0100	< 0.01	0.0001
02/23/2017	11.9	285.05	9.67	7.6	0.0087	0.02	0.0002
03/02/2017	12.6	285.75	9.64	7.8	0.0126	< 0.01	0.0001
03/09/2017	11.3	284.45	9.69	7.8	0.0128	< 0.01	0.0001
03/16/2017	12.6	285.75	9.64	7.7	0.0113	0.02	0.0002
03/23/2017	11.7	284.85	9.67	7.7	0.0103	0.04	0.0004
03/30/2017	11.2	284.35	9.69	7.6	0.0077	< 0.01	0.0001
04/06/2017	10.8	283.95	9.70	7.5	0.0068	0.12	0.0008
04/11/2017	13.5	286.65	9.61	7.5	0.0070	0.03	0.0002
04/20/2017	12.4	285.55	9.65	7.4	0.0052	0.13	0.0007
04/27/2017	13.4	286.55	9.62	7.4	0.0054	0.04	0.0002
05/04/2017	14.5	287.65	9.58	7.3	0.0057	0.07	0.0004
05/11/2017	14.5	287.65	9.58	7.2	0.0044	0.04	0.0002
05/18/2017	15.2	288.35	9.56	7.1	0.0036	0.05	0.0002
05/25/2017	15.6	288.75	9.54	7.2	0.0047	0.05	0.0002
06/01/2017	15.6	288.75	9.54	7.3	0.0057	0.07	0.0004
06/08/2017	15.8	288.95	9.54	7.3	0.0055	0.06	0.0003
06/15/2017	17.2	290.35	9.49	7.3	0.0057	0.12	0.0007
06/22/2017	18.2	291.35	9.46	7.3	0.0074	0.04	0.0003
06/29/2017	17.2	290.35	9.49	7.3	0.0061	< 0.01	0.0001
07/06/2017	18.3	291.45	9.46	7.4	0.0081	0.03	0.0002
07/13/2017	18.5	291.65	9.45	7.4	0.0081	0.01	0.0001
07/20/2017	18.8	291.95	9.44	7.3	0.0073	0.02	0.0001
07/27/2017	19.1	292.25	9.43	7.5	0.0108	< 0.01	0.0001
08/03/2017	19.4	292.55	9.42	7.5	0.0113	< 0.01	0.0001
08/10/2017	20.2	293.35	9.40	7.4	0.0089	0.08	0.0007
08/17/2017	20.1	293.25	9.40	7.4	0.0104	0.03	0.0003
08/24/2017	20.0	293.15	9.40	7.4	0.0105	0.05	0.0005
08/31/2017	19.9	293.05	9.41	7.4	0.0107	0.06	0.0006
09/07/2017	20.2	293.35	9.40	7.3	0.0079	0.08	0.0006
09/14/2017	20.1	293.25	9.40	7.2	0.0064	0.06	0.0004
09/21/2017	20.3	293.45	9.39	7.4	0.0103	0.06	0.0006
09/28/2017	20.2	293.35	9.40	7.2	0.0068	0.06	0.0004
10/05/2017	20.0	293.15	9.40	7.3	0.0082	0.08	0.0007
10/12/2017	19.7	292.85	9.41	7.4	0.0106	0.04	0.0004
10/19/2017	19.4	292.55	9.42	7.5	0.0121	0.05	0.0006
10/26/2017	18.8	291.95	9.44	7.5	0.0108	0.05	0.0005
11/02/2017	18.3	291.45	9.46	7.7	0.0161	0.03	0.0005
11/09/2017	17.7	290.85	9.48	7.9	0.0231	0.01	0.0002
11/16/2017	17.5	290.65	9.48	7.8	0.0203	0.02	0.0004
11/23/2017	14.9	288.05	9.57	7.4	0.0072	0.01	0.0001
11/30/2017	15.4	288.55	9.55	7.5	0.0088	< 0.01	0.0001
12/07/2017	15.6	288.75	9.54	7.7	0.0141	< 0.01	0.0001
12/14/2017	15.0	288.15	9.56	7.9	0.0232	0.01	0.0002
12/21/2017	14.4	287.55	9.58	8.0	0.0232	0.10	0.0023
12/27/2017	12.6	285.75	9.64	8.1	0.0278	0.07	0.0019

$f = 1/(10^{(pK_a - pH)} + 1)$, where f is the decimal fraction of un-ionized ammonia (NH₃).

$pK_a = 0.09018 + 2729.92/T$, where pK_a is the dissociation constant of ammonia at a given temperature.

$T = (K = \text{degrees C} + 273.16)$, where T is the ambient water temperature in Kelvin.

2017 - MORRISBURG WWTP AEROBIC BIOSOLIDS RESULTS

SLUDGE RESULTS		05-Jan-17	02-Feb-17	02-Mar-17	06-Apr-17	04-May-17	01-Jun-17	06-Jul-17	03-Aug-17	07-Sep-17	05-Oct-17	02-Nov-17	07-Dec-17
Ammonia	mg/L	1100	1370	173	1510	1380	1480	1650	1220	888	1350	943	1170
Nitrate	mg/L	1.5	5.3	1	5.8	0.4	< 0.5	2.2	4.3	0.2	1.6	0.8	0.8
Ammonia + Nitrate	mg/L	1102	1375	174	1516	1380	1481	1652	1224	888	1352	944	1171
Total Phosphorus	mg/L	1620	1260	758	1040	1150	1170	1030	1240	1140	1320	1300	1230
Total Solids	mg/L	30600	31000	21200	28600	31800	32800	31300	31400	30600	33200	33100	30300
Aluminum	mg/L	1750	1610	971	1460	1090	1420	1640	1320	1810	1830	1750	1510
Arsenic	mg/L	< 0.10	0.10	< 0.10	0.01	0.50	0.2	0.3	0.2	0.3	0.20	0.20	0.20
Cadmium	mg/L	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.03	< 0.03	0.040	0.04	0.030	0.050	< 0.030
Chromium	mg/L	1.91	1.92	1.12	1.14	1.06	1.24	1.65	1.42	1.56	1.40	1.51	1.75
Cobalt	mg/L	0.13	0.18	0.120	0.22	0.12	0.14	0.22	0.24	0.26	0.26	0.25	0.24
Copper	mg/L	51.4	40.8	34.2	39.1	32.1	36.4	53.2	44.9	64.5	60.5	59.5	56.5
Lead	mg/L	0.60	0.60	0.40	0.70	0.60	0.70	1.00	1.00	1.30	1.20	1.20	1.10
Mercury	mg/L	0.14	0.11	0.06	0.07	0.04	0.098	0.04	0.062	0.071	0.12	0.04	0.06
Molybdenum	mg/L	0.36	0.31	0.25	0.30	0.23	0.29	0.46	0.34	0.38	0.30	0.27	0.31
Nickel	mg/L	2.28	2.90	2.26	2.75	2.19	2.25	2.82	3.92	3.83	2.66	2.28	2.15
Selenium	mg/L	0.20	0.20	< 0.10	0.01	0.10	0.1	0.2	0.2	0.3	0.20	0.20	0.20
Zinc	mg/L	13.5	11.80	9.73	12.30	10.80	12.2	18.4	17.4	25.2	21.6	22.60	20.70

APPENDIX B:
CALL-OUT SUMMARY

Morrisburg Wastewater Treatment Plant Call-Outs 2017

- 1) February 19/2017 – Marc called out for high screen alarm. He turned breaker on and off and the screen started to work. He also noticed sludge was coming out of the walls in the basement and the blower room. Turned out that water was getting into the SBR via the washwater valve to clean the mechanical seal of the pump.
- 2) February 20/2017- Marc called out for SBR XV414 aeration valve. Valve refused to open when SBR was calling for air from the blowers. He turned switch and nothing happened so he reset the breaker and valve opened.
- 3) February 20/2017- Marc called out for SBR XV424 aeration valve. Valve refused to open also and the breaker was tripped.
- 4) March 12/2017- Vince called out for CP6 loss of communication and CP6 Messaging Fault. The Panel for CP6 had no power and the UPS was out of batteries. He replaced UPS battery and placed panel back on battery backup.
- 5) April 7/2017- Vince received call for waste plant alarm and SBR fail alarm. Checked pumping station trending. Three pumps were working on greyline. SBR 410 and 420 working in type 3 with SBR 410 in fill decant. Greyline system faulted shortly afterwards. Put plant in float control. Pumping station keeping up with flow with 1 pump. He disabled LIT200 alarm until greyline is fixed.
- 6) April 7/2017- Andrew receives call for power loss. Reset all alarms. Vince arrived on site to check on plant with high flows. SBRs still in type 3 and handling the flows. Vince checked on plant once more and the plant was still in the same situation. Halted flow to SBR 420 and allowed it to decant completely. Put SBR 420 back to auto and it went back to static fill.
- 7) May 1/2017- Andrew called in for pumping station high level alarm. Three pumps are running and pumps are having a hard time keeping up with flows. Flows slowed down and pumps are catching up.
- 8) May 17/2017- Vince received callout for atad 2 foam level trip. He originally tried to turn on jet pumps to cut down the foam but when he opened up the hatches he saw that the jet pump was not working and there was no foam. False high level readings. He left both atads with jet pumps off and raised the callout level so he shouldn't get called out again. Will have to investigate.

- 9) June 17/2017- John called in for atad 1 foam level trip. Atad 1 false trip so he changed the callout level to a high level that cannot be reached.
- 10) June 29/2017- Vince received callout for SBR failure. System called out for SBR High High Level. A bypass event occurred which lasted from 7:29pm to 7:50pm. The flow during the bypass was 10.08m³. Then a second bypass event occurred from 8:54pm to 8:59pm. The total for that bypass was 0.6m³. The total flow for the two bypasses was 10.68m³ for an average of 6.85L/s. The duration was 26mins total. Samples of bypass were taken (7.31pH, temp 16.4^oc). Notified MOE SAC of bypass duration and volume (Bypass # 901236). Notified medical officer of health of bypass. Notified Caneau of bypass as the operate the water plant in Ingleside.
- 11) July 7/2017- Marc was called out zone 5 for High High Float alarm in SBR. Alarm restored before arrival.
- 12) July 23/2017- Andrew called in for SBR 420 Low Low Level alarm. Both SBRs are running pretty low but there is no indication stating problems.
- 13) July 24/2017- Andrew called in for SBR 420 High High level alarm. Raining heavily. Alarm restored upon arrival. Andrew back on site for high level alarm in pumping station. Alarm restored upon arrival. Pumping station went back in high level for a while.
- 14) July 25/2017- Andrew called in for LT420 SBR alarm. Both SBRs seem to be functioning normally.
- 15) July 29/2017- Vince called out for zone 1 alarm which is the security alarm. Motion sensor in maintenance room was activated.
- 16) July 29/2017- Vince called out for CP4 SBR XV424 aeration valve. Breaker was tripped in CP4 panel so he cycled the power and the valve started working. But then XV414 aeration valve tripped and he tried cycling the power but that did not work. Cycled main breaker on CP4 and everything started functioning normally.
- 17) August 12/2017- John called in for high high level in pumping station. High flows coming into plant. Three pumps running and now they are keeping up.
- 18) September 14/2017- Andrew called in for pumping station high level alarm. Greyline unit had malfunction. Alarm restored before arrival.

- 19) September 17/2017- Andrew called in for another pumping station greyline malfunction. Put pumping station in float mode.
- 20) September 27/2017- John called in for pumping station low level alarm. Alarm restored before arrival.
- 21) October 27/2017- Marc called out for pumping station high level alarm. Greyline was malfunctioning again. Put it in float mode.
- 22) October 30/2017- Marc called out for high level alarm in pumping station. He put the pumping station back in greyline mode and two pumps came on which brought the level down. Marc later called in again for high level in the pumping station. Flows are high so he put on 4 pumps to get the level down. Denis later came in for more high flows he put the plant on 4 pumps until normal operating hours.
- 23) December 17/2017- Vince called out for high level in pumping station. All pumps were off and hi hi floats were activated. The greyline was malfunctioning again. The hi float was not tripped which turns on the pump in float mode. Cycled main power in pumping station and two pumps came back while two did not. It was decided to get an electrician in during normal operating hours to take a look at the pumps. The greyline came back when the main power was cycled in the pumping station. This allowed the pumping station to be operated in float mode.

APPENDIX C:

MAJOR MAINTENANCE PROJECT SUMMARY

Morrisburg WWTP Major Maintenance Projects Summary 2017

January 18 - Worked on UV. Changed 6 bulbs and one ballast.

January 24 - Installed 4 new plugins for UV lights.

February 6 - Installed 8 UV bulbs.

February 8 - Morrisburg Plumbing installed new duct work into Biofilter as it was rotting.

February 15 - Replaced 9 UV bulbs.

March 13 - Chad from ISI in to install alarms for atad liquid + foam levels so that they call out. Tested all alarms seems they all work.

March 22 - Scott MacFarlane from MPS on site to certify backflow preventers in HVAC room. All three devices passed testing.

March 24 - Engineer in to look at roof from communication tower falling on roof and damaging it.

April 10 - ISI in to program groundwater pump daily run times on daily reports.

April 27 - Communication issues with pumping station atad, and SBR. Brad Lavallee in to look at communication issues. Someone had changed both computers IP addresses.

May 9 - Sebastian in from the counties (SD&G) to look into ongoing internet problems. Found out that another modem is needed to gain access to the internet. Internet is back online. Brad Lavallee from capital controls logged into computers to make sure no other issues are still present from the internet and communication losses.

May 10 - Chad from ISI in to program the high float in the pumping station to turn on three pumps when activated instead of one in float mode. Tested high float by shutting off all pumps. Float operated perfectly. Chad is also looking into a new radar device for our pumping station. Changed three lamp cable assemblies and 4 bulbs on UV system.

May 29 - Changed intake and drain line on chlorine analyser.

July 13 - Dave Pheiffer in from Atel Air to help distinguish which lamp cable assemblies on both bank A+B on the UV system have sustained water damage.

July 14 - Changed 5 UV lamp cable assemblies.

July 18 - Tim in from capital controls in to perform annual calibrations on Cl₂ analyser and influent flow sensors.

July 20 - Replaced Spirovent VJR in boiler room which was ordered from Crane.

July 27 - Had Brad Lavallee from capital controls log into computers and change the SBR type 2+3 flow activation numbers. The SBR now changes to type 3 when instantaneous flow reaches 10,000m³. It will change back to type 2 if the instantaneous flow dips below 7,000m³.

August 4 - Chubb Edwards in to look at motion sensor in the maintenance area room. Turns out that a very small spider crawled into the device and whenever it moves in front of the sensor when the alarm is active than it will trip. Removed the spider.

August 8 - Had Dave Pheiffer come back to help me check the lamp cable assemblies on the UV systems to see which ones sustained water damage.

August 16 - Capital Steam on site to clean pumping station of grease.

September 7 - Chris in from OCWA to install cabinet for the new server.

September 8 - Chris in from OCWA to program new server. Tremblay Fire and Dave Pheiffer in to install new bell for fire alarm.

September 12 - SBR WAS pump 422 is faulting. Tried restarting the pump but it continues to fault. Having Dave Pheiffer come in to check pump electronically. After a great deal of troubleshooting, it was discovered that both pumps are operating identically except that pump 422 is having a power overage. Swapped overage trip switches and turned back pumps to auto. Will see if 412 trips than we know it's a switch problem. If 422 trips, we know it's a pump problem.

September 18 - Capital Steam on sight to clean wetwell as grease is building up.

October 11 - Third High Farms in to start hauling long term sludge away

October 12 - Third High Farms in to finish hauling long term sludge away

November 9 - Had Brad and Jean-Louis in from capital controls to program start float for float mode to automatically switch from greyline to float mode without having to do it manually on Scada. They will have to come back to program the delays.

November 13 - Jean-Louis from capital control on site to program and test float system for pumping station. System is operational.

November 14 - Rob Mantle in to do inspection on gas sensors.

November 29 - Dave Markell from OCWA in to train Marc and myself on how to use WISKI the new data entry system.

December 6 - Dave Markell from OCWA in to train Andrew on WISKI.

December 7 - Dave Markell from OCWA in to work on WISKI.

December 15 - Installed 3 ballasts in Bank 1B.

December 18 - Dave Pheiffer from Atel Air in to fix drive 203 in pumping station. Fuse was blown. Brad from capital controls on site to confirm float system works for pumping station. Checked and cleaned and they work.

December 19 - ISI in doing updates to Scada and communication network.

December 20 - ISI in to finish communication upgrades. Dave Pheiffer in to look at broken disconnect on pumping station 2 pump.

December 21 - Dave Pheiffer in to fix pumping station 2 pump disconnect.

APPENDIX D:

INSTRUMENT CALIBRATIONS & VERIFICATIONS

Instrument Calibrations & Verifications

3 Morrisburg W.P.C.P

Site Reports July, 2017

3.1 FIT-370. East Influent Channel Flow:

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT						
						DATE: July 20 / 2017
DESCRIPTION : Raw Sewage Influent.		MODEL: OCF 4.0-A1A1M2C		TAG: FIT-370		
MANUFACTURER : Greyline		Serial # 38588				
Client Name: Township of South Stormont.				Device Output Signal : 4.00 - 20.00 mA		
INSTALLATION INSPECTION						
	DESCRIPTION	FINDINGS				COMMENTS
		OK	FIXED	N/A	FAULTY	
GENERAL						<i>Calibration by means of Simulating Channel Level</i>
1	TAGGING			X		Grey Line OCF 4.0 Configuration
2						Flume Type = Parshall Size = 12"
MECHANICAL						Range = 547 LOE= 60 Sec.
3	MOUNTING: check for proper fastening, etc.	X				Mode = Flow Damping = 10%
4	ORIENTATION: check for proper angle, etc.)	X				Max. Range = 1.085 m Min. Range = 0.298 m
5	POSITION: relative position to other components (ie. for proper flow, blanking distance), etc.	X				Units = m Volume = m3 Time =Day Echo = 69% to 86%
6						Range = 42,043 m3/day
ELECTRICAL						Relay 1 = Off Relay 2 = Off Relay 2 = Off
7		X				
8	WIRE TAGGING: (exists and proper wire type)	X				Actual process = 754 m³/d @ 4.35 mA
9	QUALITY OF CONNECTIONS:	X				Head _(Max) = Max. Range - Min. Range
10	GROUNDING:	X				Head _(Max) = (1.085m - 0.298m) =.787m
11	SHIELDING: (check if grounded only at PLC end of wire)	X				Q _(Max) = 42,043 m3/day
12	CERTIFICATION CSA, ULC:	X				
13						
SET-UP/CALIBRATION						
DIGITAL		ADJUSTMENT USING		VERIFIED USING		SETPOINT / RANGE
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE		Level Target		
		ELECTRONIC TYPE		Fluke 725 calibrator S/N 8759025 Cal. Report# July 18, 2017		0 – 42043m ³ /d
Configuration Parameters:		Calibration Data Test Tolerance: 15.00%				
		<i>Input Variable</i>	<i>Transmitter Var.</i>	<i>Cal. Value</i>	<i>% Error</i>	<i>Notes</i>
	Process Simulated	27.9 cm	9,673 m ³ /d	8,425.9 m ³ /d	2.97%	(Calibration Jig set to 11")
	Process Displayed	9673 m ³ /d	7.84 mA	7.68 mA	1.00%	Passed
NOTES:***Current calculated based on <i>Display Variable</i> 7.68 mA = ((9673/42043)*16)+4				Checked By: <i>Tim Stewart</i>		
Error (% Full Scale) = ((Measured Output - Calculated Variable) / Full Scale) * 100 = ((7.84 mA – 7.68 mA) / 16 mA) * 100 = 1.0 % of full scale				Cell: 613 325 9213 Email: tim.stewart@capitalcontrols.ca		

3.2 FIT-380. West Influent Channel Flow:

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT						
DESCRIPTION : Raw Sewage Influent.					MODEL: OCF 4.0-A1A1M2B	
MANUFACTURER : Greyline					TAG: FIT-380	
Client Name: Township of South Stormont.					Serial # 38587	
					Device Output Signal : 4.00 - 20.00 mA	
INSTALLATION INSPECTION						
	DESCRIPTION	FINDINGS				COMMENTS
		OK	FIXED	N/A	FAULTY	
GENERAL						
						Calibration by means of Simulating Channel Level
1	TAGGING			X		Grey Line OCF 4.0 Configuration
2						Flume Type = Parshall Size = 12"
MECHANICAL						
3	MOUNTING: check for proper fastening, etc.	X				Range = LOE= 60 Sec. Mode = Flow Damping = 10%
4	ORIENTATION: check for proper angle, etc.)	X				Max. Range = 1.10 m Min. Range = 0.292 m
5	POSITION: relative position to other components (ie. for proper flow, blanking distance), etc.	X				Units = m Volume = m3 Time =Day Echo = 58% to 86%
6						Range = 43794 m3/day
ELECTRICAL						
7		X				Relay 1 = Off Relay 2 = Off Relay 2 = Off
8	WIRE TAGGING: (exists and proper wire type)	X				Actual process = 614.6 m ³ /d @ 4.35 mA
9	QUALITY OF CONNECTIONS:	X				Head _(Max) = Max. Range - Min. Range
10	GROUNDING:	X				Head _(Max) = (1.10m - 0.292m) = 0.808 m
11	SHIELDING: (check if grounded only at PLC end of wire)	X				Q _(Max) = 43,794 m3/day
12	CERTIFICATION CSA, ULC:	X				
SET-UP/CALIBRATION						
DIGITAL		ADJUSTMENT USING		VERIFIED USING		SETPOINT / RANGE
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE		Level Target		
		ELECTRONIC TYPE		Fluke 725 calibrator S/N 8759025 Cal. Report# July 18, 2017		0 – 43794 m ³ /d
Configuration Parameters:			Calibration Data Test Tolerance: 15.00%			
		<i>Input Variable</i>	<i>Transmitter Var.</i>	<i>Cal. Value</i>	<i>% Error</i>	<i>Notes</i>
	Process Simulated	16.51 cm	4322 m ³ /d	3732.7 m ³ /d	1.34%	(Calibration Jig set to 6.5")
	Process Displayed	4322 m ³ /d	5.77 mA	5.58 mA	1.18%	Passed
NOTES:***Current calculated based on Display Variable 5.58 mA = ((4322/43794)*16)+4 Error (% Full Scale) = ((Measured Output - Calculated Variable) / Full Scale) * 100 = ((5.77mA – 5.58 mA) / 16 mA) * 100 = 1.18 % of full scale						
				Checked By: <i>Tim Stewart</i> Cell: 613 325 9213 Email: tim.stewart@capitalcontrols.ca		