

Morrisburg Wastewater Treatment System

Sewage Works #120000168

Annual Report

Prepared for: Municipality of South Dundas

Reporting Period of January 1st – December 31st 2021

Issued: March 11, 2022

Revision: 0

This report has been prepared to meet the requirements set out in Certificate of Approval #2147-734L2K

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Operations and Compliance Reliability Indices

Compliance Event	# of Events
Ministry of Environment Inspections	0
Ministry of Labour Inspections	0
Non-Compliance	0
Spills/Overflows/Bypasses	0
Sewer Main Blockages	1

System Process Description

Morrisburg's sewage collection system is a gravity fed sanitary sewage collection system. There is one pumping station which pumps wastewater from the collection system to the wastewater treatment facility.

Morrisburg's wastewater treatment plant (WWTP) is a Class II wastewater treatment system owned and operated by the Municipality of South Dundas. Raw sewage is pumped to the WWTP from 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 Sequencing Batch Reactors (SBRs) 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.

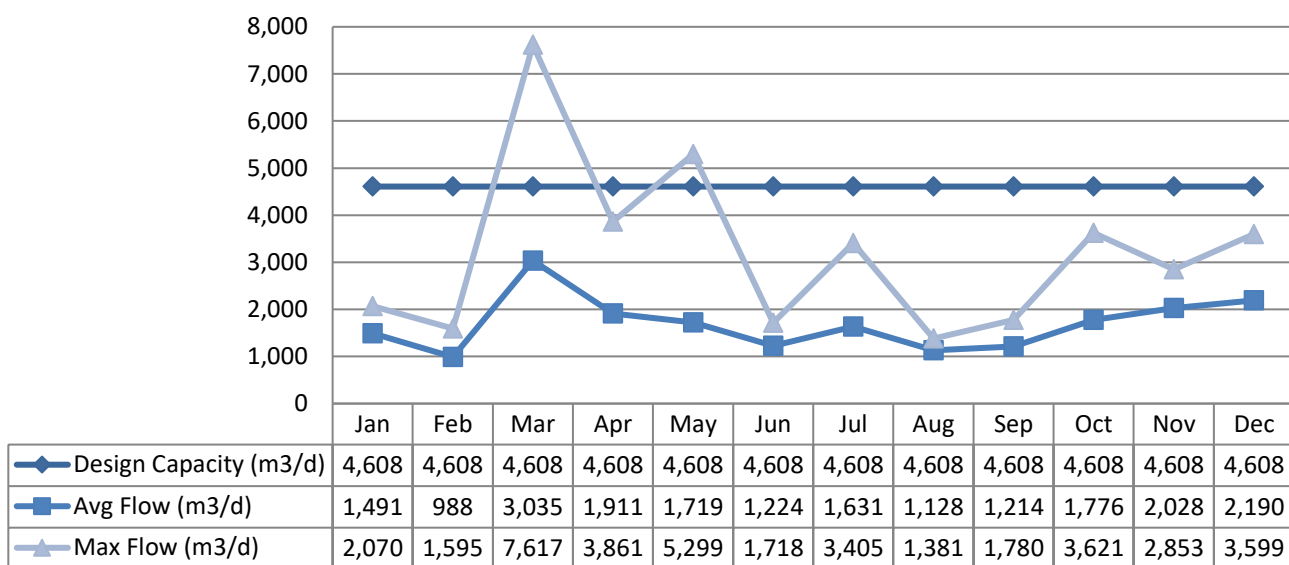
Sludge removed from the SBRs is transferred to a 140 m³ storage tank. From the tank, the sludge enters a gravity belt thickener. The thickened sludge is then pumped to an Autothermal Thermophilic Aerobic Digestion (ATAD) system for stabilization. The digested sludge is subsequently pumped to a 1480 m³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

Wastewater System Flows

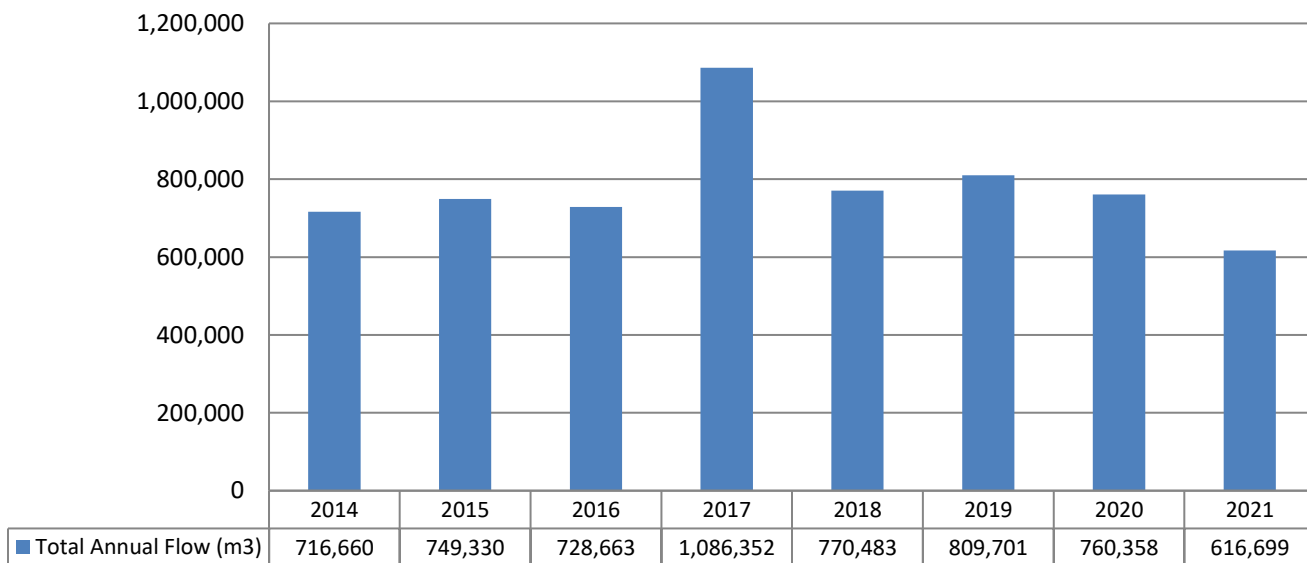
The hydraulic flows reaching the treatment facility in 2021 averaged 1,695 m³/day which represents 37% of the 4,608 m³/day design.

Raw Flows

2021 Raw Flows:



Annual Raw Flow Comparison:



Effluent Flow

A total of 616,699 m³ of effluent was discharged from Morrisburg's WWTP in 2021.

Effluent Quality Assurance or Control Measures

Effluent control measures include in-house sampling and testing for operational parameters. In-house testing provides real time results which are then used to enhance process and operational performance. Samples are collected by the Municipality of South Dundas' competent and licensed staff using approved methods and protocols for sampling including those specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

Effluent samples collected during the reporting period were submitted to Caduceon laboratory in Ottawa for analysis, with the exception of pH, temperature and unionized ammonia. Caduceon is accredited by the Canadian Association for Laboratory Accreditation (CALA). Accredited labs must meet strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, the Municipality of South Dundas is ensuring appropriate control measures are undertaken during sample analysis.

The pH and temperature parameters were analyzed in the field at the time of sample collection by certified operators to ensure accuracy and precision of the results obtained. Un-ionized ammonia was calculated using the total ammonia nitrogen concentration, pH and temperature as required by the facility's Certificate of Approval.

Effluent Quality

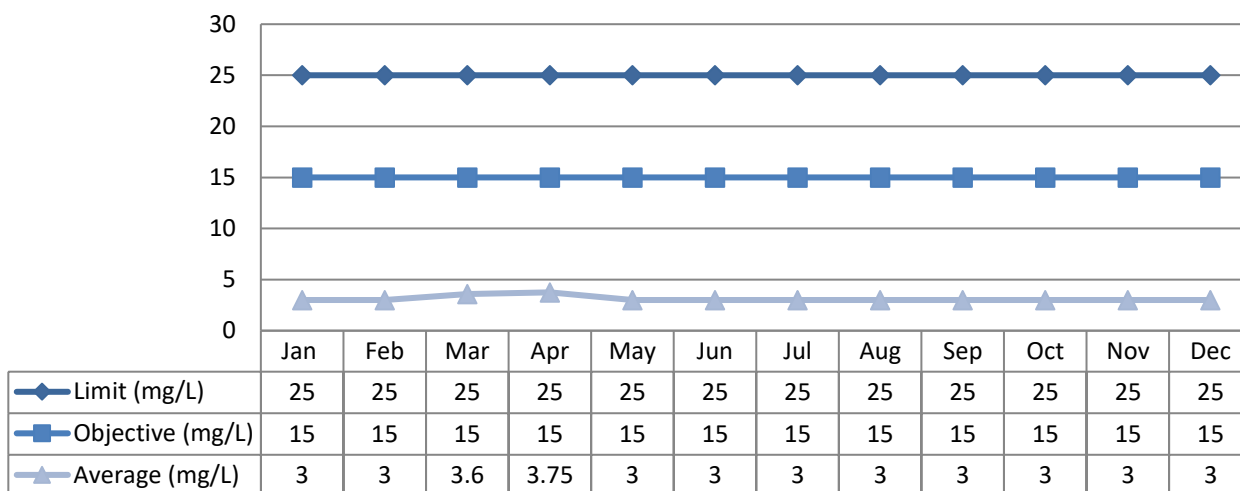
The monthly average concentrations of carbonaceous biochemical oxygen demand (CBOD₅), total suspended solids (TSS), and total phosphorus (TP) remained below the effluent objectives and limits outlined in the facility's Certificate of Approval during 2021. The total ammonia nitrogen (TAN) remained below the effluent objective for 2021. The geometric mean density of E. coli in the effluent also remained below the limit and objective in 2021. In addition, effluent pH remained within the limits and objectives throughout the year.

Effluent results from the wastewater treatment facility for 2021 are tabulated below. Additional data can be found in the Performance Assessment Reports attached in Appendix A.

Carbonaceous Biochemical Oxygen Demand (5-Day)

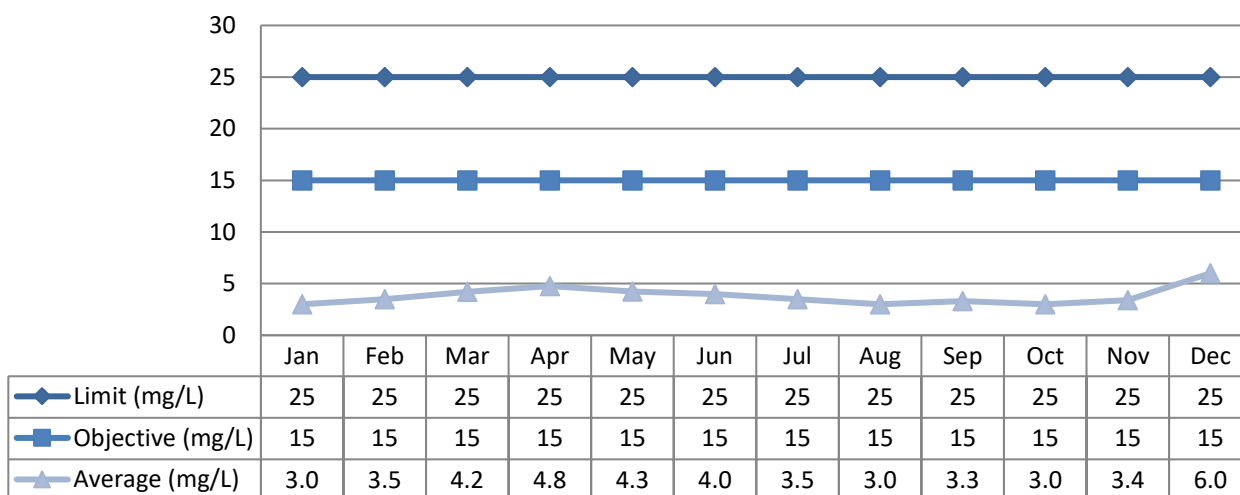
Monthly Average	C of A Limit	C of A Objective	Exceedance
Concentration (mg/L)	25	15	No

CBOD₅ Effluent Monthly Average Concentration:

**Total Suspended Solids**

Monthly Average	C of A Limit	C of A Objective	Exceedance
Concentration (mg/L)	25	15	No

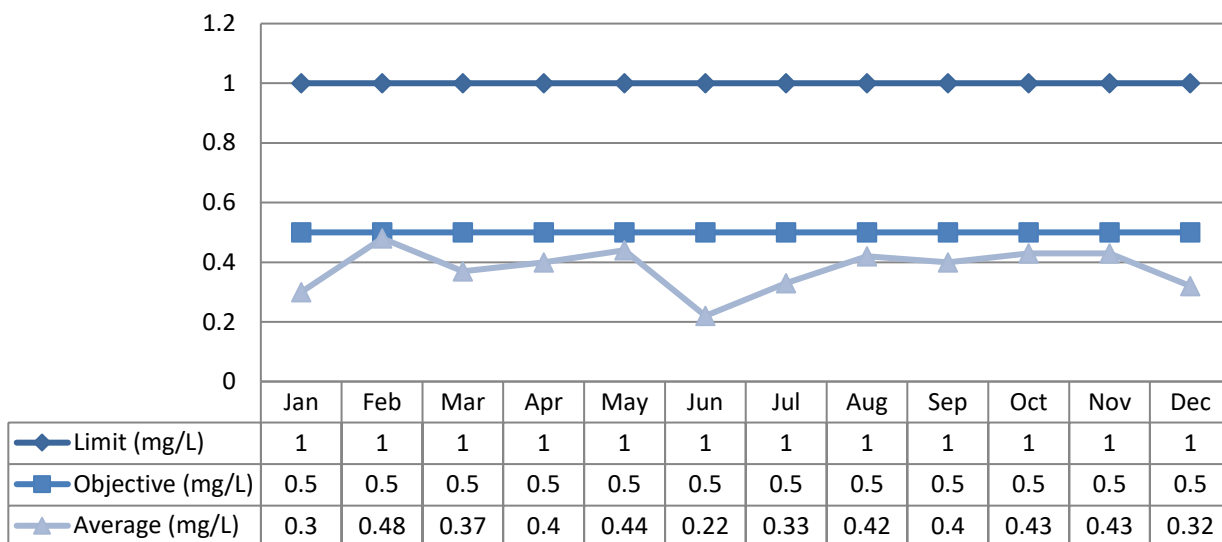
TSS Effluent Monthly Average Concentrations:



Total Phosphorus

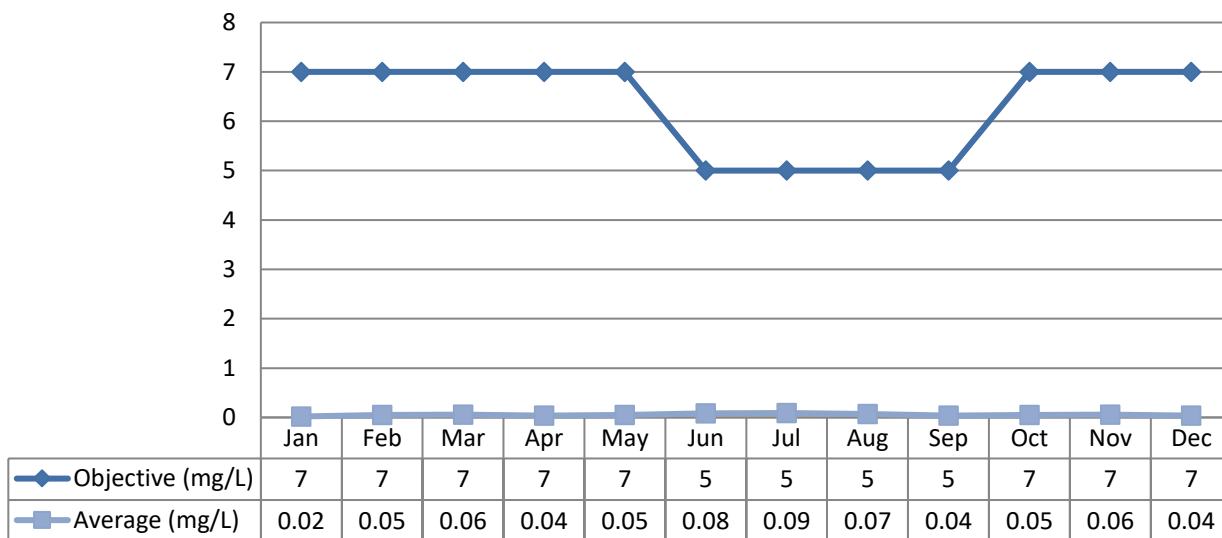
Monthly Average	C of A Limit	C of A Objective	Exceedance
Concentration (mg/L)	1.0	0.5	No

TP Effluent Monthly Average Concentrations:

**Total Ammonia Nitrogen**

Discharge Period	C of A Limit	C of A Objective	Exceedance
June 1 – Sept 30	n/a	5.0	No
Oct 1 – May 31	n/a	7.0	No

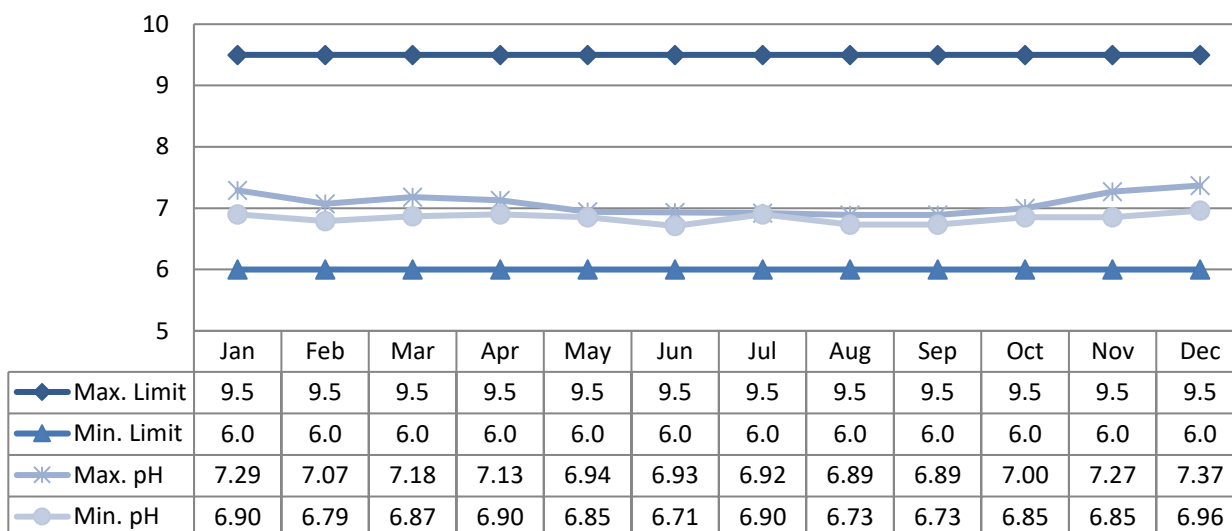
TAN Effluent Monthly Average Concentrations:



pH

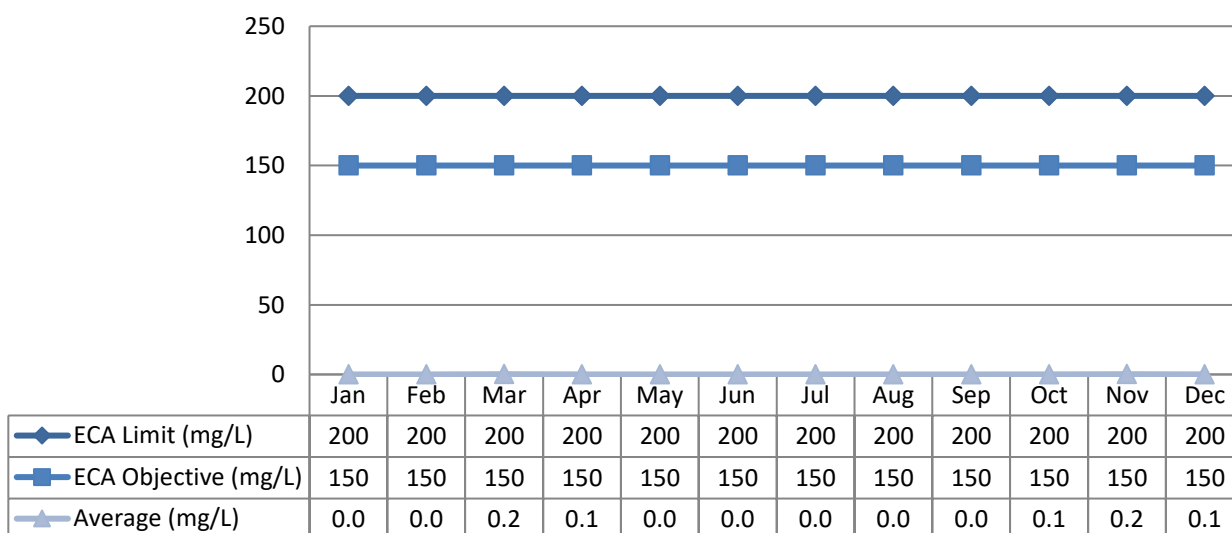
Reporting Period	C of A Limit	C of A Objective	Exceedance
All results	6.0 – 9.5	6.0 – 9.5	No

Monthly Minimum and Maximum Effluent pH Results:

**E. Coli**

Monthly Average	C of A Limit	C of A Objective	Exceedance
Geometric Mean Density	200	150	No

E. Coli Monthly Geometric Mean Density (cfu/100 mL):



Acute Lethality

Four samples were collected in 2021 and tested for acute lethality to Rainbow Trout and Daphnia Magna. Results are displayed as % mortality. An adverse result is indicated by a > 50% mortality rate.

Date	Rainbow Trout	Daphnia Magna
01/12/21	0%	0%
04/13/21	0%	0%
07/05/21	0%	0%
10/05/21	0%	0%

Operating Issues

The maximum recorded flows during the months of March and May exceeded the average day design for the Morrisburg WWTP. Based on a historical review of flows, it appears this system is impacted by inflow and infiltration.

Maintenance

Flow Meter Calibration and Maintenance

Copies of the flow meter calibration certificates for 2021 are attached in Appendix B.

Maintenance Summary

Description
<ul style="list-style-type: none"> - New Blower - Uv light and Ballast - Yearly Generator Maintenance - Hydro vac pumping station - GBT (2) display screens replaced - Lifting devices inspected - SCADA upgrades - Power Flex 40 replaced on GBT - HVAC Unit filters replaced - Sludge Hauling

Notice of Modifications

Date	Process	Modification	Status
None to report.			

Sludge Generation

In 2021, a total of 800 m³ of liquid sludge was utilized as soil conditioner. The sludge was removed from the WWTP by Terrapure in October (NASM Plan #23298). It is anticipated that approximately the same volume of sludge will be generated in 2022.

Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
Morrisburg Plaza	December 22, 2021	Grease blockage	Flushed main from MH 103 – MH 104

Summary of Abnormal Discharge Events

Bypass/Overflow/Spills

No bypasses, overflows, or spills occurred during the reporting period.

Appendix A

Performance Assessment Reports

MORRISBURG WWTP PERFORMANCE ASSESSMENT REPORT

MUNICIPALITY: SOUTH DUNDAS
PROJECT: MORRISBURG WWTP
WORKS NUM.: 120000168
DESCRIPTION: TWO SEQUENTIAL BATCH REACTORS AND AEROBIC SLUDGE DIGESTION

YEAR: 2021
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	48,231	1,491	2,070	31	45	1.79	15.1	0	2046	0
FEB	27,675	988	1,595	50	50	2.55	23.1	0	1870	0
MAR	94,100	3,035	7,617	32	44	0.16	14.9	0	3546	0
APR	57,324	1,911	3,861	76	120	2.70	21.9	0	2478	0
MAY	53,298	1,719	5,299	36	50	1.91	16.1	0	2467	0
JUN	36,712	1,224	1,718	114	172	4.98	39.6	0	1810	0
JUL	50,568	1,631	3,405	190	232	0.41	30.6	0	2387	0
AUG	34,968	1,128	1,381	81	96	4.17	35.9	0	1686	0
SEPT	36,417	1,214	1,780	39	60	2.22	15.7	0	2051	0
OCT	55,057	1,776	3,621	67	88	2.91	24.8	0	2799	800
NOV	60,841	2,028	2,853	11	37	1.78	15	0	2940	0
DEC	63,510	2,190	3,599	36	40	2.03	15.4	0	2864	0
TOTAL	616,699							0		800
AVG		1,695		63	85	2.30	22.4		28,944	
MAX			7,617							
CRITERIA		4,608	18,500					8.0		
COMPLIANCE		YES	YES							

*to storage

Morrisburg Wastewater Treatment System – 2021 Annual Report

2021- 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	01/05/2021	< 3	< 3	0.22	0.01	2
	01/12/2021	< 3	< 3	0.26	0.02	1
	01/19/2021	< 3	< 3	0.29	0.03	0
	01/26/2021	< 3	< 3	0.43	0.02	0
	Monthly Average	3.0	3	0.30	0.02	0.0
February	02/02/2021	< 3	< 3	0.45	0.04	0
	02/09/2021	< 3	< 3	0.53	0.07	0
	02/16/2021	< 3	< 3	0.40	0.04	0
	02/23/2021	< 3	5	0.54	0.05	0
	Monthly Average	3.0	3.5	0.48	0.05	0.0
March	03/02/2021	< 6	< 3	0.48	0.05	2
	03/09/2021	< 3	7	0.49	0.06	0
	03/16/2021	< 3	< 3	0.24	0.06	6
	03/23/2021	< 3	< 3	0.46	0.09	10
	03/30/2021	< 3	5	0.30	0.04	5
April	04/06/2021	< 6	< 3	0.30	0.04	4
	04/13/2021	< 3	< 3	0.37	0.02	0
	04/20/2021	< 3	6	0.45	0.05	11
	04/27/2021	< 3	3	0.48	0.04	6
	Monthly Average	3.75	4.75	0.40	0.04	0.1
May	05/04/2021	< 3	7	0.37	0.05	3
	05/11/2021	< 3	< 3	0.51	0.06	0
	05/18/2021	< 3	4	0.49	0.05	10
	05/26/2021	< 3	< 3	0.38	0.03	0
	Monthly Average	3.0	4.25	0.44	0.05	0.0
June	06/01/2021	< 3	< 3	0.21	0.10	0
	06/08/2021	< 3	8	0.22	0.05	4
	06/15/2021	< 3	< 3	0.25	0.05	10
	06/22/2021	< 3	< 3	0.2	0.16	0
	06/29/2021	< 3	< 3	0.22	0.03	13
July	07/06/2021	< 3	4	0.35	0.08	2
	07/13/2021	< 3	< 3	0.2	0.15	0
	07/20/2021	< 3	< 3	0.33	0.04	0.0001
	07/27/2021	< 3	4	0.45	0.07	1
	Monthly Average	3.0	3.5	0.33	0.09	0.0
August	08/03/2021	< 3	< 3	0.41	0.1	2
	08/10/2021	< 3	< 3	0.39	0.04	0
	08/17/2021	< 3	< 3	0.38	0.06	1
	08/24/2021	< 3	< 3	0.43	0.04	2
	08/31/2021	< 3	< 3	0.48	0.1	0
September	09/07/2021	< 3	4	0.36	0.08	0
	09/14/2021	< 3	< 3	0.41	0.02	0
	09/21/2021	< 3	< 3	0.32	0.03	6
	09/28/2021	< 3	< 3	0.5	0.04	1
	Monthly Average	3.0	3.3	0.40	0.04	0.0
October	10/05/2021	< 3	< 3	0.47	0.05	2
	10/12/2021	< 3	< 3	0.56	0.06	1
	10/19/2021	< 3	< 3	0.21	0.07	0
	10/27/2021	< 3	< 3	0.46	0.03	1
	Monthly Average	3.0	3.0	0.43	0.05	0.1
November	11/02/2021	< 3	< 3	0.65	0.09	15
	11/09/2021	< 3	< 3	0.69	0.1	1
	11/16/2021	< 3	< 3	0.28	0.03	0
	11/23/2021	< 3	4	0.29	0.05	1
	11/30/2021	< 3	4	0.36	0.05	2
December	12/07/2021	< 3	15	0.70	0.07	44
	12/14/2021	< 3	< 3	0.22	0.03	0
	12/21/2021	< 3	< 3	0.26	0.06	1.0
	12/29/2021	< 3	< 3	0.10	0.01	1
	Monthly Average	3.0	6.0	0.32	0.04	0.1
	Compliant?	YES	YES	YES	N/A	YES

2021 - MORRISBURG WWTP LOADING CALCULATIONS

MONTH	Total Effluent Flow (m ³)		BOD	TSS	TP	TAN
January	46,231	Monthly Average (mg/L)	3.0	3	0.30	0.02
		Loading (kg/d)	4.47	4.47	0.45	0.03
		Compliant?	YES	YES	YES	N/A
February	27,675	Monthly Average (mg/L)	3.0	3.5	0.48	0.05
		Loading (kg/d)	2.68	3.12	0.43	0.04
		Compliant?	YES	YES	YES	N/A
March	94,100	Monthly Average (mg/L)	3.6	4.2	0.37	0.06
		Loading (kg/d)	10.93	12.75	1.14	0.18
		Compliant?	YES	YES	YES	N/A
April	57,324	Monthly Average (mg/L)	3.8	4.75	0.40	0.04
		Loading (kg/d)	6.93	8.78	0.74	0.07
		Compliant?	YES	YES	YES	N/A
May	53,298	Monthly Average (mg/L)	3.0	4.25	0.44	0.05
		Loading (kg/d)	5.16	7.31	0.75	0.08
		Compliant?	YES	YES	YES	N/A
June	36,712	Monthly Average (mg/L)	3.0	4.0	0.22	0.08
		Loading (kg/d)	3.55	4.74	0.26	0.09
		Compliant?	YES	YES	YES	N/A
July	50,568	Monthly Average (mg/L)	3.0	3.5	0.33	0.09
		Loading (kg/d)	4.89	5.71	0.54	0.14
		Compliant?	YES	YES	YES	N/A
August	34,968	Monthly Average (mg/L)	3.0	3.0	0.42	0.07
		Loading (kg/d)	3.38	3.38	0.47	0.08
		Compliant?	YES	YES	YES	N/A
September	36,417	Monthly Average (mg/L)	3.0	3.3	0.40	0.04
		Loading (kg/d)	3.52	3.82	0.47	0.05
		Compliant?	YES	YES	YES	N/A
October	55,057	Monthly Average (mg/L)	3.0	3.0	0.43	0.05
		Loading (kg/d)	5.33	5.33	0.75	0.09
		Compliant?	YES	YES	YES	N/A
November	60,841	Monthly Average (mg/L)	3.0	3.4	0.43	0.06
		Loading (kg/d)	5.89	6.67	0.85	0.13
		Compliant?	YES	YES	YES	N/A
December	63,510	Monthly Average (mg/L)	3.0	6.0	0.32	0.04
		Loading (kg/d)	6.15	12.29	0.66	0.09
		Compliant?	YES	YES	YES	N/A

2021 - 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)
01/05/2021	13.2	286.35	9.62	7.29	0.0046	7.3	0.0337
01/12/2021	12.4	285.55	9.65	6.90	0.0018	6.9	0.0122
01/19/2021	12.1	285.25	9.66	7.04	0.0024	7.0	0.0168
01/26/2021	13.3	286.45	9.62	7.16	0.0035	7.2	0.0247
02/02/2021	12.4	285.55	9.65	7.07	0.0026	7.1	0.0185
02/09/2021	12.2	285.35	9.66	6.79	0.0014	6.8	0.0092
02/16/2021	11.9	285.05	9.67	6.94	0.0019	6.9	0.0130
02/23/2021	10.6	283.75	9.71	6.96	0.0018	7.0	0.0123
03/02/2021	10.4	283.55	9.72	7.18	0.0029	7.2	0.0208
03/09/2021	10.3	283.45	9.72	7.12	0.0025	7.1	0.0178
03/16/2021	10.5	283.65	9.71	6.94	0.0017	6.9	0.0116
03/23/2021	12.5	285.65	9.65	6.87	0.0017	6.9	0.0115
03/30/2021	11.1	284.25	9.69	6.95	0.0018	7.0	0.0125
04/06/2021	11.9	285.05	9.67	7.13	0.0029	0.0	0.0001
04/13/2021	13.0	286.15	9.63	6.90	0.0019	0.0	0.0000
04/20/2021	10.8	283.95	9.70	7.07	0.0023	0.1	0.0001
04/27/2021	10.8	283.95	9.70	7.08	0.0024	0.0	0.0001
05/04/2021	13.9	287.05	9.60	6.85	0.0018	0.1	0.0001
05/11/2021	13.5	286.65	9.61	6.94	0.0021	0.1	0.0001
05/18/2021	14.2	287.35	9.59	6.93	0.0022	0.1	0.0001
05/26/2021	14.9	288.05	9.57	6.88	0.0020	0.0	0.0001
06/01/2021	15.5	288.65	9.55	6.87	0.0021	0.1	0.0002
06/08/2021	16.6	289.75	9.51	6.77	0.0018	0.1	0.0001
06/15/2021	16.2	289.35	9.52	6.92	0.0025	0.1	0.0001
06/22/2021	17.3	290.45	9.49	6.93	0.0028	0.2	0.0004
06/29/2021	18.0	291.15	9.47	6.71	0.0017	0.0	0.0001
07/06/2021	15.6	288.75	9.54	6.91	0.0023	0.1	0.0002
07/13/2021	18.5	291.65	9.45	6.90	0.0028	0.2	0.0004
07/20/2021	18.7	291.85	9.44	6.90	0.0028	0.0	0.0001
07/27/2021	19.0	292.15	9.43	6.92	0.0030	0.1	0.0002
08/03/2021	17.3	290.45	9.49	6.74	0.0018	0.1	0.0002
08/10/2021	19.9	293.05	9.41	6.83	0.0026	0.0	0.0001
08/17/2021	20.2	293.35	9.40	6.73	0.0022	0.1	0.0001
08/24/2021	21.8	294.95	9.35	6.83	0.0030	0.0	0.0001
08/31/2021	20.9	294.05	9.37	6.89	0.0033	0.1	0.0003
09/07/2021	20.2	293.35	9.40	6.73	0.0022	0.1	0.0002
09/14/2021	20.5	293.65	9.39	6.83	0.0028	0.0	0.0001
09/21/2021	19.9	293.05	9.41	6.89	0.0030	0.0	0.0001
09/28/2021	20.0	293.15	9.40	6.89	0.0031	0.04	0.0001
10/05/2021	19.7	292.85	9.41	6.96	0.0035	0.05	0.0002
10/12/2021	19.8	292.95	9.41	6.85	0.0028	0.06	0.0002
10/19/2021	18.8	291.95	9.44	7.00	0.0036	0.07	0.0003
10/27/2021	18.0	291.15	9.47	6.97	0.0032	0.03	0.0001
11/02/2021	17.4	290.55	9.49	7.19	0.0050	0.09	0.0005
11/09/2021	17.4	290.55	9.49	6.85	0.0023	0.1	0.0002
11/16/2021	19.2	292.35	9.43	6.94	0.0032	0.03	0.0001
11/23/2021	18.7	291.85	9.44	7.00	0.0036	0.05	0.0002
11/30/2021	16.7	289.85	9.51	7.27	0.0057	0.05	0.0003
12/07/2021	14.6	287.75	9.58	7.12	0.0035	0.07	0.0002
12/14/2021	13.2	286.35	9.62	7.37	0.0055	0.03	0.0002
12/21/2021	14.8	287.95	9.57	6.96	0.0024	0.06	0.0001
12/29/2021	14.1	287.25	9.59	7.16	0.0037	0.01	0.0000
		273.15	10.08		0.0000		0.0000
		273.15	10.08		0.0000		0.0000

$f = 1/(10^{(pK_a - pH)} + 1)$, 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.

Morrisburg Wastewater Treatment System – 2021 Annual Report

2021 - MORRISBURG WWTP MONTHLY AEROBIC BIOSOLIDS CONCENTRATION RATIO

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia	1610	2140	1630	2220	2220	2300	1830	1740	1940	2170	2050	1530
Nitrate	1.2	1.0	2.3	1.2	1.7	0.2	3.0	3.8	3.0	2.4	6.3	3.0
Ammonia + Nitrate	1611	2141	1632	2221	2222	2300	1833	1744	1943	2172	2056	1533
Total Phosphorus	1200	1160	1180.00	896.0	950.0	1220	1400	936	1530	1500	1270	1250
Total Solids	35100	36000	32300	33200	36100	37400	29500	42800	28900	37000	38600	35700
Aluminum	1090	696	843	620	26	897	1170	1170	1300	1190	1230	894
Arsenic	0.20	0.10	0.10	0.10	0.10	0.20	0.20	0.2	0.2	0.2	0.2	0.1
Cadmium	0.03	0.03	0.03	0.0	0.0	0.04	0.03	0.03	0.0	0.0	0.0	0.0
Chromium	1.17	0.76	0.80	0.79	0.95	1.23	1.44	1.51	1.66	1.42	1.46	1.02
Cobalt	0.25	0.15	0.16	0.15	0.07	0.21	0.19	0.18	0.19	0.16	0.17	0.13
Copper	44.7	33.1	32.5	27.6	12.2	37.9	46.6	47.6	55.5	53.0	56.2	37.1
Lead	1.20	0.80	0.80	0.60	0.40	0.90	1.10	1	1.1	0.9	1.0	0.7
Mercury	0.160	0.084	0.083	0.072	0.043	0.057	0.064	0.048	0.062	0.039	0.032	0.027
Molybdenum	0.35	0.25	0.26	0.24	0.19	0.34	0.40	0.34	0.4	0.3	0.4	0.3
Nickel	1.84	2.24	2.62	1.66	0.50	2.07	2.28	2.77	2.5	1.7	1.7	1.2
Selenium	0.20	0.10	0.10	0.10	0.10	0.20	0.20	0.2	0.2	0.2	0.2	0.1
Zinc	22	14.7	16.30	13.4	15.4	16.8	20.7	19.2	19.4	18.6	19.3	14.1

Metals ratio = mg metals/kg solids

	Metal/Solids Ratio (Sludge)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Limit
Arsenic	5.70	2.78	3.10	3.01	2.77	5.35	6.78	4.67	6.92	5.41	5.18	2.80	170
Cadmium	0.85	0.83	0.93	0.90	0.83	1.07	1.02	0.70	1.04	0.81	0.78	0.84	34
Chromium	33.3	21.1	24.8	23.8	26.3	32.9	48.8	35.3	57.4	38.4	37.8	28.6	2800
Cobalt	7.12	4.17	4.95	4.52	1.94	5.61	6.44	4.21	6.57	4.32	4.40	3.64	340
Copper	1274	919	1006	831	338	1013	1580	1112	1920	1432	1456	1039	1700
Lead	34.2	22.2	24.8	18.1	11.1	24.1	37.3	23.4	38.1	24.3	25.9	19.6	1100
Mercury	4.56	2.33	2.57	2.17	1.19	1.52	2.17	1.12	2.15	1.05	0.83	0.76	11
Molybdenum	9.97	6.94	8.05	7.23	5.26	9.09	13.56	7.94	12.80	9.19	9.33	7.00	94
Nickel	52.4	62.2	81.1	50.0	13.9	55.3	77.3	64.7	84.8	45.9	44.0	33.3	420
Selenium	5.70	2.78	3.10	3.01	2.77	5.35	6.78	4.67	6.92	5.41	5.18	2.80	34
Zinc	635	408	505	404	427	449	702	449	671	503	500	395	4200
Sludge is Acceptable	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE	

SOME ANALYSIS RESULTS EXPRESSED AS "<" (LESS THAN); HOWEVER, IN ORDER TO COMPLETE THE CALCULATION, ONLY THE NUMERIC VALUE WAS USED; THEREFORE THE AVG. CONC. IS GREATER THAN ACTUAL.

Appendix B

Flow Meter Calibration Reports

CapitalControls

Electrical/Control Panels – PLC/SCADA Programming – Instrumentation Calibrations

1333-03 Michael St. Ottawa, ON K1B-3M9 Ph. 613 248-1999 Fax: 613 248-1997

3 Morrisburg W.P.C.P.

Site Reports August, 2021



Electrical/Control Panels – PLC/SCADA Programming – Instrumentation Calibrations

1333-03 Michael St. Ottawa, ON K1B-3M9 Ph. 613 248-1999 Fax: 613 248-1997

3.1 FIT-370 East Influent Channel Flow:

Flow Meter
As Found Results

Instrument Calibration/Verification Report

Date: June 8, 2021

Client Details		Instrument Details	
Customer	Municipality of South Dundas	Manufacturer	Siemens
Contact	Denis Villeneuve 613-543-2631	Model	OCF 4.0-A1A1M2C
		Serial Number	38588
		Location	Morrisburg W.P.C.P.
Calibrations by:	Tim Stewart Capital Controls 613-248-1999	Process	Plant Influent
		Tag ID	FIT-370
		Output	4-20 mA

Programming Parameters		Calibration Equipment	
Calibration by means of Simulating Channel Level		Make	Fluke Meter
Grey Line OCF 4.0 Configuration		Model	725
12 inch Parshall Flume		Serial #	8759025
Blanking Distance = 30.482 cm			Level Stand
Mode = Flow			
Damping = 10%			
Max. Range = 1.0780m			
Min. Range = 0.291 m			
Units = m			
Volume = m3			

Range = 42,043 m3/day			
Head(Max) = Max. Range - Min. Range			
Head(Max) = (1.078m - 0.291m) = .787m			

Pass/Fail Criteria: 5% of Full Scale			
Errors are expressed in percentage of Full Scale			
Simulated Level	0.0 cm	6.3 cm	25 cm
Actual Flow Rate	0.0 m3/d	855 m3/d	7261 m3/d
Calculated Flow Rate	0.0 m3/d	839 m3/d	7107 m3/d
Error	0.00%	0.04%	0.37%
Actual mA Output	4.01 mA	4.36 mA	6.82 mA
Expected mA Output	4.00 mA	4.31 mA	6.70 mA
mA Output Error	0.06%	0.31%	0.75%

Comments

The instrument under test has passed the annual calibration.



Electrical/Control Panels – PLC/SCADA Programming – Instrumentation Calibrations

1333-03 Michael St. Ottawa, ON K1B-3M9 Ph. 613 248-1999 Fax: 613 248-1997

3.2 FIT-380 West Influent Channel Flow:

Flow Meter As Found Results Instrument Calibration/Verification Report Date: June 8, 2021

Client Details		Instrument Details	
Customer	Municipality of South Dundas	Manufacturer	Siemens
Contact	Denis Villeneuve 613-543-2631	Model	OCF 4.0-A1A1M2B
		Serial Number	38587
		Location	Morrisburg W.P.C.P.
Calibrations by:	Tim Stewart Capital Controls 613-248-1999	Process	Plant Influent
		Tag ID	FIT-380
		Output	4-20 mA

Programming Parameters		Calibration Equipment	
Calibration by means of Simulating Channel Level		Make	Fluke Meter
Grey Line OCF 4.0 Configuration		Model	725
12 inch Parshall Flume		Serial #	8759025
Blanking Distance = 30.482 cm			Level Stand
Mode = Flow			
Damping = 10%			
Max. Range = 1.09 m			
Min. Range = 0.282 m			
Units = m			
Volume = m3			

Range = 43794 m3/day			
Head(Max) = Max. Range - Min. Range			
Head(Max) = (1.09m - 0.282m) = .808m			

Pass/Fail Criteria: 5% of Full Scale			
Errors are expressed in percentage of Full Scale			
Simulated Level	0.0 cm	6.3 cm	25 cm
Actual Flow Rate	0.0 m3/d	879 m3/d	7322 m3/d
Calculated Flow Rate	0.0 m3/d	839 m3/d	7107 m3/d
Error	0.00%	0.09%	0.49%
Actual mA Output	4.01 mA	4.34 mA	6.84 mA
Expected mA Output	4.00 mA	4.31 mA	6.70 mA
mA Output Error	0.06%	0.19%	0.88%

Comments

The instrument under test has passed the annual calibration.