City of Brantford Wastewater System

Brantford Wastewater Treatment Plant

2021 Annual Performance Report

ECA #1860-9Q7LK9

Date: March 29, 2022

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1. Background

This report has been prepared in accordance with the terms and requirements set out in the City of Brantford's Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) #1860-9Q7LK9 issued on November 4, 2014 for the Brantford Wastewater Treatment Plant (WWTP). It covers the period from January 1 to December 31, 2021.

2. Description of Wastewater System

The WWTP is located at 385 Mohawk Street, Brantford, Ontario and is a Class IV conventional activated sludge facility that services a population of 104,688 residents, receiving a mixture of residential, industrial, commercial and institutional wastewater.

Raw sewage enters the plant via 2 trunk sewers and passes through influent channels into a two celled wet well with isolation sluice gates within the Raw Sewage Pumping Station. Four dry pit submersible pumps discharge raw sewage to the top floor of the Preliminary Treatment Building. The Preliminary Treatment Building consists of two mechanically raked bar screens and one bypass screening channel. Two vortex grit removal systems allow for the removal of grit before flowing by gravity to Process Module 1 (PM #1) and Process Module 2 (PM #2). The screenings and grit are conveyed to a chute into dumpsters which are hauled to the landfill for disposal.

PM #1 consists of four circular primary clarifiers, two three-pass rectangular fine bubble aeration tanks and six circular secondary clarifiers. PM #2 consists of two rectangular primary clarifiers, two three-pass rectangular fine bubble aeration tanks and two circular secondary clarifiers. Air is delivered to the aeration systems by two 300HP turbo blowers, one 200HP turbo blower and one 300HP centrifugal blower. Ferric chloride is added near the end of the aeration basins for phosphorus precipitation. Secondary effluent from each PM flows through a Parshall flume with an ultrasonic flow measuring device before combining and entering a chlorine contact chamber for disinfection with Sodium Hypochlorite. De-chlorination with Sodium Bisulfite is added downstream of the chlorine contact chamber before being discharged to the Grand River.

Waste activated sludge and primary sludge are co-thickened in the primary clarifiers before being pumped to two primary anaerobic digesters. Digested sludge overflows to one secondary digester for decanting before being pumped to the biosolids storage facility prior to land application. The biosolids storage tanks are also equipped with decanting capability.

3. Monitoring Data

3.1. Flow Measurement

Both the raw sewage and effluent wastewater flow are measured by continuous on-line flow meters. However, the raw sewage flow meters located in the PTB do not accurately measure the actual flow into the plant. Based on the flow meter calibration reports (attached), the effluent flow meters were found to be accurate to 0.13% (PM #1) and 0.17% (PM#2) of the actual flow rate and therefore deemed accurate. As a result, for the purpose of this report the effluent meters will be used to determine the raw and final loadings.

Construction of a new meter chamber with two (2) magnetic flow meters on each of the force-mains between the raw sewage pumping station and the preliminary treatment building was started in Q3 2021. Once installed, these two (2) new magnetic flow meters will accurately quantify the raw sewage flow. The project is currently on-going but should be completed in Q2 2022.

3.2. Raw Sewage Concentrations and Loadings

Raw sewage concentrations and loadings for each month of 2021 are summarized in Table 1. Due to the inaccuracy of the existing influent flow meters, the effluent flow meters will be used for the purpose of calculating loadings.

Table 1 - Summary of Monthly Average Raw Sewage Concentrations and Loadings

Month	Average Daily Flows (Effluent) m3/d	TSS mg/L	TSS kg/d	BOD5 mg/L	BOD5 kg/d	TP mg/L	TP kg/d	TKN mg/L	TKN kg/d
January	30,728.6	234.5	7,206	200.8	6,170	5.8	178	39.9	1,226
February	28,445.9	236.0	6,713	198.5	5,646	5.0	142	41.6	1,183
March	31,077.9	250.0	7,770	236.0	7,334	5.1	158	40.0	1,243
April	32,277.8	246.3	7,950	196.9	6,355	5.4	174	47.5	1,533
May	30,260.4	239.2	7,238	202.2	6,119	6.0	182	43.8	1,325
June	30,432.5	273.3	8,317	206.8	6,293	5.5	167	43.7	1,330
July	31,942.4	283.8	9,065	230.5	7,363	4.8	153	42.4	1,354
August	30,416.9	235.6	7,166	212.0	6,448	4.6	140	37.6	1,144
September	34,014.7	296.5	10,085	224.0	7,619	5.1	174	36.7	1,248
October	37,397.3	273.8	10,239	188.5	7,049	3.7	138	32.6	1,219
November	34,585.0	257.2	8,895	178.8	6,184	3.7	128	32.7	1,131
December	37,719.5	197.2	7,438	165.8	6,254	3.4	128	26.2	988
Average	32,470.2	252.0	8,181	203.4	6,604	4.8	157	38.7	1,257

3.3. Final Effluent Concentrations and Loadings

The final effluent concentrations and loadings are compared to the ECA objectives and limits to determine compliance. The City has also committed to meeting more stringent voluntary targets established through the Grand River Water Management Plan (WMP). If all municipal WWTPs discharging into the Grand River achieve the voluntary targets, water quality in the Grand River will be greatly improved.

Through the WMP, the Watershed-wide Wastewater Optimization Program (WWOP) was established which the City is a partner in with other municipalities that discharge to the Grand River. The WWOP partners utilize optimization principles to make best use of municipal resources with a goal of achieving improved performance. The program also provides support to its municipal partners through technical assistance.

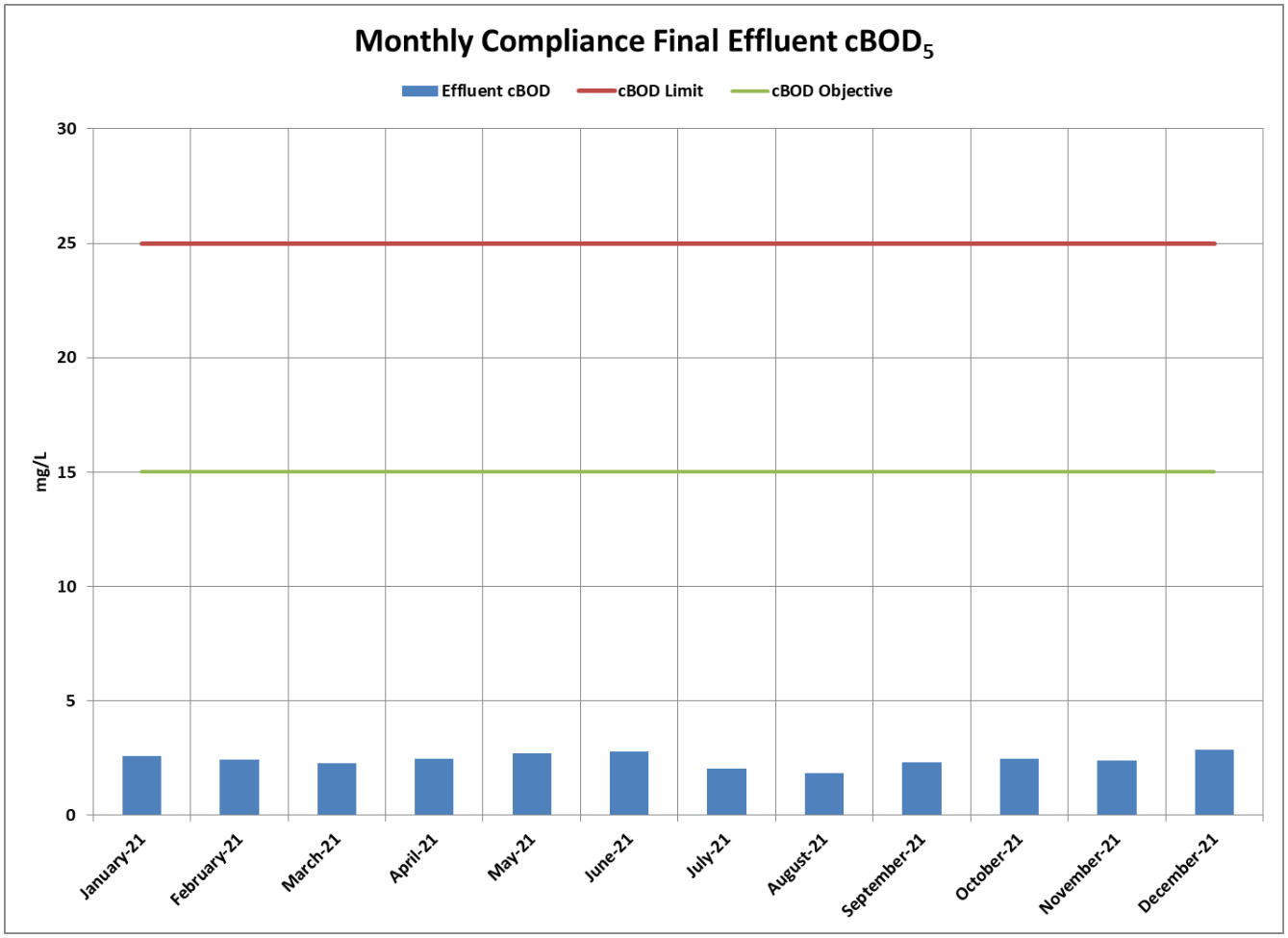
Required sampling parameters are summarized for each month of 2021 in Table 2.

Table 2 - Summary of Monthly Average Final Effluent Concentrations and Loadings

	TSS mg/L	TSS Loading kg/d	cBOD5 mg/L	cBOD5 Loading kg/d	TP mg/L	TP Loading kg/d	Total Ammonia Nitrogen mg/L	Calculated Unionized Ammonia mg/L	E. Coli (Geometric Mean Density) CFU/100mL	Total Chlorine Residual mg/L	Sodium Bisulfite Residual mg/L	pH No Units	Temp. Degrees Celsius
Objective	15		15		0.8					0.00			
Limit	25	2045	25	2045	1	81.8			200	0.02		6.00 - 9.50	
January	6.5	199	2.6	80	0.26	8.0	0.39	0.0015	8.1	0.00	3.22	7.16 – 7.56	10.6
February	5.8	160	2.5	68	0.20	5.5	0.44	0.0013	4.9	0.00	2.53	6.94 – 7.53	10.0
March	5.6	173	2.3	70	0.19	6.0	0.74	0.0013	10.0	0.00	2.48	6.74 – 7.22	11.9
April	5.8	184	2.5	79	0.17	5.4	0.31	0.0013	4.2	0.00	1.90	6.88 – 7.39	13.9
May	4.8	148	2.7	83	0.25	7.8	0.10	0.0004	15.0	0.00	2.35	6.92 – 7.36	16.9
June	5.3	162	2.8	85	0.27	8.5	0.20	0.0011	9.6	0.00	2.22	6.83 – 7.56	21.0
July	4.8	151	2.0	64	0.27	8.5	0.10	0.0009	49.5	0.00	3.05	7.00 – 7.43	21.7
August	5.4	163	1.8	55	0.31	9.4	0.11	0.0007	23.9	0.00	2.25	6.81 – 7.39	22.7
Sept.	7.0	227	2.3	76	0.29	9.5	0.09	0.0007	31.0	0.00	2.40	6.92 – 7.41	20.9
October	7.3	283	2.5	97	0.34	13.2	0.09	0.0007	35.9	0.00	1.96	7.05 – 7.48	18.9
November	7.2	248	2.4	82	0.23	8.0	0.24	0.0016	26.2	0.00	1.92	7.20 – 7.71	15.0
December	5.8	226	2.9	112	0.25	9.5	0.06	0.0004	79.9	0.00	1.98	7.16 – 7.58	13.3
Average	5.9	194	2.4	79	0.25	8.3	0.24	0.0010	17.1	0.00	2.35	6.74 – 7.71	16.4

As identified in Table 2, all parameters with ECA limits and objectives were in compliance. The Total Residual Chlorine objective of 0.00 mg/L was achieved in all months. The detection limit for the HACH low-range pocket Colorimeter II (used at the WWTP) is from 0.02 to 2.00 mg/L for total and free chlorine. Therefore consistently measuring any values below the low range value of 0.02 mg/L is difficult. Operations staff measures the sodium bisulfite residual in the same final effluent sample. The presence of sodium bisulfite indicates the absence of total chlorine in the final effluent. For all 12 months, there was a sodium bisulfite residual present to ensure adequate removal of any total residual chlorine in the final effluent (Table 2).

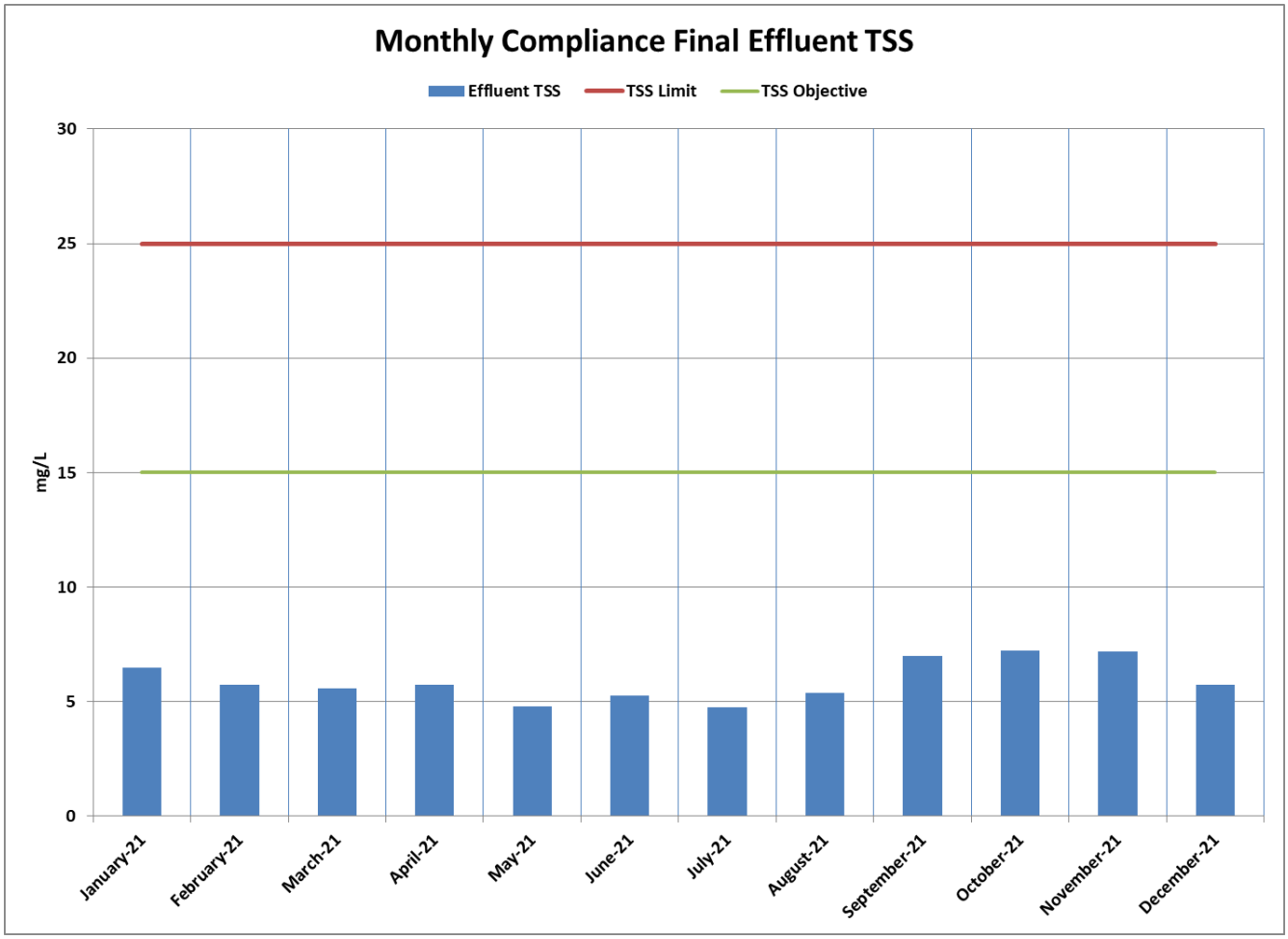
Figure 1 - Monthly Average Final Effluent cBOD5



Comments:

- Figure 1 is a trend of the monthly average final effluent $cBOD_5$.
- The monthly average final effluent $cBOD_5$ concentrations met the ECA limit and objective in 2021.
- All monthly average results were less than 5 mg/L.

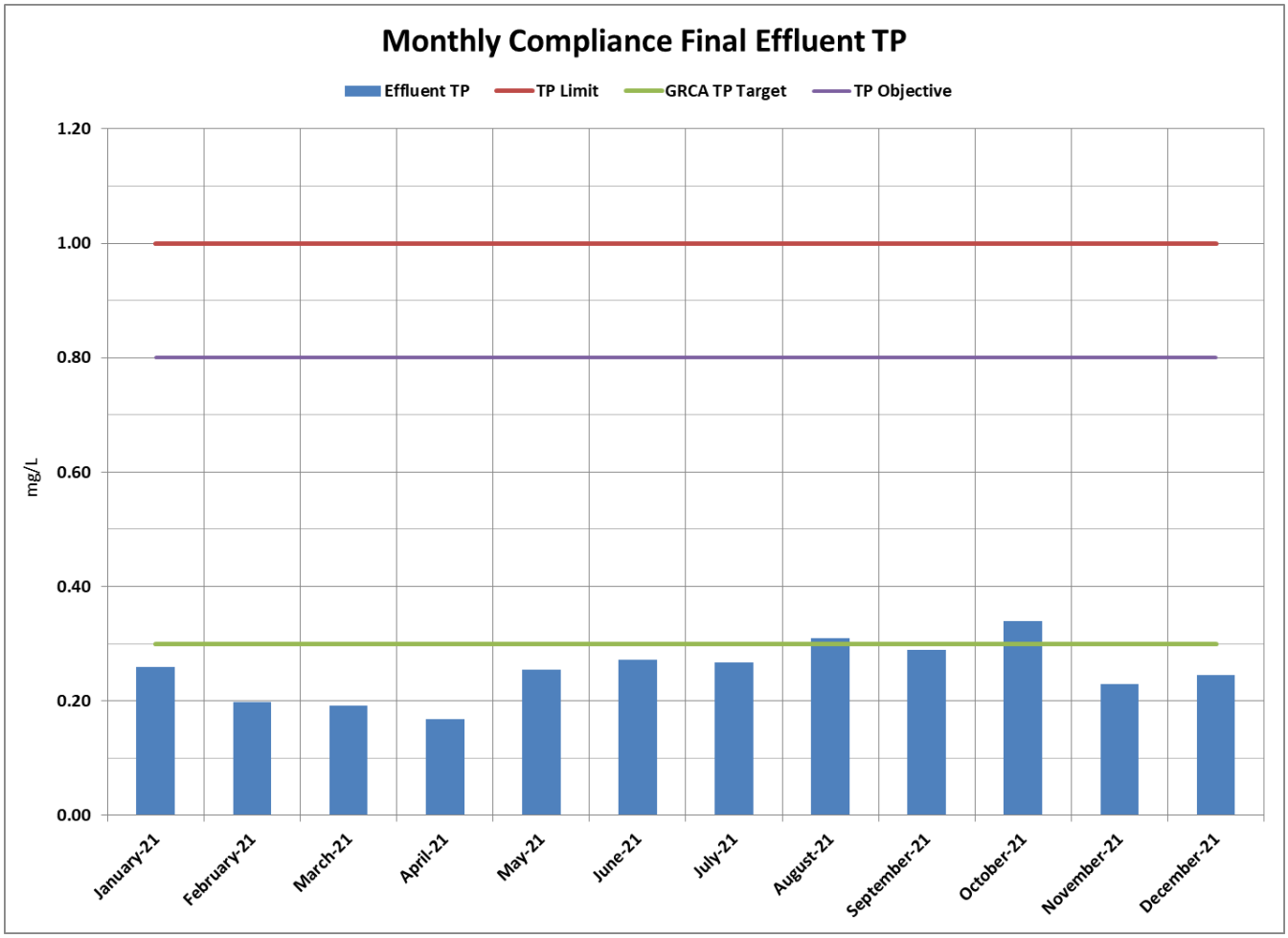
Figure 2 - Monthly Average Final Effluent TSS



Comments:

- Figure 2 is a trend of the monthly average final effluent TSS.
- The monthly average final effluent TSS concentrations met the ECA limit and objective in 2021.
- All monthly average results were less than 10 mg/L.

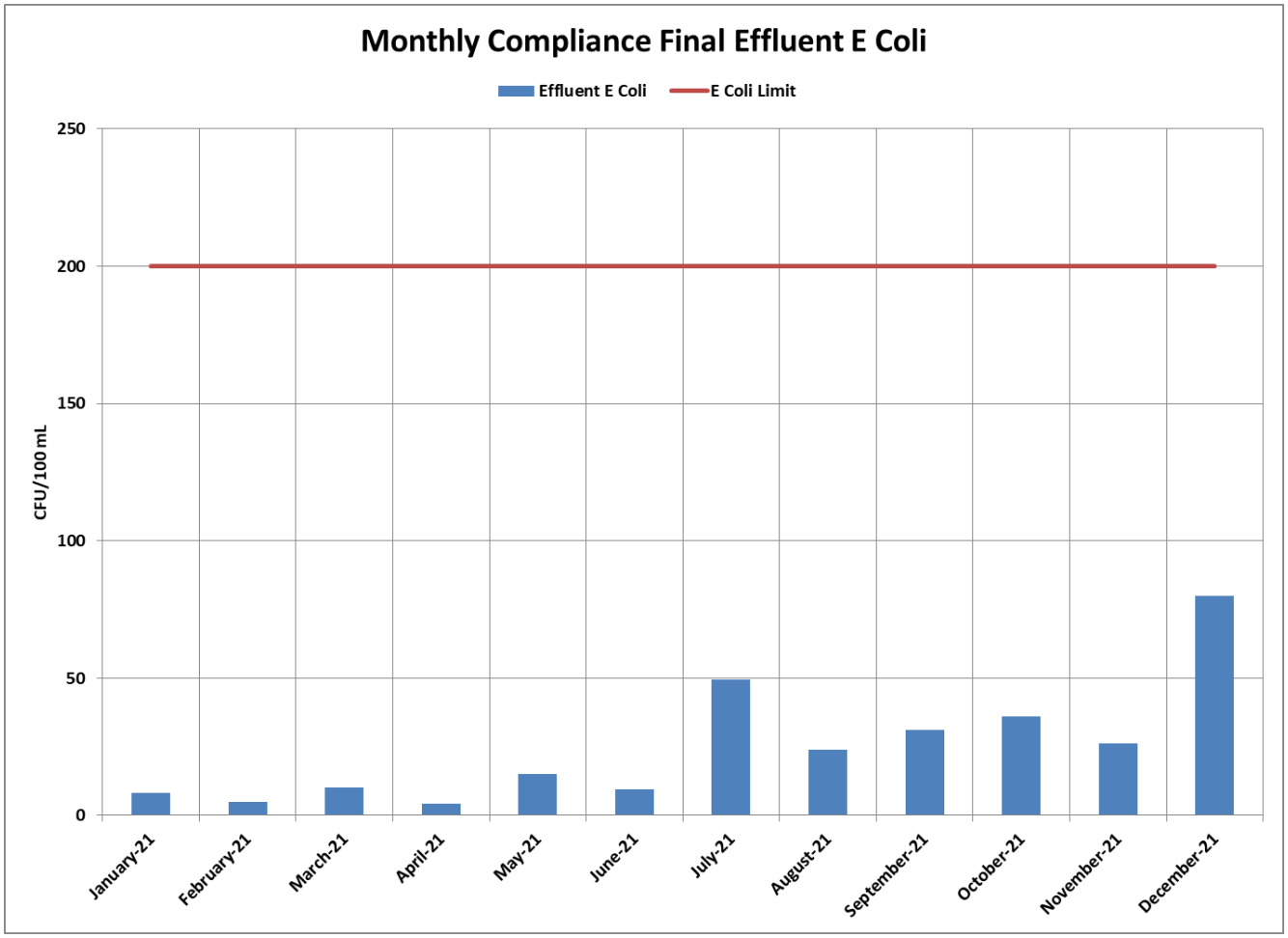
Figure 3 - Monthly Average Final Effluent TP



Comments:

- Figure 3 is a trend of the monthly average final effluent TP.
- The monthly average final effluent TP concentrations met the ECA limit and objective in 2021.
- The monthly average TP concentrations did not achieve the voluntary target of 0.3 mg/L in August and October of 2021.

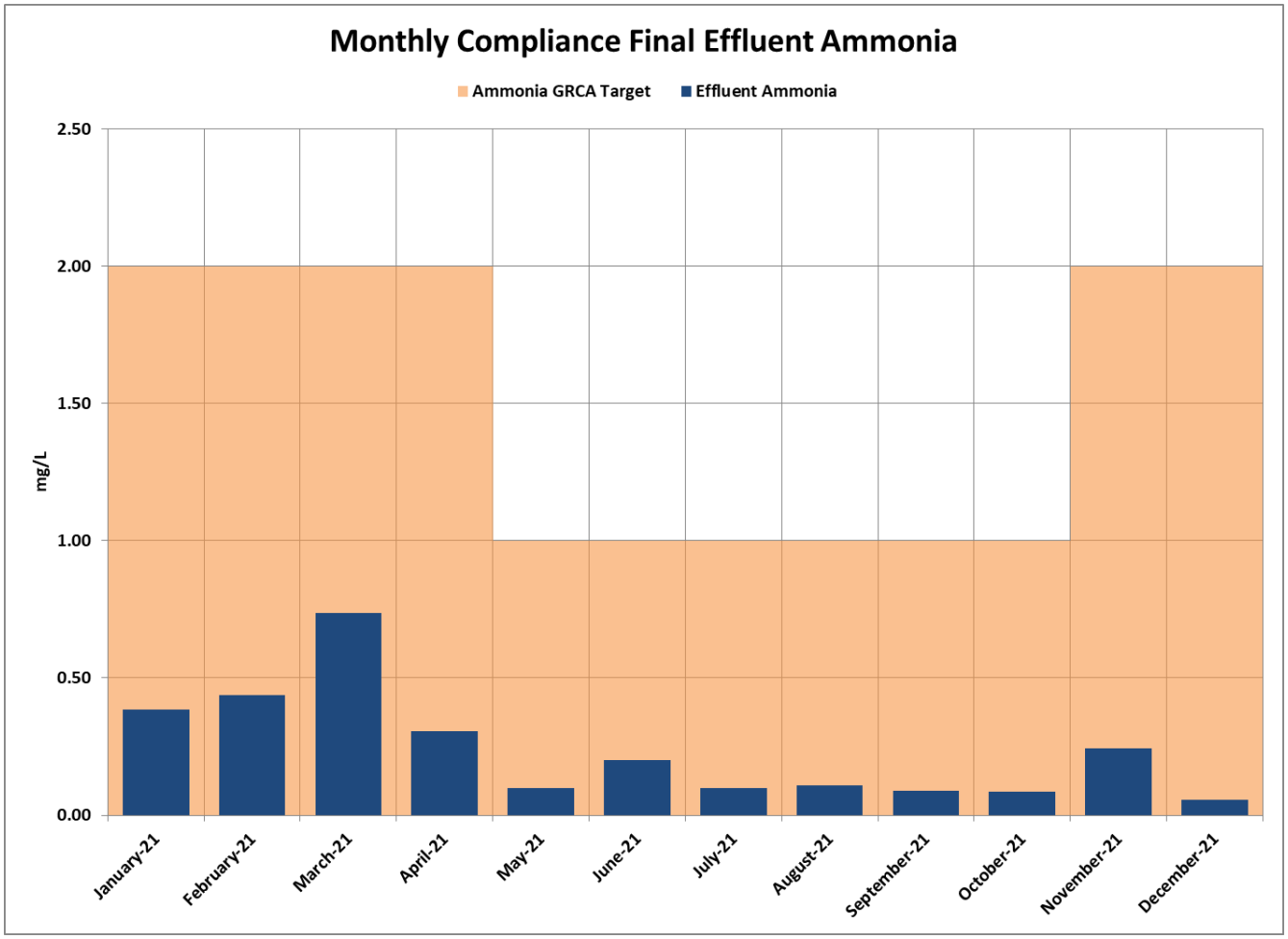
Figure 4 - Monthly Geometric Mean Density for Final Effluent E. Coli



Comments:

- Figure 4 is a trend of the monthly geometric mean density for final effluent E. Coli in CFU / 100 mL.
- The monthly geometric mean density for final effluent E. Coli met the ECA limit in 2021.

Figure 5 - Monthly Average Final Effluent Total Ammonia Nitrogen



Comments:

- Figure 5 is a trend of the monthly average final effluent total ammonia nitrogen (TAN).
- There is no limit or objective identified in the ECA for TAN.
- The monthly average final effluent TAN voluntary targets:
    - 1 mg/L - May to Oct.
    - 2 mg/L – Nov. to Apr.
- The final effluent TAN achieved the voluntary targets in all 12 months of 2021.

The City continues to strive to achieve the best possible performance from the WWTP by employing total mass control as a process control method and the use of other optimization tools. As a result, the plant achieved the voluntary target for TP in 10 of 12 months (did not achieve in August and October) but achieved the voluntary target for TAN in all months of 2021.

4. Per Capita Flows and Loadings

The raw sewage per capita flows, loadings and ratios are calculated and compared to typical values to determine if the raw sewage received represents typical wastewater or if it is influenced by other sources in the collection system. Table 3 is a summary of the per capita flows, loadings and ratios for the Brantford WWTP.

Table 3 - Brantford WWTP Per Capita Flows and Loadings

Parameter	2020	2021	Typical
Population	98,000	104,688	--
WWTP Rated Capacity (m^3/d)	81,800	81,800	--
Average Daily Influent Flow (m^3/d)	32,471	32,470	--
Peak Daily influent Flow (m^3/d)	72,529	49,137	--
Annual Average Influent BOD_5 (mg/L)	240	203.4	--
Annual Average Influent TSS (mg/L)	273	252.0	--
Annual Average Influent TKN (mg/L)	37.0	38.7	--
Annual Average Influent TP (mg/L)	5.7	4.8	--
Per Capita Wastewater Flow (L/person/day)	331	310	294 – 351
Per Capita BOD_5 Loading (g/person/day)	79.5	63.1	63 – 77
Per Capita TSS Loading (g/person/day)	90.5	78.2	69 – 93
Per Capita TKN Loading (g/person/day)	12.3	12.0	13 – 14
Per Capita TP Loading (g/person/day)	1.9	1.5	1.6 – 2.0
Average Daily Flow as % of Rated Capacity	39.7%	39.7%	--
Max Flow Day / Annual Average Flow	2.23	1.51	2.25 – 3.06
Influent TSS/BOD_5	1.14	1.24	1.01 – 1.25
Influent TKN/BOD_5	0.15	0.19	0.17 – 0.23

All of the calculated per capita flows, loadings and ratios are close to typical values or within the typical ranges. The typical values are the median values for the Grand River Watershed-wide Wastewater Optimization Program (2012 to 2020). Therefore, it can be concluded that the data used for this analysis is representative of typical municipal wastewater in the Grand River watershed.

5. Operational Challenges

As per the ECA, this section's purpose is to provide a summary of significant operational problems encountered and any associated corrective actions that were implemented.

- PM #2 Secondary Clarifier #8 – Secondary clarifier #8 has been out of service since 2019 due to its condition and cannot be placed back into service. This leaves PM #2 with no redundancy for its secondary clarifiers. The City is currently undergoing a condition assessment of all secondary clarifiers followed by specific rehabilitation work. Upon completion of this project, secondary clarifier #8 will be completely replaced which will provide redundancy again.
- Digester Gas Release – On February 1, 2021 an equipment failure in the digester gas flare caused the flare to go out. As a result, all digester gas not used in the process was released to the atmosphere. Maintenance staff were able to repair the flare and return it back to service the same day. Moving ahead, the City will continue with its on-going maintenance activities to limit the likelihood of a repeat occurrence.
- PM #2 Out of Service – In early May, staff performed maintenance work (i.e. exercising valves, etc.) for an upcoming capital project when a failure of secondary clarifier #7 occurred (only remaining in-service clarifier for PM #2). As a result, the entire secondary system had to be removed from service to facilitate the repairs. This time also made the most sense for completing some minor repairs to the PM #2 primary clarifiers as well. For the period of mid-May to late-October, PM #2 was out of service and all flows were being treated through PM #1. Although this was not the typical approach, performance was only slightly affected. Moving ahead, the City will continue with its on-going maintenance activities to limit the likelihood of a repeat occurrence.
- Biosolids Haulage – Throughout the haulage season (April 1 to November 30), the City's new contracted hauler struggled to remove enough biosolids to maintain adequate capacity. Although capacity was very limited at several times during the year, emergency measures were not required. Moving ahead into 2022, the City will improve communication with the contractor to ensure adequate capacity is available for operations.

6. Sludge Generation

6.1. Sludge Accountability

A sludge accountability analysis compares the amount of sludge reported to be removed from the plant (the sum of raw sludge pumped to the digesters and effluent TSS) to the amount of sludge projected to be produced by the plant (the sum of solids removed in the primary clarifiers, BOD_5 converted to solids in the aeration basins and the chemical added for phosphorus removal) to determine if monitoring data is truly representative and accurate. If the difference between the projected and reported masses is within +/- 15%, then the reported

data is likely accurate. Table 4 is a summary of the sludge accountability analysis for the Brantford WWTP.

Table 4 - Summary of Sludge Accountability

Parameter	Reported Sludge (kg/d)	Parameter	Projected Sludge (kg/d)	Accountability
Intentional Wasting	8,685.0 kg/d	Primary Sludge	4,909.5 kg/d	-3.8%
Unintentional Wasting	191.6 kg/d	Biological Sludge	2,719.3 kg/d	
Total Reported Sludge	8,876.6 kg/d	Chemical Sludge	924.5 kg/d	
		Total Projected Sludge	8,553.3 kg/d	

The sludge accountability analysis closed within +/-15%, which means that the data is accurate and representative.

6.2. Sludge Removal

Digested sludge (biosolids) produced at the Brantford WWTP is pumped to three on-site storage tanks prior to removal for liquid land application. Table 5 is a monthly summary of the biosolids removed for land application in 2021 compared to 2020.

Table 5 - Summary of Monthly Biosolids Removal

Month	2020 m3	2021 m3	% Change
January	0	0	
February	0	0	
March	0	0	
April	11,204.1	2,314.2	
May	8,111.1	4,893.1	
June	4,224.7	1,579.2	
July	12,203.5	3,926.5	
August	6,858.4	12,135.7	
September	1,644.0	5,881.9	
October	6,940.2	0	

Month	2020 m3	2021 m3	% Change
November	10,579.7	13,213.9	
December	0	0	
Total	61,765.7 m^3	43,944.5 m^3	-28.9%

The total volume of sludge removed in 2021 was 43,944.5 m^3 which represented a decrease of 28.9% over 2020. This decrease in sludge removal is believed to be related to the new decant system installed in the biosolids storage tanks. The new decant system allows the Operators to remove decant over a wider range in the tanks (from 2m to 8m). The City also started using a new biosolids hauler in 2021. In comparing to the previous contract hauler, the new contractor only hauled when absolutely necessary which gave operations ample time to properly decant the biosolids. This practice decreased the volume removed but also increased the total solids concentration of the biosolids removed. The City is anticipating similar biosolids volumes to be removed in 2022 as were removed in 2021.

6.3. Biosolids Analytical Data

The analytical data for the anaerobic biosolids is summarized in Table 6 (total solids, nutrients and pathogens) and in Table 7 (metals).

Table 6 - Summary of Total Solids, Nutrients and Pathogens for Anaerobic Biosolids

Month	TS (%)	TKN (mg/kg)	NH_3-N (mg/kg)	NO_3-N (mg/kg)	TP (mg/kg)	K (mg/kg)	E. Coli (CFU/g)
January	2.58	82,484	30,567	1.56	36,343	3,297	75,199
February	2.75	71,437	27,919	1.65	29,905	2,835	51,335
March	2.68	77,554	30,145	1.60	34,065	3,439	61,458
April	2.85	79,197	30,822	2.01	35,075	3,413	32,376
May	2.55	83,508	32,448	1.58	35,769	3,688	18,245
June	2.56	76,372	29,474	1.57	34,134	3,116	69,594
July	3.05	69,322	21,320	1.32	30,665	2,632	64,680
August	2.88	71,326	23,834	1.40	32,029	2,714	38,522
September	2.85	68,203	25,094	1.41	31,953	2,711	68,163
October	2.78	69,747	25,968	1.45	30,288	2,899	93,795
November	3.42	68,476	24,796	1.18	30,948	2,594	46,572

Month	TS (%)	TKN (mg/kg)	NH_3-N (mg/kg)	NO_3-N (mg/kg)	TP (mg/kg)	K (mg/kg)	E. Coli (CFU/g)
December	3.10	74,441	29,875	1.31	34,630	3,624	45,087
Average	2.84	74,339	27,688	1.50	32,984	3,080	51,222

Table 7 - Summary of Regulated Metals for Anaerobic Biosolids

Month	As (mg/kg)	Cd (mg/kg)	Co (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Se (mg/kg)	Zn (mg/kg)
CM1	1.7	0.34	3.4	28.0	17.0	0.11	0.94	4.2	11.0	0.34	42.0
CM2	170	34	340	2,800	1,700	11	94	420	1,100	34	4,200
Jan.	1.6	0.48	6.1	84.7	782.0	3.89	13.08	21.4	24.4	1.56	962.8
Feb.	3.0	0.75	4.2	66.2	608.7	3.66	9.23	18.0	20.7	3.00	652.8
Mar.	3.8	0.44	4.0	73.8	725.3	3.79	10.42	19.0	22.1	3.76	657.6
Apr.	4.4	0.52	4.0	77.1	692.8	3.53	11.46	20.1	25.1	4.41	1021.3
May	9.3	0.61	4.5	78.5	760.0	3.96	14.35	21.4	25.2	9.27	1271.5
Jun.	7.1	0.85	4.3	77.5	696.6	3.92	16.15	20.4	24.7	7.14	919.9
Jul.	1.4	0.57	4.7	68.8	659.6	3.29	14.15	20.0	25.9	1.32	888.5
Aug.	3.7	0.67	4.6	76.2	739.7	3.51	15.23	22.4	24.3	3.73	1005.6
Sep.	1.6	0.71	4.6	74.0	732.7	3.53	15.67	21.0	24.5	1.41	914.4
Oct.	1.6	0.82	5.0	74.8	715.1	3.62	14.36	20.5	24.1	1.45	930.6
Nov.	1.5	0.58	4.7	73.1	869.5	2.94	12.88	20.0	44.4	1.18	879.1
Dec.	1.3	0.67	5.1	77.3	758.1	3.28	13.64	22.0	24.7	1.31	847.7
Avg.	3.4	0.64	4.6	75.2	728.3	3.58	13.38	20.5	25.8	3.30	912.7

Metal Concentrations for the anaerobic sludge were converted from mg/L to mg/kg (as per the regulations) to compare with the limits in the Nutrient Management Act, O. Reg. 267/03 Section 98 Table 1 “Standards for Regulated Metals in Materials Applied to Land that are Sewage Biosolids.” The metals met the CM2 limit in all months in 2021.

6.4. Biosolids Land Application Sites

The following table summarizes the application sites that the City’s contracted biosolids hauler (Enviroland Services Inc.) utilized for biosolids haulage in 2021 for the Brantford WWTP. All biosolids is hauled to certified agricultural land by Enviroland (registered as a biosolids handling company through the Ministry of the Environment, Conservation and Parks #7937-AMQNUB). Table 8 is a summary of the conditioning sites used for biosolids from the Brantford WWTP.

Table 8 - Summary of Conditioning Sites Used for Brantford WWTP Biosolids

Site #	Volume Applied (m^3)	Site #	Volume Applied (m^3)
24691	2,314.2	24665	9,598.7
24717	6,478.0	24790	6,210.0
22861	1,943.1	24559	4,759.6
24206	6,566.1	24721	2,821.6
Brantford Landfill	3,253.2		
		Total	43,944.5

Due to wet weather during the summer of 2021, the biosolids haulage contractor was unable to spread biosolids during specific times in June and July. As a result, the contractor used a dewatering unit and hauled the cake to the City’s landfill for disposal.

7. Septage Receiving

The following section provides a summary of the daily volumes and analytical data for the septage received at the Brantford WWTP.

7.1. Septage Volumes

Volume of septage received at the facility in 2021 totaled 8,352 m^3 which is similar to the volume received in 2020 (8,888.2 m^3). In 2020, several businesses stopped hauling to the site and perhaps began taking their business to another site. This downward trend in septage haulage appears to have continued in 2021. The volumes received are summarized per quarter in Table 9.

7.2. Analytical Data

Table 9 is a summary of the average volumes received and the analytical data for the quarterly septage sampling conducted at the facility.

Table 9 - Summary of Quarterly Septage Volumes Received and Sampling Analysis

Quarter	Average Daily Volume Received (m^3/d)	Total Volume Received (m^3)	% of WWTP Flows	BOD_5 (mg/L)	TSS (mg/L)	TP (mg/L)	TKN (mg/L)
Q1 (January – March)	14.7	1,320	0.05%	2,550	5,120	157	1,620
Q2 (April – June)	28.8	2,618	0.09%	4,700	7,150	156	1,910
Q3 (July – September)	24.2	2,231	0.08%	3,910	25,500	124	926
Q4 (October – December)	23.7	2,183	0.06%	1,170	6,350	40.2	262
Annual	22.9	8,352	0.07%	3,082.5	11,030	119.3	1,179.5

8. Maintenance

The following section provides an overview of some of the major maintenance activities and capital upgrades carried out at the facility in 2021.

8.1. Summary of Major Maintenance Activities

- Refurbishment of the gearbox on secondary clarifier #7;
- Refurbishment of primary clarifier #5 scum system;
- Chemical building floor repairs;
- Maintenance shop LED light conversion;

8.2. Summary of Completed Capital Upgrades

- Upgrades to biosolids storage tank decant system;
- Comprehensive WWTP Upgrade Assessment;
- Installation of WWTP bypass check valve;
- Upgrades to the Fifth Avenue WWPS;
- Replacement of Critical Gates and Valves at the Empey WWPS.

8.3. Summary of Capital Projects in Progress:

- Upgrades to PM #1 primary clarifiers (#1 to #4);
- Cleanout, inspection and repairs to the anaerobic digesters;
- Replacement of WWTP influent flow metering;
- Preliminary treatment building bypass and automation;
- Secondary clarifier condition assessment and rehabilitation;
- Class EA and Upgrades to the Empey St. WWPS.

9. Calibrations

This section provides a summary of calibrations performed on all effluent monitoring equipment. All calibration reports are included in this report as Appendix A.

9.1. Influent and Effluent Flow Meters

Calibration tests were performed on September 2nd, 2021 for the final effluent meters (PM #1 and PM #2). Both meters are operating to within +/- 15% error. Influent Flow Meters cannot be calibrated accurately due to a design flaw. As per Section C. Monitoring Data, Subsection i, construction of a meter chamber housing magnetic flow meters on the two (2) raw sewage force-mains between the raw sewage pumping station and the preliminary treatment building will be completed in Q2 2022.

10. Complaints

As per the ECA this section is to provide a summary of any complaints received and any steps taken to address the complaint. There were no complaints reported to the City regarding the WWTP in 2021.

11. Bypass, Spills, and Abnormal Discharge Events

As per the ECA this section is to provide a summary of all by-pass, spill or abnormal discharge events. The WWTP did not experience any bypasses, spills or abnormal discharge events in 2020.

12. Bypasses Due to Grand River High Water Levels

As per the ECA this section is to provide a summary of all bypasses due to high water level events in the Grand River and an update on the implementation plan for provision of effluent pumping to eliminate such bypasses. There were no bypass events due to high water levels in the Grand River from the WWTP.

A study investigating the feasibility of an effluent pumping station was completed in 2020. Based on the feasibility study, the City is planning on initiating an Environmental Assessment in 2022 with the design to commence in 2023 for an effluent pumping station.

13. Notice of Modifications to Sewage Works

The following is an update to two (2) outstanding modifications initiated under the ECA's Limited Operational Flexibility in 2020, including the following:

- Upgrades to the PM #1 primary clarifiers (sludge and scum collectors, pumping and piping modifications, etc.). Construction started in Q4 2021 and expected to be completed in Q3 2022.
- Replacement of the biosolids storage tanks decant system from a telescopic valve to a floating decant system. Construction was completed in April 2021.

14. Other Information

No additional information was requested by the District Manager.

Appendix A – Flow Meter Calibration Records

Figure 6 - PM #1 Effluent Flow Meter Calibration Certificate

Industrial Technical Services
5080 Timberlea Blvd, Unit 35,
Mississauga, ON L4W 4M2
Ph: 905-275-2717 Fax: 905-275-2724
www.itsinstruments.com

Certificate No: 32742-002

Certificate Of Calibration

Customer:
City of Brantford
PO Box 818, 385 Mohawk St. Brantford, ON N3T 5R7
Phone: (519) 756-5957
Fax: (519) 756-2691

Instrument Identification:
Description: Flow Indicator / Transmitter
Manufacturer: Milltronics
Model No: Multiranger Plus
Serial No: N/Av
Range: 0 to 1209 m^3/day
Tolerance: ± 5% FS
Tag No: 0000064041
Location: Old Plant Effluent Flow - Brantford Treatment Plant

Cal. Date: September 2, 2021
Due Date: September 2, 2022

Program Parameters

PAR	SETTING	
	Entry	Description
P1	2	Units - Centimeters
P2	5	Measurement Mode - OCM
P3	100.4	Empty Distance
P4	75.28	Span
P5	30	Near Blanking
P6	2	mA Output - 4 to 20 mA
P7	2	Decimal Point
P23	0	Transducer Type - ST
P32	1	DLD output
P33	1	Totalling
P34	0	Tank Shape - Non volume
P37	1.000	Display Conversion
P38	0.000	Display offset
P40	1	Primary Device Exponential
P41	4	Flow Time units - Per day
P42	1.566	OCM Exponent

PAR	SETTING	
	Entry	Description
P45	75.28	Maximum Head
P46	1209	Maximum Flowrate
P48	5.000	OCM low head cutoff
P49	2	OCM decimal point
P50	2	OCM mA output - Flow
P52	-2	Totalizer display factor (x 100)
P53	0	Totalizer decimal point
P65	23C	Air Temperature
P68	1000	Fill damping
P69	1000	Empty damping
P72	1	Fuzz filter
P73	1	Agitator discrimination
P74	3	Fail-safe mode
P75	0.500	Fail-safe timer
P76	22.74	Display

Test Report:

AS FOUND			AS LEFT		
Reference	*Instrument*	*Error*	*Reference*	*Instrument*	*Error*
cm	cm	%FS	cm	cm	%FS
63.7	65.32	0.13	63.7	65.32	0.13

Standards Used:

Asset No	*Manufacturer*	*Calibration Date*	*Due Date*
RUL002	Starrett	June 15, 2021	June 15, 2022

	Yes	No		Yes	No
Passed:	✓		*As found in tolerance:*	✓	
Failed:			*As left in tolerance:*	✓	
Calibration Sticker applied?	✓		*Repair performed:*		✓
Restricted Use:			*Adjustment performed:*		✓

Comments: Verified program parameters.
Single point verification.
Readings distance from sensor to level.

Performed By: Y. Motiwala, Technician
Reviewed By ITS: C. Ramnarine, Service Manager
Reviewed By Customer:

Issue Date: September 8, 2021 *Date:* September 8, 2021

Figure 7 - PM #2 Effluent Flow Meter Calibration Certificate

Industrial Technical Services
5080 Timberlea Blvd, Unit 35,
Mississauga, ON L4W 4M2
Ph: 905-275-2717 Fax: 905-275-2724
www.itsinstruments.com

Certificate No: 32742-001

Certificate Of Calibration

Customer:
City of Brantford
PO Box 818, 385 Mohawk St. Brantford, ON N3T 5R7
Phone: (519) 756-5957
Fax: (519) 756-2691

Instrument Identification:
Description: Flow Indicator / Transmitter
Manufacturer: Milltronics
Model No: Multiranger Plus
Serial No: N/Av
Range: 0 to 1209 m^3/day
Tolerance: ± 2% FS
Tag No: 0000064042
Location: New Plant Effluent Flow - Brantford Treatment Plant

Cal. Date: September 2, 2021
Due Date: September 2, 2022

Program Parameters

PAR	SETTING	
	Entry	Description
P1	2	Units - Centimeters
P2	5	Measurement Mode - OCM
P3	103.6	Empty Distance
P4	75.28	Span
P5	30.00	Near Blanking
P6	2	mA Output - 4 to 20mA
P7	2	Decimal Point
P23	0	Transducer Type - ST
P32	1	DLD Output
P33	1	Totalling
P34	0	Tank Shape - Non Volume
P37	1.000	Display Conversion
P38	0.000	Display Offset
P40	1	Primary Device - Exponential
P41	4	Flow Time Units - Per day
P42	1.566	OCM Exponent

PAR	SETTING	
	Entry	Description
P45	75.28	Maximum Head
P46	1209	Maximum Flowrate
P48	0.000	OCM low head cutoff
P49	2	OCM decimal point
P50	2	OCM mA output
P52	-2	Totalizer display factor
P53	0	Totalizer decimal point
P65	23C	Air temperature
P68	1000	Fill damping
P69	1000	Empty damping
P72	1	Fuzz filter
P73	1	Agitator discrimination
P74	3	fail-safe mode
P75	0.5	fail-safe timer
P76	16.14	Display

Test Report:

AS FOUND			AS LEFT		
Reference	*Instrument*	*Error*	*Reference*	*Instrument*	*Error*
cm	cm	%FS	cm	cm	%FS
102	104.1	0.17	102	104.1	0.17

Standards Used:

Asset No	*Manufacturer*	*Calibration Date*	*Due Date*
RUL002	Starrett	June 15, 2021	June 15, 2022

	Yes	*No*		*Yes*	*No*
Passed:	✓		*As found in tolerance:*	✓	
Failed:			*As left in tolerance:*	✓	
Calibration Sticker applied?	✓		*Repair performed:*		✓
Restricted Use:			*Adjustment performed:*		✓

Comments: Verified program parameters.
Single point verification.
Reading is distance from sensor to level.

Performed By: Y. Motiwala, Technician
Reviewed By ITS: C. Ramnarine, Service Manager
Reviewed By Customer:

Issue Date: September 8, 2021 *Date:* September 8, 2021