PROVIDING MORE EPCOR

EPCOR Water Services Inc.
Edmonton, Alberta

2019
Annual Wastewater System Report

SUBMITTED TO:

The Province of Alberta

Alberta Environment and Parks (AEP)

As per requirements of

APPROVAL TO OPERATE NO. 639-03-03

Feb - 2020

Executive Summary

In 2019, Approval to Operate No. 361975-00-00 for Gold Bar Wastewater Treatment Plant and Approval to Operate No. 639-03-00 for the Edmonton Wastewater Collection System were cancelled and a combined approval was issued under Approval to Operate No. 639-03-03. The following report contains two parts, PART I: Wastewater Treatment Plant and PART II: Wastewater Collection System, in order to meet the requirements of the combined Approval to Operate.

PART I: Wastewater Treatment Report

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2019 Overview

The Gold Bar Wastewater Treatment Plant (WWTP) located on the banks of the North Saskatchewan River in Edmonton, Alberta successfully passed the ISO 14001:2015 (Environmental Management System) and the ISO 45001:2018 (Occupational Health and Safety Management System) Re-Assessment Audits for its Integrated Management System. Major capital projects focusing on rehabilitation were completed, including Secondary 5 and the Distribution Chamber, with a number of projects scheduled for completion in 2020. There were fourteen significant wet weather event with inflows to the plant greater than 1,200 million litres per day (MLD). The plant received a peak flow of 1,893 MLD on July 17.

The Gold Bar WWTP final effluent discharge limits of Approval to Operate 639-03-03 are summarized in Table 1 and the monitoring requirements are outlined in Table 2. The Gold Bar WWTP Effluent Limit Performance (WELP*) index for 2019 is 25.3% (Figure 1). The 2019 index is slightly higher than the five-year running average of 23.0% (Figure 2), impacted primarily by poor performance from May 13-16 when two secondary clarifiers were out of service for Projects and too many solids were being carried in the plant.

Table 1: Approval to Operate 639-03-03 Limits for Treated Wastewater

Parameter	Limit
Carbonaceous Biochemical Oxygen Demand (5-day) - $CBOD_5$	≤ 20 mg/L monthly arithmetic mean of daily composite samples
Total Suspended Solids - TSS	≤ 20 mg/L monthly arithmetic mean of daily composite samples
Total Phosphorus - TP	≤ 1.0 mg/L monthly arithmetic mean of daily composite samples
Total Ammonia-Nitrogen (December 1 to May 31)	≤ 10 mg/L monthly arithmetic mean of daily composite samples
Total Ammonia-Nitrogen (June 1 to November 30)	≤ 5.0 mg/L monthly arithmetic mean of daily composite samples
Escherichia coli counts	≤ 126 counts per 100 mL/monthly geometric mean of daily grab samples
pH	6.5 to 8.5 pH units

*__WELP Index__: The index calculates a percentage value representing the percentage of the discharge limit for each parameter measured in the final effluent. Each value is given equal weighting in the calculation of the index.

Table 2: Approval to Operate 639-03-03 Monitoring Requirements

Parameter	Frequency (Minimum)	Sample Type	Sampling Location
UNTREATED WASTEWATER			
pH	Once per day	Composite	Untreated wastewater entering the wastewater treatment plant
BOD_5			
TSS			
Total Phosphorus			
Total Ammonia-Nitrogen			
Volume of Flow	Continuous, recorded daily	Calculated	
TREATED WASTEWATER			
pH	Once per day	Composite	Wastewater treated plant effluent prior to release to the North Saskatchewan River
$CBOD_5$			
TSS			
Total Phosphorus			
Total Ammonia-Nitrogen			
Acute Toxicity	Monthly	Grab	
Chronic Toxicity	Quarterly	Grab	
Volume	Continuous, recorded daily	Calculated	
E.coli counts	Once per day	Grab	After ultraviolet (UV) disinfection
Volume	Continuous, recorded	Calculated	Reuse water transmission main
WASTEWATER PLANT BYPASS			
Release Volume	Continuous during bypass event, recorded daily	Calculated	Primary and Secondary treatment bypass of wastewater at the wastewater treatment plant Unauthorized release point
pH	Any bypass event lasting > 2 hours	Composite	
BOD_5			
TSS			
Total Phosphorus			
Total Ammonia-Nitrogen			
E.coli counts		Grab	
SLUDGE DISPOSAL			
Sludge Volume	Total Volume	Estimated	Prior to leaving the wastewater treatment plant
Sludge Mass	Total Mass		Amount of sludge being disposed of as per the *Biosolids Management Plan*
CSO OUTFALLS AND UNAUTHORIZED RELEASE			
Release Volume	Total volume during each discharge event	Continuous during discharge event	Rat Creek CSO outfall; Hardisty-Capilano CSO outfall; Highlands CSO outfall; Cromdale CSO outfall; Strathearn CSO outfall; and unauthorized release point
pH	Each discharge event	Composite	Rat Creek CSO outfall
BOD_5			
TSS			
Total Phosphorus		Grab	Unauthorized release point
Total Ammonia-Nitrogen			
E.coli counts			
The amount of any substance other than wastewater or storm water that is spilled or discharged accidentally or intentionally into the wastewater collection	Each event	Estimated volume or mass	Unauthorized release point

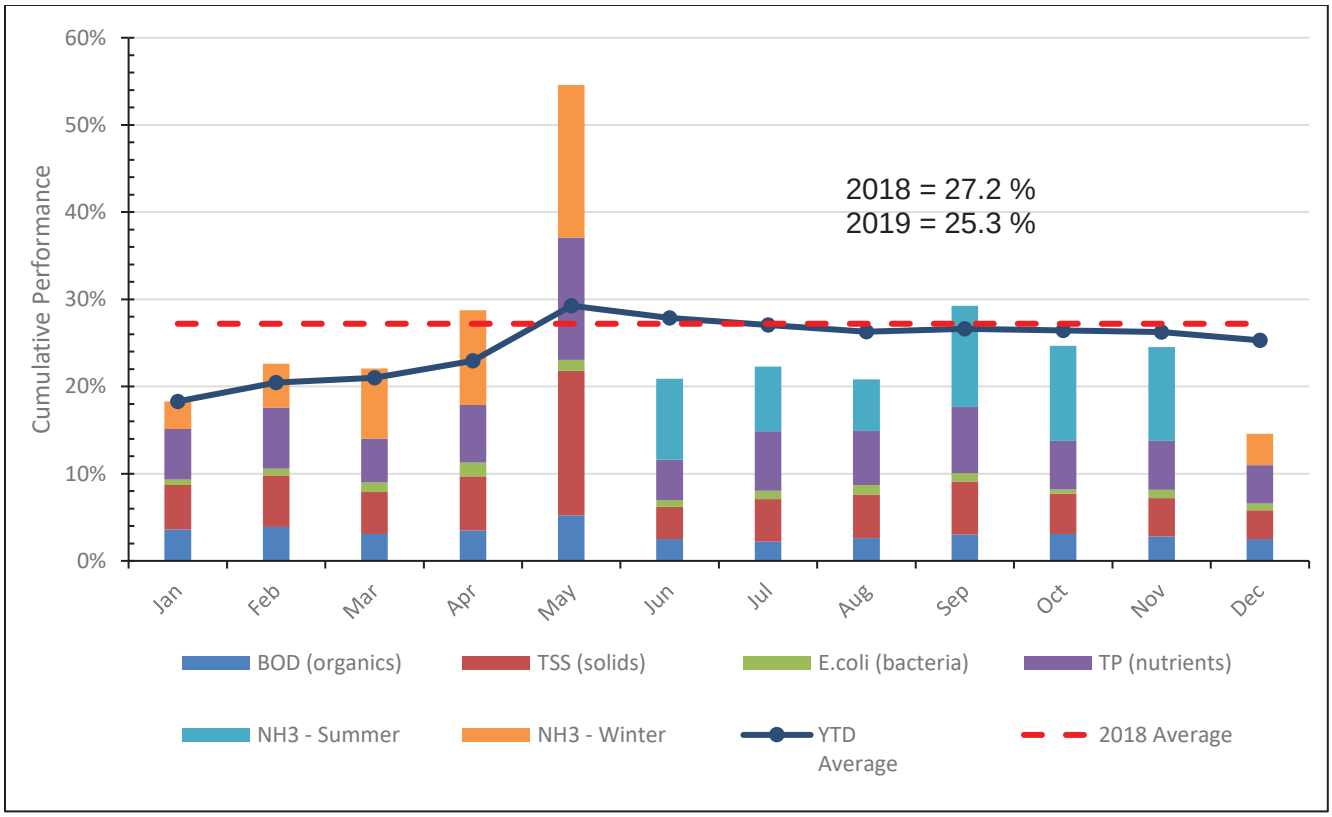

Figure 1: 2019 Monthly Gold Bar WWTP Wastewater Effluent Performance (WELP) Index

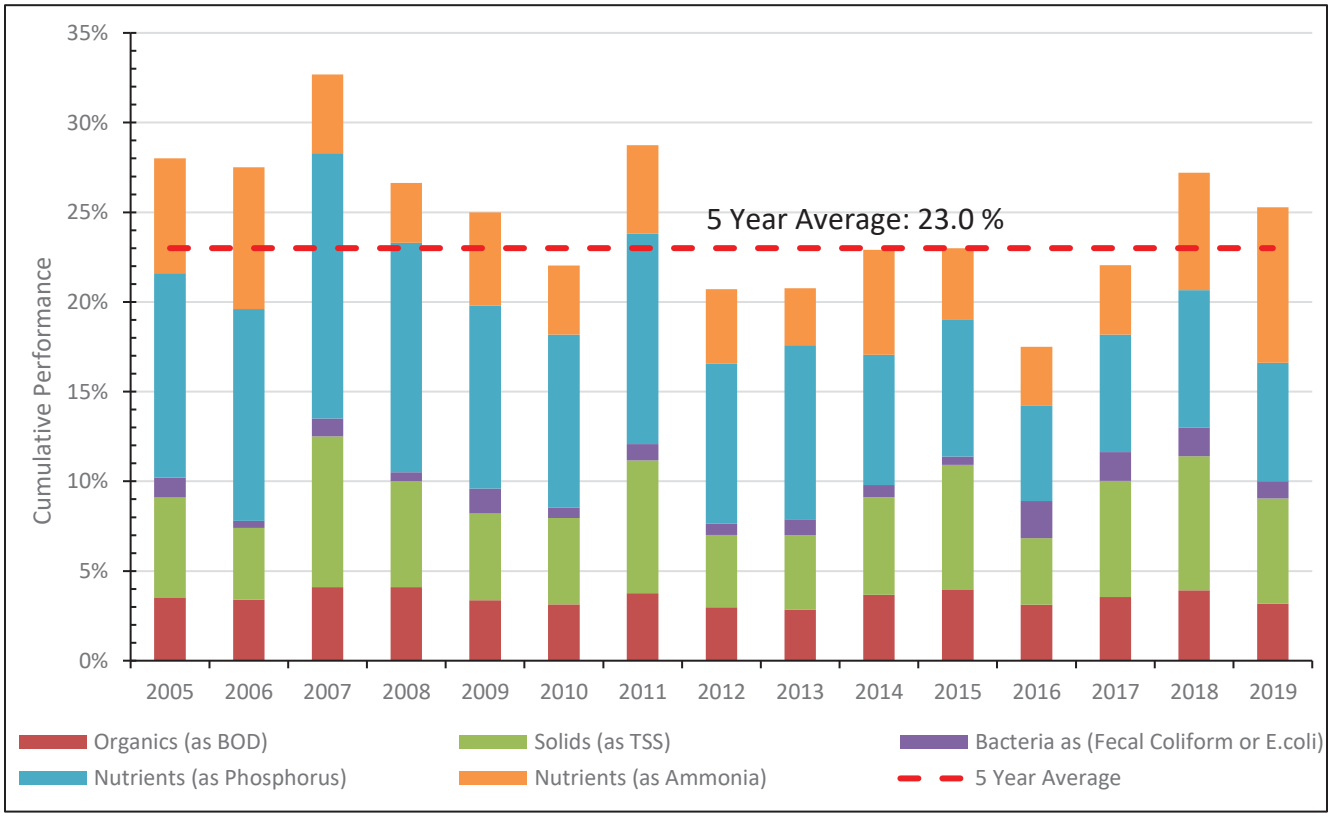

Figure 2: Gold Bar WWTP Wastewater Effluent Performance (WELP Index) 2005-2019

For 2019, all of the monthly limits for Approval to Operate discharge parameters were met (Table 4, Appendix A). A total of 104,189 million litres (ML) of wastewater was conveyed to the plant. Secondary treatment and UV disinfection was provided to 95,432 ML (91.6%) of the total influent raw flow with 4,032 ML (3.9%) of reclaimed water provided to industrial customers. A summary of reclaimed water quality in 2019 is provided in Table 5.

Plant Bypass (Secondary and Primary)

- In 2019, Gold Bar WWTP had 92 days of secondary and primary plant bypasses. Total volume of secondary bypass in 2019 was 4,725 ML (4.5%). In addition, the total primary bypass volume was ~314 ML.

Uncommitted Hydraulic Reserve Capacity (Secondary Treatment)

- In 2019, Gold Bar WWTP had total dry weather volume of 99,464 ML. This volume is sum total of Outfall 10 effluent (95,432 ML) and membrane product water (4,032 ML). Outfall 10 effluent also includes wet weather flow that did not result in secondary bypass and any additional wet weather flow that had secondary treatment during plant secondary bypass events.
- Average dry weather flow in 2019 was 273 MLD. However, true dry weather flow was lower than 273 MLD and was approximately 263 MLD. This average flow excludes additional flow to the plant during snow melt or rainfall but includes Inflow and Infiltration (I&I). The true dry weather volume was approximately 95,915 ML.
- Based on 310 MLD of average secondary treatment capacity and true dry weather average of 263 MLD, uncommitted hydraulic reserve capacity for secondary treatment in 2019 was 47 MLD.

Additionally, in 2019, monitoring and reporting requirements were incorporated into the Approval to Operate 639-03-03 for air pollution control systems and ambient air quality, as per Table 3. Monitoring data can be found in Appendix D.

Table 3: Approval to Operate 639-03-03 Air Monitoring Requirements

Emission Source	Parameter	Frequency	Method of Monitoring	Sample Location	Reporting Frequency
Carbon scrubber during operation seasons	Temperature	Continuous	Temperature transmitter, record daily average	Influent air of carbon scrubber	As per 6.3.2, 6.3.4 and 6.3.5
	Air pressure		Air pressure transmitter, record daily average		
	H_2S		H_2S sensor, record daily average	Effluent air of carbon scrubber, effective July 1, 2020	
East scrubber; West Scrubber; EPT Scrubber; and Fermenter Scrubber	pH	Continuous	pH sensor, record daily average	Blowdown recirculation line before chemical makeup of each wet scrubber	As per 6.3.2, 6.3.4 and 6.3.5
	ORP		ORP sensor, record daily average		
East scrubber; West Scrubber; EPT Scrubber; and Fermenter Scrubber	H_2S	Continuous	H_2S sensor, record daily average	Influent air of each wet scrubber, effective July 1, 2020	As per 6.3.2, 6.3.4 and 6.3.5
	H_2S		H_2S sensor, record daily average	Effluent air of each wet scrubber	
	H_2S	Annually	Manual stack survey following the latest Alberta Stack Sampling Code	Effluent air of each wet scrubber, effective July 1, 2020	
N/A	H_2S	Daily when ambient temperature >0°C	Before ambient air monitoring station commissioned: low range H_2S analyzer, grab sample	Fence line of Gold Bar Wastewater Treatment Plant	As per 6.3.2, 6.3.4 and 6.3.5

Summary of 2019 Major Work Program

Major Maintenance includes activities within the Major Work Schedule as well as significant equipment failure and major Preventive Maintenance (PM) work on various plant assets. Major Maintenance is classified as having significant impact to Operations, high person-hour efforts, and/or large financial expenditures (capital or expense).

Most maintenance is completed at Gold Bar WWTP using internal work forces; however, when special skills are required to complete maintenance, contract services are utilized to complete specific tasks. Contract services used in 2019 included Tundra Boiler Controls for boiler maintenance, MAP Water & Sewer Services Ltd. for roadwork at Clover Bar Lagoons, and other contractors as required for weed control, tree trimming, asbestos abatement, lifting device certification and overhead crane repair, and EPCOR Technologies services for transformer maintenance.

Major Maintenance activities during 2019 included clarifier chain replacement on five clarifiers, UV bulb and hydraulic cylinder replacement in one UV disinfection channel, and boiler tube replacement in one boiler.

Buildings

- Ladder Audit of Gold Bar and Clover Bar
- Major repairs on Grit 1/2/3 clam shell
- Repair and re-piping of Plant 1 sump pits
- Repair of west scrubber building roof
- Installed new lifting device in Digester Square 2
- Replaced radiators on all three EPT rooftop air handling units

Digestion

- Replaced mixer on Blend Tank 2
- Compressor 103 and 106 rebuild
- K102 mechanical seal replacement
- Boiler 6, 7, 8, 9 inspection and recertification

Disinfection

- Channel 4 control board replacement
- Channel 3 bulb replacements and hydraulic work

Fermentation

- Cleaning and inspection was completed on Fermenter 3
- Fermenter 1 West TPS shaft repair and bearing replacement
- Fermenter 2 East TPS full overhaul
- Fermenter 3 TPS pump plunger replacement

Grounds

- Site restoration of Capilano park from spill
- Major asphalt repairs around Gold Bar site

Grit Recovery Facility

- Multiple sump cleanings and troubleshooting of facility

Lab

- Ice and snow guard added over walkway
- UPS power backup installed

Lagoons (Clover Bar)

- Multiple valve replacements at the pump house and chambers around Cell 3 East

Membrane Filtration

- Repair of product water discharge check valves

Nutrient Recovery Facility

- Dryer fan replacement
- Repair of leak on fluidization suction line

Odour Control

- Conductivity measurement trial on West and Fermenter Scrubbers
- West Scrubber and Fermenter Scrubber recycle pump replacement
- EPT scrubber major shutdown for multiple repairs (including replacement of sheaves on drive to reduce speed)
- Replaced control heads on both softened water systems

Pretreatment

- Wash presses for Screen 5 and 7 were rebuilt
- Grit tank 4, 5, 6, and 7 inspection and repairs (including replacement of Grit 7 incline auger - capital)
- Chain replacement in Screens 1, 2, and 3
- CSO screens overflow cleanup

Primary Treatment

- Cleaning and decommissioning of Primary 1 and 2
- Cleaning and inspection of Primary 3 and 4
- Cleaning and inspection of EPT 9, 10, 11, and 12
- Repair of Primary 7 sludge pump
- Primary 3 and 4 scum pump repair

Secondary Treatment

- Secondary 5 and 8 chain replacement with Type II loop chain
- Replaced Secondary Alum carrier water flow control valve
- Completed MoC adjustments to Secondary 1-8 pneumatic air valves
- Repaired flights in Secondary 1
- Secondary 2 RAS pump impeller replacement
- Replacement all shear pin sprockets in Secondary 5
- Replaced Secondary 6 WAS pump
- Secondary 9 pass 3 and 4 gearbox replacement

Sludge/ Supernatant Piping

- Valve replacements for various parts of the SSP lines

Utilities

- Generator 1 repair
- Transformer 18001 ongoing testing
- Transformer 19201 failure investigation
- Boiler 2, 3, 4, and 5 inspection and recertification
- Blower Building 2 FE pump repair
- Loop 6 glycol inspection

Waste Activated Sludge Thickening

- NDT on pressure vessels
- Rebuild south and center TWAS pump

TABLE 4: 2019 Gold Bar WWTP Performance

Summary of the Gold Bar Wastewater Treatment Plant performance from January 1 to December 31, 2019 as required under sections 6.3.3 of the Approval to Operate No. 639-03-03 . All analytical data in the table were developed on 24-hour composite samples collected using autosamplers at the sampling location specified in Table 5-1. The discrete samples for *Escherichia coli (E. coli)* determinations were collected at random times each day.

No instances of non-conformance with regards to monitoring requirements were reported to AEP in 2019.

Month		Flows (ML)							pH				TSS (mg/L)					
		Raw	Outfall 30	MPW	Outfall 20	EPEPS	Outfall 10		Raw	Outfall 30	Outfall 20	Outfall 10	Raw	Outfall 30	Outfall 20	EPEPS	Outfall 10	
							FEC	FE				FEC					FEC	FE
January	Avg	249.98	0.31	11.96	0.00	0.00	234.70	234.70	7.5	7.45	---	7.5	349	240	---	---	5.1	5.1
	Min	234.00	0.00	10.20	0.00	0.00	231.20	231.20	7.3	7.45	---	7.4	246	240	---	---	3.7	3.7
	Max	332.00	9.70	13.20	0.00	0.00	246.30	246.30	7.6	7.45	---	7.7	648	240	---	---	7.3	7.3
February	Avg	248.00	0.00	12.17	0.00	0.00	235.83	235.83	7.6	---	---	7.5	337	---	---	---	5.9	5.9
	Min	240.30	0.00	11.00	0.00	0.00	227.40	227.40	7.4	---	---	7.3	264	---	---	---	4.8	4.8
	Max	275.70	0.00	12.90	0.00	0.00	263.00	263.00	7.8	---	---	7.6	420	---	---	---	7.6	7.6
March	Avg	309.19	27.55	11.06	0.19	0.00	270.39	270.39	7.5	7.5	7.50	7.4	340	150	348	---	4.8	4.8
	Min	248.00	0.00	9.50	0.00	0.00	235.60	235.60	7.4	7.3	7.50	7.2	132	56	348	---	2.3	2.3
	Max	435.78	116.70	12.40	1.33	0.00	324.60	324.60	7.6	7.7	7.50	7.6	572	300	348	---	18.1	18.1
April	Avg	260.51	0.74	10.88	0.00	0.00	248.90	248.90	7.6	7.6	---	7.6	356	71	---	---	6.2	6.2
	Min	244.10	0.00	9.30	0.00	0.00	232.70	232.70	7.4	7.6	---	7.4	272	71	---	---	2.4	2.4
	Max	300.60	20.60	11.90	0.00	0.00	270.00	270.00	7.7	7.6	---	7.8	728	71	---	---	28.0	28.0
May	Avg	263.70	4.62	11.24	0.00	0.00	247.85	247.85	7.6	7.5	---	7.6	342	120	---	---	16.6	16.6
	Min	240.90	0.00	10.40	0.00	0.00	229.60	229.60	7.5	7.4	---	7.4	254	68	---	---	3.8	3.8
	Max	371.30	87.30	12.10	0.00	0.00	272.50	272.50	7.8	7.6	---	7.8	500	172	---	---	120	120
June	Avg	343.24	47.84	11.34	0.05	0.00	284.01	284.01	7.7	7.7	7.6	7.6	312	54	383	---	3.7	3.7
	Min	256.20	0.00	9.50	0.00	0.00	244.80	244.80	7.5	7.3	7.4	7.4	194	22	137	---	2.5	2.5
	Max	641.01	279.80	12.50	0.70	0.00	357.70	357.70	7.9	8.0	7.9	7.8	488	117	656	---	4.9	4.9
July	Avg	367.40	48.30	10.30	0.10	0.00	308.80	308.80	7.6	7.7	7.73	7.6	286	60	405	---	4.9	4.9
	Min	290.60	0.00	5.10	0.00	0.00	274.90	274.90	7.4	7.3	7.65	7.1	163	22	256	---	2.9	2.9
	Max	653.20	303.00	11.60	0.70	0.00	354.10	354.10	7.8	8.1	7.82	7.7	700	203	724	---	12.9	12.9
August	Avg	310.71	14.31	10.93	0.02	0.00	285.45	285.45	7.7	7.7	7.75	7.7	263	57	181	---	5.0	5.0
	Min	268.90	0.00	10.20	0.00	0.00	258.00	258.00	7.5	7.0	7.63	7.5	192	23	132	---	3.0	3.0
	Max	454.51	110.30	11.50	0.31	0.00	335.30	335.30	7.8	8.3	7.87	7.8	368	99	230	---	6.9	6.9
September	Avg	282.67	6.20	10.31	0.03	0.00	266.13	266.13	7.6	7.6	7.54	7.6	304	54	692	---	6.1	6.1
	Min	256.70	0.00	9.60	0.00	0.00	246.30	246.30	7.4	7.5	7.54	7.5	165	38	692	---	3.4	3.4
	Max	370.59	62.80	11.00	0.88	0.00	304.80	304.80	7.8	7.8	7.54	7.8	492	83	692	---	13.4	13.4
October	Avg	270.03	5.21	11.49	0.00	0.00	253.33	253.33	7.6	7.6	---	7.7	283	71	---	---	4.6	4.6
	Min	251.80	0.00	10.60	0.00	0.00	240.30	240.30	7.4	7.5	---	7.4	180	62	---	---	3.2	3.2
	Max	419.00	86.00	12.50	0.00	0.00	321.70	321.70	7.8	7.7	---	7.8	388	92	---	---	6.3	6.3
November	Avg	270.10	3.60	11.10	0.00	0.00	255.40	255.40	7.6	7.6	---	7.6	302	89	---	---	4.4	4.4
	Min	247.30	0.00	10.10	0.00	0.00	235.30	235.30	7.5	7.5	---	7.5	248	77	---	---	3.7	3.7
	Max	377.50	49.20	12.00	0.00	0.00	317.10	317.10	7.8	7.6	---	7.8	472	116	---	---	5.9	5.9
December	Avg	251.00	0.00	10.50	0.00	0.00	240.50	240.50	7.5	---	---	7.7	321	---	---	---	3.3	3.3
	Min	224.40	0.00	7.70	0.00	0.00	211.90	211.90	7.4	---	---	7.5	246	---	---	---	2.3	2.3
	Max	265.10	0.00	13.00	0.00	0.00	253.10	253.10	7.7	---	---	7.8	380	---	---	---	4.1	4.1
Annual Volume (ML)		96,418	4,725.00	3,707	10.01	0.00	87,976	87,976										
2019	Avg	286	13.2	11.1	0.03	0.00	261	261	7.6	7.6	7.6	7.6	316	97	402	---	5.9	5.9
2018	Avg	271	8.8	9.6	0.00	0.00	253	253	7.6	7.5	7.3	7.5	325	78	320	---	7.3	7.3

Month		BOD_5 (mg/L)				$CBOD_5$ (mg/L)		TP (mg P/L)						NH_3 (mg N/L)					
		Raw	Outfall 30	Outfall 20	EPEPS	Outfall 10		Raw	Outfall 30	Outfall 20	EPEPS	Outfall 10		Raw	Outfall 30	Outfall 20	EPEPS	Outfall 10	
						FEC	FE					FEC	FE					FEC	FE
January	Avg	335	271	---	---	3.6	3.6	7.70	5.98	---	---	0.29	0.29	38.0	42.8	---	---	1.58	1.58
	Min	228	271	---	---	3.0	3.0	6.20	5.98	---	---	0.22	0.22	30.7	42.8	---	---	0.37	0.37
	Max	454	271	---	---	5.0	5.0	9.70	5.98	---	---	0.37	0.37	50.5	42.8	---	---	3.97	3.97
February	Avg	331	---	---	---	3.9	3.9	8.07	---	---	---	0.35	0.35	44.8	---	---	---	2.51	2.51
	Min	258	---	---	---	3.0	3.0	6.80	---	---	---	0.26	0.26	38.4	---	---	---	0.86	0.86
	Max	408	---	---	---	4.0	4.0	10.3	---	---	---	1.31	1.31	49.1	---	---	---	3.65	3.65
March	Avg	303	137	140	---	3.1	3.1	6.25	3.32	4.06	---	0.25	0.25	32.1	25.4	16.80	---	4.03	4.03
	Min	151	97	140	---	2.0	2.0	3.46	0.60	4.06	---	0.15	0.15	20.6	15.6	16.80	---	0.76	0.76
	Max	432	232	140	---	6.0	6.0	8.11	4.60	4.06	---	0.73	0.73	45.2	33.0	16.80	---	6.36	6.36
April	Avg	306	107	---	---	3.5	3.5	7.96	4.09	---	---	0.33	0.33	43.7	43.5	---	---	5.43	5.43
	Min	199	107	---	---	< 2.0	< 2.0	6.63	4.09	---	---	0.18	0.18	35.1	43.5	---	---	3.35	3.35
	Max	373	107	---	---	9	9	10.80	4.09	---	---	0.99	0.99	47.9	43.5	---	---	9.62	9.62
May	Avg	290	107	---	---	5.2	5.2	7.48	3.68	---	---	0.70	0.70	39.0	30.4	---	---	8.76	8.76
	Min	218	102	---	---	2.0	2.0	5.25	3.52	---	---	0.21	0.21	25.7	26.7	---	---	3.47	3.47
	Max	369	112	---	---	18.0	18.0	9.04	3.83	---	---	3.96	3.96	45.8	34.0	---	---	14.6	14.6
June	Avg	214	76	80	---	2.5	2.5	6.93	2.82	2.94	---	0.23	0.23	36.6	28.5	8.6	---	2.32	2.32
	Min	112	40	35	---	1.0	1.0	3.87	1.49	1.33	---	0.18	0.18	17.4	18.9	6.0	---	0.19	0.19
	Max	354	151	117	---	4.0	4.0	9.00	5.00	4.06	---	0.29	0.29	51.1	44.0	11.4	---	5.20	5.20
July	Avg	193	74	60	---	2.2	2.2	6.20	2.64	2.72	---	0.34	0.34	31.6	28.6	9.05	---	1.86	1.86
	Min	77	25	52	---	< 1.0	< 1.0	2.90	0.93	2.29	---	0.18	0.18	13.5	13.0	6.33	---	0.07	0.07
	Max	266	245	65	---	5.0	5.0	8.59	5.87	3.32	---	0.81	0.81	46.7	41.9	10.8	---	4.36	4.36
August	Avg	240	103	83	---	2.6	2.6	6.66	4.74	1.86	---	0.31	0.31	29.4	30.5	7.24	---	1.48	1.48
	Min	193	29	63	---	1.0	1.0	4.33	1.49	1.65	---	0.21	0.21	15.6	17.7	7.17	---	0.14	0.14
	Max	322	234	103	---	4.0	4.0	9.30	7.48	2.07	---	0.49	0.49	40.7	44.8	7.31	---	3.08	3.08
September	Avg	261	101	139	---	3.0	3.0	7.63	4.97	5.51	---	0.38	0.38	40.2	36.1	14.6	---	2.90	2.90
	Min	143	64	139	---	2.0	2.0	5.51	3.10	5.51	---	0.29	0.29	23.2	21.1	14.6	---	0.64	0.64
	Max	373	154	139	---	4.0	4.0	12.4	6.92	5.51	---	0.67	0.67	49.1	43.4	14.6	---	6.91	6.91
October	Avg	282	114	---	---	3.1	3.1	7.42	3.23	---	---	0.28	0.28	39.9	24.0	---	---	2.72	2.72
	Min	158	79	---	---	2.0	2.0	3.99	2.04	---	---	0.17	0.17	21.6	18.2	---	---	0.77	0.77
	Max	338	154	---	---	4.0	4.0	11.4	4.06	---	---	0.42	0.42	48.3	28.6	---	---	4.70	4.70
November	Avg	308	159	---	---	2.8	2.8	7.78	4.75	---	---	0.28	0.28	40.3	34.2	---	---	2.69	2.69
	Min	233	102	---	---	1.0	1.0	6.22	3.26	---	---	0.17	0.17	26.2	26.3	---	---	0.95	0.95
	Max	393	257	---	---	4.0	4.0	12.2	5.96	---	---	0.42	0.42	45.4	38.4	---	---	5.24	5.24
December	Avg	339	---	---	---	2.5	2.5	7.45	---	---	---	0.22	0.22	41.3	---	---	---	1.79	1.79
	Min	281	---	---	---	1.0	1.0	6.90	---	---	---	0.17	0.17	34.2	---	---	---	0.71	0.71
	Max	414	---	---	---	4.0	4.0	8.65	---	---	---	0.26	0.26	46.2	---	---	---	3.82	3.82
2019	Avg	283	125	100	---	3.2	3.2	7.30	4.02	3.42	---	0.33	0.33	38.1	32.4	11.3	---	3.17	3.17
2018	Avg	299	125	127	---	3.8	3.8	7.21	4.23	2.56	---	0.38	0.38	36.8	30.0	11.1	---	2.35	2.35

Month		TKN (mg N/L)				NO_2+NO_3 (mg N/L)				Chloride (mg/L)				*E. coli* Counts/100 mL				Total Digested Sludge (ML)
		Raw	Outfall 30	Outfall 20	Outfall 10	Raw	Outfall 30	Outfall 20	Outfall 10	Raw	Outfall 30	Outfall 20	Outfall 10	Raw	Outfall 30	Outfall 20	Outfall 10	
					FEC				FEC				FEC	$X10^6$	$X10^6$	$X10^6$	FEC	
January	Avg	60.1	51.9	---	3.28	0.02	0.01	---	10.8	144	521	---	143	2.4	2.5	---	4	65.59
	Min	49.5	51.9	---	1.78	< 0.01	0.01	---	8.46	82	521	---	88	2.2	2.5	---	< 1	
	Max	69.2	51.9	---	5.40	0.07	0.01	---	13.0	382	521	---	390	2.6	2.5	---	23	
February	Avg	64.6	---	---	4.30	0.02	---	---	15.7	95	---	---	104	2.3	---	---	5	62.50
	Min	57.0	---	---	2.31	< 0.01	---	---	11.6	69	---	---	79.5	2.1	---	---	1	
	Max	76.6	---	---	6.02	0.04	---	---	19.6	141	---	---	238	2.5	---	---	17	
March	Avg	49.5	35.5	27.0	5.53	0.01	1.15	0.56	11.4	155	245	261	158	1.6	1.8	1.4	7	67.72
	Min	30.1	---	27.0	2.55	< 0.01	0.01	0.56	7.10	79	110	261	85	1.3	0.9	1.2	5	
	Max	65.3	46.4	27.0	7.91	0.02	2.66	0.56	17.3	320	453	261	314	2.0	8.5	1.6	19	
April	Avg	61.4	50.9	---	7.13	0.01	4.44	---	11.3	95	159	---	94	2.1	< 1	---	10	66.21
	Min	49.6	50.9	---	4.67	< 0.01	4.44	---	3.8	70	159	---	76	1.8	< 1	---	2	
	Max	70.4	50.9	---	12.6	0.03	4.44	---	15.0	124	159	---	112	2.4	< 1	---	26	
May	Avg	55.0	41.9	---	11.3	0.05	0.49	---	5.8	86	78	---	85	1.9	1.3	---	8	70.08
	Min	21.5	39.3	---	5.60	< 0.01	0.38	---	2.8	69	77	---	76	1.4	1.1	---	1	
	Max	65.3	44.4	---	17.4	0.09	0.61	---	9.3	98	79	---	94	2.7	1.5	---	60	
June	Avg	54.8	35.9	17.8	4.13	0.01	0.57	0.47	9.6	78	66	33	78	2.9	2.9	1.9	5	67.60
	Min	27.9	24.9	9.7	1.40	< 0.01	0.04	0.19	5.8	48	47	25	56	2.7	1.0	0	1	
	Max	75.6	52.3	23.4	6.69	0.03	2.10	0.78	12.5	92	91	36	88	3.0	9.5	18	29	
July	Avg	48.1	35.2	18.2	3.67	0.09	1.08	0.89	8.9	75	67	33	78	8.3	2.8	1.6	6	64.20
	Min	23.5	36.6	13.1	1.23	< 0.01	0.03	0.05	4.34	45	37	30	52	2.9	0.9	0.9	3	
	Max	67.3	51.8	20.8	6.68	0.44	4.79	1.70	15.2	100	90	38	93	24	8.6	3.8	14	
August	Avg	47.6	39.3	14.5	3.39	0.02	0.52	0.72	10.4	75	65	39	82	3.9	2.0	2.2	8	67.37
	Min	28.0	37.5	13.0	1.80	< 0.01	0.02	0.40	6.49	57	48	36	72	3.4	0.8	1.0	2	
	Max	67.4	53.4	16.0	5.18	0.03	1.25	1.04	13.0	89	94	41	90	4.5	6.0	4.8	22	
September	Avg	59.3	43.8	28.8	4.88	0.01	0.52	---	11.0	75	63	31	82	4.5	1.5	1.7	6	71.43
	Min	43.4	27.3	28.8	2.26	< 0.01	0.18	---	7.90	58	40	31	60	4.0	< 0.1	1.7	2	
	Max	85.2	51.8	28.8	8.10	0.03	1.41	---	15.1	90	78	31	94	5.0	6.8	1.7	34	
October	Avg	58.4	31.4	---	4.38	0.01	0.24	---	9.68	75	58	---	81	2.6	3.4	---	3	71.17
	Min	30.7	20.8	---	2.32	< 0.01	0.08	---	5.80	46	48	---	60	2.0	1.9	---	< 1	
	Max	66.4	38.4	---	5.88	< 0.01	0.33	---	13.0	84	72	---	94	3.4	9.9	---	12	
November	Avg	63.9	46.8	---	4.40	0.07	0.48	---	10.30	121	154	---	124	2.2	1.5	---	6	69.27
	Min	49.8	36.5	---	2.73	< 0.01	0.02	---	8.52	77	107	---	82	2.0	< 0.7	---	1	
	Max	90.9	52.6	---	7.0	0.25	1.43	---	13.60	308	210	---	266	2.4	3.5	---	18	
December	Avg	64.4	---	---	3.59	< 0.01	---	---	9.50	115	---	---	120	2.2	---	---	5	69.29
	Min	57.9	---	---	2.34	< 0.01	---	---	7.47	89.4	---	---	93.0	1.8	---	---	2	
	Max	72.9	---	---	6.14	< 0.01	---	---	11.5	229	---	---	207	2.6	---	---	16	
Annual Volume (ML)																		812.4
2019	Avg	57.3	41.3	21.3	5.00	0.03	0.95	0.66	10.4	99	148	79	102					
2018	Avg	56.1	38.5	17.1	4.28	0.04	0.93	0.28	10.3	102	137	36	108					

PBP – Plant Bypass
TBP – Total Bypass Plant (including plant and secondary)
SEC – Secondary Bypass Plant
EPE - Enhanced Primary Effluent
EPT – Enhanced Primary Treatment

FEC – Final Effluent, Combined
RAW – Influent
BOD_5 – 5-day Biological Oxygen Demand
$CBOD_5$ – 5-day Inhibited BOD

TSS – Total Suspended Solids
TP – Total Phosphorus
NH_3-N – Ammonia as nitrogen

MPW – Membrane Product Water
ns – No sample

Outfall 10 - Combined, UV-disinfected (FEC + EPE)
Outfall 20 – Combined Bypass (RAW + PE + EPE)
Outfall 30 - Combined Bypass (RAW + Screened + PE + EPE)

TABLE 5. 2019 Reclaimed Water Quality.

Summary of data developed on the ultrafiltered final effluent (*i.e.* reclaimed water) samples from January 1 to December 31, 2019 as required under section 4.2.2 (i) and 4.4.1 (j) of the Approval to Operate No. 639-03-03. All parameters except *E. coli* which were developed on daily 24-hour composite samples of the recycled water. The *E. coli* testing was conducted on discrete samples collected on a daily basis.

Month		FLOW ML	Total Alkalinity (mg CaCO3 /L)	Ammonia (mg N/L)	Biochemical Oxygen Demand (mg/L)	Chemical Oxygen Demand (mg/L)	Chloride (mg Cl/L)	Conductivity (mS/cm)	*E. coli* (Counts/100 mL)	pH	Total Suspended Solids (mg/L)	Total Organic Carbon (mg/L)	Total Phosphorus (mg P/L)	Total Dissolved Solids (mg/L)	Turbidity (NTU)
January	Avg	11.96	169	0.89	< 2	25	145	1,092	< 1	8.0	< 0.7	9.0	0.10	640	0.30
	Min	10.20	149	0.12	< 2	20	86.9	893	< 1	7.9	< 0.7	8.3	0.07	437	0.18
	Max	13.20	177	4.04	< 2	30	376	1,800	< 1	8.2	< 0.7	9.7	0.14	932	0.47
February	Avg	12.17	153	1.04	< 2	28	107	1,000	< 1	7.9	< 0.7	9.9	0.16	582	0.25
	Min	11.00	140	0.07	< 2	22	81.2	885	< 1	7.7	< 0.7	9.3	0.03	446	0.18
	Max	12.90	168	1.99	< 2	35	237	1,430	< 1	8.1	< 0.7	10.6	1.66	825	0.35
March	Avg	11.06	143	0.70	< 2	27	160	1,092	< 1	7.9	< 0.7	9.3	0.09	640	0.25
	Min	9.50	115	0.08	< 2	< 20	89.1	928	< 1	7.7	< 0.7	7.8	0.01	489	0.15
	Max	12.40	178	2.24	< 2	43	316	1,530	< 1	8.0	< 0.7	10.4	0.21	890	0.55
April	Avg	10.88	131	1.25	< 2	27	95.5	968	< 1	7.9	< 0.7	10.7	0.11	590	0.18
	Min	9.30	127	0.24	< 2	20	80.0	914	< 1	7.8	< 0.7	9.7	0.08	429	0.11
	Max	11.90	134	5.55	< 2	36	110	1,020	< 1	8.1	< 0.7	11.4	0.14	657	0.36
May	Avg	11.24	166	1.80	< 2	27	88.7	980	< 1	8.0	< 0.7	10.3	0.11	609	0.19
	Min	10.40	155	0.20	< 2	20	76.3	911	< 1	7.8	< 0.7	9.1	0.03	407	0.12
	Max	12.10	179	5.21	< 2	40	98.7	1,030	< 1	8.1	< 0.7	12.4	0.21	661	1.35
June	Avg	11.34	141	0.36	< 2	27	80.4	997	< 1	7.9	< 0.7	10.0	0.17	627	0.18
	Min	9.50	132	0.04	< 2	20	59.8	711	< 1	7.8	< 0.7	7.7	0.06	287	0.13
	Max	12.50	148	1.02	< 2	37	91.0	1,190	< 1	8.1	0.9	11.6	0.60	767	0.60
July	Avg	10.30	196	0.30	< 2	27	81.4	1,151	< 1	8.0	< 0.7	9.9	0.46	769	0.25
	Min	5.10	158	0.04	< 2	20	56.3	900	< 1	7.4	< 0.7	7.8	0.09	581	0.14
	Max	11.60	239	1.09	< 2	47	97.2	1,330	< 1	8.2	1.0	11.0	1.50	947	0.64
August	Avg	10.93	166	0.15	< 2	27	86.7	1,110	< 1	8.0	< 0.7	9.9	0.23	722	0.37
	Min	10.20	155	0.04	< 2	20	75.5	837	< 1	7.4	< 0.7	9.2	0.10	561	0.16
	Max	11.50	178	0.65	< 2	39	95.8	1,260	< 1	8.1	0.9	10.9	0.55	865	1.58
September	Avg	10.31	164	0.26	< 2	26	83.9	985	< 1	8.0	< 0.7	9.9	0.15	626	0.23
	Min	9.60	160	0.08	< 2	20	63.4	767	< 1	8.0	< 0.7	8.5	0.08	501	0.15
	Max	11.00	170	1.07	< 2	32	96.2	1,110	< 1	8.1	0.9	10.8	0.48	688	0.45
October	Avg	11.49	166	0.39	< 2	29	84.6	956	< 1	8.1	< 0.7	9.7	0.10	607	0.18
	Min	10.60	161	0.10	< 2	20	62.6	812	< 1	7.9	< 0.7	8.4	0.06	498	0.12
	Max	12.50	172	1.55	< 2	45	105	1,020	< 1	8.2	0.9	10.6	0.13	710	0.29
November	Avg	11.10	159	0.38	< 2	26	128	1,079	< 1	8.0	< 0.7	9.4	0.09	651	0.17
	Min	10.10	152	0.06	< 2	20	82.6	915	< 1	8.0	< 0.7	8.8	0.06	483	0.13
	Max	12.00	168	1.01	< 2	37	300	1,540	< 1	8.2	< 0.7	10.3	0.12	955	0.42
December	Avg	10.50	164	0.34	< 2	29	124	1,091	< 1	8.1	< 0.7	9.6	0.08	636	0.23
	Min	7.70	160	0.08	< 2	20	98.1	987	< 1	8.0	< 0.7	8.9	0.05	470	0.13
	Max	13.00	168	0.85	< 2	30	211	1,360	< 1	8.2	< 0.7	10.0	0.12	740	0.33
Annual Summary	Avg	11.11	160	0.65	< 2	27	105	1,042	< 1	8.0	< 0.7	9.8	0.15	642	0.23
	Min	5.10	115	0.04	< 2	< 20	56.3	711	< 1	7.4	< 0.7	7.7	0.01	287	0.11
	Max	13.20	239	5.55	< 2	47	376	1,800	< 1	8.2	1.0	12.4	1.66	955	1.58

Notes:

1) NTU – Nephelometric turbidity units.
2) Counts/100mL – Counts per 100 mL of sample.
3) ML – Megaliters (1,000,000 liters)

TABLE 6. 2019 Effluent Toxicity

Summary of chronic and acute toxicity testing as outlined in the sections 4.4.1 (i) and 6.1.1. of the Approval to Operate No. 639-03-03. Both acute and chronic toxicity tests were carried out by contract laboratories in accordance with the Environment Canada Biological Test Methods (Environment Canada 1990 and 1992). The acute testing included 48-hour Rainbow Trout static toxicity, 48-hour static toxicity using *Daphnia magna* and 15-minute Microtox tests using luminescence bacteria. Seven-day *Ceriodaphnia dubia* , Fathead minnows and three-day *P. subcapitata* survival and reproductive impairment tests were used to determine chronic toxicity.

No effluent toxic events observed in 2019.

Dates	Qrt	Microtox	*Daphnia Magna*	Rainbow Trout	*Ceriodaphnia dubia*				Fathead Minnows				*Pseudokirchneriella*				
					Survival		*Reproduction*		*Survival*		*Biomass*						
		% of Control	LC_{50} %[1]	LC_{50} %	LC_{25} %	LC_{50} %	IC_{25} %	IC_{50} %[2]	LC_{25} %	LC_{50} %	IC_{25} %	IC_{50} %	IC_{25} %[3]	NOEL (%)[4]	LOEL (%)[5]	TOEL (%)[6]	Toxic Units (TU)[7]
1/9/2019	1	>81.9	>100	>100		>100				>100			>91	91	>91	n/a	1099
2/13/2019		>81.9	>100	>100													
3/13/2019		>81.9	>100	>100													
4/11/2019	2	>81.9	>100	>100		>100				>100			>90.91	1.42	2.841	2.009	70.42
5/21/2019		>81.9	>100	>100													
6/13/2019		>81.9	>100	>100													
7/10/2019	3	>81.9	>100	>100		>100				>100			>90.91	1.42	2.841	2.009	70.42
8/13/2019		>81.9	>100	>100													
9/17/2019		>81.9	>100	>100													
10/10/2019	4	>81.9	>100	>100		>100				>100			>90.91	1.42	2.841	2.009	70.42
11/12/2019		>81.9	>100	>100													
12/11/2019		>81.9	>100	>100													

[1] LC50 - % effluent concentration at which there is a 50% mortality of test organisms; [2] IC50 - % effluent concentration at which there is a 50% reduction in growth or reproduction of test organisms; [3] IC25 - % effluent concentration at which there is a 25% reduction in growth or reproduction of test organisms; [4] NOEL - the concentration at which there was no observed effect level; [5] LOEL - the concentration at which you start seeing the lowest observable effect; [6] TOEL - NOEL/LOEL; [7] TU - the ratio of the concentration observed divided by the concentration for 50% inhibition.

TABLE 7. 2019 Summary of Gold Bar Wastewater Proficiency Testing

Summary of quality assurance data as required under sections 4.4.1 (m) of the Approval to Operate No. 639-03-03, and includes the Laboratory z-scores achieved from analyzing proficiency testing (PT) samples for constituents required by the Approval to Operate No. 639-03-03. The 2019 PT samples were provided by the Canadian Association for Laboratory Accreditation (CALA). A PT scores greater than or equal to 70 or z-scores less than or equal to 3.000 are considered acceptable for CALA PT.

Study	Date	pH		BOD		C-BOD		TSS		NH3-N		TP		*E.coli*	
		PT Score	Avg. z-score	PT Score	Avg. z-score	PT Score	Avg. z-score	PT Score	Avg. z-score	PT Score	Avg. z-score	PT Score	Avg. z-score	PT Score	Avg. z-score
CALA	May-19	92	0.48	90	0.69	93	-0.41	96	0.25	94	0.38	95	-0.36	90	-0.66
CALA	Oct-19	98	0.15	98	0.157	89	-0.74	91	-0.48	89	0.76	99	0.07	94	-0.32

Notes:

PT Score > 70 acceptable.

VH - Very high bias, H - High bias, L - Low bias, A - Acceptable, Q - Questionable, U - Unsatisfactory

CALA - Canadian Association for Laboratory Accreditation.

pH - pH manual, BOD - 5-day Biochemical Oxygen Demand, C-BOD - 5-day Carbonaceous Biochemical Oxygen Demand, TSS - Total Suspended Solids, NH3-N - Ammonia as Nitrogen, TP - Total Phosphorus.

E.coli - Sample analyzed using membrane filtration (mENDO) method.

Table 8: 2019 Environmental Release Reports & Administrative Non-Compliances

Summary of environmental release reports and administrative non-compliances as per section 6.3.3 (d) of Approval to Operate No. 639-03-03.

Date of Occurrence	ERS Incident Number	Location	Incident Description	Type	AEP Reference Number
7-Oct-19	ENV-20191008-287329	Gold Bar - Fenceline	Goldbar Approval to Operate details that we must complete fence line monitoring for H2S daily with our Jerome meter that reads to ppb. On Oct 3rd the Crew did not complete this task. From 7 day letter: The failure of EPCOR on October 3, 2019 to complete daily Hydrogen Sulphide (H2S) fence line sampling as outlined in our Approval to Operate. EPCOR reported the contravention by telephone on October 7, 2019 at approximately 12:00 pm to the 24 Hour Environmental Hotline of Alberta Environment and Parks (AEP).	Approval Not Met	359790

TABLE 9: 2019 List of Certified Wastewater Treatment Operators
(as of December 2019)

Name	Title	WWT Certification Level
Grossell, Ken M	Manager, Operations	IV
Schneider, Brian P	WWTP Operator Foreman	IV
Kerr, David A	WWTP HEI Coordinator	IV
Graham, Thomas A	WWTP Operator Foreman	IV
Jones, Kira I	WWTP Operator Foreman	IV
Kwan, Tom	WWTP Operator Foreman	IV
Espinosa, Diego F	WWTP Operator Foreman	IV
Lekamwasam, Janaka	WWTP Operator Foreman	IV
Sanche, Dagny	WWTP Training Coordinator	IV
Nunes, Michael	WWTP Lead Operator	III
Barrett, Jeremy L	Manager, Process Risk & Integration	III
Li, Bing (Frank)	WWTP Operator	III
Jama, Yusuf	WWTP Operator	III
Budden, Curt	WWTP Operator Foreman	III
Rindero, Billy	WWTP Operator Foreman	III
Hetherington, Clarke	WWTP Operator	III
Hahn, Kevin	WWTP Operator	III
Penner, Jody	WWTP Lead Operator	III
Sandouga, Sam	WWTP Lead Operator	III
Baker, Cole	WWTP Lead Operator	III
Holden, Derek	WWTP Operator	III
Nieuwenhuis, Andrew	WWTP Operator	III
Vogelgesang, Ryan	WWTP Operator	III
Jordan, Bradley	WWTP Lead Operator	II
Sontrop, Melanie	WWTP Operator	II
Diletzoy, Kyle	WWTP Operator	II
Rees, Emma	WWTP Operator	II
Omeragic, Armen	WWTP Operator	I
Downey, Anthony	WWTP Operator	I
Paglicauan, Jermine	WWTP Operator	I
Furber, Brandyn	WWTP Operator	I

TABLE 10: 2019 Summary of Gold Bar WWTP Odour Complaints

Number of odour complaints received within the Gold Bar WWTP Odour Response Boundaries and number of complaints where Gold Bar WWTP is the confirmed source of odour, based on wind direction, scrubber operation, and plant operations/maintenance.

Month	Number of Odour Complaints	Number of Complaints where Gold Bar WWTP is the Confirmed Source of Odour
January	10	5
February	1	1
March	2	1
April	2	0
May	0	0
June	1	0
July	1	1
August	3	1
September	2	1
October	1	1
November	0	0
December	3	3
Total	**26**	**14**

TABLE 11: Summary of 2019 Completed Projects and Planned Major Capital and Rehabilitation Projects

Program	Project/Scope	Completion
Plant Reliability		
	Secondary 5 Structural Rehab	Completed
	Distribution Chamber Rehab	Completed
	Screens 4/5/6 Gate and Actuator Replacements	Completed
	Odour Monitoring System	In Service
	Scum House 2/3 Ventilation Equipment Upgrades	In Service
	Replace 2.5 km Of Sludge Lines	In Service
	Headworks and Primary Aeration System Upgrades	Sept 2020
	Raise Overflow Weirs	Dec 2020
	Contractor Facilities Improvements	Dec 2020
	Channel 1 Major Inspection	Dec 2020
	Digester Square 1 Structural Rehab	Dec 2020
	EPT Ventilation Dilution Upgrades	Dec 2020
	Fermenter Rehab/Upgrades	Dec 2020
	Utility Water System Rehabilitation	Dec 2020
	Failed Terminal Heating Devices Replacement	Dec 2020
	Heating Loop 3 and 4 Rehabilitation	Dec 2020
	Grit Building 2 Ventilation Upgrades	Dec 2020
	West Screen Building Ventilation Uprades	Dec 2020
	Blower Building 1 Ventilation Upgrades	Dec 2020
	Safety and Equipment Davits	Dec 2020
	Air Scrubber Building 1 Ventilation	Dec 2020
	Square 1 Gas Room Expansion	Dec 2021
	Utility Hot Water System Rehabilitation	Dec 2021
	Stainless Chain Replacement	Dec 2021
	Plant Wide Monitoring System	Dec 2021
	EPT Scrubber Upgrades	Dec 2021
	Heating Loop 5 Rehab and Upgrade	Dec 2021
	Heating Loop 7 Rehab and Upgrade	Dec 2021
	Mechanical Rehab Secondaries 2-8	Dec 2021
	Diversion Structure Structural Rehab	Dec 2022
	Operations Center at Mid-Point Entrance	Dec 2023
Program Work		
	Isolation Upgrades	2019 work completed
	HVAC Rehabilitation	2019 work completed
	Buildings and Site Rehabilitation	2019 work completed
	Electrical Rehabilitation	2019 work completed
	Instrumentation Rehab and Upgrades	2019 work completed
	Control System Rehab and Improvements	2019work completed
	Mechanical Rehabilitation	2019 work completed
	Structural Rehabilitation	2019 work completed
	Membrane Rehabilitation	2019 work completed
	Clarifier Chain Rehabilitation	2019 work completed
	Plant Improvements	2019 work completed
	Process Improvements	2019 work completed
	Plant Equipment Upgrades	2019 work completed
	Fleet Replacement	2019 work completed
	Lab Equipment Replacement	2019 work completed
Digester Reliability		
	Digester 3 Upgrades	Commissioning
	Digester 4 Upgrades	On Hold
Clover Bar Improvements		
	Cloverbar Cell 1-4 Redevelopment	Dec 2023
	Cloverbar Valve, Chamber, and Piping Rehab	
Special Projects		
	Build Pipe Racks	Dec 2020
	NSR Flood Protection	Dec 2021
	Dewatering Facility	Dec 2023

2019 Biosolids Program Summary

In 2019, the biosolids management program was able to remove 28,202 dry tonnes (DT) of biosolids from the Clover Bar Lagoons for beneficial reuse. Biosolids production from Gold Bar WWTP and ACRWC was 27,412 DT, which lowered the storage inventory by 790 DT.

The following is a summary of the program:

Beneficial Application Use Method	Application Weight (dry tonnes)	Application Volume (m^3)
Composting (City of Edmonton)	1,537	6,148
Nutri-Gold (dewatered material)	2,857	11,428
Nutri-Gold (thickened material)	14,944	213,486
Agricultural Land Application (3rd party)	2,857	43,954
Non-Agricultural Land Application	6,007	24,028
Research Project	1.64*	6.6
Total	28,202	

*Included in Nutri-Gold dewatered material

Summaries of the Nutri-Gold, third party agricultural and non-agricultural land applications programs are included in Appendix E and Appendix F. Appendix G includes a brief summary of a University of Alberta study analyzing greenhouse gas emissions from various soil amendments, completed under authorization number 639-22749-SLU. The results of the composting operation are reported through the City of Edmonton composting facility approval #20440-01-00.

Appendix A – 2019 Plant Performance Reports

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
January 2019

PROVIDING MORE EPCOR

Digested Sludge: Total Monthly Volume (ML)	65.59

Volume of Flow (ML) / Liquid Stream Quality: pH@25°C, TSS (mg/L)

DATE	Peak Flow (MLD)	Influent RAW	Effluent Non UV Disinfected OUTFALL30	Non UV Disinfected MPW	Non UV Disinfected OUTFALL20	UV Disinfected EPEPS	UV Disinfected OUTFALL10 FEC	UV Disinfected OUTFALL10 FE	pH@25°C RAW	pH@25°C OUTFALL30	pH@25°C OUTFALL20	pH@25°C OUTFALL10 FEC	TSS RAW	TSS OUTFALL30	TSS OUTFALL20	TSS EPEPS	TSS OUTFALL10 FEC	TSS OUTFALL10 FE
Tue 01	318.5	234.0	0.0	10.2	0.0	0.0	223.8	223.8	7.6			7.5	344				4.4	4.4
Wed 02	374.3	251.8	0.0	10.2	0.0	0.0	241.6	241.6	7.4			7.6	396				5.5	5.5
Thu 03	368.6	262.7	0.0	10.5	0.0	0.0	252.2	252.2	7.6			7.6	343				6.2	6.2
Fri 04	320.7	252.1	0.0	11.5	0.0	0.0	240.6	240.6	7.5			7.5	406				5.2	5.2
Sat 05	306.8	236.8	0.0	11.7	0.0	0.0	225.1	225.1	7.4			7.6	416				5.4	5.4
Sun 06	319.8	240.3	0.0	11.4	0.0	0.0	228.9	228.9	7.5			7.6	344				4.7	4.7
Mon 07	320.9	248.3	0.0	11.9	0.0	0.0	236.4	236.4	7.6			7.5	316				6.3	6.3
Tue 08	304.7	240.6	0.0	11.6	0.0	0.0	229.0	229.0	7.6			7.7	308				5.1	5.1
Wed 09	318.5	243.5	0.0	11.5	0.0	0.0	232.0	232.0	7.5			7.5	312				5.8	5.8
Thu 10	335.2	239.9	0.0	11.5	0.0	0.0	228.4	228.4	7.5			7.5	336				3.7	3.7
Fri 11	329.9	243.2	0.0	11.6	0.0	0.0	231.6	231.6	7.5			7.5	360				5.1	5.1
Sat 12	334.1	240.4	0.0	11.6	0.0	0.0	228.8	228.8	7.3			7.5	332				4.0	4.0
Sun 13	358.2	240.5	0.0	11.4	0.0	0.0	229.1	229.1	7.4			7.5	648				4.4	4.4
Mon 14	333.1	249.6	0.0	11.6	0.0	0.0	238.0	238.0	7.4			7.5	300				5.6	5.6
Tue 15	331.7	246.4	0.0	11.9	0.0	0.0	234.5	234.5	7.5			7.5	336				4.5	4.5
Wed 16	331.4	243.0	0.0	11.4	0.0	0.0	231.6	231.6	7.5			7.5	372				4.9	4.9
Thu 17	333.9	242.3	0.0	10.9	0.0	0.0	231.4	231.4	7.5			7.5	304				5.2	5.2
Fri 18	329.9	243.6	0.0	12.2	0.0	0.0	231.4	231.4	7.5			7.5	324				4.6	4.6
Sat 19	345.5	249.3	0.0	13.0	0.0	0.0	236.3	236.3	7.6			7.5	340				7.3	7.3
Sun 20	353.1	246.1	0.0	12.9	0.0	0.0	233.2	233.2	7.6			7.6	312				5.2	5.2
Mon 21	340.4	246.6	0.0	13.0	0.0	0.0	233.6	233.6	7.5			7.6	340				4.7	4.7
Tue 22	336.8	246.6	0.0	13.1	0.0	0.0	233.5	233.5	7.5			7.6	300				4.9	4.9
Wed 23	337.3	247.2	0.0	13.0	0.0	0.0	234.2	234.2	7.6			7.5	345				4.5	4.5
Thu 24	332.5	248.5	0.0	12.9	0.0	0.0	235.6	235.6	7.6			7.6	246				4.8	4.8
Fri 25	325.9	247.8	0.0	12.9	0.0	0.0	234.9	234.9	7.6			7.6	332				6.5	6.5
Sat 26	447.6	280.9	9.7	13.2	0.0	0.0	258.0	258.0	7.5	7.5		7.5	400	240			4.9	4.9
Sun 27	418.0	332.9	0.0	12.7	0.0	0.0	320.2	320.2	7.5			7.4	310				4.6	4.6
Mon 28	342.2	254.9	0.0	12.1	0.0	0.0	242.8	242.8	7.6			7.5	328				4.8	4.8
Tue 29	336.1	247.0	0.0	12.3	0.0	0.0	234.7	234.7	7.5			7.6	296				4.2	4.2
Wed 30	334.4	243.8	0.0	12.6	0.0	0.0	231.2	231.2	7.6			7.6	372				4.5	4.5
Thu 31	346.1	258.7	0.0	12.4	0.0	0.0	246.3	246.3	7.5			7.5	392				6.3	6.3
Average	340.84	249.98	0.31	11.96	0.00	0.00	237.71	237.71	7.5	7.5	---	7.5	349	240	---	---	5.1	5.1
Minimum	304.70	234.00	0.00	10.20	0.00	0.00	223.80	223.80	7.3	7.5	---	7.4	246	240	---	---	3.7	3.7
Maximum	447.60	332.90	9.70	13.20	0.00	0.00	320.20	320.20	7.6	7.5	---	7.7	648	240	---	---	7.3	7.3
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	7,749	10	371	0.00	0	7,369	7,369	---	---	---	---	---	---	---	---	---	---

Liquid Stream Quality: BOD5/cBOD5 (mg/L), TP (mg/L), NH3-N (mg/L)

DATE	BOD5/cBOD5 RAW BOD5	OUTFALL30 BOD5	OUTFALL20 BOD5	EPEPS BOD5	OUTFALL10 FEC cBOD5	OUTFALL10 FE cBOD5	TP RAW	TP OUTFALL30	TP OUTFALL20	TP EPEPS	TP OUTFALL10 FEC	TP OUTFALL10 FE	NH3-N RAW	NH3-N OUTFALL30	NH3-N OUTFALL20	NH3-N EPEPS	NH3-N OUTFALL10 FEC	NH3-N OUTFALL10 FE
Tue 01	396				4	4	7.04				0.28	0.28	38.8				0.74	0.74
Wed 02	334				4	4	8.15				0.29	0.29	38.4				1.00	1.00
Thu 03	317				4	4	8.04				0.32	0.32	45.3				3.75	3.75
Fri 04	422				4	4	7.30				0.32	0.32	33.8				1.91	1.91
Sat 05	454				3	3	7.06				0.30	0.30	32.9				0.71	0.71
Sun 06	325				3	3	7.02				0.24	0.24	32.9				0.54	0.54
Mon 07	349				4	4	6.44				0.29	0.29	36.5				0.64	0.64
Tue 08	306				4	4	7.09				0.32	0.32	36.7				0.51	0.51
Wed 09	302				3	3	6.86				0.37	0.37	30.7				0.37	0.37
Thu 10	329				3	3	6.67				0.32	0.32	34.9				0.52	0.52
Fri 11	275				3	3	6.99				0.30	0.30	33.7				0.47	0.47
Sat 12	296				3	3	7.02				0.28	0.28	31.2				0.74	0.74
Sun 13	367				3	3	8.11				0.26	0.26	38.8				0.79	0.79
Mon 14	274				3	3	6.75				0.27	0.27	36.8				0.86	0.86
Tue 15	410				4	4	7.07				0.28	0.28	37.2				0.43	0.43
Wed 16	314				3	3	7.59				0.32	0.32	36.0				0.74	0.74
Thu 17	348				3	3	7.39				0.32	0.32	38.4				0.73	0.73
Fri 18	362				4	4	7.07				0.30	0.30	37.0				0.50	0.50
Sat 19	316				4	4	8.20				0.36	0.36	34.4				1.06	1.06
Sun 20	318				4	4	8.54				0.28	0.28	39.4				2.63	2.63
Mon 21	361				4	4	8.45				0.25	0.25	41.4				3.68	3.68
Tue 22	310				4	4	8.48				0.26	0.26	42.4				2.14	2.14
Wed 23	303				3	3	8.74				0.27	0.27	44.8				2.62	2.62
Thu 24	384				4	4	8.46				0.30	0.30	47.8				2.41	2.41
Fri 25	360				5	5	8.52				0.33	0.33	42.6				1.50	1.50
Sat 26	341	271			4	4	8.26	5.98			0.25	0.25	50.5	42.8			3.54	3.54
Sun 27	228				3	3	6.20				0.22	0.22	32.5				3.97	3.97
Mon 28	284				3	3	7.94				0.22	0.22	40.7				2.88	2.88
Tue 29	324				4	4	8.40				0.32	0.32	38.4				2.55	2.55
Wed 30	339				4	4	9.13				0.26	0.26	39.5				2.20	2.20
Thu 31	327				4	4	9.70				0.26	0.26	33.0				1.89	1.89
Average	335	271	---	---	3.6	3.6	7.70	5.98	---	---	0.29	0.29	38.0	42.8	---	---	1.58	1.58
Minimum	228	271	---	---	3	3	6.20	5.98	---	---	0.22	0.22	30.7	42.8	---	---	0.37	0.37
Maximum	454	271	---	---	5	5	9.70	5.98	---	---	0.37	0.37	50.5	42.8	---	---	3.97	3.97
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Liquid Stream Quality: un-ionized NH3-N (mg/L), TKN (mg/L), NO_2+NO_3 (mg/L), Chloride (mg/L), *E. coli* (Counts/100 mL)

DATE	un-ionized NH3-N OUT-FAL 30	OUT-FAL 20	OUT-FAL 10	TKN RAW	TKN OUTFALL30	TKN OUTFALL20	TKN OUTFALL10 FEC	NO_2+NO_3 RAW	NO_2+NO_3 OUTFALL30	NO_2+NO_3 OUTFALL20	NO_2+NO_3 OUTFALL10 FEC	Chloride RAW	Chloride OUTFALL30	Chloride OUTFALL20	Chloride OUTFALL10 FEC	*E. coli* RAW X10^6	*E. coli* OUTFALL30 X10^6	*E. coli* OUTFALL20 X10^6	*E. coli* OUTFALL10 FEC
Tue 01				53.5			2.27				10.7	130			115				10
Wed 02				61.3			2.44	< 0.07			10.5	328			151				2
Thu 03				58.4			5.40				10.3	255			323				23
Fri 04				55.2			3.69				11.7	164			218				13
Sat 05				56.6			2.44				10.1	159			179				14
Sun 06				55.9			2.09				10.1	114			150				9
Mon 07				53.6			2.25				10.2	123			124				10
Tue 08				57.0			2.02				10.3	117			126				4
Wed 09				55.8			1.78	< 0.01			11.5	101			114				15
Thu 10				52.0			2.04				12.3	97.9			106				5
Fri 11				60.2			2.12				11.6	100			106				5
Sat 12				58.4			2.36				10.0	102			110				4
Sun 13				62.0			2.54				8.46	82.0			98.6				4
Mon 14				59.4			2.36				8.84	90.9			89.0				10
Tue 15				55.9			2.23				10.5	94.6			98.0				6
Wed 16				62.8			2.68	< 0.01			11.0	84.3			96.7				5
Thu 17				63.4			2.85				9.78	85.5			91.9	2.6			3
Fri 18				62.0			2.36				11.9	82.9			91.2				7
Sat 19				66.2			3.59				11.0	82.8			94.8				4
Sun 20				68.6			4.92				11.1	97.6			87.7				2
Mon 21				62.6			4.99				11.2	106			94.4				< 1
Tue 22				61.2			3.78				12.4	104			117				5
Wed 23				65.1			4.26	0.01			13.0	107			119	2.2			1
Thu 24				63.2			3.85				11.0	110			111				4
Fri 25				62.2			3.35				12.3	175			118				1
Sat 26				58.7	51.9		4.96		0.01		11.5	382	521		224		2.5		5
Sun 27				49.5			5.40				9.54	369			390				4
Mon 28				61.7			4.51				10.9	125			266				5
Tue 29				64.0			4.58				10.7	107			155				3
Wed 30				69.2			3.92	< 0.01			11.3	119			116				5
Thu 31				68.9			3.72				10.2	278			155				1
Average	---	---	---	60.1	51.9	---	3.28	0.02	0.01	---	10.8	144	521	---	143	---	---	---	---
Minimum	---	---	---	49.5	51.9	---	1.78	< 0.01	0.01	---	8.46	82.0	521	---	87.7	2.2	2.5	---	< 1
Maximum	---	---	---	69.2	51.9	---	5.40	0.07	0.01	---	13.0	382	521	---	390	2.6	2.5	---	23
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.4	2.5	---	4
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the result.

Enhanced Primary Treatment (EPT) Usage					
Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage YTD
4	4	100%	4	4	100.00%

Report Comments

AEP Ref #

- RAW — Untreated Influent into the Plant
- INF — Untreated wastewater from collection system
- INFs — Influent, screened at the Headworks Diversion Structure
- PE — Primary Effluent from conventional primaries
- PE 30 — Primary Effluent from conventional primaries discharged via Outfall 30
- EPT — Enhanced Primary Treatment
- EPE — Enhanced Primary Effluent
- EPEPS — Enhanced Primary Effluent and Pump Station
- FE — Final Effluent from secondary treatment process (with biological nutrient removal). Pre-Ultraviolet disinfection.
- FEC — Combined pre-UV disinfection (FE+EPEPS)
- OUTFALL 10 — UV-disinfected, discharged via OUTFALL 10
- OUTFALL 20 — Combined Bypass (RAW + PE + EPE)
- OUTFALL 30 — Combined Bypass (INF + INFS + PE30 + EPE)
- MPW — Membrane Product Water (effluent re-use water)
- ML — Megalitre (1,000,000 Litres)
- MPN — Most Probable Number
- NR — No result
- NS — No sample
- INS — Insufficient sample

Abhishek Bhargava
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

PROVIDING MORE EPCOR

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
February 2019

Digested Sludge: Total Monthly Volume (ML)	62.50

Volume of Flow (ML)

DATE	Peak Flow (MLD)	Influent RAW	Effluent – Non UV Disinfected OUTFALL 30	Non UV Disinfected OUTFALL 20	Non UV Disinfected MPW	UV Disinfected OUTFALL 20	UV Disinfected EPEPS	UV Disinfected OUTFALL 10 FEC	UV Disinfected OUTFALL 10 FE
Fri-01	324.90	250.00	0.00	0.00	12.40	0.00	0.00	237.60	237.60
Sat-02	344.80	246.50	0.00	0.00	12.40	0.00	0.00	234.10	234.10
Sun-03	358.30	249.00	0.00	0.00	12.60	0.00	0.00	236.40	236.40
Mon-04	335.50	249.10	0.00	0.00	12.20	0.00	0.00	236.90	236.90
Tue-05	328.00	247.00	0.00	0.00	12.80	0.00	0.00	234.20	234.20
Wed-06	329.50	245.60	0.00	0.00	12.20	0.00	0.00	233.40	233.40
Thu-07	329.10	245.00	0.00	0.00	12.10	0.00	0.00	232.90	232.90
Fri-08	321.50	244.30	0.00	0.00	11.40	0.00	0.00	232.90	232.90
Sat-09	342.60	246.70	0.00	0.00	11.80	0.00	0.00	234.90	234.90
Sun-10	356.60	250.20	0.00	0.00	12.40	0.00	0.00	237.80	237.80
Mon-11	337.40	250.40	0.00	0.00	12.60	0.00	0.00	237.80	237.80
Tue-12	336.10	247.70	0.00	0.00	12.40	0.00	0.00	235.30	235.30
Wed-13	339.80	246.40	0.00	0.00	12.50	0.00	0.00	233.90	233.90
Thu-14	324.20	244.20	0.00	0.00	12.80	0.00	0.00	231.40	231.40
Fri-15	413.00	249.40	0.00	0.00	12.60	0.00	0.00	236.80	236.80
Sat-16	448.70	275.70	0.00	0.00	12.70	0.00	0.00	263.00	263.00
Sun-17	341.10	240.30	0.00	0.00	12.90	0.00	0.00	227.40	227.40
Mon-18	343.00	245.50	0.00	0.00	12.70	0.00	0.00	232.80	232.80
Tue-19	329.80	243.70	0.00	0.00	12.50	0.00	0.00	231.20	231.20
Wed-20	338.10	248.50	0.00	0.00	11.70	0.00	0.00	236.80	236.80
Thu-21	328.60	243.80	0.00	0.00	12.00	0.00	0.00	231.80	231.80
Fri-22	326.20	245.90	0.00	0.00	11.00	0.00	0.00	234.90	234.90
Sat-23	346.10	244.70	0.00	0.00	11.10	0.00	0.00	233.60	233.60
Sun-24	352.60	249.40	0.00	0.00	11.70	0.00	0.00	237.70	237.70
Mon-25	344.80	250.90	0.00	0.00	12.00	0.00	0.00	238.90	238.90
Tue-26	332.40	248.70	0.00	0.00	11.50	0.00	0.00	237.20	237.20
Wed-27	332.40	249.00	0.00	0.00	11.70	0.00	0.00	237.30	237.30
Thu-28	326.80	246.30	0.00	0.00	12.10	0.00	0.00	234.20	234.20
Average	343.28	248.00	0.00	0.00	12.17	0.00	0.00	235.83	235.83
Minimum	321.50	240.30	0.00	0.00	11.00	0.00	0.00	227.40	227.40
Maximum	448.70	275.70	0.00	0.00	12.90	0.00	0.00	263.00	263.00
GeoMean	---	---	---	---	---	---	---	---	---
TOTAL	---	6,944	0	0	341	0.00	0	6,603	6,603

Liquid Stream Quality

DATE	pH@25°C RAW	pH OUTFALL 30	pH OUTFALL 20	pH OUTFALL 10 FEC	TSS (mg/L) RAW	TSS OUTFALL 30	TSS OUTFALL 20	TSS EPEPS	TSS OUTFALL 10 FEC	TSS OUTFALL 10 FE	BOD₅/cBOD₅ (mg/L) RAW BOD₅	OUTFALL 30 BOD₅	OUTFALL 20 BOD₅	EPEPS BOD₅	OUTFALL 10 FEC cBOD₅	OUTFALL 10 FE cBOD₅	TP (mg/L) RAW	TP OUTFALL 30	TP OUTFALL 20	TP EPEPS	TP OUTFALL 10 FEC	TP OUTFALL 10 FE
Fri-01	7.6			7.6	372				5.1	5.1	294				3.0	3.0	10.3				0.30	0.30
Sat-02	7.5			7.5	356				5.7	5.7	332				4.0	4.0	8.74				0.41	0.41
Sun-03	7.5			7.6	324				6.7	6.7	348				4.0	4.0	9.46				0.29	0.29
Mon-04	7.7			7.4	368				6.5	6.5	408				4.0	4.0	9.39				0.32	0.32
Tue-05	7.4			7.5	328				6.3	6.3	316				4.0	4.0	9.16				0.32	0.32
Wed-06	7.6			7.5	320				6.2	6.2	258				3.0	3.0	8.40				0.33	0.33
Thu-07	7.6			7.4	340				4.8	4.8	318				4.0	4.0	8.30				0.26	0.26
Fri-08	7.5			7.4	264				5.2	5.2	345				4.0	4.0	7.76				0.28	0.28
Sat-09	7.6			7.5	348				5.0	5.0	354				4.0	4.0	8.42				0.29	0.29
Sun-10	7.6			7.6	352				5.1	5.1	379				4.0	4.0	7.77				0.30	0.30
Mon-11	7.6			7.5	408				5.5	5.5	327				3.0	3.0	8.67				0.30	0.30
Tue-12	7.5			7.4	284				6.3	6.3	337				4.0	4.0	7.81				1.31	1.31
Wed-13	7.6			7.5	340				5.6	5.6	306				4.0	4.0	7.80				0.34	0.34
Thu-14	7.6			7.5	312				6.0	6.0	357				4.0	4.0	8.90				0.29	0.29
Fri-15	7.5			7.4	412				5.8	5.8	365				4.0	4.0	8.48				0.32	0.32
Sat-16	7.5			7.5	392				5.3	5.3	262				4.0	4.0	7.01				0.28	0.28
Sun-17	7.6			7.4	272				5.0	5.0	275				4.0	4.0	7.22				0.28	0.28
Mon-18	7.5			7.4	320				5.8	5.8	334				4.0	4.0	8.72				0.29	0.29
Tue-19	7.6			7.5	300				6.2	6.2	340				4.0	4.0	6.80				0.30	0.30
Wed-20	7.5			7.5	304				7.6	7.6	331				4.0	4.0	7.26				0.31	0.31
Thu-21	7.6			7.5	304				7.2	7.2	343				4.0	4.0	7.60				0.33	0.33
Fri-22	7.5			7.3	328				6.2	6.2	303				4.0	4.0	8.38				0.34	0.34
Sat-23	7.8			7.5	420				6.7	6.7	343				4.0	4.0	7.53				0.34	0.34
Sun-24	7.5			7.4	290				6.6	6.6	352				4.0	4.0	6.95				0.36	0.36
Mon-25	7.6			7.5	312				5.4	5.4	376				4.0	4.0	7.24				0.33	0.33
Tue-26	7.7			7.5	292				6.0	6.0	318				4.0	4.0	7.22				0.34	0.34
Wed-27	7.5			7.4	396				6.0	6.0	338				4.0	4.0	7.15				0.33	0.33
Thu-28	7.5			7.4	368				6.4	6.4	317				4.0	4.0	7.48				0.33	0.33
Average	7.6	---	---	7.5	337	---	---	---	5.9	5.9	331	---	---	---	3.9	3.9	8.07	---	---	---	0.35	0.35
Minimum	7.4	---	---	7.3	264	---	---	---	4.8	4.8	258	---	---	---	3.0	3.0	6.80	---	---	---	0.26	0.26
Maximum	7.8	---	---	7.6	420	---	---	---	7.6	7.6	408	---	---	---	4.0	4.0	10.3	---	---	---	1.31	1.31
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

DATE	NH3-N (mg/L) RAW	NH3-N OUTFALL 30	NH3-N OUTFALL 20	NH3-N EPEPS	NH3-N OUTFALL 10 FEC	NH3-N OUTFALL 10 FE	TKN (mg/L) RAW	TKN OUTFALL 30	TKN OUTFALL 20	TKN OUTFALL 10 FEC	NO₂+NO₃ (mg/L) RAW	NO₂+NO₃ OUTFALL 30	NO₂+NO₃ OUTFALL 20	NO₂+NO₃ OUTFALL 10 FEC	Chloride (mg/L) RAW	Chloride OUTFALL 30	Chloride OUTFALL 20	Chloride OUTFALL 10 FEC	*E. coli* (Counts/100 mL) RAW X10^6	*E. coli* OUTFALL 30 X10^6	*E. coli* OUTFALL 20 X10^6	*E. coli* OUTFALL 10 FEC
Fri-01	42.5				3.12	3.12	72.6			4.91				11.6	141			238				5
Sat-02	38.4				3.62	3.62	63.2			6.02				12.0	93.0			150				6
Sun-03	45.3				3.59	3.59	68.0			5.48				13.5	75.8			103				4
Mon-04	47.9				2.99	2.99	68.5			4.92				13.9	77.5			80.4				5
Tue-05	45.1				3.42	3.42	63.6			5.63				13.8	79.4			83.6				5
Wed-06	46.2				3.65	3.65	62.9			5.59	0.01			13.1	76.0			83.7				1
Thu-07	45.8				3.02	3.02	62.6			4.62				13.8	72.5			85.0				3
Fri-08	43.5				2.36	2.36	67.0			3.39				14.6	84.4			87.7				7
Sat-09	46.2				3.03	3.03	68.3			4.65				14.0	73.2			88.6				4
Sun-10	43.5				2.92	2.92	63.8			5.03				14.2	68.9			79.5				1
Mon-11	42.1				3.53	3.53	67.5			5.40				14.8	83.9			79.7				6
Tue-12	46.6				3.31	3.31	63.0			5.48				12.8	88.5			83.0				5
Wed-13	43.7				2.68	2.68	62.1			4.49	0.04			14.9	88.5			90.2				6
Thu-14	45.6				3.32	3.32	63.8			4.94				16.4	85.4			92.1				5
Fri-15	44.1				2.26	2.26	63.4			4.06				17.8	87.2			86.3	2			10
Sat-16	41.0				3.52	3.52	57.0			5.28				15.4	74.7			86.4				5
Sun-17	45.0				2.77	2.77	62.8			4.30				15.8	81.5			81.9				4
Mon-18	45.9				2.62	2.62	76.6			3.86				17.3	80.9			91.7				5
Tue-19	43.4				2.19	2.19	58.8			3.28				17.4	102			85.9				4
Wed-20	45.3				1.00	1.00	67.0			3.02	< 0.01			16.6	127			109				7
Thu-21	45.4				0.88	0.88	64.6			2.64				17.5	135			135	3			2
Fri-22	45.0				1.31	1.31	61.9			2.31				17.9	125			133				6
Sat-23	47.7				1.81	1.81	64.8			3.84				17.7	122			134				7
Sun-24	45.5				2.45	2.45	62.0			4.24				19.2	104			113				12
Mon-25	49.1				2.09	2.09	64.1			4.59				17.0	101			99.1				12
Tue-26	47.0				0.98	0.98	62.9			2.99				19.6	103			103				15
Wed-27	44.2				1.01	1.01	63.4			2.90	< 0.01			19.2	111			103				17
Thu-28	43.6				0.86	0.86	62.0			2.59				18.0	114			115				9
Average	44.8	---	---	---	2.51	2.51	64.6	---	---	4.30	0.02	---	---	15.7	94.9	---	---	104	---	---	---	---
Minimum	38.4	---	---	---	0.86	0.86	57.0	---	---	2.31	< 0.01	---	---	11.6	68.9	---	---	79.5	2	---	---	1
Maximum	49.1	---	---	---	3.65	3.65	76.6	---	---	6.02	0.04	---	---	19.6	141	---	---	238	3	---	---	17
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	---	---	5
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage

Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD	% Usage
0	0	100%	4	4	100.00%

Report Comments

1	RAW - February 28: Analysis of this sample exceeded the recommended holding time for BOD.

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW	Untreated Influent into the plant
INF	Untreated Wastewater from collection system
INFs	Influent, screened at the Headworks Diversion Structure
PE	Primary Effluent from conventional primaries
PE 30	Primary Effluent from conventional primaries discharged via Outfall 30
EPT	Enhanced Primary Treatment
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent and Pump Station
FE	Final Effluent from secondary treatment process (with biological nutrient removal).
FEC	Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10	UV-disinfected, discharged via OUTFALL 10
OUTFALL 20	Combined Bypass (RAW + PE + EPE)
OUTFALL 30	Combined Bypass (INF + INFS + PE30 + EPE)
MPW	Membrane Product Water (Effluent re-use water)
ML	Megalitre (1,000,000 Litre)
MPN	Most Probable Number
NR	No Result
NS	No Sample
INS	Insufficient Sample

Abhishek Bhargava
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
March 2019

PROVIDING MORE EPCOR

Digested Sludge: Total Monthly Volume (ML)	67.72

Volume of Flow (ML)

DATE	Peak Flow (MLD)	Influent	Effluent					
			Non UV Disinfected			UV Disinfected		
							OUTFALL 10	
	RAW	RAW	OUTFALL 30	OUTFALL 20	MPW	EPEPS	FEC	FE
Fri-01	329.00	250.50	0.00	0.00	12.20	0.00	238.30	238.30
Sat-02	348.10	250.10	0.00	0.00	12.30	0.00	237.80	237.80
Sun-03	353.60	248.00	0.00	0.00	12.40	0.00	235.60	235.60
Mon-04	347.10	256.60	0.00	0.00	12.20	0.00	244.40	244.40
Tue-05	335.50	253.20	0.00	0.00	12.30	0.00	240.90	240.90
Wed-06	335.10	250.30	0.00	0.00	10.80	0.00	239.50	239.50
Thu-07	339.70	258.00	0.00	0.00	10.40	0.00	247.60	247.60
Fri-08	328.60	249.60	0.00	0.00	11.40	0.00	238.20	238.20
Sat-09	358.20	248.60	0.00	0.00	9.90	0.00	238.70	238.70
Sun-10	365.20	249.70	0.00	0.00	9.50	0.00	240.20	240.20
Mon-11	369.90	260.60	0.00	0.00	10.10	0.00	250.50	250.50
Tue-12	414.90	277.72	0.00	0.02	10.70	0.00	267.00	267.00
Wed-13	474.10	289.77	20.80	0.07	11.20	0.00	257.70	257.70
Thu-14	470.60	287.10	14.10	0.30	11.30	0.00	261.40	261.40
Fri-15	533.80	322.07	39.30	0.77	11.00	0.00	271.00	271.00
Sat-16	541.40	321.67	37.20	0.97	10.70	0.00	272.80	272.80
Sun-17	815.20	396.73	103.90	1.13	10.20	0.00	281.50	281.50
Mon-18	751.90	426.33	114.10	1.33	9.60	0.00	301.30	301.30
Tue-19	787.60	435.78	116.70	0.78	10.60	0.00	307.70	307.70
Wed-20	698.90	426.30	101.80	0.00	10.80	0.00	313.70	313.70
Thu-21	698.30	423.80	98.00	0.00	10.40	0.00	315.40	315.40
Fri-22	580.50	399.20	63.80	0.00	10.80	0.00	324.60	324.60
Sat-23	546.90	358.70	39.10	0.00	11.40	0.00	308.20	308.20
Sun-24	474.60	318.80	3.40	0.00	11.70	0.00	303.70	303.70
Mon-25	460.00	295.30	0.00	0.00	11.70	0.00	283.60	283.60
Tue-26	511.90	307.90	17.60	0.00	11.50	0.00	278.80	278.80
Wed-27	421.10	302.90	1.50	0.00	11.50	0.00	289.90	289.90
Thu-28	376.10	292.00	0.00	0.00	11.10	0.00	280.90	280.90
Fri-29	367.80	284.60	0.00	0.00	10.60	0.00	274.00	274.00
Sat-30	379.80	280.10	0.00	0.00	11.30	0.00	268.80	268.80
Sun 31	375.20	275.20	0.00	0.00	10.80	0.00	264.40	264.40
Average	477.42	309.19	27.55	0.19	11.06	0.00	270.39	270.39
Minimum	328.60	248.00	0.00	0.00	9.50	0.00	235.60	235.60
Maximum	815.20	435.78	116.70	1.33	12.40	0.00	324.60	324.60
GeoMean	---	---	---	---	---	---	---	---
TOTAL	---	9,497	771	5.37	342	0	8,378	8,378

Liquid Stream Quality

DATE	pH@25°C				TSS (mg/L)					BOD$_5$/cBOD$_5$ (mg/L)						TP (mg/L)					NH3-N (mg/L)					TKN (mg/L)				NO_2+NO_3 (mg/L)				Chloride (mg/L)				*E. coli* (Counts/100 mL)			
															OUTFALL 10																											
	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE	RAW	BOD$_5$	BOD$_5$	BOD$_5$	cBOD$_5$	cBOD$_5$	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Fri-01	7.4	398							4.8	4.8	347				4.0	4.0	7.2				0.33	0.33	42.0				2.55		58.4			17.3	98.9			123				6
Sat-02	7.6	328							6.4	6.4	412				4.0	4.0	7.86				0.35	0.35	42.0				2.18	2.18	57.3			17.1	79.6			112				8
Sun-03	7.5	356							5.3	5.3	258				3.0	3.0	7.94				0.33	0.33	45.2				2.70	2.70	61.2			16.6	78.6			88.1				8
Mon-04	7.6	348							18.1	18.1	364				6.0	6.0	8.11				0.73	0.73	39.7				5.74	5.74	65.3			15.1	84.2			84.9				5
Tue-05	7.4	336							8.0	8.0	352				4.0	4.0	7.70				0.35	0.35	22.4				4.24	4.24	63.5			15.1	98.0			97.4				12
Wed-06	7.5	340							6.2	6.2	362				4.0	4.0	7.42				0.33	0.33	37.0				2.19	2.19	61.6			16.2	97.6			102				5
Thu-07	7.5	384							6.5	6.5	288				4.0	4.0	7.42				0.35	0.35	43.5				3.49	3.49	64.6			16.0	97.0			100				7
Fri-08	7.5	424							5.2	5.2	406				3.0	3.0	7.47				0.32	0.32	43.0				3.86	3.86	63.2			11.2	102			106				6
Sat-09	7.5	392							3.6	3.6	314				3.0	3.0	6.93				0.27	0.27	31.5				4.23	4.23	53.8			10.9	170			121				5
Sun-10	7.5	328							4.4	4.4	372				3.0	3.0	6.53				0.27	0.27	34.4				3.36	3.36	51.4			10.9	164			158				5
Mon-11	7.6	356							3.6	3.6	334				4.0	4.0	6.70				0.25	0.25	21.6				5.00	5.00	52.6			9.9	297			172				6
Tue-12	7.4	280							4.4	4.4	332				3.0	3.0	6.10				0.27	0.27	32.5				4.87	4.87	46.5			9.0	320			280				14
Wed-13	7.5	348	300						4.9	4.9	328	232			3.0	3.0	7.33	2.14			0.20	0.20	32.2	33.0			2.94	2.94	55.2	46.4		4.10	< 0.01	0.99		8.6	243	453		314		6		6
Thu-14	7.6	536	232						2.8	2.8	361	163			2.0	2.0	7.63	4.60			0.18	0.18	32.1	33.0			3.60	3.60	55.8	42.0		4.89		1.96		8.2	282	384		274		1		5
Fri-15	7.5	572	222						4.0	4.0	322	135			4.0	4.0	6.76	4.24			0.21	0.21	31.0	27.6			4.30	4.30	63.0	37.1		5.66		1.71		9.4	266	376		268		9		14
Sat-16	7.5	356	158						3.2	3.2	378	138			2.0	2.0	5.79	3.60			0.19	0.19	30.3	27.2			3.08	3.08	44.4	34.8		6.13		2.66		9.3	247	330		255		2		6
Sun-17	7.4	488	262						4.8	4.8	295	97			3.0	3.0	5.38	3.79			0.22	0.22	23.8	18.8			4.82	4.82	41.2	32.0		5.66		2.56		9.0	256	312		237		2		8
Mon-18	7.4	246	173						3.0	3.0	151	126			3.0	3.0	3.46	3.32			0.15	0.15	22.7	15.6			2.48	2.48	31.6	31.0		3.67		0.94		8.9	240	271		235		2	1	5
Tue-19	7.4	310	117	348					5.9	5.9	240	137	140		3.0	3.0	4.62	3.36	4.06		0.24	0.24	22.0	22.9	16.8		2.62	2.62	37.2	30.9	27.0	4.12		1.29	0.56	8.2	204	215	261	218		1	2	5
Wed-20	7.2	237	85						3.1	3.1	180	117			3.0	3.0	3.90	3.17			0.17	0.17	20.6	17.8			3.21	3.21	30.1	29.8		4.06	< 0.01	1.46		7.1	159	176		190	1	1		6
Thu-21	7.5	388	108						4.4	4.4	171	101			3.0	3.0	4.44	3.49			0.18	0.18	20.6	23.1			3.26	3.26	34.7	31.7		4.73		1.33		8.6	135	138		156		1		11
Fri-22	7.4	257	105						4.3	4.3	186	130			3.0	3.0	5.09	0.60			0.19	0.19	25.9	26.6			3.77	3.77	38.4	36.6		5.43		0.21		8.0	124	125		132		1		5
Sat-23	7.4	284	98						3.7	3.7	188	107			2.0	2.0	5.32	3.82			0.18	0.18	23.5	25.7			5.35	5.35	40.4	38.5		6.37		0.25		9.1	111	113		123		1		10
Sun-24	7.4	254	80						4.2	4.2	289	119			3.0	3.0	5.72	3.70			0.19	0.19	34.6	26.1			6.31	6.31	48.0	34.1		7.27		0.28		9.6	105	110		112		1		5
Mon-25	7.4	204							3.5	3.5	230				3.0	3.0	5.70				0.17	0.17	35.0				6.36	6.36	49.5			7.68				10.9	106			114				9
Tue-26	7.5	340	110						3.0	3.0	292	165			2.0	2.0	6.32	3.96			0.17	0.17	33.2	29.8			5.64	5.64	48.2	39.8		6.60		0.41		11.3	157	232		118		2		7
Wed-27	7.5	132	56						4.3	4.3	222	150			3.0	3.0	4.62	2.64			0.18	0.18	32.3	28.9			4.73	4.73	39.4	32.6		5.37	< 0.01	0.01		10.9	113	190		159		2		10
Thu-28	7.4	300							3.4	3.4	308				3.0	3.0	5.89				0.15	0.15	32.4				5.47	5.47	41.0			6.20				11.7	97.4			124	2			19
Fri-29	7.6	286							2.3	2.3	321				2.0	2.0	6.08				0.15	0.15	35.4				4.93	4.93	44.0			5.98				11.80	97.5			111				11
Sat-30	7.6	408							3.0	3.0	432				2.0	2.0	6.27				0.16	0.16	34.6				4.92	4.92	46.6			5.90				13.00	85.3			110				5
Sun 31	7.5	320							3.2	3.2	349				3.0	3.0	6.14				0.19	0.19	37.0				4.490	4.49	46.6			5.62				13.2	90.1			102				5
Average	7.4	340	150	348	---	4.8	4.8	303	137	140	---	3.1	3.1	6.25	3.32	4.06	---	0.25	0.25	32.1	25.4	16.8	---	4.03	4.03	49.5	35.5	27.0	5.53	0.01	1.15	0.56	11.4	155	245	261	158	---	---	---	---
Minimum	7.2	132	56	348	---	2.3	2.3	151	97	140	---	2.0	2.0	3.46	0.60	4.06	---	0.15	0.15	20.6	15.6	16.8	---	0.76	0.76	30.1	---	27.0	2.55	< 0.01	0.01	0.56	7.1	78.6	110	261	84.9	1	1	1	5
Maximum	7.6	572	300	348	---	18.1	18.1	432	232	140	---	6.0	6.0	8.11	4.60	4.06	---	0.73	0.73	45.2	33.0	16.8	---	6.36	6.36	65.3	46.4	27.0	7.91	0.02	2.66	0.56	17.3	320	453	261	314	2	9	2	19
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	2	1	7
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage					
Total Bypass (hrs)	EPT Usage (hrs)	% Ussage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
131	131	100%	135	135	100.00%

Report Comments

1	OUTFALL 20 - March 12 through March 17: Flow of snowmelt not sewage.

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW	Untreated Influent into the plant
INF	Untreated Wastewater from collection system
INFs	Influent, screened at the Headworks Diversion Structure
PE	Primary Effluent from conventional primaries
PE 30	Primary Effluent from conventional primaries discharged via Outfall 30
EPT	Enhanced Primary Treatment
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent and Pump Station
FE	Final Effluent from secondary treatment process (with biological nutrient removal).

FEC	Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10	UV-disinfected, discharged via OUTFALL 10
OUTFALL 20	Combined Bypass (RAW + PE + EPE)
OUTFALL 30	Combined Bypass (INF + INFS + PE30 + EPE)
MPW	Membrane Product Water (Effluent re-use water)
ML	Megalitre (1,000,000 Litre)
MPN	Most Probable Number
NR	No Result
NS	No Sample
INS	Insufficient Sample

Abhishek Bhargava
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
April 2019

PROVIDING MORE EPCOR

Digested Sludge: Total Monthly Volume (ML)	66.21

Volume of Flow (ML)

DATE	Peak Flow (MLD)	Influent	Effluent					
			Non UV Disinfected			UV Disinfected		
			OUTFALL 30	OUTFALL 20	MPW	EPEPS	OUTFALL 10	
	RAW						FEC	FE
Mon-01	278.7	368.9	0.0	0.0	10.6	0.0	268.1	268.1
Tue-02	270.3	352.9	0.0	0.0	10.9	0.0	259.4	259.4
Wed-03	268.7	370.1	0.0	0.0	10.7	0.0	258.0	258.0
Thu-04	267.3	433.9	0.0	0.0	10.1	0.0	257.2	257.2
Fri-05	264.1	325.0	0.0	0.0	10.4	0.0	253.7	253.7
Sat-06	262.1	346.6	0.0	0.0	11.0	0.0	251.1	251.1
Sun-07	265.7	370.9	0.0	0.0	10.9	0.0	254.8	254.8
Mon-08	264.2	345.7	0.0	0.0	11.0	0.0	253.2	253.2
Tue-09	257.7	323.7	0.0	0.0	10.9	0.0	246.8	246.8
Wed-10	260.5	348.0	0.0	0.0	10.7	0.0	249.8	249.8
Thu-11	257.7	319.5	0.0	0.0	9.3	0.0	248.4	248.4
Fri-12	257.5	325.8	0.0	0.0	10.0	0.0	247.5	247.5
Sat-13	257.6	353.6	0.0	0.0	10.6	0.0	247.0	247.0
Sun-14	258.0	354.2	0.0	0.0	10.9	0.0	247.1	247.1
Mon-15	260.4	344.6	0.0	0.0	11.5	0.0	248.9	248.9
Tue-16	255.4	319.6	0.0	0.0	11.8	0.0	243.6	243.6
Wed-17	251.7	321.5	0.0	0.0	11.9	0.0	239.8	239.8
Thu-18	251.8	322.0	0.0	0.0	11.7	0.0	240.1	240.1
Fri-19	248.1	348.0	0.0	0.0	10.7	0.0	237.4	237.4
Sat-20	245.0	344.7	0.0	0.0	11.5	0.0	233.5	233.5
Sun-21	244.1	344.7	0.0	0.0	11.4	0.0	232.7	232.7
Mon-22	254.1	350.2	0.0	0.0	11.1	0.0	243.0	243.0
Tue-23	254.9	329.0	0.0	0.0	11.5	0.0	243.4	243.4
Wed-24	252.5	317.8	0.0	0.0	11.3	0.0	241.2	241.2
Thu-25	255.3	317.0	0.0	0.0	11.1	0.0	244.2	244.2
Fri-26	256.2	325.5	0.0	0.0	11.0	0.0	245.2	245.2
Sat-27	300.6	521.6	20.6	0.0	10.0	0.0	270.0	270.0
Sun-28	274.2	396.7	0.0	0.0	10.2	0.0	264.0	264.0
Mon-29	261.3	351.5	0.0	0.0	10.0	0.0	251.3	251.3
Tue-30	264.5	352.3	0.0	0.0	10.6	0.0	253.9	253.9
Average	260.51	351.49	0.74	0.00	10.88	0.00	248.90	248.90
Minimum	244.10	317.00	0.00	0.00	9.30	0.00	232.70	232.70
Maximum	300.60	521.60	20.60	0.00	11.90	0.00	270.00	270.00
GeoMean	---	---	---	---	---	---	---	---
TOTAL	7,820	---	21	0.00	325	0	7,474	7,474

Liquid Stream Quality

DATE	pH@25°C				TSS (mg/L)					BOD$_5$/cBOD$_5$ (mg/L)						TP (mg/L)					NH3-N (mg/L)					TKN (mg/L)				NO$_2$+NO$_3$ (mg/L)				Chloride (mg/L)				*E. coli* (Counts/100 mL)			
															OUTFALL 10																												
	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10	RAW	OUTFALL 30	OUTFALL 20	EPEPS	FEC	FE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10
				FEC					FEC	BOD$_5$	BOD$_5$	BOD$_5$	BOD$_5$	cBOD$_5$	cBOD$_5$					FEC					FEC				FEC													
Mon-01	7.6			7.4	300				3.1	220				< 2.0	< 2.0	6.63				0.18	36.8				3.83	50.4			4.97				15.0	93.0			98.7				5
Tue-02	7.4			7.6	332				2.5	321				3.0	3.0	6.64				0.20	35.1				3.35	52.2			4.67				11.3	84.1			110				14
Wed-03	7.6			7.5	304				3.3	266				3.0	3.0	6.71				0.20	36.5				4.51	49.6			5.54	0.03			10.1	95.8			112				15
Thu-04	7.5			7.6	360				2.4	199				2.0	2.0	7.21				0.21	40.4				4.73	52.6			5.87				10.4	98.2			109				12
Fri-05	7.5			7.5	348				4.0	256				3.0	3.0	7.90				0.25	46.4				4.69	65.2			5.96				12.8	109			103				10
Sat-06	7.6			7.6	728				6.0	369				3.0	3.0	8.84				0.29	46.3				3.53	67.6			6.17				12.4	100			103				13
Sun-07	7.6			7.5	360				5.0	292				3.0	3.0	7.53				0.27	37.6				6.14	63.3			7.10				13.3	100			99.1				17
Mon-08	7.5			7.6	272				5.9	275				3.0	3.0	7.46				0.28	42.8				5.78	61.6			7.20				12.2	105			93.6				12
Tue-09	7.5			7.5	356				4.6	373				2.0	2.0	8.05				0.26	42.1				4.16	62.0			5.44				13.4	105			105				15
Wed-10	7.7			7.8	352				4.9	316				3.0	3.0	7.70				0.29	43.5				4.06	59.8			5.71	0.01			13.8	113			99.0				14
Thu-11	7.5			7.5	326				5.4	293				3.0	3.0	8.11				0.28	40.4				4.38	57.6			6.03				12.6	110			102				13
Fri-12	7.6			7.6	348				4.8	329				3.0	3.0	7.79				0.30	43.1				5.28	62.7			6.82				10.2	106			97.8				14
Sat-13	7.6			7.7	368				4.6	330				3.0	3.0	8.61				0.28	44.1				6.11	62.9			7.30				11.3	97.7			98.5				8
Sun-14	7.6			7.7	332				5.3	304				4.0	4.0	7.40				0.29	45.8				6.15	58.6			8.01				10.1	95.2			92.2				11
Mon-15	7.6			7.6	386				5.2	296				3.0	3.0	7.32				0.33	47.1				7.11	56.0			8.59				7.88	102			89.1				10
Tue-16	7.6			7.6	576				4.8	325				3.0	3.0	8.01				0.28	47.0				4.65	59.7			6.21				11.8	100			90.4	2			12
Wed-17	7.6			7.6	328				5.8	326				4.0	4.0	7.87				0.36	46.8				4.45	60.8			6.35	< 0.01			11.5	89.3			89.1	2			8
Thu-18	7.6			7.6	360				5.3	316				4.0	4.0	8.37				0.30	47.5				4.34	58.9			5.82				12.4	86.4			89.0				6
Fri-19	7.7			7.5	336				6.0	333				3.0	3.0	9.93				0.35	46.5				4.72	63.2			6.59				14.1	75.6			85.7				7
Sat-20	7.7			7.6	336				4.2	373				4.0	4.0	10.80				0.25	47.7				5.08	65.5			6.78				13.6	70.2			79.0				6
Sun-21	7.7			7.6	336				3.4	364				3.0	3.0	9.28				0.25	45.1				5.29	66.0			6.06				14.0	74.2			76.1				5
Mon-22	7.6			7.6	316				3.6	307				3.0	3.0	9.20				0.21	44.0				5.20	68.0			6.27				14.3	85.4			79.0				2
Tue-23	7.7			7.6	327				3.8	322				3.0	3.0	9.18				0.24	45.9				6.52	67.4			8.24				10.2	76.6			83.6				5
Wed-24	7.6			7.7	348				4.2	214				3.0	3.0	7.92				0.26	47.9				6.28	70.4			8.23	0.01			10.2	98.1			86.4				13
Thu-25	7.4			7.5	300				5.3	324				3.0	3.0	8.07				0.33	47.1				7.18	67.9			9.16				10.3	82.4			88.4				3
Fri-26	7.6			7.6	304				4.2	254				< 2.0	2.0	8.01				0.34	47.8				6.39	67.9			8.67				10.2	95.6			86.7				5
Sat-27	7.6	7.6		7.5	440	70.7			24.9	224	107			7.0	7.0	7.05	4.09			0.94	38.6	43.5			5.40	60.1	50.9		8.95		4.44		10.5	124	159		102		< 1		13
Sun-28	7.6			7.5	296				28.0	331				7.0	7.0	6.88				0.99	45.0				6.74	59.0			9.90				8.23	87.6			97.2				16
Mon-29	7.6			7.8	320				5.5	364				5.0	5.0	7.06				0.46	42.7				7.24	57.7			8.68				6.38	84.4			82.6				26
Tue-30	7.8			7.8	276				9.0	365				9.0	9.0	7.34				0.55	42.8				9.62	66.9			12.60				3.78	103			89.1				24
Average	7.6	7.6	---	7.6	356	70.7	---	---	6.2	306	107	---	---	3.5	3.5	7.96	4.09	---	---	0.33	43.7	43.5	---	---	5.43	61.4	50.9	---	7.13	0.01	4.44	---	11.3	94.9	159	---	93.9	---	---	---	---
Minimum	7.4	7.6	---	7.4	272	70.7	---	---	2.4	199	107	---	---	< 2.0	< 2.0	6.63	4.09	---	---	0.18	35.1	43.5	---	---	3.35	49.6	50.9	---	4.67	< 0.01	4.44	---	3.78	70.2	159	---	76.1	2	< 1	---	2
Maximum	7.7	7.6	---	7.8	728	70.7	---	---	28.0	373	107	---	---	9.0	9.0	10.8	4.09	---	---	0.99	47.9	43.5	---	---	9.62	70.4	50.9	---	12.6	0.03	4.44	---	15.0	124	159	---	112	2	< 1	---	26
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage

Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
7	7	100%	142	142	100.00%

Report Comments

1.	RAW - April 01 and April 03: Analysis of these samples exceeded the recommended holding time for BOD$_5$.
2.	OUTFALL 10 - April 20: Sample temperature for cBOD$_5$ was not within the range of 20 ± 3°C.
3.	OUTFALL 10 - April 25: Analysis of this sample exceeded the recommended holding time for *E. coli* by one hour.

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW Untreated Influent into the plant
INF Untreated Wastewater from collection system
INFs Influent, screened at the Headworks Diversion Structure
PE Primary Effluent from conventional primaries
PE 30 Primary Effluent from conventional primaries discharged via Outfall 30
EPT Enhanced Primary Treatment
EPE Enhanced Primary Effluent
EPEPS Enhanced Primary Effluent and Pump Station
FE Final Effluent from secondary treatment process (with biological nutrient removal).

FEC Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10 UV-disinfected, discharged via OUTFALL 10
OUTFALL 20 Combined Bypass (RAW + PE + EPE)
OUTFALL 30 Combined Bypass (INF + INFS + PE30 + EPE)
MPW Membrane Product Water (Effluent re-use water)
ML Megalitre (1,000,000 Litre)
MPN Most Probable Number
NR No Result
NS No Sample
INS Insufficient Sample

Abhishek Bhargava
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
May 2019

PROVIDING MORE EPCOR

Digested Sludge: Total Monthly Volume (ML)	70.08

Volume of Flow (ML)

DATE	Peak Flow (MLD)	Influent	Effluent						
			Non UV Disinfected			UV Disinfected			
		RAW	OUTFALL 30	OUTFALL 20	MPW	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Wed-01	333.7	261.0	0.0	0.0	11.3	0.0	249.7	249.7
Thu-02	365.7	266.4	0.0	0.0	10.7	0.0	255.7	255.7
Fri-03	370.6	263.9	0.0	0.0	10.4	0.0	253.5	253.5
Sat-04	347.2	251.2	0.0	0.0	12.0	0.0	239.2	239.2
Sun-05	354.4	254.3	0.0	0.0	10.8	0.0	243.5	243.5
Mon-06	333.5	258.1	0.0	0.0	11.3	0.0	246.8	246.8
Tue-07	314.8	250.6	0.0	0.0	11.5	0.0	239.1	239.1
Wed-08	433.8	264.8	2.5	0.0	11.5	0.0	250.8	250.8
Thu-09	317.7	254.6	0.0	0.0	11.7	0.0	242.9	242.9
Fri-10	326.2	255.8	0.0	0.0	11.5	0.0	244.3	244.3
Sat-11	342.1	251.1	0.0	0.0	11.4	0.0	239.7	239.7
Sun-12	352.1	252.3	0.0	0.0	11.3	0.0	241.0	241.0
Mon-13	324.3	263.3	0.0	0.0	11.2	0.0	252.1	252.1
Tue-14	361.1	262.0	0.0	0.0	11.7	0.0	250.3	250.3
Wed-15	989.8	371.3	87.3	0.0	11.5	0.0	272.5	272.5
Thu-16	340.5	269.3	0.0	0.0	11.2	0.0	258.1	258.1
Fri-17	308.5	255.4	0.0	0.0	11.1	0.0	244.3	244.3
Sat-18	320.9	247.2	0.0	0.0	11.2	0.0	236.0	236.0
Sun-19	323.5	240.9	0.0	0.0	11.3	0.0	229.6	229.6
Mon-20	340.6	248.8	0.0	0.0	11.2	0.0	237.6	237.6
Tue-21	332.0	259.8	0.0	0.0	11.3	0.0	248.5	248.5
Wed-22	314.6	257.2	0.0	0.0	11.3	0.0	245.9	245.9
Thu-23	314.4	255.0	0.0	0.0	10.6	0.0	244.4	244.4
Fri-24	561.0	319.5	39.5	0.0	12.1	0.0	267.9	267.9
Sat-25	344.1	263.7	0.0	0.0	11.1	0.0	252.6	252.6
Sun-26	340.1	256.3	0.0	0.0	11.1	0.0	245.2	245.2
Mon-27	334.3	266.9	0.0	0.0	10.8	0.0	256.1	256.1
Tue-28	325.9	263.0	0.0	0.0	10.6	0.0	252.4	252.4
Wed-29	322.9	266.0	0.0	0.0	10.6	0.0	255.4	255.4
Thu-30	319.3	257.2	0.0	0.0	9.8	0.0	247.4	247.4
Fri 31	311.5	257.6	0.0	0.0	10.0	0.0	247.6	247.6
Average	370.26	263.70	4.62	0.00	11.24	0.00	247.85	247.85
Minimum	308.50	240.90	0.00	0.00	10.40	0.00	229.60	229.60
Maximum	989.80	371.30	87.3	0.00	12.10	0.00	272.50	272.50
GeoMean	---	---	---	---	---	---	---	---
TOTAL	---	8,165	129	0.00	345	0.00	7,690	7,690

Liquid Stream Quality

pH@25°C

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Wed-01	7.6			7.6
Thu-02	7.5			7.8
Fri-03	7.7			7.8
Sat-04	7.6			7.7
Sun-05	7.7			7.6
Mon-06	7.6			7.6
Tue-07	7.6			7.7
Wed-08	7.5			7.7
Thu-09	7.6			7.6
Fri-10	7.6			7.7
Sat-11	7.5			7.6
Sun-12	7.6			7.7
Mon-13	7.6			7.5
Tue-14	7.6			7.6
Wed-15	7.5	7.4		7.4
Thu-16	7.5			7.5
Fri-17	7.6			7.6
Sat-18	7.7			7.6
Sun-19	7.7			7.6
Mon-20	7.6			7.6
Tue-21	7.7			7.6
Wed-22	7.6			7.7
Thu-23	7.6			7.7
Fri-24	7.6	7.6		7.6
Sat-25	7.7			7.6
Sun-26	7.7			7.6
Mon-27	7.6			7.7
Tue-28	7.6			7.7
Wed-29	7.6			7.6
Thu-30	7.7			7.6
Fri 31	7.7			7.6
Average	7.6	7.5	---	7.6
Minimum	7.5	7.4	---	7.4
Maximum	7.8	7.6	---	7.8
GeoMean	---	---	---	---
TOTAL	---	---	---	---

TSS (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Wed-01	368				6.8	6.8
Thu-02	432				4.9	4.9
Fri-03	283				10.8	10.8
Sat-04	336				5.6	5.6
Sun-05	388				12	12.0
Mon-06	320				6.0	6.0
Tue-07	383				6.4	6.4
Wed-08	440				12.6	12.6
Thu-09	320				4.3	4.3
Fri-10	348				4.6	4.6
Sat-11	284				5.3	5.3
Sun-12	344				9.1	9.1
Mon-13	320				114	114
Tue-14	313				90	90.0
Wed-15	500	172			120	120
Thu-16	332				28	28.0
Fri-17	304				6.0	6.0
Sat-18	348				5.2	5.2
Sun-19	280				5.3	5.3
Mon-20	304				4.7	4.7
Tue-21	344				7.3	7.3
Wed-22	343				4.8	4.8
Thu-23	332				4.1	4.1
Fri-24	444	68			5.5	5.5
Sat-25	263				4.4	4.4
Sun-26	254				3.9	3.9
Mon-27	324				4.2	4.2
Tue-28	324				4.7	4.7
Wed-29	368				4.4	4.4
Thu-30	276				3.8	3.8
Fri 31	376				5.0	5.0
Average	342	120	---	---	16.6	16.6
Minimum	254	68	---	---	3.8	3.8
Maximum	500	172	---	---	120	120
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

BOD_5/$cBOD_5$ (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Wed-01	369				6	6
Thu-02	342				4	4
Fri-03	301				6	6
Sat-04	288				5	5
Sun-05	272				7	7
Mon-06	356				4	4
Tue-07	352				2	2
Wed-08	331				6	6
Thu-09	314				3	3
Fri-10	338				3	3
Sat-11	361				4	4
Sun-12	256				4	4
Mon-13	241				16	16
Tue-14	343				18	18
Wed-15	226	112			18	18
Thu-16	293				8	8
Fri-17	257				3	3
Sat-18	284				2	2
Sun-19	235				3	3
Mon-20	272				3	3
Tue-21	272				4	4
Wed-22	256				4	4
Thu-23	256				3	3
Fri-24	245	102			3	3
Sat-25	218				3	3
Sun-26	249				3	3
Mon-27	266				3	3
Tue-28	307				4	4
Wed-29	265				3	3
Thu-30	265				2	2
Fri 31	362				3	3
Average	290	107	---	---	5.2	5.2
Minimum	218	102	---	---	2.0	2.0
Maximum	369	112	---	---	18.0	18.0
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

TP (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Wed-01	7.3				0.55	0.55
Thu-02	8.33				0.44	0.44
Fri-03	7.17				0.63	0.63
Sat-04	7.55				0.40	0.40
Sun-05	7.55				0.95	0.95
Mon-06	7.74				0.44	0.44
Tue-07	7.16				0.41	0.41
Wed-08	7.66				0.61	0.61
Thu-09	7.41				0.39	0.39
Fri-10	7.92				0.41	0.41
Sat-11	8.38				0.41	0.41
Sun-12	9.04				0.50	0.50
Mon-13	8.41				3.96	3.96
Tue-14	7.19				3.03	3.03
Wed-15	5.25	3.52			3.51	3.51
Thu-16	6.90				1.20	1.20
Fri-17	8.09				0.32	0.32
Sat-18	6.96				0.37	0.37
Sun-19	6.85				0.21	0.21
Mon-20	7.17				0.23	0.23
Tue-21	7.61				0.27	0.27
Wed-22	7.64				0.22	0.22
Thu-23	8.22				0.24	0.24
Fri-24	7.52	3.83			0.27	0.27
Sat-25	7.07				0.22	0.22
Sun-26	7.08				0.23	0.23
Mon-27	6.92				0.24	0.24
Tue-28	7.58				0.25	0.25
Wed-29	7.01				0.24	0.24
Thu-30	7.38				0.25	0.25
Fri 31	7.98				0.26	0.26
Average	7.48	3.68	---	---	0.70	0.70
Minimum	5.25	3.52	---	---	0.21	0.21
Maximum	9.04	3.83	---	---	3.96	3.96
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

NH_3-N (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Wed-01	40.0				11.6	11.6
Thu-02	41.1				11.4	11.4
Fri-03	39.7				10.0	10.0
Sat-04	45.8				9.93	9.93
Sun-05	45.8				9.87	9.87
Mon-06	42.8				8.77	8.77
Tue-07	42.1				7.61	7.61
Wed-08	41.6				9.21	9.21
Thu-09	44.7				8.61	8.61
Fri-10	42.9				9.13	9.13
Sat-11	35.8				7.19	7.19
Sun-12	40.2				6.39	6.39
Mon-13	43.1				7.02	7.02
Tue-14	41.7				9.25	9.25
Wed-15	25.7	26.7			10.2	10.2
Thu-16	39.8				13.8	13.8
Fri-17	38.6				14.6	14.6
Sat-18	36.8				11.7	11.7
Sun-19	39.7				9.48	9.48
Mon-20	33.7				8.09	8.09
Tue-21	38.6				10.1	10.1
Wed-22	36.1				7.84	7.84
Thu-23	40.3				9.49	9.49
Fri-24	29.2	34.0			9.57	9.57
Sat-25	36.6				6.87	6.87
Sun-26	35.4				7.52	7.52
Mon-27	35.7				7.90	7.90
Tue-28	40.7				6.02	6.02
Wed-29	33.7				4.39	4.39
Thu-30	38.7				3.47	3.47
Fri 31	43.0				4.68	4.68
Average	39.0	30.4	---	---	8.76	8.76
Minimum	25.7	26.7	---	---	3.47	3.47
Maximum	45.8	34.0	---	---	14.6	14.6
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

TKN (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Wed-01	63.8			14.7
Thu-02	65.3			13.2
Fri-03	52.4			12.0
Sat-04	63.6			11.8
Sun-05	57.1			12.9
Mon-06	65.2			10.4
Tue-07	56.7			9.47
Wed-08	53.3			11.7
Thu-09	58.1			9.25
Fri-10	57.0			10.0
Sat-11	51.5			9.36
Sun-12	61.2			7.80
Mon-13	56.4			14.5
Tue-14	51.8			15.4
Wed-15	21.5	39.3		17.4
Thu-16	27.8			15.4
Fri-17	46.7			16.3
Sat-18	45.7			14.2
Sun-19	56.9			11.4
Mon-20	58.1			11.8
Tue-21	58.9			11.9
Wed-22	55.3			10.1
Thu-23	61.0			11.6
Fri-24	49.7	44.4		11.4
Sat-25	56.3			8.70
Sun-26	61.4			9.75
Mon-27	56.3			10.2
Tue-28	59.3			8.32
Wed-29	54.9			6.02
Thu-30	58.6			5.60
Fri 31	62.9			6.45
Average	55.0	41.9	---	11.3
Minimum	21.5	39.3	---	5.60
Maximum	65.3	44.4	---	17.4
GeoMean	---	---	---	---
TOTAL	---	---	---	---

NO_2+NO_3 (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Wed-01	0.01			3.12
Thu-02				3.41
Fri-03				4.69
Sat-04				4.55
Sun-05				4.62
Mon-06				5.78
Tue-07				5.47
Wed-08	0.09			4.68
Thu-09				4.64
Fri-10				4.93
Sat-11				4.63
Sun-12				5.38
Mon-13				4.92
Tue-14				4.66
Wed-15	< 0.01	0.38		2.80
Thu-16				3.41
Fri-17				4.61
Sat-18				6.47
Sun-19				7.74
Mon-20				8.34
Tue-21				7.48
Wed-22	NR			8.50
Thu-23				5.83
Fri-24		0.61		5.90
Sat-25				6.25
Sun-26				7.24
Mon-27				6.59
Tue-28				7.56
Wed-29	< 0.15			8.24
Thu-30				9.18
Fri 31				9.34
Average	0.05	0.49	---	5.84
Minimum	< 0.01	0.38	---	2.80
Maximum	0.09	0.61	---	9.34
GeoMean	---	---	---	---
TOTAL	---	---	---	---

Chloride (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Wed-01	93.9			94.2
Thu-02	91.8			92.0
Fri-03	94.2			87.7
Sat-04	87.5			88.1
Sun-05	80.2			83.0
Mon-06	85.9			77.0
Tue-07	93.4			88.0
Wed-08	86.4			89.8
Thu-09	85.3			92.8
Fri-10	76.6			84.2
Sat-11	75.7			82.6
Sun-12	79.9			80.4
Mon-13	87.7			78.4
Tue-14	86.7			90.3
Wed-15	79.3	76.7		89.6
Thu-16	98.3			86.1
Fri-17	96.2			92.1
Sat-18	84.4			91.6
Sun-19	84.4			86.6
Mon-20	86.7			83.5
Tue-21	88.7			82.0
Wed-22	83.2			84.0
Thu-23	87.6			83.8
Fri-24	74.0	79.4		82.4
Sat-25	69.2			80.1
Sun-26	74.1			75.9
Mon-27	83.6			76.7
Tue-28	93.2			84.2
Wed-29	88.7			86.0
Thu-30	90.2			88.2
Fri 31	88.5			87.3
Average	85.7	78.1	---	85.4
Minimum	69.2	76.7	---	75.9
Maximum	98.3	79.4	---	94.2
GeoMean	---	---	---	---
TOTAL	---	---	---	---

E. coli (Counts/100 mL)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Wed-01				60
Thu-02				24
Fri-03				21
Sat-04				20
Sun-05				21
Mon-06				13
Tue-07				15
Wed-08				5
Thu-09				23
Fri-10				8
Sat-11				7
Sun-12				7
Mon-13				22
Tue-14				34
Wed-15		1.1		6
Thu-16	1.4			17
Fri-17				5
Sat-18				4
Sun-19				1
Mon-20				6
Tue-21				8
Wed-22				2
Thu-23				2
Fri-24		1.5		3
Sat-25				6
Sun-26				1
Mon-27	2.7			4
Tue-28				13
Wed-29				10
Thu-30				3
Fri 31				2
Average	---	---	---	---
Minimum	1.4	1.1	---	1
Maximum	2.7	1.5	---	60
GeoMean	1.9	1.3	---	8
TOTAL	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage					
Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
22	22	100%	164	164	100%

Report Comments

1.	OUTFALL - May 07 and MAY 13: Analysis of these samples exceeded the recommended holding time for $cBOD_5$.

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW	Untreated Influent into the plant
INF	Untreated Wastewater from collection system
INFs	Influent, screened at the Headworks Diversion Structure
PE	Primary Effluent from conventional primaries
PE 30	Primary Effluent from conventional primaries discharged via Outfall 30
EPT	Enhanced Primary Treatment
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent and Pump Station
FE	Final Effluent from secondary treatment process (with biological nutrient removal).

FEC	Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10	UV-disinfected, discharged via OUTFALL 10
OUTFALL 20	Combined Bypass (RAW + PE + EPE)
OUTFALL 30	Combined Bypass (INF + INFS + PE30 + EPE)
MPW	Membrane Product Water (Effluent re-use water)
ML	Megalitre (1,000,000 Litre)
MPN	Most Probable Number
NR	No Result
NS	No Sample
INS	Insufficient Sample

Abhishek Bhargava
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
June 2019

PROVIDING MORE EPCOR

Digested Sludge: Total Monthly Volume (ML)	67.6

Volume of Flow (ML) and pH@25°C

DATE	Peak Flow (MLD)	Influent RAW	Effluent Non UV Disinfected OUTFALL 30	Effluent Non UV Disinfected OUTFALL 20	Effluent Non UV Disinfected MPW	Effluent UV Disinfected EPEPS	Effluent UV Disinfected OUTFALL 10 FEC	Effluent UV Disinfected OUTFALL 10 FE	pH RAW	pH OUTFALL 30	pH OUTFALL 20	pH OUTFALL 10 FEC
Sat-01	338.4	256.8	0.0	0.0	10.9	0.0	245.9	245.9	7.8			7.7
Sun-02	338.8	256.2	0.0	0.0	11.4	0.0	244.8	244.8	7.9			7.7
Mon-03	334.2	261.9	0.0	0.0	10.0	0.0	251.9	251.9	7.7			7.7
Tue-04	605.1	290.1	17.2	0.0	9.5	0.0	263.4	263.4	7.5	7.3		7.6
Wed-05	329.5	263.6	0.0	0.0	10.6	0.0	253.0	253.0	7.6			7.6
Thu-06	908.8	361.9	63.4	0.0	9.8	0.0	288.7	288.7	7.5	7.6		7.8
Fri-07	1,456.2	556.3	235.3	0.4	10.1	0.0	310.5	310.5	7.5	7.5	7.4	7.7
Sat-08	437.3	310.6	3.4	0.0	11.5	0.0	295.7	295.7	7.7	8.0		7.5
Sun-09	469.9	290.5	10.6	0.0	10.3	0.0	269.6	269.6	7.7	7.6		7.7
Mon-10	711.9	310.9	22.6	0.0	10.8	0.0	277.5	277.5	7.7	7.8		7.6
Tue-11	383.0	279.1	0.6	0.0	11.7	0.0	266.8	266.8	7.7			7.7
Wed-12	329.5	274.9	0.0	0.0	11.8	0.0	263.1	263.1	7.7			7.7
Thu-13	499.8	301.5	5.7	0.0	11.9	0.0	283.9	283.9	7.6	7.8		7.6
Fri-14	377.6	279.7	0.0	0.0	12.2	0.0	267.5	267.5	7.7			7.7
Sat-15	347.2	261.1	0.0	0.0	12.4	0.0	248.7	248.7	7.7			7.7
Sun-16	375.4	266.1	0.0	0.0	12.3	0.0	253.8	253.8	7.6			7.7
Mon-17	339.6	274.8	0.0	0.0	12.5	0.0	262.3	262.3	7.6			7.6
Tue-18	323.0	271.1	0.0	0.0	12.3	0.0	258.8	258.8	7.6			7.6
Wed-19	1,456.2	599.6	279.8	0.7	11.9	0.0	307.2	307.2	7.5	7.5	7.5	7.6
Thu-20	1,479.4	641.0	271.2	0.2	11.9	0.0	357.7	357.7	7.6	7.6	7.7	7.4
Fri-21	829.3	396.6	30.8	0.0	11.5	0.0	354.3	354.3	7.7	7.7		7.4
Sat-22	411.3	326.1	0.0	0.0	11.5	0.0	314.6	314.6	7.8			7.7
Sun-23	416.1	303.1	0.0	0.0	11.6	0.0	291.5	291.5	7.8			7.7
Mon-24	597.2	343.2	43.7	0.0	11.4	0.0	288.1	288.1	7.6	7.6		7.5
Tue-25	1,350.0	401.3	95.9	0.1	11.3	0.0	294.0	294.0	7.6	7.6		7.5
Wed-26	1,226.6	423.9	108.2	0.0	11.4	0.0	304.3	304.3	7.6	7.6		7.4
Thu-27	549.3	325.9	8.3	0.0	11.5	0.0	306.1	306.1	7.6	7.7		7.5
Fri-28	1,402.2	483.0	142.8	0.1	11.4	0.0	328.7	328.7	7.7	7.7	7.9	7.6
Sat-29	1,017.5	401.4	86.1	0.0	11.4	0.0	303.9	303.9	7.6	7.7		7.5
Sun-30	405.3	319.4	1.4	0.0	10.9	0.0	307.1	307.1	7.8	8.0		7.6
Average	665.10	343.24	47.84	0.05	11.34	0.00	284.01	284.01	7.7	7.7	7.6	7.6
Minimum	323.00	256.20	0.00	0.00	9.50	0.00	244.80	244.80	7.5	7.3	7.4	7.4
Maximum	1,479.40	641.01	279.80	0.70	12.50	0.00	357.70	357.70	7.9	8.0	7.9	7.8
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	10,332	1,427	1.45	340	0	8,563	8,563	---	---	---	---

Liquid Stream Quality — TSS (mg/L) and BOD_5/$cBOD_5$ (mg/L)

DATE	TSS RAW	TSS OUTFALL 30	TSS OUTFALL 20	TSS EPEPS	TSS OUTFALL 10 FEC	TSS OUTFALL 10 FE	RAW BOD_5	OUTFALL 30 BOD_5	OUTFALL 20 BOD_5	EPEPS BOD_5	OUTFALL 10 FEC $cBOD_5$	OUTFALL 10 FE $cBOD_5$
Sat-01	356				4.4	4.4	312				4.0	4.0
Sun-02	294				4.9	4.9	313				3.0	3.0
Mon-03	308				4.4	4.4	214				3.0	3.0
Tue-04	488	117			4.5	4.5	277	145			3.0	3.0
Wed-05	312				4.3	4.3	279				3.0	3.0
Thu-06	400	52			4.5	4.5	242	78			3.0	3.0
Fri-07	297	88	377		4.3	4.3	163	86	117		3.0	3.0
Sat-08	262	22			3.3	3.3	354	47			3.0	3.0
Sun-09	311	64			2.8	2.8	314	151			4.0	4.0
Mon-10	416	58			4.4	4.4	228	119			3.0	3.0
Tue-11	287				3.7	3.7	243				3.0	3.0
Wed-12	238				2.5	2.5	243				3.0	3.0
Thu-13	266	57			2.9	2.9	214	106			2.0	2.0
Fri-14	300				3.2	3.2	189				2.0	2.0
Sat-15	352				3.4	3.4	194				3.0	3.0
Sun-16	420				3.2	3.2	206				3.0	3.0
Mon-17	297				2.9	2.9	226				3.0	3.0
Tue-18	288				3.5	3.5	257				2.0	2.0
Wed-19	360	91	656		4.6	4.6	115	63	116		2.0	2.0
Thu-20	290	47	137		4.1	4.1	112	43	35		2.0	2.0
Fri-21	196	27			4.5	4.5	134	40			2.0	2.0
Sat-22	250				4.2	4.2	196				3.0	3.0
Sun-23	226				4.0	4.0	194				1.0	1.0
Mon-24	279	25			3.3	3.3	186	68			3.0	3.0
Tue-25	443	47			3.0	3.0	179	59			2.0	2.0
Wed-26	377	61			3.1	3.1	156	57			2.0	2.0
Thu-27	264	46			3.1	3.1	196	72			2.0	2.0
Fri-28	268	49	360		3.9	3.9	165	49	52		2.0	2.0
Sat-29	332	43			2.8	2.8	148	53			1.0	1.0
Sun-30	194	31			3.5	3.5	164	48			1.0	1.0
Average	312	54	383	---	3.7	3.7	214	76	80	---	2.5	2.5
Minimum	194	22	137	---	2.5	2.5	112	40	35	---	1.0	1.0
Maximum	488	117	656	---	4.9	4.9	354	151	117	---	4.0	4.0
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---

Liquid Stream Quality — TP (mg/L) and NH3-N (mg/L)

DATE	TP RAW	TP OUTFALL 30	TP OUTFALL 20	TP EPEPS	TP OUTFALL 10 FEC	TP OUTFALL 10 FE	NH3-N RAW	NH3-N OUTFALL 30	NH3-N OUTFALL 20	NH3-N EPEPS	NH3-N OUTFALL 10 FEC	NH3-N OUTFALL 10 FE
Sat-01	7.83				0.27	0.27	37.4				3.84	3.84
Sun-02	7.29				0.25	0.25	41.0				3.15	3.15
Mon-03	7.68				0.24	0.24	39.3				2.69	2.69
Tue-04	8.30	5.00			0.26	0.26	41.5	44.0			3.08	3.08
Wed-05	8.44				0.24	0.24	51.1				2.50	2.50
Thu-06	6.70	3.26			0.25	0.25	37.6	30.3			2.10	2.10
Fri-07	4.05	2.50	3.36		0.23	0.23	21.1	22.2	11.4		1.46	1.46
Sat-08	7.86	1.75			0.21	0.21	37.6	25.3			1.95	1.95
Sun-09	7.28	4.65			0.22	0.22	42.3	35.9			5.20	5.20
Mon-10	7.37	4.26			0.23	0.23	40.4	38.6			4.14	4.14
Tue-11	8.86				0.21	0.21	45.7				2.66	2.66
Wed-12	8.72				0.21	0.21	45.9				3.55	3.55
Thu-13	7.60	4.16			0.22	0.22	41.3	34.8			3.04	3.04
Fri-14	9.00				0.24	0.24	38.4				2.80	2.80
Sat-15	8.13				0.23	0.23	43.7				2.13	2.13
Sun-16	7.94				0.23	0.23	38.7				2.71	2.71
Mon-17	7.78				0.18	0.18	41.4				2.16	2.16
Tue-18	8.11				0.25	0.25	43.8				1.09	1.09
Wed-19	4.24	2.05	4.06		0.26	0.26	19.8	18.9	9.53		0.40	0.40
Thu-20	3.87	1.77	1.33		0.20	0.20	17.4	20.4	6.04		0.19	0.19
Fri-21	4.66	1.49			0.19	0.19	27.1	19.2			1.29	1.29
Sat-22	6.43				0.29	0.29	38.4				3.51	3.51
Sun-23	6.66				0.28	0.28	42.8				4.34	4.34
Mon-24	6.85	3.22			0.25	0.25	36.0	32.8			2.76	2.76
Tue-25	5.92	2.54			0.26	0.26	27.0	27.0			1.23	1.23
Wed-26	5.75	2.47			0.21	0.21	29.4	26.5			0.89	0.89
Thu-27	7.69	2.61			0.19	0.19	39.1	28.4			1.59	1.59
Fri-28	5.60	2.18	3.02		0.22	0.22	28.6	24.1	7.40		2.01	2.01
Sat-29	5.32	2.24			0.18	0.18	28.6	27.7			0.33	0.33
Sun-30	6.00	1.85			0.18	0.18	34.8	27.6			0.91	0.91
Average	6.93	2.82	2.94	---	0.23	0.23	36.6	28.5	8.59	---	2.32	2.32
Minimum	3.87	1.49	1.33	---	0.18	0.18	17.4	18.9	6.04	---	0.19	0.19
Maximum	9.00	5.00	4.06	---	0.29	0.29	51.1	44.0	11.4	---	5.20	5.20
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---

Liquid Stream Quality — TKN (mg/L), NO_2+NO_3 (mg/L), Chloride (mg/L), *E. coli* (Counts/100 mL)

DATE	TKN RAW	TKN OUTFALL 30	TKN OUTFALL 20	TKN OUTFALL 10 FEC	NO_2+NO_3 RAW	NO_2+NO_3 OUTFALL 30	NO_2+NO_3 OUTFALL 20	NO_2+NO_3 OUTFALL 10 FEC	Chloride RAW	Chloride OUTFALL 30	Chloride OUTFALL 20	Chloride OUTFALL 10 FEC	*E. coli* RAW X10^6	*E. coli* OUTFALL 30 X10^6	*E. coli* OUTFALL 20 X10^6	*E. coli* OUTFALL 10 FEC
Sat-01	62.6			5.82				10.9	82.5			88				3
Sun-02	57.8			5.28				10.9	85.2			84				1
Mon-03	59.3			4.88				11.0	90.6			82				5
Tue-04	65.5	52.3		5.41		0.06		10.3	91.9	91.3		88		2.8		3
Wed-05	75.6			4.36	< 0.01			8.6	86.5			87				5
Thu-06	57.6	38.4		4.39		0.09		8.9	73.6	67.4		84		6.0		5
Fri-07	33.6	29.7	21.3	3.23		0.79	0.24	7.2	49.7	49.3	34.8	74		1.0	17.7	7
Sat-08	60.7	28.4		3.71		0.21		6.2	68.2	57.2		65		2.1		6
Sun-09	60.8	44.0		6.69		0.10		8.6	85.6	78.6		78		2.7		5
Mon-10	55.1	42.8		6.11		0.44		8.1	79.7	75.3		79		6.0		5
Tue-11	62.7			4.17				8.4	78.5			80				8
Wed-12	65.7			5.15	< 0.01			10.1	82.4			81				3
Thu-13	61.2	45.3		5.06		0.04		10.4	83.6	72.9		81		1.6		2
Fri-14	62.8			5.15				10.6	79.8			80				8
Sat-15	64.8			4.62				9.6	78.1			80				5
Sun-16	63.6			4.70				11.3	76.6			78				2
Mon-17	57.2			3.33				12.5	82.2			75				7
Tue-18	63.1			3.02				11.1	86.0			81	3.0			4
Wed-19	31.3	24.9	23.4	2.34	< 0.01	0.82	0.19	8.5	47.7	47.4	36.1	81		1.0	1.6	11
Thu-20	27.9	27.0	9.69	1.40		2.10	0.78	5.8	59.5	62.0	24.8	56		3.4	0.3	2
Fri-21	39.8	25.0		2.82		1.66		8.3	91.6	55.1		68		3.2		4
Sat-22	55.6			5.46				10.8	85.6			83				10
Sun-23	61.4			6.64				10.1	87.9			88				10
Mon-24	58.7	44.7		4.98		0.30		11.2	80.0	81.4		84		9.5		5
Tue-25	47.0	39.5		2.97		0.23		10.7	69.7	69.9		81		1.2	2.0	29
Wed-26	40.9	33.0		2.34	0.03	0.60		9.4	71.1	63.3		73		5.2		4
Thu-27	64.1	37.0		2.88		0.52		9.6	78.3	69.7		70	2.7	5.2		5
Fri-28	41.8	34.2	16.8	3.28		0.42	0.68	8.2	72.3	57.6	34.3	70		8.6	1.3	6
Sat-29	37.6	33.4		1.70		0.45		10.3	65.5	63.4		75		2.7		5
Sun-30	47.6	31.0		2.14		0.85		10.9	76.0	64.1		72		1.1		5
Average	54.8	35.9	17.8	4.13	0.01	0.57	0.47	9.6	78	66.2	32.5	78.1	---	---	---	---
Minimum	27.9	24.9	9.7	1.40	< 0.01	0.04	0.19	5.8	47.7	47.4	24.8	55.6	2.7	1.0	0.3	1
Maximum	75.6	52.3	23.4	6.69	0.03	2.10	0.78	12.5	92	91.3	36.1	88.2	3.0	10	18	29
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	3	3	2	5
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage					
Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
160	160	100%	324	324	100.00%

Report Comments

1	OUTFALL 20 - June 20: Analysis of the sample exceeded the recommended hold time for BOD.
2	OUTFALL 10 - June 3: Analysis of the sample exceeded the recommended hold time for E. Coli by 36 minutes.

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW	Untreated Influent into the plant
INF	Untreated Wastewater from collection system
INFs	Influent, screened at the Headworks Diversion Structure
PE	Primary Effluent from conventional primaries
PE 30	Primary Effluent from conventional primaries discharged via Outfall 30
EPT	Enhanced Primary Treatment
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent and Pump Station
FE	Final Effluent from secondary treatment process (with biological nutrient removal).
FEC	Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10	UV-disinfected, discharged via OUTFALL 10
OUTFALL 20	Combined Bypass (RAW + PE + EPE)
OUTFALL 30	Combined Bypass (INF + INFS + PE30 + EPE)
MPW	Membrane Product Water (Effluent re-use water)
ML	Megalitre (1,000,000 Litre)
MPN	Most Probable Number
NR	No Result
NS	No Sample
INS	Insufficient Sample

Ken Grossell
A/Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
July 2019

Digested Sludge: Total Monthly Volume (ML)	64.2

Volume of Flow (ML)

DATE	Peak Flow (MLD)	Influent	Effluent					
			Non UV Disinfected			UV Disinfected		
		RAW	OUTFALL 30	OUTFALL 20	MPW	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Mon-01	827.7	374.1	74.3	0.0	11.0	0.0	288.8	288.8
Tue-02	399.8	320.3	0.9	0.0	10.7	0.0	308.7	308.7
Wed-03	483.4	319.6	18.7	0.0	10.4	0.0	290.5	290.5
Thu-04	442.1	307.0	3.5	0.0	10.4	0.0	293.1	293.1
Fri-05	438.0	302.8	17.6	0.0	10.3	0.0	274.9	274.9
Sat-06	495.1	296.5	3.4	0.0	10.3	0.0	282.8	282.8
Sun-07	546.9	329.8	25.5	0.0	10.5	0.0	293.8	293.8
Mon-08	543.1	379.1	14.9	0.0	10.1	0.0	354.1	354.1
Tue-09	378.5	302.8	0.0	0.0	10.7	0.0	292.1	292.1
Wed-10	370.2	292.2	0.0	0.0	10.7	0.0	281.5	281.5
Thu-11	344.5	290.6	0.0	0.0	10.7	0.0	279.9	279.9
Fri-12	354.6	296.0	0.0	0.0	10.6	0.0	285.4	285.4
Sat-13	1,249.1	402.2	70.4	0.0	10.9	0.0	320.9	320.9
Sun-14	448.6	293.9	4.2	0.0	11.6	0.0	278.1	278.1
Mon-15	422.4	296.9	0.0	0.0	11.5	0.0	285.4	285.4
Tue-16	789.0	322.1	24.6	0.0	11.6	0.0	285.9	285.9
Wed-17	1,892.8	461.3	149.6	0.4	11.4	0.0	299.9	299.9
Thu-18	1,449.0	571.9	220.7	0.1	5.1	0.0	346.0	346.0
Fri-19	1,447.2	653.2	303.0	0.4	10.4	0.0	339.4	339.4
Sat-20	1,209.2	508.9	155.7	0.0	10.0	0.0	343.2	343.2
Sun-21	481.1	371.7	33.7	0.0	9.8	0.0	328.2	328.2
Mon-22	431.1	346.0	4.3	0.0	10.0	0.0	331.7	331.7
Tue-23	498.4	338.0	0.0	0.0	10.3	0.0	327.7	327.7
Wed-24	525.1	349.3	14.9	0.0	10.2	0.0	324.2	324.2
Thu-25	612.5	380.3	32.0	0.0	10.0	0.0	338.3	338.3
Fri-26	387.2	313.2	0.0	0.0	10.1	0.0	303.1	303.1
Sat-27	1,488.5	502.9	202.2	0.7	9.8	0.0	290.2	290.2
Sun-28	943.8	432.1	68.2	0.0	9.8	0.0	354.1	354.1
Mon-29	633.1	383.3	51.6	0.0	10.2	0.0	321.5	321.5
Tue-30	405.9	332.5	2.3	0.0	10.3	0.0	319.9	319.9
Wed 31	382.0	319.2	0.0	0.0	11.0	0.0	308.2	308.2
Average	674.5	367.4	48.3	0.1	10.3	0.0	308.8	308.8
Minimum	344.5	290.6	0.0	0.0	5.1	0.0	274.9	274.9
Maximum	1,608.9	653.2	303.0	0.7	11.6	0.0	354.1	354.1
GeoMean	---	---	---	---	---	---	---	---
TOTAL	---	11,390	1,496	1.69	320	0	9,572	9,572

Liquid Stream Quality

pH@25°C

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Mon-01	7.6	7.5		7.6
Tue-02	7.6	7.9		7.5
Wed-03	7.6	7.7		7.6
Thu-04	7.6	8.0		7.6
Fri-05	7.7	7.6		7.7
Sat-06	7.7	8.1		7.5
Sun-07	7.6	7.6		7.6
Mon-08	7.4	7.3		7.1
Tue-09	7.8			7.6
Wed-10				7.7
Thu-11				7.7
Fri-12	7.5			7.7
Sat-13	7.7	7.6		7.6
Sun-14	7.7	7.9		7.6
Mon-15	7.7			7.7
Tue-16	7.7	7.7		7.6
Wed-17	7.7	7.5	7.7	7.6
Thu-18	7.7	7.5	7.8	7.5
Fri-19	7.6	7.8	7.7	7.6
Sat-20	7.7	7.8		7.6
Sun-21	7.7	7.6		7.7
Mon-22	7.8	7.9		7.7
Tue-23	7.7			7.7
Wed-24	7.7	7.7		7.7
Thu-25	7.7	7.8		7.6
Fri-26	7.7			7.7
Sat-27	7.4	7.4	7.8	7.7
Sun-28	7.6	7.6		7.5
Mon-29	7.6	7.6		7.6
Tue-30	7.7	8.1		7.6
Wed 31	7.7			7.7
Average	7.6	7.7	7.7	7.6
Minimum	7.4	7.3	7.7	7.1
Maximum	7.8	8.1	7.8	7.7
GeoMean	---	---	---	---
TOTAL	---	---	---	---

TSS (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Mon-01	188	46			3.2	3.2
Tue-02	236	35			2.9	2.9
Wed-03	353	50			4.1	4.1
Thu-04	248	30			3.4	3.4
Fri-05	278	41			3.6	3.6
Sat-06	320	92			3.7	3.7
Sun-07	266	47			4.6	4.6
Mon-08	323	23			4.0	4.0
Tue-09	257				8.5	8.5
Wed-10	252				6.7	6.7
Thu-11	260				7.2	7.2
Fri-12	303				4.6	4.6
Sat-13	548	82			4.6	4.6
Sun-14	264	162			12.9	12.9
Mon-15	225				7.0	7.0
Tue-16	368	72			6.7	6.7
Wed-17	700	203	724		4.6	4.6
Thu-18	260	45	310		4.5	4.5
Fri-19	176	73	256		4.7	4.7
Sat-20	164	22			4.8	4.8
Sun-21	163	45			4.9	4.9
Mon-22	198	31			4.6	4.6
Tue-23	214				4.6	4.6
Wed-24	354	38			5.1	5.1
Thu-25	246	40			4.6	4.6
Fri-26	277				3.5	3.5
Sat-27	356	103	328		3.3	3.3
Sun-28	212	34			3.9	3.9
Mon-29	246	41			3.7	3.7
Tue-30	224	29			4.0	4.0
Wed 31	390				3.8	3.8
Average	286	60	405	---	4.9	4.9
Minimum	163	22	256	---	2.9	2.9
Maximum	700	203	724	---	12.9	12.9
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

BOD_5/$cBOD_5$ (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
	BOD_5	BOD_5	BOD_5	BOD_5	$cBOD_5$	$cBOD_5$
Mon-01	135	63			2.0	2.0
Tue-02	204	50			2.0	2.0
Wed-03	200	117			3.0	3.0
Thu-04	254	55			2.0	2.0
Fri-05	233	85			2.0	2.0
Sat-06	253	146			3.0	3.0
Sun-07	266	89			5.0	5.0
Mon-08	210	48			2.0	2.0
Tue-09	229				< 1.0	< 1.0
Wed-10	215				3.0	3.0
Thu-11	203				3.0	3.0
Fri-12	247				3.0	3.0
Sat-13	187	63			< 1.0	< 1.0
Sun-14	211	123			3.0	3.0
Mon-15	226				3.0	3.0
Tue-16	210	83			2.0	2.0
Wed-17	154	67	63		3.0	3.0
Thu-18	110	29	60		< 1.0	< 1.0
Fri-19	77	25	52		< 1.0	< 1.0
Sat-20	108	27			< 1.0	< 1.0
Sun-21	134	48			2.0	2.0
Mon-22	178	48			3.0	3.0
Tue-23	163				2.0	2.0
Wed-24	221	87			3.0	3.0
Thu-25	180	61			2.0	2.0
Fri-26	205				2.0	2.0
Sat-27	166	245	65		3.0	3.0
Sun-28	139	42			2.0	2.0
Mon-29	188	46			2.0	2.0
Tue-30	209	44			2.0	2.0
Wed 31	265				3.0	3.0
Average	193	74	60	---	2.2	2.2
Minimum	77	25	52	---	< 1.0	< 1.0
Maximum	266	245	65	---	5.0	5.0
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

TP (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Mon-01	5.47	2.75			0.29	0.29
Tue-02	6.68	1.94			0.28	0.28
Wed-03	7.66	4.74			0.38	0.38
Thu-04	8.55	1.89			0.37	0.37
Fri-05	7.33	3.48			0.31	0.31
Sat-06	7.98	5.87			0.41	0.41
Sun-07	7.22	3.92			0.64	0.64
Mon-08	6.64	2.61			0.46	0.46
Tue-09	7.75				0.81	0.81
Wed-10	8.28				0.68	0.68
Thu-11	7.92				0.60	0.60
Fri-12	8.59				0.42	0.42
Sat-13	6.83	2.60			0.29	0.29
Sun-14	7.42	5.41			0.38	0.38
Mon-15	7.68				0.40	0.40
Tue-16	7.08	3.57			0.40	0.40
Wed-17	6.27	2.44	3.32		0.25	0.25
Thu-18	4.15	1.26	2.54		0.22	0.22
Fri-19	2.90	1.10	2.29		0.20	0.20
Sat-20	3.64	0.93			0.19	0.19
Sun-21	4.94	1.82			0.20	0.20
Mon-22	5.40	1.04			0.27	0.27
Tue-23	6.36				0.32	0.32
Wed-24	5.63	3.52			0.26	0.26
Thu-25	4.41	1.91			0.19	0.19
Fri-26	6.22				0.22	0.22
Sat-27	3.77	2.14	2.74		0.24	0.24
Sun-28	3.59	1.47			0.18	0.18
Mon-29	4.38	2.11			0.18	0.18
Tue-30	5.36	2.15			0.19	0.19
Wed 31	6.16				0.22	0.22
Average	6.20	2.64	2.72	---	0.34	0.34
Minimum	2.90	0.93	2.29	---	0.18	0.18
Maximum	8.59	5.87	3.32	---	0.81	0.81
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

NH_3-N (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Mon-01	27.0	26.9			0.68	0.68
Tue-02	39.4	30.4			1.03	1.03
Wed-03	39.5	41.9			1.64	1.64
Thu-04	44.0	32.2			1.85	1.85
Fri-05	42.0	41.1			2.42	2.42
Sat-06	42.4	40.5			1.85	1.85
Sun-07	39.9	39.6			1.99	1.99
Mon-08	35.5	30.0			1.08	1.08
Tue-09	46.3				1.45	1.45
Wed-10	45.5				0.99	0.99
Thu-11	46.7				1.16	1.16
Fri-12	45.3				1.61	1.61
Sat-13	30.2	21.1			1.58	1.58
Sun-14	42.9	40.4			2.03	2.03
Mon-15	42.1				2.08	2.08
Tue-16	38.5	31.6			2.18	2.18
Wed-17	23.0	14.2	9.4		1.84	1.84
Thu-18	17.5	17.9	10.8		0.33	0.33
Fri-19	15.4	17.9	6.3		0.07	0.07
Sat-20	19.6	20.9			0.22	0.22
Sun-21	28.3	28.5			1.10	1.10
Mon-22	28.9	27.5			2.13	2.13
Tue-23	30.7				3.33	3.33
Wed-24	23.3	38.2			3.24	3.24
Thu-25	21.4	24.7			3.02	3.02
Fri-26	24.9				3.86	3.86
Sat-27	13.5	13.0	9.6		2.55	2.55
Sun-28	15.2	19.7			0.95	0.95
Mon-29	21.3	30.1			2.09	2.09
Tue-30	24.1	30.5			2.86	2.86
Wed 31	25.8				4.36	4.36
Average	31.6	28.6	9.0	---	1.86	1.86
Minimum	13.5	13.0	6.3	---	0.07	0.07
Maximum	46.7	41.9	10.8	---	4.36	4.36
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

TKN (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Mon-01	43.9	36.6		2.16
Tue-02	56.6	33.2		1.97
Wed-03	61.7	51.8		3.14
Thu-04	67.3	39.6		3.64
Fri-05	61.5	46.8		4.42
Sat-06	65.2	51.5		3.70
Sun-07	57.1	47.1		3.98
Mon-08	48.9	35.9		2.95
Tue-09	61.1			3.81
Wed-10	64.3			2.95
Thu-11	59.1			3.06
Fri-12	63.5			3.29
Sat-13	49.6	28.2		2.93
Sun-14	65.9	50.2		4.24
Mon-15	64.7			4.16
Tue-16	55.0	41.1		4.26
Wed-17	43.7	20.9	19.5	3.92
Thu-18	30.4	23.4	20.8	1.89
Fri-19	23.5	22.6	13.1	1.23
Sat-20	25.5	23.2		1.38
Sun-21	41.5	36.2		3.11
Mon-22	42.8	31.3		4.42
Tue-23	46.3			5.24
Wed-24	38.0	43.8		4.82
Thu-25	35.0	30.2		4.68
Fri-26	43.3			6.68
Sat-27	28.5	20.4	19.3	4.80
Sun-28	32.1	25.9		2.70
Mon-29	34.5	35.0		3.82
Tue-30	38.6	35.1		4.55
Wed 31	42.4			5.96
Average	48.1	35.2	18.2	3.67
Minimum	23.5	36.6	13.1	1.23
Maximum	67.3	51.8	20.8	6.68
GeoMean	---	---	---	---
TOTAL	---	---	---	---

NO_2+NO_3 (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Mon-01		0.75		11.6
Tue-02		0.57		11.0
Wed-03	0.44	0.33		11.8
Thu-04		0.34		11.5
Fri-05		0.20		12.0
Sat-06		0.35		13.2
Sun-07		0.28		15.2
Mon-08		0.60		11.3
Tue-09				11.5
Wed-10	< 0.01			11.7
Thu-11				10.0
Fri-12				10.7
Sat-13		0.86		6.6
Sun-14		0.28		9.7
Mon-15				9.7
Tue-16		1.30		8.4
Wed-17	0.01	0.75	0.05	8.3
Thu-18		0.33	1.70	4.4
Fri-19		2.20	1.32	4.3
Sat-20		4.42		4.8
Sun-21		1.46		8.7
Mon-22		0.80		7.8
Tue-23				6.5
Wed-24	< 0.01	0.03		6.4
Thu-25		0.71		6.8
Fri-26				8.1
Sat-27		0.67	0.51	8.0
Sun-28		1.42		4.8
Mon-29		0.70		7.2
Tue-30		0.97		7.2
Wed 31	< 0.01			7.4
Average	0.09	1.08	0.89	8.9
Minimum	< 0.01	0.03	0.05	4.3
Maximum	0.44	4.79	1.70	15.2
GeoMean	---	---	---	---
TOTAL	---	---	---	---

Chloride (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Mon-01	69.0	64.6		79
Tue-02	89.2	70.9		75
Wed-03	86.7	90.2		85
Thu-04	100.0	78.8		87
Fri-05	87.3	85.0		93
Sat-06	86.2	83.0		89
Sun-07	78.0	71.3		85
Mon-08	72.6	64.5		74
Tue-09	89.2			79
Wed-10	85.2			84
Thu-11	80.8			87
Fri-12	85.6			91
Sat-13	58.8	49.9		75
Sun-14	73.2	67.4		73
Mon-15	83.0			76
Tue-16	74.9	65.0		81
Wed-17	58.8	38.7	33.0	79
Thu-18	53.6	52.2	37.6	61
Fri-19	51.5	54.2	30.2	54
Sat-20	66.9	63.5		52
Sun-21	77.1	78.8		75
Mon-22	86.7	74.5		81
Tue-23	80.6			82
Wed-24	73.7	87.4		87
Thu-25	67.6	73.6		81
Fri-26	76.2			81
Sat-27	44.5	37.1	29.5	86
Sun-28	51.7	47.2		56
Mon-29	71.4	71.5		66
Tue-30	77.3	74.0		77
Wed 31	76.3			82
Average	74.6	67.1	32.6	77.8
Minimum	44.5	37.1	29.5	52.3
Maximum	100.0	90.2	37.6	93.0
GeoMean	---	---	---	---
TOTAL	---	---	---	---

E. coli (Counts/100 mL)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
	X10^6	X10^6	X10^6	FEC
Mon-01		1.4		5
Tue-02		1.0		5
Wed-03		1.3		5
Thu-04		2.1		5
Fri-05		0.9		5
Sat-06		3.9		5
Sun-07				3
Mon-08				5
Tue-09				8
Wed-10				7
Thu-11		2.9		14
Fri-12	24	3.2		10
Sat-13			0.9	8
Sun-14		1.3		5
Mon-15		8.6		10
Tue-16		2.5		4
Wed-17	3	8.6	1.0	6
Thu-18		2.5	1.9	3
Fri-19		8.6	1.3	3
Sat-20		3.2		5
Sun-21		6.8		6
Mon-22		4.6		7
Tue-23				10
Wed-24		1.2		5
Thu-25		3.4		5
Fri-26				5
Sat-27		1.6	3.8	4
Sun-28		3.5		4
Mon-29		1.2		7
Tue-30		8.6		8
Wed 31				10
Average	---	---	---	---
Minimum	2.9	0.9	0.9	3
Maximum	24.0	8.6	3.8	14
GeoMean	8	3	2	6
TOTAL	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage					
Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
196	196	100%	520	520	100.00%

Report Comments

1	OUTFALL 30 - July 3: Analysis of the sample exceeded the recommended hold time for BOD.
2	OUTFALL 30 - July 3: Analysis of the sample exceeded the recommended incubation time for E.coli.
3	OUTFALL 30 - July 4: Analysis of the sample exceeded the recommended incubation time for E.coli.
4	OUTFALL 30 - July 6: Analysis of the sample exceeded the recommended hold time for BOD and pH.

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW	Untreated Influent into the plant
INF	Untreated Wastewater from collection system
INFs	Influent, screened at the Headworks Diversion Structure
PE	Primary Effluent from conventional primaries
PE 30	Primary Effluent from conventional primaries discharged via Outfall 30
EPT	Enhanced Primary Treatment
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent and Pump Station
FE	Final Effluent from secondary treatment process (with biological nutrient removal).

FEC	Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10	UV-disinfected, discharged via OUTFALL 10
OUTFALL 20	Combined Bypass (RAW + PE + EPE)
OUTFALL 30	Combined Bypass (INF + INFS + PE30 + EPE)
MPW	Membrane Product Water (Effluent re-use water)
ML	Megalitre (1,000,000 Litre)
MPN	Most Probable Number
NR	No Result
NS	No Sample
INS	Insufficient Sample

Abhishek Bhargava
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
August 2019

PROVIDING MORE EPCOR

Digested Sludge: Total Monthly Volume (ML)	67.37

Volume of Flow (ML)

DATE	Peak Flow (MLD)	Influent	Effluent					
			Non UV Disinfected			UV Disinfected		
			OUTFALL 30	OUTFALL 20	MPW	EPEPS	OUTFALL 10	
		RAW					FEC	FE
Thu-01	1,497.90	454.51	110.30	0.31	10.30	0.00	333.60	333.60
Fri-02	1,406.80	402.89	70.20	0.29	10.40	0.00	322.00	322.00
Sat-03	627.90	334.50	13.30	0.00	10.20	0.00	311.00	311.00
Sun-04	389.30	287.80	0.00	0.00	10.20	0.00	277.60	277.60
Mon-05	739.30	317.42	27.50	0.02	10.60	0.00	279.30	279.30
Tue-06	956.20	402.60	59.50	0.00	11.10	0.00	332.00	332.00
Wed-07	381.20	317.40	0.00	0.00	10.90	0.00	306.50	306.50
Thu-08	377.40	306.90	0.00	0.00	11.10	0.00	295.80	295.80
Fri-09	876.40	395.60	49.50	0.00	10.80	0.00	335.30	335.30
Sat-10	361.10	285.10	0.00	0.00	11.10	0.00	274.00	274.00
Sun-11	368.90	281.10	0.00	0.00	11.00	0.00	270.10	270.10
Mon-12	357.80	287.40	0.00	0.00	11.30	0.00	276.10	276.10
Tue-13	658.50	344.10	17.00	0.00	11.50	0.00	315.60	315.60
Wed-14	373.00	291.40	0.00	0.00	11.10	0.00	280.30	280.30
Thu-15	452.30	287.20	0.00	0.00	10.90	0.00	276.30	276.30
Fri-16	550.00	296.90	2.50	0.00	11.10	0.00	283.30	283.30
Sat-17	358.50	269.80	0.00	0.00	11.10	0.00	258.70	258.70
Sun-18	438.80	273.90	0.30	0.00	11.00	0.00	262.60	262.60
Mon-19	555.90	338.70	18.90	0.00	10.60	0.00	309.20	309.20
Tue-20	335.10	285.00	0.00	0.00	10.80	0.00	274.20	274.20
Wed-21	355.70	282.90	0.00	0.00	11.00	0.00	271.90	271.90
Thu-22	333.70	276.50	0.00	0.00	11.10	0.00	265.40	265.40
Fri-23	563.10	295.20	14.60	0.00	11.10	0.00	269.50	269.50
Sat-24	409.10	281.60	0.40	0.00	11.30	0.00	269.90	269.90
Sun-25	355.80	269.60	0.00	0.00	11.20	0.00	258.40	258.40
Mon-26	372.80	276.50	0.00	0.00	11.20	0.00	265.30	265.30
Tue-27	329.10	269.60	0.00	0.00	11.30	0.00	258.30	258.30
Wed-28	680.30	316.70	16.10	0.00	11.00	0.00	289.60	289.60
Thu-29	330.20	268.90	0.00	0.00	10.90	0.00	258.00	258.00
Fri-30	522.30	344.60	35.20	0.00	10.70	0.00	298.70	298.70
Sat 31	455.80	289.60	8.20	0.00	10.90	0.00	270.50	270.50
Average	540.97	310.71	14.31	0.02	10.93	0.00	285.45	285.45
Minimum	329.10	268.90	0.00	0.00	10.20	0.00	258.00	258.00
Maximum	1,497.90	454.51	110.30	0.31	11.50	0.00	335.30	335.30
GeoMean	---	---	---	---	---	---	---	---
TOTAL	---	9,632	444	0.62	339	0	8,849	8,849

Liquid Stream Quality

pH@25°C

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Thu-01	7.7	7.7	7.9	7.58
Fri-02	7.7	7.6	7.6	7.74
Sat-03	7.7	7.9		7.61
Sun-04	7.8			7.75
Mon-05	7.7	7.5		7.61
Tue-06	7.6	7.6		7.68
Wed-07	7.6			7.57
Thu-08	7.8			7.69
Fri-09	7.7	8.1		7.5
Sat-10	7.8			7.65
Sun-11	7.8			7.66
Mon-12	7.7			7.74
Tue-13	7.6	7.7		7.62
Wed-14	7.8			7.59
Thu-15	7.7			7.63
Fri-16	7.7	7.9		7.71
Sat-17	7.6			7.65
Sun-18	7.8	8.3		7.77
Mon-19	7.6	7.7		7.59
Tue-20	7.7			7.7
Wed-21	7.7			7.71
Thu-22	7.7			7.78
Fri-23	7.7	7.7		7.74
Sat-24	7.7	8.1		7.72
Sun-25	7.8			7.73
Mon-26	7.7			7.73
Tue-27	7.6			7.63
Wed-28	7.5	7.0		7.61
Thu-29	7.6			7.54
Fri-30	7.5	7.6		7.75
Sat 31	7.6	7.8		7.65
Average	7.7	7.7	7.8	7.7
Minimum	7.5	7.0	7.6	7.5
Maximum	7.8	8.3	7.9	7.8
GeoMean	---	---	---	---
TOTAL	---	---	---	---

TSS (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Thu-01	271	54	132		4.1	4.1
Fri-02	368	99	230		3.3	3.3
Sat-03	228	23			4.6	4.6
Sun-04	192				4.2	4.2
Mon-05	271	53			4.6	4.6
Tue-06	236	33			5.8	5.8
Wed-07	254				6.9	6.9
Thu-08	253				4.9	4.9
Fri-09	220	62			5.1	5.1
Sat-10	256				5.9	5.9
Sun-11	232				5.1	5.1
Mon-12	234				6.4	6.4
Tue-13	284	64			4.1	4.1
Wed-14	228				3.0	3.0
Thu-15	340				4.1	4.1
Fri-16	236	60			3.8	3.8
Sat-17	240				3.7	3.7
Sun-18	226	67			3.9	3.9
Mon-19	253	73			4.9	4.9
Tue-20	256				6.6	6.6
Wed-21	257				5.0	5.0
Thu-22	282				4.7	4.7
Fri-23	322	59			6.1	6.1
Sat-24	250	67			5.7	5.7
Sun-25	259				4.8	4.8
Mon-26	278				5.7	5.7
Tue-27	280				5.7	5.7
Wed-28	344	67			5.6	5.6
Thu-29	281				5.6	5.6
Fri-30	260	37			6.0	6.0
Sat 31	254	37			6.2	6.2
Average	263	57	181	---	5.0	5.0
Minimum	192	23	132	---	3.0	3.0
Maximum	368	99	230	---	6.9	6.9
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

BOD_5/$cBOD_5$ (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
	RAW	BOD_5	BOD_5	BOD_5	$cBOD_5$	$cBOD_5$
Thu-01	203	62	103		2.0	2.0
Fri-02	195	80	63		1.0	1.0
Sat-03	195	29			3.0	3.0
Sun-04	212				2.0	2.0
Mon-05	193	120			2.0	2.0
Tue-06	202	58			3.0	3.0
Wed-07	211				1.0	1.0
Thu-08	210				3.0	3.0
Fri-09	235	82			3.0	3.0
Sat-10	305				3.0	3.0
Sun-11	246				3.0	3.0
Mon-12	227				3.0	3.0
Tue-13	218	99			3.0	3.0
Wed-14	221				2.0	2.0
Thu-15	280				2.0	2.0
Fri-16	322	114			2.0	2.0
Sat-17	202				1.0	1.0
Sun-18	234				2.0	2.0
Mon-19	201	122			3.0	3.0
Tue-20	271				3.0	3.0
Wed-21	292				3.0	3.0
Thu-22	245				3.0	3.0
Fri-23	265	130			3.0	3.0
Sat-24	221				3.0	3.0
Sun-25	280				3.0	3.0
Mon-26	276				4.0	4.0
Tue-27	239				4.0	4.0
Wed-28	250	134			3.0	3.0
Thu-29	313				3.0	3.0
Fri-30	222	82			3.0	3.0
Sat 31	258	89			2.0	2.0
Average	240	103	83	---	2.6	2.6
Minimum	193	29	63	---	1.0	1.0
Maximum	322	234	103	---	4.0	4.0
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

TP (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Thu-01	4.3	3.48	1.65		0.23	0.23
Fri-02	5.16	3.01	2.07		0.21	0.21
Sat-03	5.80	1.49			0.21	0.21
Sun-04	8.47				0.22	0.22
Mon-05	7.85	4.44			0.31	0.31
Tue-06	4.38	2.12			0.44	0.44
Wed-07	5.61				0.49	0.49
Thu-08	5.76				0.32	0.32
Fri-09	4.62	3.90			0.35	0.35
Sat-10	6.38				0.31	0.31
Sun-11	6.29				0.35	0.35
Mon-12	6.41				0.32	0.32
Tue-13	7.13	5.05			0.28	0.28
Wed-14	9.30				0.26	0.26
Thu-15	8.75				0.27	0.27
Fri-16	5.84	5.07			0.25	0.25
Sat-17	6.98				0.26	0.26
Sun-18	6.53	7.48			0.24	0.24
Mon-19	5.54	5.27			0.31	0.31
Tue-20	7.07				0.34	0.34
Wed-21	7.24				0.33	0.33
Thu-22	7.14				0.28	0.28
Fri-23	7.16	6.34			0.32	0.32
Sat-24	6.84	5.27			0.33	0.33
Sun-25	6.65				0.30	0.30
Mon-26	7.34				0.33	0.33
Tue-27	8.42				0.36	0.36
Wed-28	7.03	5.82			0.35	0.35
Thu-29	7.92				0.36	0.36
Fri-30	5.61	5.19			0.49	0.49
Sat 31	6.79	7.12			0.30	0.30
Average	6.66	4.74	1.86	---	0.31	0.31
Minimum	4.33	1.49	1.65	---	0.21	0.21
Maximum	9.30	7.48	2.07	---	0.49	0.49
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

NH_3-N (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	EPEPS	OUTFALL 10 FEC	OUTFALL 10 FE
Thu-01	15.6	27.6	7.31		2.40	2.40
Fri-02	18.2	17.7	7.17		3.08	3.08
Sat-03	23.5	18.0			1.35	1.35
Sun-04	30.2				1.36	1.36
Mon-05	28.9	27.4			1.69	1.69
Tue-06	20.1	19.0			0.94	0.94
Wed-07	26.9				1.67	1.67
Thu-08	27.3				0.91	0.91
Fri-09	20.7	26.6			0.76	0.76
Sat-10	30.8				1.16	1.16
Sun-11	29.9				1.08	1.08
Mon-12	29.3				1.16	1.16
Tue-13	28.6	30.4			0.69	0.69
Wed-14	40.3				0.51	0.51
Thu-15	33.0				0.27	0.27
Fri-16	28.0	29.3			0.14	0.14
Sat-17	32.3				0.56	0.56
Sun-18	32.0	38.6			0.71	0.71
Mon-19	22.6	33.5			1.19	1.19
Tue-20	32.0				2.09	2.09
Wed-21	30.8				1.89	1.89
Thu-22	29.2				1.24	1.24
Fri-23	29.0	42.5			2.01	2.01
Sat-24	27.4	34.7			2.94	2.94
Sun-25	28.1				2.31	2.31
Mon-26	38.6				2.57	2.57
Tue-27	38.8				2.00	2.00
Wed-28	33.1	35.1			2.59	2.59
Thu-29	40.7				1.44	1.44
Fri-30	28.9	32.6			1.07	1.07
Sat 31	35.4	44.8			1.99	1.99
Average	29.4	30.5	7.2	---	1.48	1.48
Minimum	15.6	17.7	7.2	---	0.14	0.14
Maximum	40.7	44.8	7.3	---	3.08	3.08
GeoMean	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---

TKN (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Thu-01	28.0	37.5	13.0	4.13
Fri-02	35.1	25.8	16.0	5.18
Sat-03	42.1	23.0		3.06
Sun-04	53.9			3.54
Mon-05	46.9	39.2		3.67
Tue-06	32.6	23.2		2.73
Wed-07	42.0			3.40
Thu-08	46.9			3.09
Fri-09	33.4	34.5		2.70
Sat-10	44.5			2.88
Sun-11	47.6			2.81
Mon-12	43.8			3.00
Tue-13	43.2	37.3		2.25
Wed-14	52.8			2.25
Thu-15	53.0			2.10
Fri-16	43.0	39.3		1.80
Sat-17	49.7			2.92
Sun-18	51.8	51.1		2.44
Mon-19	41.0	45.5		2.97
Tue-20	52.9			3.82
Wed-21	49.2			3.77
Thu-22	52.2			3.39
Fri-23	50.4	49.2		4.01
Sat-24	51.8	44.0		4.91
Sun-25	45.4			4.53
Mon-26	55.7			3.92
Tue-27	67.4			4.78
Wed-28	57.0	43.3		4.68
Thu-29	62.5			3.34
Fri-30	47.2	42.8		2.91
Sat 31	51.2	53.4		4.21
Average	47.6	39.3	14.5	3.39
Minimum	28.0	37.5	13.0	1.80
Maximum	67.4	53.4	16.0	5.18
GeoMean	---	---	---	---
TOTAL	---	---	---	---

NO_2+NO_3 (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Thu-01		0.07	0.40	6.5
Fri-02		0.82	1.04	8.9
Sat-03		0.90		7.3
Sun-04				10.0
Mon-05		0.43		10.8
Tue-06		0.33		7.5
Wed-07	0.02			9.3
Thu-08				10.8
Fri-09		0.02		8.6
Sat-10				11.4
Sun-11				12.1
Mon-12				12.1
Tue-13		0.23		9.6
Wed-14	0.03			11.4
Thu-15				12.3
Fri-16		0.57		8.8
Sat-17				11.4
Sun-18				13.0
Mon-19		0.07		10.4
Tue-20				11.5
Wed-21	< 0.01			11.3
Thu-22				11.4
Fri-23		0.83		10.5
Sat-24				9.3
Sun-25				12.5
Mon-26				11.6
Tue-27				11.4
Wed-28	< 0.01	1.25		9.7
Thu-29				11.3
Fri-30		0.91		8.90
Sat 31		0.29		10.1
Average	0.02	0.52	0.72	10.4
Minimum	< 0.01	0.02	0.40	6.5
Maximum	0.03	1.25	1.04	13.0
GeoMean	---	---	---	---
TOTAL	---	---	---	---

Chloride (mg/L)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
Thu-01	62	66	41.4	77
Fri-02	68	50	35.8	80
Sat-03	67	48		74
Sun-04	83			81
Mon-05	84	66		90
Tue-06	65	49		72
Wed-07	80			84
Thu-08	84			88
Fri-09	63	67		85
Sat-10	79			80
Sun-11	75			82
Mon-12	83			82
Tue-13	74	70		85
Wed-14	85			83
Thu-15	89			86
Fri-16	81	63		85
Sat-17	70			85
Sun-18	57			80
Mon-19	70	72		76
Tue-20	72			81
Wed-21	76			83
Thu-22	78			88
Fri-23	82	94		85
Sat-24	80			84
Sun-25	76			83
Mon-26	85			82
Tue-27	81			88
Wed-28	71	70		81
Thu-29	77			82
Fri-30	67	64		78
Sat 31	63	69.4		72
Average	75	65	39	82
Minimum	57.2	48	36	71.5
Maximum	89	94	41	90
GeoMean	---	---	---	---
TOTAL	---	---	---	---

E. coli (Counts/100 mL)

DATE	RAW	OUTFALL 30	OUTFALL 20	OUTFALL 10 FEC
	X10^6	X10^6	X10^6	FEC
Thu-01		2.8	4.8	11
Fri-02		3.8	1.0	5
Sat-03		0.8		5
Sun-04				7
Mon-05		1.0		10
Tue-06		2.1		6
Wed-07				14
Thu-08				8
Fri-09		2.4		10
Sat-10				6
Sun-11				4
Mon-12	4.5			22
Tue-13		0.9		21
Wed-14				5
Thu-15				8
Fri-16		2.5		5
Sat-17				5
Sun-18		6.0		7
Mon-19		2.8		9
Tue-20	3.4			6
Wed-21				9
Thu-22				9
Fri-23		2.5		17
Sat-24		1.1		2
Sun-25				5
Mon-26				7
Tue-27				9
Wed-28		1.4		6
Thu-29				6
Fri-30		1.6		15
Sat 31		2.6		5
Average	---	---	---	---
Minimum	3	1	1	2
Maximum	4.5	6	5	22
GeoMean	4	2	2	7
TOTAL	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage					
Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
71	71	100%	591	591	100.00%

Report Comments

1	OUTFALL 20 - August 5: Flow of stormwater not sewage.
2	OUTFALL 30 - August 18: Insufficient sample in composite to run N-TOX and Chloride
3	OUTFALL 30 - August 24: Insufficient sample in composite to run BOD, N-TOX and Chloride

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW	Untreated Influent into the plant
INF	Untreated Wastewater from collection system
INFs	Influent, screened at the Headworks Diversion Structure
PE	Primary Effluent from conventional primaries
PE 30	Primary Effluent from conventional primaries discharged via Outfall 30
EPT	Enhanced Primary Treatment
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent and Pump Station
FE	Final Effluent from secondary treatment process (with biological nutrient removal).

FEC	Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10	UV-disinfected, discharged via OUTFALL 10
OUTFALL 20	Combined Bypass (RAW + PE + EPE)
OUTFALL 30	Combined Bypass (INF + INFS + PE30 + EPE)
MPW	Membrane Product Water (Effluent re-use water)
ML	Megalitre (1,000,000 Litre)
MPN	Most Probable Number
NR	No Result
NS	No Sample
INS	Insufficient Sample

Abhishek Bhargava
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

2019 Annual Wastewater Treatment Report

Gold Bar Wastewater Treatment Plant
Plant Performance Report
September 2019

Digested Sludge: Total Monthly Volume (ML)	71.43

Volume of Flow (ML) / Liquid Stream Quality (pH, TSS, BOD₅/cBOD₅)

DATE	Peak Flow (MLD)	Influent RAW	Effluent – Non UV Disinfected OUTFALL 30	Non UV Disinfected OUTFALL 20	Non UV Disinfected MPW	UV Disinfected EPEPS	UV Disinfected OUTFALL 10 FEC	UV Disinfected OUTFALL 10 FE	pH@25°C RAW	pH OUTFALL 30	pH OUTFALL 20	pH OUTFALL 10 FEC	TSS (mg/L) RAW	TSS OUTFALL 30	TSS OUTFALL 20	TSS EPEPS	TSS OUTFALL 10 FEC	TSS OUTFALL 10 FE	BOD₅/cBOD₅ (mg/L) RAW BOD₅	OUTFALL 30 BOD₅	OUTFALL 20 BOD₅	EPEPS BOD₅	OUTFALL 10 FEC cBOD₅	OUTFALL 10 FE cBOD₅
Sun-01	348.1	267.0	0.0	0.00	10.9	0.0	256.1	256.1	7.6			7.7	492				5.5		220				3.0	
Mon-02	495.9	293.8	6.5	0.00	10.7	0.0	276.6	276.6	7.6	7.7		7.7	336	53			5.7		303	108			3.0	
Tue-03	379.8	283.2	0.0	0.00	10.9	0.0	272.3	272.3	7.5			7.7	165				6.4		193				4.0	
Wed-04	371.0	271.6	0.0	0.00	11.0	0.0	260.6	260.6	7.8			7.7	290				5.9		143				3.0	
Thu-05	370.6	271.5	0.0	0.00	11.0	0.0	260.5	260.5	7.5			7.7	303				5.8		269				3.0	
Fri-06	336.9	269.5	0.0	0.00	10.8	0.0	258.7	258.7	7.6			7.7	396				5.2		305				3.0	
Sat-07	346.5	263.8	0.0	0.00	10.7	0.0	253.1	253.1	7.6			7.7	292				5.1		273				3.0	
Sun-08	1,057.2	359.0	44.2	0.00	10.0	0.0	304.8	304.8	7.4	7.6		7.5	352	49			4.6		242	119			2.0	
Mon-09	547.6	312.8	12.1	0.00	10.1	0.0	290.6	290.6	7.5	7.8		7.5	266	38			5.1		235	74			2.0	
Tue-10	442.9	316.4	9.1	0.00	9.9	0.0	297.4	297.4	7.5	7.7		7.6	288	45			6.2		373	64			3.0	
Wed-11	385.2	281.1	0.0	0.00	9.6	0.0	271.5	271.5	7.6			7.6	303				5.6		332				3.0	
Thu-12	381.3	277.0	0.0	0.00	9.8	0.0	267.2	267.2	7.5			7.6	320				6.0		254				3.0	
Fri-13	360.4	276.0	0.0	0.00	9.8	0.0	266.2	266.2	7.6			7.7	320				5.0		275				3.0	
Sat-14	375.4	265.1	0.0	0.00	10.0	0.0	255.1	255.1	7.6			7.6	248				5.4		248				3.0	
Sun-15	384.2	266.0	0.0	0.00	10.0	0.0	256.0	256.0	7.6			7.7	270				6.3		292				2.0	
Mon-16	374.4	272.3	0.0	0.00	10.2	0.0	262.1	262.1	7.6			7.6	284				6.6		258				3.0	
Tue-17	475.8	282.9	4.7	0.00	10.4	0.0	267.8	267.8	7.5	7.8		7.6	311	71			6.1		368	154			3.0	
Wed-18	351.4	265.6	0.0	0.00	10.1	0.0	255.5	255.5	7.6			7.6	332				6.0		251				3.0	
Thu-19	347.8	265.7	0.0	0.00	10.2	0.0	255.5	255.5	7.7			7.6	310				6.0		282				3.0	
Fri-20	346.0	268.5	0.0	0.00	10.0	0.0	258.5	258.5	7.6			7.6	292				3.4		269				4.0	
Sat-21	362.6	256.7	0.0	0.00	10.4	0.0	246.3	246.3	7.5			7.6	304				5.8		284				3.0	
Sun-22	378.9	258.3	0.0	0.00	10.1	0.0	248.2	248.2	7.6			7.7	300				5.7		235				3.0	
Mon-23	355.7	265.9	0.0	0.00	10.2	0.0	255.7	255.7	7.6			7.7	246				5.3		278				3.0	
Tue-24	351.6	260.8	0.0	0.00	10.3	0.0	250.5	250.5	7.6			7.7	282				7.6		221				3.0	
Wed-25	348.9	263.0	0.0	0.00	10.1	0.0	252.9	252.9	7.7			7.8	286				5.7		219				3.0	
Thu-26	899.3	370.6	62.8	0.88	10.6	0.0	296.3	296.3	7.5	7.5	7.5	7.6	424	83	692		8.7		254	127	139		2.0	
Fri-27	808.3	345.8	34.3	0.00	10.6	0.0	300.9	300.9	7.4	7.5		7.7	292	40			6.8		208	64			3.0	
Sat-28	375.2	265.0	0.0	0.00	10.4	0.0	254.6	254.6	7.6			7.6	258				13.4		218				4.0	
Sun-29	386.0	267.0	0.0	0.00	10.5	0.0	256.5	256.5	7.6			7.6	268				3.6		232				2.0	
Mon-30	376.4	268.4	0.0	0.00	10.7	0.0	257.7	257.7	7.7			7.6	303				9.2		304				4.0	
Average	441.39	282.67	6.20	0.03	10.31	0.00	266.13	266.13	7.6	7.6	7.5	7.6	304	54	692	---	6.1	---	261	101	139	---	3.0	---
Minimum	336.90	256.70	0.00	0.00	9.60	0.00	246.30	246.30	7.4	7.5	7.5	7.5	165	38	692	---	3.4	---	143	64	139	---	2.0	---
Maximum	1,057.20	370.58	62.80	0.88	11.00	0.00	304.80	304.80	7.8	7.8	7.5	7.8	492	83	692	---	13.4	---	373	154	139	---	4.0	---
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	8,450	174	0.88	310	0	7,966	7,966	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Liquid Stream Quality (continued)

DATE	TP (mg/L) RAW	TP OUTFALL 30	TP OUTFALL 20	TP EPEPS	TP OUTFALL 10 FEC	TP OUTFALL 10 FE	NH3-N (mg/L) RAW	NH3-N OUTFALL 30	NH3-N OUTFALL 20	NH3-N EPEPS	NH3-N OUTFALL 10 FEC	NH3-N OUTFALL 10 FE	TKN (mg/L) RAW	TKN OUTFALL 30	TKN OUTFALL 20	TKN OUTFALL 10 FEC	NO_2+NO_3 (mg/L) RAW	NO_2+NO_3 OUTFALL 30	NO_2+NO_3 OUTFALL 20	NO_2+NO_3 OUTFALL 10 FEC	Chloride (mg/L) RAW	Chloride OUTFALL 30	Chloride OUTFALL 20	Chloride OUTFALL 10 FEC	*E. coli* (Counts/100 mL) RAW X10^6	*E. coli* OUTFALL 30 X10^6	*E. coli* OUTFALL 20 X10^6	*E. coli* OUTFALL 10 FEC
Sun-01	9.06				0.30	0.30	37.2				1.93	1.93	67.9			5.03				11.5	69			72				4
Mon-02	7.34	6.92			0.31	0.31	35.2	43.4			4.92	4.92	55.6	51.8		6.26		1.41		9.9	68	66		74		2.3		2
Tue-03	6.57				0.41	0.41	39.9				6.91	6.91	51.0			8.10				8.2	80			78				13
Wed-04	6.35				0.36	0.36	44.2				4.72	4.72	50.1			6.85	< 0.01			11.8	76			94				8
Thu-05	7.17				0.43	0.43	36.8				4.69	4.69	52.1			5.48				11.5	73			87				8
Fri-06	7.29				0.42	0.42	41.6				2.55	2.55	58.6			4.77				12.2	77			89				34
Sat-07	7.07				0.35	0.35	40.7				1.98	1.98	61.4			4.25				12.5	67			88				8
Sun-08	5.51	4.64			0.30	0.30	23.2	36.0			1.41	1.41	43.4	48.2		3.39		0.28		10.0	58	61		82		6.8		7
Mon-09	5.74	4.21			0.29	0.29	32.6	40.0			2.36	2.36	47.9	45.6		3.96		0.56		9.7	71	68		72		1.9		4
Tue-10	6.43	4.44			0.46	0.46	30.8	38.2			3.33	3.33	56.7	44.6		5.65		0.18		8.8	65	76		76		1.9		11
Wed-11	7.28				0.34	0.34	42.6				5.00	5.00	62.6			6.56	< 0.01			9.7	84			81	4			8
Thu-12	7.52				0.40	0.40	43.7				4.14	4.14	66.5			5.57				10.5	85			87				9
Fri-13	7.62				0.38	0.38	40.8				2.86	2.86	62.9			4.56				10.7	87			87				11
Sat-14	7.70				0.35	0.35	44.7				2.89	2.89	64.0			4.81				11.5	80			94				4
Sun-15	7.00				0.33	0.33	44.3				1.60	1.60	58.6			5.26				12.4	77			83				9
Mon-16	7.38				0.39	0.39	42.4				2.21	2.21	59.2			4.60				10.7	83			81				8
Tue-17	7.45	5.72			0.37	0.37	36.8	41.1			2.18	2.18	61.8	47.2		4.26		0.41		10.7	86	78		94		< 0.1		7
Wed-18	7.42				0.41	0.41	42.7				1.74	1.74	62.8			4.23	0.01			11.2	90			87	5			5
Thu-19	8.68				0.34	0.34	47.1				2.18	2.18	65.3			4.11				12.6	82			94				3
Fri-20	7.70				0.36	0.36	43.7				2.00	2.00	61.4			3.82				12.6	80			86				4
Sat-21	6.82				0.33	0.33	37.8				0.76	0.76	54.6			2.68				9.2	72			85				5
Sun-22	6.58				0.33	0.33	35.8				0.64	0.64	53.8			2.26				8.9	78			76				3
Mon-23	7.54				0.34	0.34	39.4				0.72	0.72	58.2			2.48				7.9	80			79				6
Tue-24	9.17				0.36	0.36	47.9				2.16	2.16	66.6			4.06				10.4	77			84				8
Wed-25	9.69				0.39	0.39	49.1				2.53	2.53	66.2			4.87	0.03			11.8	80			83				17
Thu-26	7.48	5.73	5.51		0.40	0.40	34.7	33.2	14.6		3.00	3.00	52.6	41.7	28.8	5.55		0.34		11.9	58	54	31	80		3.6	2	7
Fri-27	6.62	3.10			0.40	0.40	29.3	21.1			1.63	1.63	45.9	27.3		3.50		0.44		10.7	60	40		60		1.6		3
Sat-28	9.09				0.67	0.67	47.8				4.18	4.18	63.1			6.26				15.1	68			72				6
Sun-29	9.18				0.35	0.35	47.3				5.63	5.63	63.0			7.15				12.3	71			74				2
Mon-30	12.40				0.58	0.58	44.7				4.08	4.08	85.2			5.97				12.0	74			74				8
Average	7.63	4.97	5.51	---	0.38	0.38	40.2	36.1	14.6	---	2.90	2.90	59.3	43.8	28.8	4.88	0.01	0.52	---	11.0	75	63	31	82	5	---	---	---
Minimum	5.51	3.10	5.51	---	0.29	0.29	23.2	21.1	14.6	---	0.64	0.64	43.4	27.3	28.8	2.26	< 0.01	0.18	---	7.9	58	40	31	60	4	< 0.1	2	2
Maximum	12.40	6.92	5.51	---	0.67	0.67	49.1	43.4	14.6	---	6.91	6.91	85.2	51.8	28.8	8.10	0.03	1.41	---	15.1	90	78	31	94	5	6.8	2	34
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4.5	1.5	2	6
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage					
Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
28	28	100%	619	619	100%

Report Comments

1	RAW - September 5: Analysis of the sample exceeded the recommended hold time for TSS and BOD.
2	RAW - September 28: Analysis of the sample exceeded the recommended hold time for BOD.

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW	Untreated Influent into the plant
INF	Untreated Wastewater from collection system
INFs	Influent, screened at the Headworks Diversion Structure
PE	Primary Effluent from conventional primaries
PE 30	Primary Effluent from conventional primaries discharged via Outfall 30
EPT	Enhanced Primary Treatment
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent and Pump Station
FE	Final Effluent from secondary treatment process (with biological nutrient removal).
FEC	Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10	UV-disinfected, discharged via OUTFALL 10
OUTFALL 20	Combined Bypass (RAW + PE + EPE)
OUTFALL 30	Combined Bypass (INF + INFS + PE30 + EPE)
MPW	Membrane Product Water (Effluent re-use water)
ML	Megalitre (1,000,000 Litre)
MPN	Most Probable Number
NR	No Result
NS	No Sample
INS	Insufficient Sample

Abhishek Bhargava
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

2019 Annual Wastewater Treatment Report

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Plant Performance Report
October 2019

Digested Sludge Total Monthly Volume (ML)	71.17

Volume of Flow (ML) / Liquid Stream Quality: pH, TSS, BOD₅/cBOD₅

DATE	Peak Flow (MLD)	Influent RAW	Effluent Non UV Disinfected OUTFALL 30	Effluent Non UV Disinfected OUTFALL 20	Effluent Non UV Disinfected MPW	Effluent UV Disinfected EPEPS	Effluent UV Disinfected OUTFALL 10 FEC	Effluent UV Disinfected OUTFALL 10 FE	pH@25°C RAW	pH@25°C OUTFALL 30	pH@25°C OUTFALL 20	pH@25°C OUTFALL 10 FEC	TSS (mg/L) RAW	TSS (mg/L) OUTFALL 30	TSS (mg/L) OUTFALL 20	TSS (mg/L) EPEPS	TSS (mg/L) OUTFALL 10 FEC	TSS (mg/L) OUTFALL 10 FE	BOD₅/cBOD₅ (mg/L) RAW BOD₅	BOD₅/cBOD₅ (mg/L) OUTFALL 30 BOD₅	BOD₅/cBOD₅ (mg/L) OUTFALL 20 BOD₅	BOD₅/cBOD₅ (mg/L) EPEPS BOD₅	BOD₅/cBOD₅ (mg/L) OUTFALL 10 FEC cBOD₅	BOD₅/cBOD₅ (mg/L) OUTFALL 10 FE cBOD₅
Tue-01	354.5	264.4	0.0	0.0	10.9	0.0	253.5	253.5	7.6			7.7	260				5.6	5.6	234				3.0	
Wed-02	352.5	261.7	0.0	0.0	10.8	0.0	250.9	250.9	7.6			7.8	256				5.8	5.8	235				3.0	
Thu-03	353.5	255.5	0.0	0.0	10.9	0.0	244.6	244.6	7.6			7.6	283				6.3	6.3	288				4.0	
Fri-04	365.2	265.1	0.0	0.0	11.1	0.0	254.0	254.0	7.7			7.7	236				5.2	5.2	285				4.0	
Sat-05	367.2	258.5	0.0	0.0	11.2	0.0	247.3	247.3	7.6			7.7	240				4.9	4.9	272				4.0	
Sun-06	372.9	254.8	0.0	0.0	11.2	0.0	243.6	243.6	7.6			7.6	237				4.7	4.7	273				3.0	
Mon-07	687.7	289.2	23.4	0.0	11.4	0.0	254.4	254.4	7.5	7.7		7.7	303	92			4.6	4.6	251	119			3.0	
Tue-08	630.7	288.7	12.9	0.0	11.2	0.0	264.6	264.6	7.5	7.5		7.6	260	62			4.1	4.1	293	79			3.0	
Wed-09	346.8	257.9	0.0	0.0	11.2	0.0	246.7	246.7	7.5			7.7	296				4.0	4.0	299				3.0	
Thu-10	337.0	253.4	0.0	0.0	11.9	0.0	241.5	241.5	7.6			7.7	292				3.2	3.2	303				2.0	
Fri-11	338.0	258.3	0.0	0.0	11.8	0.0	246.5	246.5	7.6			7.7	266				3.9	3.9	257				3.0	
Sat-12	378.3	251.8	0.0	0.0	11.5	0.0	240.3	240.3	7.5			7.7	292				4.6	4.6	272				3.0	
Sun-13	544.9	278.9	23.6	0.0	10.6	0.0	244.7	244.7	7.5	7.5		7.8	296	64			4.1	4.1	290	154			3.0	
Mon-14	582.9	419.0	86.0	0.0	11.3	0.0	321.7	321.7	7.5	7.5		7.4	180	65			4.0	4.0	158	102			3.0	
Tue-15	390.7	280.7	0.1	0.0	11.8	0.0	268.8	268.8	7.5			7.6	268				4.6	4.6	253				3.0	
Wed-16	352.9	266.1	0.0	0.0	11.5	0.0	254.6	254.6	7.6			7.6	250				4.2	4.2	307				4.0	
Thu-17	351.3	265.0	0.0	0.0	11.5	0.0	253.5	253.5	7.5			7.7	266				5.0	5.0	174				3.0	
Fri-18	342.9	264.2	0.0	0.0	12.1	0.0	252.1	252.1	7.7			7.8	288				4.9	4.9	333				3.0	
Sat-19	361.9	260.1	0.0	0.0	12.1	0.0	248.0	248.0	7.7			7.6	280				4.3	4.3	286				3.0	
Sun-20	367.7	260.3	0.0	0.0	11.6	0.0	248.7	248.7	7.8			7.8	260				3.8	3.8	277				3.0	
Mon-21	358.8	262.0	0.0	0.0	11.8	0.0	250.2	250.2	7.6			7.7	332				4.1	4.1	302				3.0	
Tue-22	436.2	268.9	0.0	0.0	11.8	0.0	257.1	257.1	7.5			7.7	368				4.1	4.1	275				3.0	
Wed-23	376.2	263.4	0.0	0.0	12.5	0.0	250.9	250.9	7.5			7.7	344				4.5	4.5	296				3.0	
Thu-24	339.7	260.8	0.0	0.0	11.2	0.0	249.6	249.6	7.6			7.6	292				5.3	5.3	309				3.0	
Fri-25	357.3	268.2	0.0	0.0	11.8	0.0	256.4	256.4	7.5			7.5	388				5.2	5.2	292				3.0	
Sat-26	373.1	260.7	0.0	0.0	11.8	0.0	248.9	248.9	7.6			7.6	320				5.9	5.9	313				3.0	
Sun-27	371.8	261.1	0.0	0.0	11.6	0.0	249.5	249.5	7.6			7.6	272				5.4	5.4	305				3.0	
Mon-28	356.4	262.2	0.0	0.0	11.7	0.0	250.5	250.5	7.6			7.7	296				4.7	4.7	338				4.0	
Tue-29	344.9	259.8	0.0	0.0	3.0	0.0	256.8	256.8	7.4			7.7	276				4.1	4.1	310				3.0	
Wed-30	345.1	262.5	0.0	0.0	5.9	0.0	256.6	256.6	7.6			7.6	314				4.2	4.2	325				3.0	
Thu 31	336.9	253.7	0.0	0.0	10.8	0.0	242.9	242.9	7.6			7.6	264				3.4	3.4	331				3.0	
Average	396.18	270.03	5.21	0.00	11.49	0.00	253.33	253.33	7.6	7.6	—	7.7	283	71	—	—	4.6	4.6	282	114	—	—	3.1	—
Minimum	337.00	251.80	0.00	0.00	10.60	0.00	240.30	240.30	7.4	7.5	—	7.4	180	62	—	—	3.2	3.2	158	79	—	—	2.0	—
Maximum	687.70	419.00	86.00	0.00	12.50	0.00	321.70	321.70	7.8	7.7	—	7.8	388	92	—	—	6.3	6.3	338	154	—	—	4.0	—
GeoMean	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL	—	8,337	146	0.00	342	0	7,849	7,849	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Liquid Stream Quality (continued): TP, NH3-N, TKN, NO_2+NO_3, Chloride, *E. coli*

DATE	TP (mg/L) RAW	TP (mg/L) OUTFALL 30	TP (mg/L) OUTFALL 20	TP (mg/L) EPEPS	TP (mg/L) OUTFALL 10 FEC	TP (mg/L) OUTFALL 10 FE	NH3-N (mg/L) RAW	NH3-N (mg/L) OUTFALL 30	NH3-N (mg/L) OUTFALL 20	NH3-N (mg/L) EPEPS	NH3-N (mg/L) OUTFALL 10 FEC	NH3-N (mg/L) OUTFALL 10 FE	TKN (mg/L) RAW	TKN (mg/L) OUTFALL 30	TKN (mg/L) OUTFALL 20	TKN (mg/L) OUTFALL 10 FEC	NO_2+NO_3 (mg/L) RAW	NO_2+NO_3 (mg/L) OUTFALL 30	NO_2+NO_3 (mg/L) OUTFALL 20	NO_2+NO_3 (mg/L) OUTFALL 10 FEC	Chloride (mg/L) RAW	Chloride (mg/L) OUTFALL 30	Chloride (mg/L) OUTFALL 20	Chloride (mg/L) OUTFALL 10 FEC	*E. coli* (Counts/100 mL) RAW X10^6	*E. coli* (Counts/100 mL) OUTFALL 30 X10^6	*E. coli* (Counts/100 mL) OUTFALL 20 X10^6	*E. coli* (Counts/100 mL) OUTFALL 10 FEC
Tue-01	8.26				0.42		36.5				2.89		65.3			4.52				11.0	79.8			86				2
Wed-02	8.33				0.37		45.4				3.29		64.4			5.38	< 0.01			11.6	82.8			86				3
Thu-03	8.95				0.35		44.8				2.81		63.2			4.93				12.9	80.2			87				1
Fri-04	8.70				0.34		45.0				2.63		60.8			4.63				13.0	76.2			85				4
Sat-05	8.57				0.31		45.1				3.47		62.4			4.94				12.7	70.6			82				3
Sun-06	8.56				0.32		48.3				4.38		62.2			5.77				12.0	67.4			76				< 1
Mon-07	6.46	4.06			0.31		32.1	28.6			1.93		51.9	38.4		3.76		0.23		10.8	70.0	72		74		2.9		5
Tue-08	5.78	2.04			0.25		33.9	18.2			0.77		50.5	20.8		2.35		0.08		7.0	66.0	49		71		1.9		4
Wed-09	6.74				0.25		37.0				1.25		54.8			2.85	< 0.01			7.3	67.6			73				6
Thu-10	7.42				0.28		37.5				1.26		58.4			3.00				8.1	74.9			78				< 1
Fri-11	7.00				0.28		37.3				0.99		54.6			2.78				8.5	75.4			94				4
Sat-12	6.77				0.25		35.7				1.21		54.1			3.00				8.9	74.8			94				4
Sun-13	6.27	3.86			0.26		34.0	26.8			1.58		50.6	36.4		3.18		0.33		9.0	69.6	63		78		9.9		3
Mon-14	3.99	2.96			0.21		21.6	22.2			1.08		30.7	29.9		2.32		0.33		5.8	45.6	48		60		2.5		12
Tue-15	5.82				0.24		34.4				2.07		48.9			3.38				6.7	71.7			61				1
Wed-16	6.89				0.17		37.0				2.21		57.2			3.40	< 0.01			7.4	83.5			80				5
Thu-17	7.16				0.27		41.1				3.38		58.3			4.83				9.6	82.3			85				1
Fri-18	7.34				0.26		40.5				3.57		61.7			5.44				10.4	80.7			87				1
Sat-19	7.43				0.25		43.5				3.46		59.2			5.21				10.6	79.5			85				2
Sun-20	7.31				0.26		40.7				3.50		66.4			5.42				10.7	73.9			93				1
Mon-21	7.39				0.26		43.3				2.99		64.1			4.91				10.1	78.9			78				4
Tue-22	7.21				0.29		40.7				2.57		60.1			4.32				11.0	79.7			81	3			3
Wed-23	11.4				0.29		39.0				2.93		61.1			4.61	< 0.01			9.3	77.3			82				5
Thu-24	7.51				0.26		44.0				2.03		63.4			4.42				11.1	82.5			81				2
Fri-25	7.80				0.30		40.2				3.23		59.3			4.88				11.6	81.2			87				9
Sat-26	7.68				0.32		44.6				3.48		59.2			5.11				9.9	75.0			84				2
Sun-27	7.38				0.35		42.5				4.42		60.9			5.88				9.4	74.0			78				3
Mon-28	7.20				0.23		42.4				4.70		57.4			4.78				8.8	76.3			75				4
Tue-29	7.49				0.28		43.2				3.30		61.6			5.31				8.3	83.0			82	2			9
Wed-30	7.61				0.28		42.2				3.36		63.5			5.30	< 0.01			8.6	79.6			87				6
Thu 31	7.72				0.26		44.6				3.64		63.5			5.25				8.1	79.4			86				4
Average	7.42	3.23	—	—	0.28	—	39.9	24.0	—	—	2.72	—	58.4	31.4	—	4.38	0.01	0.24	—	9.7	75	58	—	81	—	—	—	—
Minimum	3.99	2.04	—	—	0.17	—	21.6	18.2	—	—	0.77	—	30.7	20.8	—	2.32	< 0.01	0.08	—	5.8	45.6	48	—	60.4	2	2	—	< 1
Maximum	11.4	4.06	—	—	0.42	—	48.3	28.6	—	—	4.70	—	66.4	38.4	—	5.88	< 0.01	0.33	—	13.0	84	72	—	94	3	10	—	12
GeoMean	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	—	3
TOTAL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage					
Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
29	29	100%	648	648	100%

Report Comments

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW	Untreated Influent into the plant
INF	Untreated Wastewater from collection system
INFs	Influent, screened at the Headworks Diversion Structure
PE	Primary Effluent from conventional primaries
PE 30	Primary Effluent from conventional primaries discharged via Outfall 30
EPT	Enhanced Primary Treatment
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent and Pump Station
FE	Final Effluent from secondary treatment process (with biological nutrient removal).
FEC	Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10	UV-disinfected, discharged via OUTFALL 10
OUTFALL 20	Combined Bypass (RAW + PE + EPE)
OUTFALL 30	Combined Bypass (INF + INFS + PE30 + EPE)
MPW	Membrane Product Water (Effluent re-use water)
ML	Megalitre (1,000,000 Litre)
MPN	Most Probable Number
NR	No Result
NS	No Sample
INS	Insufficient Sample

Alfredo Suarez
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Plant Performance Report
November 2019

Digested Sludge: Total Monthly Volume (ML)	69.27

Volume of Flow (ML)

DATE	Peak Flow (MLD)	Influent RAW	Effluent: Non UV Disinfected OUTFALL 30	Effluent: Non UV Disinfected OUTFALL 29	Effluent: Non UV Disinfected MPW	Effluent: UV Disinfected EPEPS	Effluent: UV Disinfected OUTFALL 10 FEC	Effluent: UV Disinfected OUTFALL 10 FE
Fri-01	338.2	252.1	0.0	0.0	10.3	0.0	241.8	241.8
Sat-02	359.4	253.8	0.0	0.0	10.4	0.0	243.4	243.4
Sun-03	368.1	267.8	0.0	0.0	11.3	0.0	256.5	256.5
Mon-04	348.2	256.2	0.0	0.0	10.9	0.0	245.3	245.3
Tue-05	347.8	256.5	0.0	0.0	11.2	0.0	245.3	245.3
Wed-06	343.8	259.0	0.0	0.0	11.4	0.0	247.6	247.6
Thu-07	349.1	260.1	0.0	0.0	11.4	0.0	248.7	248.7
Fri-08	504.5	377.5	49.2	0.0	11.2	0.0	317.1	317.1
Sat-09	360.4	259.1	0.0	0.0	11.4	0.0	247.7	247.7
Sun-10	353.5	251.9	0.0	0.0	11.3	0.0	240.6	240.6
Mon-11	363.0	255.6	0.0	0.0	11.0	0.0	244.6	244.6
Tue-12	366.0	262.5	0.0	0.0	10.8	0.0	251.7	251.7
Wed-13	408.6	285.1	0.0	0.0	11.0	0.0	274.1	274.1
Thu-14	366.0	272.9	0.0	0.0	10.6	0.0	262.3	262.3
Fri-15	446.8	269.4	1.3	0.0	11.1	0.0	257.0	257.0
Sat-16	460.6	298.0	14.0	0.0	11.1	0.0	273.9	273.9
Sun-17	497.6	298.0	36.7	0.0	11.4	0.0	249.9	249.9
Mon-18	421.8	302.7	6.2	0.0	11.1	0.0	285.4	285.4
Tue-19	377.5	273.3	0.0	0.0	11.1	0.0	262.2	262.2
Wed-20	373.9	274.2	0.0	0.0	11.2	0.0	263.0	263.0
Thu-21	342.6	268.6	0.0	0.0	10.1	0.0	258.5	258.5
Fri-22	362.0	269.5	0.0	0.0	10.9	0.0	258.6	258.6
Sat-23	385.2	269.2	0.0	0.0	10.9	0.0	258.3	258.3
Sun-24	390.5	268.9	0.0	0.0	11.0	0.0	257.9	257.9
Mon-25	354.4	265.0	0.0	0.0	11.2	0.0	253.8	253.8
Tue-26	342.7	258.4	0.0	0.0	11.3	0.0	247.1	247.1
Wed-27	340.9	258.5	0.0	0.0	11.2	0.0	247.3	247.3
Thu-28	335.2	259.3	0.0	0.0	11.7	0.0	247.6	247.6
Fri-29	339.4	252.9	0.0	0.0	10.5	0.0	242.4	242.4
Sat-30	361.6	247.3	0.0	0.0	12.0	0.0	235.3	235.3
Average	376.87	271.60	3.84	0.00	11.05	0.00	258.61	258.61
Minimum	335.20	251.90	0.00	0.00	10.10	0.00	240.60	240.60
Maximum	504.50	377.50	49.20	0.00	11.70	0.00	317.10	317.10
GeoMean	—	—	—	—	—	—	—	—
TOTAL	—	8,102	107	0.00	332	0	7,663	7,663

Liquid Stream Quality

DATE	pH@25°C RAW	pH@25°C OUTFALL 30	pH@25°C OUTFALL 29	pH@25°C OUTFALL 10 FEC	TSS (mg/L) RAW	TSS (mg/L) OUTFALL 30	TSS (mg/L) OUTFALL 29	TSS (mg/L) EPEPS	TSS (mg/L) OUTFALL 10 FEC	TSS (mg/L) OUTFALL 10 FE	BOD_5/cBOD$_5$ (mg/L) RAW	BOD_5 OUTFALL 30	BOD_5 OUTFALL 20	BOD_5 EPEPS	cBOD$_5$ OUTFALL 10 FEC	cBOD$_5$ OUTFALL 10 FE	TP (mg/L) RAW	TP OUTFALL 30	TP OUTFALL 29	TP EPEPS	TP OUTFALL 10 FEC	TP OUTFALL 10 FE	NH3-N (mg/L) RAW	NH3-N OUTFALL 30	NH3-N OUTFALL 29	NH3-N EPEPS	NH3-N OUTFALL 10 FEC	NH3-N OUTFALL 10 FE	TKN (mg/L) RAW	TKN (mg/L) OUTFALL 30	TKN (mg/L) OUTFALL 20	TKN (mg/L) OUTFALL 10 FEC	NO_2+NO_3 (mg/L) RAW	NO_2+NO_3 (mg/L) OUTFALL 30	NO_2+NO_3 (mg/L) OUTFALL 29	NO_2+NO_3 (mg/L) OUTFALL 10 FEC	Chloride (mg/L) RAW	Chloride (mg/L) OUTFALL 30	Chloride (mg/L) OUTFALL 20	Chloride (mg/L) OUTFALL 10 FEC	E. coli (Counts/100 mL) RAW	E. coli (Counts/100 mL) OUTFALL 30	E. coli (Counts/100 mL) OUTFALL 20	E. coli (Counts/100 mL) OUTFALL 10 FEC
Fri-01	7.6			7.65	276				4.1	4.1	299				3.0	3.0	6.18				0.42	0.42	44.8				4.25	4.25	64.0			5.98				9.10	82.5			83.9				4
Sat-02	7.8			7.64	288				4.3	4.3	341				3.0	3.0	8.41				0.37	0.37	42.5				5.24	5.24	58.2			5.43				9.04	77.1			84.7				12
Sun-03	7.7			7.64	308				3.9	3.9	291				2.0	2.0	7.84				0.35	0.35	43.8				4.86	4.86	64.3			7.01				9.50	78.5			84.4				3
Mon-04	7.6			7.68	292				4.1	4.1	233				2.0	2.0	8.16				0.34	0.34	42.2				4.66	4.66	61.1			3.83				9.44	83.4			82.2				8
Tue-05	7.6			7.66	328				4.0	4.0	361				3.0	3.0	8.67				0.31	0.31	43.4				2.25	2.25	65.9			3.76				10.1	131			106				4
Wed-06	7.5			7.59	268				3.9	3.9	305				3.0	3.0	7.83				0.32	0.32	43.2				2.84	2.84	62.4			4.43	< 0.005			9.72	99.0			116				4
Thu-07	7.5			7.63	312				5.0	5.0	314				3.0	3.0	8.26				0.31	0.31	40.6				2.93	2.93	63.9			4.58				10.2	95.6			102				2
Fri-08	7.5	7.6		7.51	372	81			5.2	5.2	270	102			3.0	3.0	6.22	3.26			0.26	0.26	27.6	26.3			0.97	0.97	49.8	36.5		2.87		0.36		8.52	212	210		164		< 0.7		4
Sat-09	7.7			7.54	264				4.4	4.4	241				3.0	3.0	6.83				0.25	0.25	42.8				2.68	2.68	55.8			4.15				8.80	107			148				6
Sun-10	7.7			7.58	276				4.2	4.2	302				3.0	3.0	7.29				0.28	0.28	45.4				3.72	3.72	63.8			5.67				10.9	96.3			112				3
Mon-11	7.6			7.61	272				5.0	5.0	251				2.0	2.0	7.22				0.28	0.28	43.5				3.53	3.53	60.5			5.01				10.9	95.8			101				6
Tue-12	7.6			7.64	254				3.7	3.7	272				3.0	3.0	7.49				0.25	0.25	40.8				2.67	2.67	58.5			4.11				9.44	202			110				4
Wed-13	7.5			7.62	380				4.6	4.6	348				4.0	4.0	7.03				0.26	0.26	39.2				2.70	2.70	56.2			4.48	0.02			8.77	308			220	2.4			4
Thu-14	7.5			7.61	264				4.3	4.3	261				3.0	3.0	7.09				0.21	0.21	41.4				2.59	2.59	57.2			4.36				8.60	151			266				3
Fri-15	7.6	7.5		7.73	396	116			3.9	3.9	339	257			3.0	3.0	12.2	5.96			0.24	0.24	41.3	38.4			2.17	2.17	90.9	52.6		4.02		0.02		10.3	190	128		195		2.2		7
Sat-16	7.5	7.6		7.69	472	80			3.7	3.7	344	155			3.0	3.0	8.35	5.20			0.17	0.17	35.6	37.1			2.23	2.23	66.6	49.1		4.22		0.29		10.5	152	201		157		3.5		3
Sun-17	7.5	7.6		7.66	260	77			3.7	3.7	254	134			3.0	3.0	6.85	4.75			0.27	0.27	36.8	36.6			2.45	2.45	60.0	51.4		4.21		0.29		10.2	116	124		136		1.6		1
Mon-18	7.5	7.6		7.57	284	90			5.2	5.2	393	148			2.0	2.0	8.78	4.58			0.26	0.26	35.6	32.6			2.16	2.16	81.8	44.5		3.80		1.43		9.84	113	107		126		1.8		2
Tue-19	7.5			7.61	284				5.5	5.5	248				3.0	3.0	6.91				0.25	0.25	39.4				2.70	2.70	55.6			4.49				10.7	132			109				3
Wed-20	7.6			7.66	264				5.9	5.9	362				3.0	3.0	7.58				0.26	0.26	41.5				2.70	2.70	65.9			4.58	< 0.005			12.2	142			145				18
Thu-21	7.5			7.70	264				4.9	4.9	289				1.0	1.0	6.84				0.26	0.26	40.8				1.88	1.88	58.9			4.04				11.2	98.7			133				12
Fri-22	7.6			7.59	248				4.8	4.8	269				3.0	3.0	7.27				0.29	0.29	38.7				0.95	0.95	61.1			2.73				10.5	101			108				14
Sat-23	7.6			7.64	300				5.1	5.1	392				3.0	3.0	7.77				0.29	0.29	25.2				1.78	1.78	66.1			4.02				11.3	99.2			110				17
Sun-24	7.6			7.66	380				4.0	4.0	363				3.0	3.0	8.08				0.26	0.26	40.0				2.40	2.40	66.6			4.40				11.0	99.0			103				10
Mon-25	7.5			7.62	272				4.1	4.1	339				3.0	3.0	7.47				0.30	0.30	45.2				1.85	1.85	64.4			3.71				10.8	92.3			101				13
Tue-26	7.6			7.66	280				4.4	4.4	281				3.0	3.0	7.49				0.32	0.32	44.0				1.46	1.46	66.0			3.10				10.8	96.8			101	2.0			15
Wed-27	7.6			7.65	312				4.3	4.3	312				3.0	3.0	7.70				0.35	0.35	41.0				1.77	1.77	68.5			3.67	0.25			13.6	106			106				18
Thu-28	7.5			7.65	312				4.5	4.5	296				3.0	3.0	7.30				0.23	0.23	43.4				2.03	2.03	66.8			3.96				12.2	114			111				18
Fri-29	7.5			7.69	360				4.3	4.3	314				3.0	3.0	7.12				0.28	0.28	35.9				2.98	2.98	64.8			5.11				10.2	105			114				10
Sat-30	7.7			7.81	308				4.0	4.0	373				3.0	3.0	7.02				0.28	0.28	43.0				3.35	3.35	61.9			5.35				10.6	96.7			108				7
Average	7.6	7.6	—	7.5	302	89	—	—	4.4	4.4	308	159	—	—	2.8	2.8	7.78	4.76	—	—	0.22	0.28	40.3	34.2	—	—	2.89	2.69	63.9	46.8	—	4.40	0.07	0.48	—	10.3	121	154	—	124	—	—	—	—
Minimum	7.5	7.5	—	7.5	248	77	—	—	3.7	3.7	233	102	—	—	1.0	1.0	6.22	3.26	—	—	0.17	0.17	25.2	26.3	—	—	0.95	0.95	49.8	36.5	—	2.73	< 0.005	0.02	—	8.52	77.1	107	—	82.2	2	< 0.7	—	1
Maximum	7.8	7.6	—	7.8	472	116	—	—	5.9	5.9	393	257	—	—	4.0	4.0	12.2	5.96	—	—	0.42	0.42	45.4	38.4	—	—	5.24	5.24	90.9	52.6	—	7.01	0.25	1.43	—	13.8	308	210	—	266	2	4	—	18
GeoMean	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1	—	6
TOTAL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage

Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
25	25	100%	673	673	100%

Report Comments

AEP** Ref #

** AEP - Alberta Environment & Parks

RAW Untreated influent into the plant
INF Untreated Wastewater from collection system
INFs Influent, screened at the Headworks Diversion Structure
PE Primary Effluent from conventional primaries
PE 30 Primary Effluent from conventional primaries discharged via Outfall 30
EPT Enhanced Primary Treatment
EPE Enhanced Primary Effluent
EPEPS Enhanced Primary Effluent and Pump Station
FE Final Effluent from secondary treatment process (with biological nutrient removal).

FEC Combined pre-UV disinfection (FE+EPEPS)
OUTFALL 10 UV-disinfected, discharged via OUTFALL 10
OUTFALL 20 Combined Bypass (RAW + PE + EPE)
OUTFALL 30 Combined Bypass (INF + INFS + PE30 + EPE)
MPW Membrane Product Water (Effluent re-use water)
ML Megalitre (1,000,000 Litre)
MPN Most Probable Number
NR No Result
NS No Sample
INS Insufficient Sample

Alfredo Suarez
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Plant Performance Report
December 2019

Digested Sludge Total Monthly Volume (ML)	69.3

Volume of Flow (ML)

DATE	Peak Flow (MLD)	Influent	Effluent					
			Non UV Disinfected			UV Disinfected		
		RAW	OUTFALL 20	OUTFALL 30	MPW	EPE/PS	OUTFALL 10 FEC	OUTFALL 10 FE
Sun-01	377.8	261.5	0.0	0.0	12.7	0.0	248.8	248.8
Mon-02	346.5	265.1	0.0	0.0	12.0	0.0	253.1	253.1
Tue-03	341.6	260.4	0.0	0.0	11.8	0.0	248.6	248.6
Wed-04	337.1	258.5	0.0	0.0	10.7	0.0	245.8	245.8
Thu-05	342.0	253.9	0.0	0.0	9.9	0.0	244.0	244.0
Fri-06	337.8	259.8	0.0	0.0	11.2	0.0	248.6	248.6
Sat-07	358.5	253.5	0.0	0.0	9.8	0.0	243.7	243.7
Sun-08	370.0	255.7	0.0	0.0	8.0	0.0	247.7	247.7
Mon-09	350.3	259.2	0.0	0.0	9.0	0.0	250.2	250.2
Tue-10	340.8	255.7	0.0	0.0	7.7	0.0	248.0	248.0
Wed-11	339.6	255.1	0.0	0.0	9.6	0.0	245.5	245.5
Thu-12	335.1	253.9	0.0	0.0	8.7	0.0	245.2	245.2
Fri-13	332.0	257.0	0.0	0.0	10.2	0.0	246.8	246.8
Sat-14	360.0	252.0	0.0	0.0	7.8	0.0	244.2	244.2
Sun-15	356.1	250.5	0.0	0.0	8.0	0.0	242.5	242.5
Mon-16	342.0	254.7	0.0	0.0	7.9	0.0	246.8	246.8
Tue-17	335.5	250.5	0.0	0.0	8.5	0.0	242.0	242.0
Wed-18	332.5	251.2	0.0	0.0	8.7	0.0	242.5	242.5
Thu-19	332.6	251.0	0.0	0.0	9.7	0.0	241.3	241.3
Fri-20	334.6	253.9	0.0	0.0	9.4	0.0	244.5	244.5
Sat-21	347.8	245.9	0.0	0.0	11.1	0.0	234.8	234.8
Sun-22	351.0	244.0	0.0	0.0	12.0	0.0	232.0	232.0
Mon-23	343.6	248.9	0.0	0.0	11.8	0.0	238.1	238.1
Tue-24	371.8	254.3	0.0	0.0	12.4	0.0	241.9	241.9
Wed-25	327.2	224.4	0.0	0.0	12.5	0.0	211.9	211.9
Thu-26	328.3	228.8	0.0	0.0	12.0	0.0	214.8	214.8
Fri-27	353.6	244.6	0.0	0.0	12.6	0.0	232.0	232.0
Sat-28	355.1	243.3	0.0	0.0	11.9	0.0	231.4	231.4
Sun-29	361.8	236.8	0.0	0.0	12.2	0.0	226.6	226.6
Mon-30	348.2	245.9	0.0	0.0	12.2	0.0	233.7	233.7
Tue-31	366.2	252.2	0.0	0.0	13.0	0.0	239.2	239.2
Average	348.7	251.0	0.0	0.0	10.5	0.0	240.5	240.5
Minimum	327.2	224.4	0.0	0.0	7.7	0.0	211.9	211.9
Maximum	377.8	265.1	0.0	0.0	13.0	0.0	253.1	253.1
GeoMean	---	---	---	---	---	---	---	---
TOTAL	---	7,791	0	0.00	325	0	7,456	7,456

Liquid Stream Quality

DATE	pH@25°C RAW	pH@25°C OUTFALL 30	pH@25°C OUTFALL 20	pH@25°C OUTFALL 10 FEC	TSS (mg/L) RAW	TSS OUTFALL 30	TSS OUTFALL 20	TSS EPE/PS	TSS OUTFALL 10 FEC	TSS OUTFALL 10 FE	BOD5/cBOD5 (mg/L) RAW	BOD5 OUTFALL 30	BOD5 OUTFALL 20	BOD5 EPE/PS	BOD5 OUTFALL 10 cBOD5	BOD5 OUTFALL 10 cBOD5	TP (mg/L) RAW	TP OUTFALL 30	TP OUTFALL 20	TP EPE/PS	TP OUTFALL 10 FEC	TP OUTFALL 10 FE	NH3-N (mg/L) RAW	NH3-N OUTFALL 30	NH3-N OUTFALL 20	NH3-N EPE/PS	NH3-N OUTFALL 10 FEC	NH3-N OUTFALL 10 FE	TKN (mg/L) RAW	TKN OUTFALL 30	TKN OUTFALL 20	TKN OUTFALL 10 FEC	NO3+NO2 (mg/L) RAW	NO3+NO2 OUTFALL 30	NO3+NO2 OUTFALL 20	NO3+NO2 OUTFALL 10 FEC	Chloride (mg/L) RAW	Chloride OUTFALL 30	Chloride OUTFALL 20	Chloride OUTFALL 10 FEC	E. coli (Counts/100 mL) RAW	E. coli OUTFALL 30	E. coli OUTFALL 20	E. coli OUTFALL 10 FEC
															FEC	FE																												
Sun-01	7.6			7.7	284				3.4	3.4	303				3.0	3.0	7.00				0.25	0.25	43.3				3.82	3.82	64.7			6.14				8.73	93.0			101				7
Mon-02	7.6			7.8	256				2.9	2.9	310				3.0	3.0	7.43				0.24	0.24	38.0				3.58	3.58	72.0			5.60				9.16	100			99.9				10
Tue-03	7.5			7.8	296				3.4	3.4	294				3.0	3.0	7.65				0.24	0.24	38.7				2.78	2.78	66.7			4.69				9.96	112			106				13
Wed-04	7.7			7.8	312				3.4	3.4	305				3.0	3.0	7.31				0.26	0.26	35.4				2.24	2.24	63.4			4.47	< 0.01			10.9	229			139				10
Thu-05	7.4			7.7	246				4.1	4.1	414				3.0	3.0	7.56				0.26	0.26	36.4				1.51	1.51	63.9			3.73				10.2	142			207				5
Fri-06	7.6			7.7	332				3.4	3.4	330				3.0	3.0	6.90				0.22	0.22	40.1				1.33	1.33	62.5			3.67				8.74	121			155				5
Sat-07	7.6			7.7	308				4.1	4.1	305				2.0	2.0	7.01				0.23	0.23	39.7				2.59	2.59	63.0			4.44				9.56	102			132				5
Sun-08	7.5			7.6	264				2.9	2.9	288				3.0	3.0	7.14				0.22	0.22	40.6				2.99	2.99	65.4			4.45				11.3	101			113				5
Mon-09	7.5			7.7	340				3.8	3.8	326				4.0	4.0	7.78				0.24	0.24	41.8				2.47	2.47	65.0			4.62				11.5	104			98.7				16
Tue-10	7.5			7.7	308				3.3	3.3	328				3.0	3.0	7.74				0.24	0.24	34.2				1.43	1.43	66.6			3.79				10.4	105			104				4
Wed-11	7.5			7.7	340				3.4	3.4	343				3.0	3.0	7.44				0.24	0.24	41.5				1.75	1.75	67.2			3.90	< 0.005			7.94	107			110				5
Thu-12	7.6			7.6	304				3.2	3.2	406				2.0	2.0	6.99				0.24	0.24	39.0				1.24	1.24	63.7			2.85				7.47	106			115	3			5
Fri-13	7.5			7.7	356				3.8	3.8	316				3.0	3.0	7.38				0.25	0.25	41.4				1.18	1.18	62.9			2.97				7.61	116			123				5
Sat-14	7.5			7.7	332				3.7	3.7	397				3.0	3.0	7.97				0.24	0.24	43.5				1.63	1.63	72.9			3.39				7.91	123			124				3
Sun-15	7.6			7.6	292				3.1	3.1	342				3.0	3.0	6.98				0.22	0.22	40.5				1.99	1.99	63.5			3.81				8.68	118			125				2
Mon-16	7.6			7.8	336				3.9	3.9	325				2.0	2.0	7.19				0.22	0.22	45.1				1.80	1.80	63.5			3.80				9.36	122			119				6
Tue-17	7.5			7.6	332				2.7	2.7	367				2.0	2.0	7.28				0.21	0.21	45.3				1.32	1.32	64.4			3.13				9.68	136			127	2			5
Wed-18	7.6			7.7	344				2.9	2.9	330				2.0	2.0	6.96				0.20	0.20	42.4				0.97	0.97	63.1			2.75	< 0.01			10.0	119			133				2
Thu-19	7.5			7.6	372				3.1	3.1	281				1.0	1.0	7.22				0.21	0.21	42.2				0.71	0.71	64.5			2.44				9.69	121			136				5
Fri-20	7.5			7.7	344				2.8	2.8	336				2.0	2.0	7.19				0.21	0.21	40.9				0.75	0.75	62.7			2.34				9.49	112			128				4
Sat-21	7.6			7.7	324				3.1	3.1	336				2.0	2.0	7.55				0.21	0.21	41.1				1.13	1.13	60.8			2.83				8.95	114			118				4
Sun-22	7.6			7.6	352				3.5	3.5	353				2.0	2.0	7.06				0.20	0.20	42.7				1.76	1.76	64.9			3.61				8.82	128			123				4
Mon-23	7.5			7.6	328				3.1	3.1	324				2.0	2.0	7.54				0.18	0.18	40.4				1.12	1.12	62.0			2.36				10.6	140			126				3
Tue-24	7.6			7.7	332				3.5	3.5	356				2.0	2.0	7.31				0.21	0.21	40.9				1.02	1.02	57.9			2.80				9.02	119			139				5
Wed-25	7.5			7.7	308				2.9	2.9	371				1.0	1.0	7.63				0.18	0.18	43.9				0.99	0.99	62.6			2.43				7.70	98.6			123				5
Thu-26	7.6			7.6	340				3.3	3.3	369				3.0	3.0	7.66				0.17	0.17	46.2				1.78	1.78	68.0			3.28				8.90	93.4			108				8
Fri-27	7.6			7.7	292				3.2	3.2	295				2.0	2.0	7.63				0.18	0.18	43.1				2.32	2.32	67.1			4.00				10.6	102			96.7				4
Sat-28	7.5			7.7	340				3.1	3.1	331				2.0	2.0	7.67				0.20	0.20	40.2				1.80	1.80	61.5			3.49				9.94	97.3			104				7
Sun-29	7.6			7.5	320				2.3	2.3	403				3.0	3.0	8.04				0.19	0.19	46.0				1.74	1.74	63.8			3.20				9.90	89.4			97.9				10
Mon-30	7.6			7.7	331				3.4	3.4	339				2.0	2.0	7.73				0.20	0.20	44.5				1.90	1.90	61.0			3.74				10.6	100			93.0				10
Tue-31	7.6			7.7	380				3.5	3.5	398				3.0	3.0	8.65				0.25	0.25	39.9				1.81	1.81	64.1			3.35				9.17	101			101				5
Average	7.5	---	---	7.7	321	---	---	---	3.3	3.3	339	---	---	---	2.5	2.5	7.46	---	---	---	0.22	0.22	41.3	---	---	---	1.79	1.79	64.4	---	---	3.59	< 0.01	---	---	9.50	115	---	---	120	---	---	---	---
Minimum	7.4	---	---	7.5	246	---	---	---	2.3	2.3	281	---	---	---	1.0	1.0	6.90	---	---	---	0.17	0.17	34.2	---	---	---	0.71	0.71	57.9	---	---	2.34	< 0.01	---	---	7.47	89.4	---	---	91.0	2	---	---	2
Maximum	7.7	---	---	7.8	380	---	---	---	4.1	4.1	414	---	---	---	4.0	4.0	8.65	---	---	---	0.29	0.26	46.2	---	---	---	3.82	3.82	72.9	---	---	6.14	---	---	---	11.5	229	---	---	207	3	---	---	16
GeoMean	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* Contact Laboratory for information about the quality assurance associated with the results

Enhanced Primary Treatment (EPT) Usage

Total Bypass (hrs)	EPT Usage (hrs)	% Usage	Total Bypass YTD (hrs)	EPT Usage YTD (hrs)	% Usage
0	0	100%	673	673	100.00%

Report Comments

1	Outfall 10 - December 5: Analysis of the sample exceeded the recommended hold time for Chloride

AEP Ref #**

** AEP - Alberta Environment & Parks

RAW Untreated Influent into the plant
INF Untreated Wastewater from collection system
INFs Influent, screened at the Headworks Diversion Structure
PE Primary Effluent from conventional primaries
PE 30 Primary Effluent from conventional primaries discharged via Outfall 30
EPT Enhanced Primary Treatment
EPE Enhanced Primary Effluent
EPE/PS Enhanced Primary Effluent and Pump Station
FE Final Effluent from secondary treatment process (with biological nutrient removal),

FEC Combined pre-UV disinfection (FE+EPE/PS)
OUTFALL 10 UV-disinfected, discharged via OUTFALL 10
OUTFALL 20 Combined Bypass (RAW + PE + EPE)
OUTFALL 30 Combined Bypass (INF + INFS + PE30 + EPE)
MPW Membrane Product Water (Effluent re-use water)
ML Megalitre (1,000,000 Litre)
MPN Most Probable Number
NR No Result
NS No Sample
INS Insufficient Sample

Alfredo Suarez
Senior Manager, Operations

Shane Harnish
Senior Manager, Analytical Operations

Appendix B – 2019 Operational Monthly Summary

Gold Bar Wastewater Treatment Plant
10977 50 Street
Edmonton AB T6A 2E9
Canada
epcor.com

Approval 639-03-03
Gold Bar Waste Water Treatment Plant Operations Monthly Summary

2019

SENIOR MANAGER, OPERATIONS MANAGER, OPERATIONS	• ABHISHEK BHARGAVA • KEN GROSSELL (LEVEL IV)
LEVEL IV OPERATORS	• TOM GRAHAM • KIRA JONES • TOM KWAN • DIEGO ESPINOSA • JANAKA LEKAMWASAM

January
- 1 secondary bypass – January 26th
- Air scouring started for EPT – January 4th, 12th, 18th & 25th
- Membrane Tank 1 O/S for coating, Membrane Tank 4 back in service after coating
- EPT 11/12 O/S for inspection, back in service January 31st due to 9/10 EPT draining
- Supernatant started January 19th
- Primary 3 drained January 28th for Projects
- Using Train D and west sludge piping to lagoons starting January 24th

February
- 0 secondary bypass events
- Ostarta running February 1st
- EPT 9/10 O/S for inspection
- High orthophosphate in secondary February 12th – alum dosed, grab samples taken
- High influent flow (430 ML) February 16th due to water main break, no bypass

March
- 14 secondary bypass events – March 6th, 11th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd & 26th
- 7 main plant diversion bypass events – March 17th, 18th, 19th, 20th, 21st, 22nd & 23rd
- Sec 1 O/S March 5th for broke flight replacement

- Sec 5 O/S March 9th and March 15th for broken flight replacement
- Primary 4 O/S for chain tightenening
- 2 Diversion Structure Screens failed – March 16th and 17th
- South Diversion Structure/Influent Channel 1 available for service March 27th

April
- 1 secondary bypass event – April 27th
- Influent Channel 2/Screens 4/5/6 back in service April 4th
- Sec 11 drained for chain replacement April 6th
- Blower 1 & 4 available – April 9th
- GRF back in service – April 18th – 2 trucks on April 24th

May
- 3 secondary bypass events – May 8th, 15th & 24th
- All bioreactors out of winter mode May 22nd
- EPT 11/12 back in service May 19th after inspection complete
- Sec 11 back in service May 17th after chain replacement
- Sec 5 O/S May 13th for Projects

June
- 15 secondary bypass events – June 4th, 6th, 7th, 9th, 10th, 13th, 19th, 20th, 21st, 24th, 25th, 26th, 27th, 28th, 29th & 30th
- UV outage June 4th (7am-8am) - plant power outage for annual maintenance on plant power feeds
- Sec 2 O/S June 21st for chain inspection
- Prim 3/4 O/S for inspection – complete June 14th
- Screen 7 O/S for compactor – complete June 7th
- GRF offline June 12th – plugged twice – complete June 18th

July
- 15 secondary bypass events – July 1st, 3rd, 5th, 6th, 7th, 8th, 13th, 14th, 16th, 17-18th, 18-21st, 21-22nd, 24-25th, 27-28th & 29th
- Grit Tank 7 auger failure July 7th
- Dig 3 leaking water – purged O/S July 12th
- Sec 2 inspection complete – July 8th
- Sec 8 O/S for chain replacement – July 13th
- Fermenter 3 O/S for inspection/scum upgrade for Projects July 27th

August
- 11 secondary bypass events – August 1st, 2nd-3rd, 5th-6th, 9th, 13th, 16th, 18th-19th, 23rd, 28th, 30th & 31st
- Primary 1 O/S August 7th
- Ostara O/S – acid clean August 12th
- Grit Tank 7 O/S – cleaning August 16th
- Primary 2 O/S August 24th

- Blower 5 shutdown for Voltus – August 24th and 30th

September

- Planned UV outage September 19, 12:33am – 6:33am. Estimated 52 ML non-UV treated wastewater discharged to North Saskatchewan River. Outage required for breaker replacement in UV.
- 6 secondary bypass events – September 2nd, 8th, 9th, 10th, 17th & 26th-27th
- Secondary 7 drained for chain/bio repair – September 9th
- Secondary 8 in service September 5th
- Influent Channel 3 - Grit Tank 6 O/S for repair – North side of Diversion Structure O/S – September 10th
- Grit Tank 2 September 26th & Git Tank 3 Sept 22nd O/S for cleaning
- UV shutdown September 19th for 6 hours for breaker replacement
- 11 trucks to GRF for September

October

- 2 secondary bypass events – October 7th-8th & 13th-14th
- 19 trucks to GRF, GRF plugged – October 1st & 30th
- Dig 3 filling with FE – October 7th
- Channel 3, Grit Tanks 6/7, and Screens 7/8 in service October 8th
- Channel 2 O/S October 10th
- Fermenter 1 O/S for inspection – October 12th
- Fermenter 3 in service – October 17th
- 1 Voltus blower shutdown – October 27th

November

- 4 secondary bypass events – November 8th, 15th-16th, 16th &17th-18th
- UV Channel 4 effluent gate failed to close – O/S
- GRF plugged November 7th – O/S for season
- Pumped down Dig 3 – November 14th
- Delta V upgrade – week of November 18th
- Filling Sec 5 with FE November 29th

December

- 0 secondary bypass events
- 1 Voltus call in – December 3rd
- UV dose setpoint set to 23 mWs/sq cm – December 4th
- Sec 5 in service – December 6th
- Blower 5 O/S – inspection needed – December 10th

2019 Summary of Notifications to Alberta Environment & Parks		
Date	**Summary of Notifications**	**AEP Reference Number**
March 17, 2019	Reported temporary variation from target operating capacity. The actual treatment capacity achieved was approximately 550 MLD. Approximately 9 ML of raw wastewater flow was screened and then bypassed to the NSR that would have been otherwise treated by enhanced primary treatment had the target treatment capacity of 600 MLD been achieved during time period. Additionally 1-2 hour screened bypass events occurred on March 15, 16 total estimated volume of 2 ML. 7 day letter sent March 22, 2019.	344350
May 30, 2019	AEP was notified via the 24 hour reporting line of a planned 1 hour UV outage on June 4th 2019, at 7am for annual maintenance activities related to plant power feeds.	353989
August 14, 2019	Notified of planned temporary reduction in target treatment capacity from 1200 MLD to 1000 MLD for conventional and enhanced primary treated wastewater flows for grit removal tank maintenance. Outage to start today August 14, and proceed until September 1, 2019.	357489
August 29, 2019	Notified of extension of planned temporary reduction in target treatment capacity from 1200 MLD to 1000 MLD for conventional and enhanced primary treated wastewater flows for grit removal tank maintenance. Outage to start August 14, and proceed until September 9, 2019.	357489
September 9, 2019	Notified of planned temporary reduction in target treatment capacity from 1200 MLD to 700 MLD for conventional and enhanced primary treated wastewater flows for planned capital work. Outage to start September 9, and proceed until October 1, 2019.	358652
September 16, 2019	AEP was notified of a planned 12 hour UV outage to start September 19th at 1am and ending by 1pm.	358915
September 30, 2019	Notified of extension to planned temporary reduction in target treatment capacity from 1200 MLD to 700 MLD for conventional and enhanced primary treated wastewater flows for planned capital work. Outage started September 9, and is planned to proceed until October 10, 2019.	358652
October 7, 2019	Reported contravention to the operating approval to 24 hour AEP reporting line from failing to take fenceline H2S grab samples on October 3, 2019. 7 day letter required.	359790
October 10, 2019	Notified of extension to planned temporary reduction in target treatment capacity from 1200 MLD to 700 MLD for conventional and enhanced primary treated wastewater flows for planned	358652

	capital work. Outage started September 9, and is planned to proceed until March 1, 2020.	
October 16, 2019	Notified 24 hour reporting line of a scrubber outage for preventative maintenance that exceeded 48 hour timeframe. Scrubbers offline October 16 4:45am back online by October 18, 6am, total time offline ~ 49.25h.	360135
November 15, 2019	Notified of change to planned temporary reduction in target treatment capacity from 1200 MLD to 570 MLD for conventional and enhanced primary treated wastewater flows for planned capital work. Outage started September 9, and is planned to proceed until January 31, 2020.	358652

Appendix C – 2019 Summary of Monthly Chemical Usage at Gold Bar WWTP

2019 Secondary Alum Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	262	0	0	0	0	0	0	0
3	0	0	0	0	0	0	120	0	0	0	0	0
4	0	0	0	0	0	0	25	0	0	0	0	0
5	0	0	0	0	0	0	145	0	0	0	0	0
6	0	0	0	0	0	0	0	136	0	0	0	0
7	0	0	0	0	0	0	0	1115	0	0	0	0
8	0	0	0	0	0	77	0	760	0	0	0	0
9	0	0	0	0	0	410	0	787	0	0	0	0
10	0	0	0	0	0	291	31	0	0	0	0	0
11	0	0	0	0	0	0	115	0	0	0	0	0
12	0	3784	0	0	0	0	1075	0	0	0	0	0
13	0	0	0	0	1999	0	963	0	0	0	0	0
14	0	0	0	0	12204	0	1020	0	0	0	0	0
15	0	0	0	0	5982	0	0	0	0	0	0	0
16	0	0	0	0	26817	0	0	0	0	0	0	0
17	0	0	0	0	36508	0	0	0	0	0	0	0
18	0	3	0	0	21202	0	0	0	0	0	0	0
19	0	0	0	0	15532	0	0	556	0	0	0	0
20	0	0	0	0	2550	0	0	330	0	0	0	0
21	0	0	0	0	1	0	0	0	0	0	0	0
22	0	0	0	0	0	2	0	0	0	0	0	0
23	0	0	0	1669	0	14	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	51	0	0	0	0	0	0	0
28	0	0	0	0	6	0	0	0	0	0	0	0
29	0		0	18	0	0	0	0	0	0	0	0
30	0		0	0	0	0	0	0	0	0	0	0
31	0		0		0		0	0		0		0
Total (kg)	**0**	**3,788**	**0**	**1,687**	**123,114**	**794**	**3,493**	**3,684**	**0**	**0**	**0**	**0**

2019 EPT Alum Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	0	0	0	0	8528	10338	0	0	0	0
2	0	0	0	0	0	0	523	3172	1030	0	0	0
3	0	0	0	0	0	0	3295	1865	0	0	0	0
4	0	0	0	0	0	2848	1018	0	0	0	0	0
5	0	0	0	0	0	0	5051	2287	0	0	0	0
6	0	0	0	0	0	4461	752	4273	0	0	0	0
7	0	0	0	0	0	12646	6129	0	0	2326	0	0
8	0	0	0	0	1220	1279	2738	0	4797	1530	4438	0
9	0	0	0	0	0	2157	0	3587	1925	0	0	0
10	0	0	0	0	0	2303	0	0	2264	0	0	0
11	0	0	0	0	0	640	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	8704	0	0	1230	6023	1682	0	2642	0	0
14	0	0	5890	0	0	0	807	0	0	9567	0	0
15	0	0	8032	0	8603	0	0	0	0	293	226	0
16	0	0	7614	0	0	0	2820	953	0	691	2971	0
17	0	0	9580	0	0	0	6062	0	900	0	4643	0
18	0	0	13892	0	0	0	14896	120	0	0	1159	0
19	0	0	14583	0	0	16435	19185	1918	0	0	0	0
20	0	0	14994	0	0	18674	16536	0	0	0	28	0
21	0	0	15828	0	0	3393	7213	0	0	28	0	0
22	0	0	15097	0	0	0	1177	0	0	0	0	0
23	0	0	12134	0	0	0	0	2376	0	0	0	0
24	0	0	2105	0	6148	7190	5797	149	0	0	0	0
25	0	0	0	0	0	10242	3318	0	0	0	0	0
26	8288	0	5665	0	0	8676	0	0	3128	0	0	0
27	0	0	1249	3961	0	2021	7974	0	2377	0	0	0
28	0	0	0	0	0	15344	6409	1413	0	0	0	0
29	0		0	0	0	9495	10992	0	0	0	0	0
30	0		0	0	0	829	581	5434	0	0	0	0
31	0		0		0		0	2042		0		0
Total (kg)	**8,288**	**0**	**135,367**	**3,961**	**15,971**	**119,862**	**137,824**	**41,609**	**16,420**	**17,076**	**13,464**	**0**

2019 EPT Polymer Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	0	0	0	0	24	29	0	0	0	0
2	0	0	0	0	0	0	1	9	3	0	0	0
3	0	0	0	0	0	0	9	5	0	0	0	0
4	0	0	0	0	0	5	3	0	0	0	0	0
5	0	0	0	0	0	0	14	6	0	0	0	0
6	0	0	0	0	0	12	2	12	0	0	0	0
7	0	0	0	0	0	35	17	0	0	6	0	0
8	0	0	0	0	2	3	8	0	13	4	11	0
9	0	0	0	0	0	6	0	12	6	0	0	0
10	0	0	0	0	0	6	0	0	7	0	0	0
11	0	0	0	0	0	2	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	19	0	0	3	12	6	0	6	0	0
14	0	0	16	0	0	0	2	0	0	31	0	0
15	0	0	22	0	18	0	0	0	0	1	0	0
16	0	0	21	0	0	0	8	2	0	1	7	0
17	0	0	27	0	0	0	17	0	2	0	14	0
18	0	0	39	0	0	0	42	0	0	0	3	0
19	0	0	41	0	0	40	54	6	0	0	0	0
20	0	0	42	0	0	52	46	0	0	0	0	0
21	0	0	45	0	0	9	18	0	0	0	0	0
22	0	0	42	0	0	0	2	0	0	0	0	0
23	0	0	34	0	0	0	0	6	0	0	0	0
24	0	0	6	0	13	20	16	0	0	0	0	0
25	0	0	0	0	0	28	9	0	0	0	0	0
26	18	0	16	0	0	24	0	0	9	0	0	0
27	0	0	3	7	0	6	23	0	6	0	0	0
28	0	0	0	0	0	43	18	5	0	0	0	0
29	0		0	0	0	27	30	0	0	0	0	0
30	0		0	0	0	2	2	17	0	0	0	0
31	0		0		0		0	6		0		0
Total (kg)	**18**	**0**	**373**	**7**	**33**	**323**	**377**	**122**	**45**	**49**	**36**	**0**

2019 DAF Polymer Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	32	35	31	37	35	22	23	26	25	26	30	29
2	31	32	31	38	29	22	22	28	24	27	33	25
3	33	33	30	36	29	31	23	29	25	25	34	22
4	33	32	29	33	28	21	24	25	24	27	34	21
5	35	20	29	35	30	26	26	24	21	28	32	20
6	32	33	26	32	29	27	23	22	20	29	33	20
7	29	32	25	35	26	28	20	24	20	33	18	23
8	28	30	29	58	25	30	21	26	20	31	32	26
9	28	32	37	30	23	33	23	26	20	32	34	28
10	30	32	32	19	24	33	26	26	21	32	35	29
11	31	32	28	40	23	36	27	27	24	31	34	29
12	30	32	24	33	24	38	25	27	24	30	31	28
13	29	23	26	30	27	12	23	26	28	62	28	26
14	29	28	24	36	39	38	26	26	27	137	34	27
15	31	25	28	30	28	38	28	26	25	94	35	28
16	30	22	35	29	40	35	30	25	26	30	33	27
17	29	23	34	21	47	32	31	28	27	30	32	26
18	28	23	34	40	34	34	35	33	23	29	30	26
19	27	26	36	41	32	30	35	27	22	31	30	27
20	30	28	48	37	30	27	31	10	23	29	10	27
21	33	27	37	38	34	28	32	27	26	28	30	28
22	33	29	46	36	34	30	18	30	27	15	30	29
23	31	25	47	31	27	34	33	33	25	34	30	28
24	16	28	43	28	27	26	32	33	24	35	30	29
25	37	28	43	25	27	24	27	24	26	36	32	25
26	37	26	39	25	32	23	27	22	26	37	28	26
27	32	26	34	25	37	25	29	25	25	38	26	25
28	37	29	33	33	28	24	26	28	28	39	25	24
29	41		38	34	28	24	28	23	32	39	29	27
30	39		39	34	22	22	26	24	27	38	29	27
31	35		38		22		27	24		37		26
Total (kg)	**976**	**791**	**1,053**	**1,000**	**918**	**854**	**831**	**804**	**736**	**1,167**	**900**	**808**

2019 Scrubber Bleach Usage (L as delivered 16% sodium hypochlorite solution)

	January	February	March	April	May	June	July	August	September	October	November	December
1	878	755	770	1190	694	1029	509	937	1810	3156	1510	903
2	973	575	800	1431	611	1024	557	849	1741	1840	1502	962
3	696	680	949	1686	496	435	804	672	1678	1889	1319	1081
4	887	716	1328	435	633	866	807	965	1519	1808	1287	1087
5	749	645	1131	456	537	962	909	854	1305	1958	1591	773
6	790	477	660	497	759	1067	984	1124	1369	2088	1525	882
7	597	444	555	587	705	835	1007	971	1509	2287	1400	903
8	762	494	481	588	789	496	1066	1623	1473	2162	1284	846
9	770	405	555	617	667	691	1357	1779	1174	1949	1435	983
10	688	463	502	478	773	720	1088	928	1247	2183	1194	1035
11	729	528	595	515	875	765	1155	1090	1205	2417	1270	963
12	886	596	1475	511	869	738	991	1210	1383	2458	1289	1269
13	913	499	960	716	830	650	957	1393	1260	2472	1107	1079
14	767	639	365	756	813	1020	773	1176	1373	1376	1179	1208
15	764	705	549	770	845	1058	871	1286	1631	1189	1335	1179
16	825	922	368	321	628	1146	1128	1088	1712	934	1375	1119
17	788	1222	346	438	702	1238	818	1331	1681	744	1365	1530
18	905	708	237	712	707	1221	394	1345	1272	932	1292	722
19	914	629	222	729	861	728	261	934	878	2379	1003	1058
20	655	381	267	685	821	1482	237	1609	1900	1675	800	1124
21	669	543	166	749	930	239	160	641	1341	1839	846	1013
22	784	595	438	730	983	396	330	1857	1472	1593	894	1066
23	444	492	227	594	1025	532	456	1858	1407	1346	1002	1016
24	914	570	273	616	1101	613	564	1914	1538	1215	1344	1004
25	741	599	472	753	924	692	458	1835	1446	1308	1155	1025
26	601	634	688	715	981	440	880	1973	1477	1694	1014	987
27	313	691	359	572	955	344	748	2032	803	1908	1208	1072
28	357	696	592	642	1013	337	470	1857	1168	2187	974	1264
29	769		668	899	1010	437	825	1865	1233	1438	1044	931
30	591		880	667	1020	634	712	1453	791	1667	1265	977
31	623		1011		986		882	1142		1755		1079
Total (L)	**22,742**	**17,300**	**18,889**	**21,053**	**25,542**	**22,837**	**23,157**	**41,594**	**41,798**	**55,843**	**36,806**	**32,141**

2019 Scrubber Caustic Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	67	32	70	43	66	48	77	79	68	70	103	58
2	43	55	68	75	61	77	82	92	96	71	75	68
3	80	100	82	35	76	44	93	89	77	73	60	64
4	51	43	21	63	51	74	48	101	68	68	65	65
5	62	67	75	52	90	85	81	98	86	89	74	60
6	49	44	57	79	61	70	85	104	66	79	72	66
7	56	45	66	74	66	76	106	204	91	98	81	66
8	64	63	51	48	92	54	76	178	72	84	111	52
9	59	80	53	30	77	86	70	98	65	75	126	67
10	100	76	47	61	66	95	118	87	68	101	103	75
11	63	66	48	75	68	104	117	68	53	98	88	60
12	76	78	45	79	59	35	68	69	76	87	95	79
13	58	63	51	54	30	94	67	65	72	92	81	62
14	55	50	52	54	67	101	67	63	66	73	77	67
15	77	70	67	54	93	124	76	59	68	73	84	69
16	24	77	43	60	77	90	81	63	81	78	96	65
17	100	65	39	81	63	86	50	59	81	58	90	83
18	80	67	70	53	88	42	52	63	72	76	81	66
19	29	52	48	59	65	78	110	66	63	71	74	67
20	44	53	37	91	75	70	47	60	64	79	67	74
21	71	66	51	86	83	102	78	86	63	74	64	67
22	6	44	42	48	51	70	43	67	63	83	68	74
23	94	59	31	34	53	25	54	81	68	67	72	74
24	71	73	38	77	119	104	101	81	69	46	76	65
25	52	60	46	62	96	71	102	68	57	58	79	72
26	39	62	33	54	92	51	6	82	61	71	74	69
27	41	39	87	54	95	99	80	89	56	94	71	75
28	157	37	40	78	75	29	95	81	52	87	65	69
29	48		56	74	20	115	55	74	61	78	70	75
30	63		40	59	77	39	100	98	55	104	61	68
31	33		59		85		68	71		76		76
Total (kg)	**1,915**	**1,686**	**1,615**	**1,843**	**2,237**	**2,234**	**2,355**	**2,646**	**2,057**	**2,430**	**2,404**	**2,117**

2019 Membrane Bleach Usage (L as delivered 16% sodium hypochlorite solution)

	January	February	March	April	May	June	July	August	September	October	November	December
1	499	354	698	369	276	250	567	649	451	324	436	440
2	414	284	397	344	216	463	613	378	355	274	578	363
3	311	237	430	374	306	451	706	273	337	378	367	335
4	361	352	352	294	237	482	363	447	291	387	412	385
5	584	290	117	213	282	660	375	412	260	346	590	458
6	385	267	504	505	373	345	473	326	415	416	444	389
7	575	396	424	347	298	364	423	494	418	358	442	531
8	412	194	441	210	237	566	606	485	303	429	544	300
9	334	288	296	509	437	243	547	380	433	469	346	346
10	281	334	344	438	448	330	552	474	421	410	329	344
11	448	274	56	321	454	474	665	413	380	393	309	415
12	344	264	319	451	580	334	545	469	440	461	317	334
13	353	351	400	351	352	422	408	498	497	404	380	431
14	533	255	230	336	241	535	417	465	581	391	391	232
15	700	358	381	390	407	543	430	451	395	415	432	381
16	398	286	387	431	264	475	495	494	379	380	388	452
17	390	402	218	487	221	572	576	480	361	382	336	442
18	371	315	261	465	427	650	221	450	331	366	436	737
19	345	374	528	313	384	667	362	495	348	361	381	556
20	346	561	223	405	466	540	421	474	270	275	412	428
21	289	520	159	476	534	559	394	467	393	523	310	406
22	277	466	386	481	529	614	277	497	343	421	482	639
23	367	359	270	384	461	299	406	485	333	316	567	424
24	292	291	550	455	529	381	409	441	349	668	540	522
25	270	307	450	270	470	597	601	533	289	370	495	668
26	285	501	363	198	220	695	371	528	261	406	513	488
27	284	618	337	381	366	589	356	478	326	568	602	460
28	245	498	439	236	519	372	315	508	183	344	497	544
29	341		314	214	575	566	466	483	226	78	374	364
30	370		340	559	543	525	558	398	304	426	504	419
31	340		502		274		573	482		395		479
Total (L)	**11,744**	**9,998**	**11,116**	**11,209**	**11,926**	**14,564**	**14,489**	**14,306**	**10,676**	**12,132**	**13,155**	**13,714**

2019 Ostara Magnesium Chloride Usage (L as delivered 30% magnesium chloride solution)

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	6462	3253	5323	4889	4541	0	0	0	3469	4136
2	0	0	8933	4557	3567	4805	5670	0	0	0	3120	3907
3	0	0	10613	4606	3905	4661	5111	0	0	0	3209	3954
4	0	0	6987	3850	4004	5783	7066	0	0	0	2593	2832
5	0	0	3856	4091	4115	5853	6621	0	3788	0	2135	2815
6	0	0	4178	4125	3733	4893	7740	0	5910	0	5789	4076
7	0	2328	3938	4569	3505	5193	7643	0	6020	0	2309	3984
8	0	5529	2376	3217	3139	5130	6205	0	5816	0	2094	3994
9	0	6311	0	4060	3133	4750	6115	0	5989	0	3641	3763
10	0	6334	0	3987	2425	3634	6044	0	5983	0	3680	3978
11	0	5810	0	3656	2356	184	6007	0	6115	0	3656	8806
12	0	5544	0	5089	3150	3955	6326	0	6766	0	3185	3401
13	0	3269	1192	5755	2766	3620	5761	0	5880	0	3661	3957
14	0	3663	4918	5625	3039	3191	5907	0	6011	0	3752	5106
15	0	3787	4263	5262	3010	5305	4765	0	6019	0	3303	3297
16	0	5659	4331	6093	2862	5340	6727	0	4976	3128	3995	4229
17	0	4303	4511	4644	3761	4914	5867	0	6742	4898	3968	4336
18	0	4450	4316	2221	3831	4983	3955	0	5959	4635	3983	2825
19	0	3854	4203	0	3647	5141	5816	0	2385	4665	4241	5823
20	0	6385	4345	0	3381	6390	5867	0	0	4634	3916	3342
21	0	5521	4600	3177	2300	4413	5793	0	0	4113	2778	3293
22	0	2268	4617	2261	518	5510	3442	0	0	4828	2515	3318
23	0	4681	4541	2490	0	5266	5339	0	0	4960	3921	1154
24	0	4848	4743	5683	2206	4450	5401	0	0	4822	3977	0
25	0	4462	4523	5740	3761	5426	5416	0	0	4941	3693	0
26	0	4880	3731	6098	3871	5288	5623	0	0	4839	4393	0
27	0	5040	4361	5464	3834	5391	5595	0	0	4795	3503	0
28	0	8290	4271	5614	3793	5461	5455	0	0	4170	3618	0
29	0		3562	4495	3916	5385	2426	0	0	6179	4031	0
30	0		2666	6086	4180	5671	1471	0	0	4810	4124	0
31	0		3168		4724		0	0		5691		0
Total (L)	**0**	**107,217**	**124,205**	**125,765**	**101,757**	**144,876**	**165,716**	**0**	**84,360**	**76,111**	**106,252**	**90,325**

2019 Ostara Caustic Usage (kg as delivered 50% sodium hydroxide solution)

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	1370	1565	906	427	245	0	0	0	535	1242
2	0	0	1370	2191	792	458	326	0	0	0	751	1230
3	0	0	1370	2065	833	830	170	0	0	0	853	1141
4	0	0	1370	1839	823	953	350	0	0	0	171	552
5	0	0	1370	1634	817	1092	757	0	662	0	31	578
6	0	0	1370	2207	749	338	1057	0	932	0	195	511
7	0	685	1370	2595	681	448	1014	0	809	0	325	480
8	0	1370	685	2071	566	607	953	0	604	0	248	493
9	0	1370	0	2365	711	476	1016	0	801	0	452	670
10	0	1370	0	1313	509	390	828	0	703	0	602	978
11	0	1370	0	1289	509	158	771	0	575	0	572	609
12	0	1370	0	1628	513	455	762	0	786	0	467	798
13	0	1370	685	1717	550	84	578	0	809	0	634	1091
14	0	1370	1370	1619	482	387	695	0	834	0	679	1168
15	0	1370	1370	1559	601	596	725	0	875	0	720	1141
16	0	1370	1370	1610	618	861	1027	0	726	304	890	1201
17	0	1370	1370	1541	592	790	1053	0	660	701	864	1253
18	0	1370	1370	745	541	536	493	0	151	1013	790	920
19	0	1370	1370	22	606	610	717	0	0	1122	802	850
20	0	1370	1370	71	517	585	736	0	0	1185	702	819
21	0	1370	1370	103	245	675	667	0	0	911	615	897
22	0	1370	1370	8	245	944	400	0	0	1071	309	811
23	0	1370	2299	775	0	884	470	0	0	957	563	338
24	0	1370	2317	1642	141	745	422	0	0	733	504	0
25	0	1370	946	1339	433	848	1111	0	0	660	687	0
26	0	1370	2074	1467	441	694	1258	0	0	754	955	0
27	0	1370	1978	1202	434	696	890	0	0	727	703	0
28	0	1370	1991	1137	523	540	1407	0	0	568	977	0
29	0		1951	986	537	544	600	0	0	978	1063	0
30	0		1555	325	264	683	0	0	0	772	1039	0
31	0		1790		713		0	0		144		0
Total (kg)	**0**	**29,455**	**40,191**	**40,628**	**16,894**	**18,334**	**21,499**	**0**	**9,926**	**12,599**	**18,697**	**19,771**

Appendix D – 2019 Air Pollution Control System Performance

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
July 2019

Date	East Scrubber		Fermenter Scrubber		West Scrubber		EPT Scrubber		GRF Scrubber		
	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	Temperature In (°C)	Pressure In (kPa)	H_2S Out (ppb)
July 1, 2019	9.51	736.5	9.50	669.7	9.50	669.2	9.50	668.5	14.9	-0.34	0.5
July 2, 2019	9.50	652.3	9.49	669.6	9.50	666.7	9.50	671.4	14.9	-0.34	0.8
July 3, 2019	9.49	629.1	9.49	669.7	9.51	659.6	9.52	674.1	15.1	-0.34	0.8
July 4, 2019	9.50	632.4	9.50	669.9	9.50	670.5	9.51	674.5	15.5	-0.34	0.5
July 5, 2019	9.56	641.7	9.50	669.9	9.50	668.8	9.50	667.5	15.9	-0.34	0.5
July 6, 2019	9.50	622.3	9.50	669.8	9.50	670.5	9.50	670.1	17.2	-0.34	0.6
July 7, 2019	9.50	625.4	9.50	669.9	9.50	664.4	9.50	670.2	17.1	-0.34	0.7
July 8, 2019	9.50	633.2	9.51	670.6	9.50	680.1	9.50	673.2	17.0	-0.34	0.5
July 9, 2019	10.59	633.9	9.50	670.0	9.50	665.1	9.50	669.5	15.8	-0.34	0.5
July 10, 2019	9.49	606.7	9.55	678.3	9.50	664.2	9.50	669.3	16.6	-0.34	0.5
July 11, 2019	9.51	751.7	9.50	669.1	10.59	620.8	9.50	670.1	17.8	-0.34	0.6
July 12, 2019	9.52	706.3	9.50	670.0	9.50	665.9	9.50	669.5	20.4	-0.34	0.6
July 13, 2019	9.50	646.4	9.50	670.2	9.50	677.7	9.50	640.9	20.5	-0.34	0.5
July 14, 2019	9.50	624.2	9.50	669.6	9.50	670.5	9.50	666.1	20.2	-0.34	0.4
July 15, 2019	9.50	640.1	9.50	670.0	9.50	664.3	9.50	669.1	19.2	-0.34	0.5
July 16, 2019	9.50	642.3	9.50	670.2	9.50	667.0	9.50	656.9	18.3	-0.34	0.3
July 17, 2019	9.50	630.5	9.50	681.9	9.51	686.5	9.50	679.1	18.3	-0.34	0.5
July 18, 2019	9.51	676.4	9.51	700.4	9.49	680.0	9.51	708.2	16.3	-0.34	0.7
July 19, 2019	9.50	640.8	9.50	700.2	9.53	677.4	9.50	702.9	16.1	-0.34	0.8
July 20, 2019	9.50	638.3	9.50	700.2	9.51	682.8	9.50	703.5	17.7	-0.34	0.6
July 21, 2019	9.50	639.2	9.49	699.9	9.51	673.5	9.50	701.0	19.5	-0.34	0.4
July 22, 2019	9.49	635.3	9.49	699.8	9.53	667.8	9.50	699.6	21.3	-0.34	-0.4
July 23, 2019	9.50	629.3	9.50	699.9	9.50	665.0	9.50	699.4	22.9	-0.34	1.6
July 24, 2019	9.51	640.9	9.51	700.1	9.51	669.9	9.50	684.5	20.7	-0.34	1.6
July 25, 2019	9.50	638.5	9.49	699.5	9.56	669.4	9.50	703.8	18.2	-0.34	1.2
July 26, 2019	9.49	639.1	9.50	700.0	9.50	661.0	9.50	698.6	20.5	-0.34	1.6
July 27, 2019	9.51	654.3	9.50	700.1	9.51	690.5	9.50	655.9	19.2	-0.34	1.6
July 28, 2019	9.50	639.6	9.50	700.1	9.55	662.5	9.50	702.0	18.0	-0.34	1.0
July 29, 2019	9.50	630.7	9.50	699.9	9.50	661.2	9.50	697.5	18.7	-0.34	1.6
July 30, 2019	9.50	639.1	9.50	699.9	9.50	678.0	9.50	702.3	18.8	-0.34	1.5
July 31, 2019	9.50	626.0	9.50	697.4	9.53	559.2	9.50	697.4	18.8	-0.34	1.1

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
August 2019

Date	East Scrubber		Fermenter Scrubber		West Scrubber		EPT Scrubber		GRF Scrubber		
	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	Temperature In (°C)	Pressure In (kPa)	H_2S Out (ppb)
August 1, 2019	9.50	637.6	9.50	700.2	9.50	218.5	9.50	684.7	19.8	-0.34	0.6
August 2, 2019	9.50	623.6	9.49	699.6	9.49	107.0	9.49	625.0	21.3	-0.34	1.4
August 3, 2019	9.49	678.2	9.52	700.5	9.50	673.9	9.51	723.5	19.0	-0.34	1.5
August 4, 2019	9.51	682.5	9.49	699.8	9.50	668.3	9.50	991.5	19.0	-0.34	1.1
August 5, 2019	9.50	638.3	9.50	699.8	9.50	665.7	9.49	874.4	20.3	-0.34	1.1
August 6, 2019	9.50	647.1	9.51	700.0	9.50	676.0	9.51	751.6	17.9	-0.34	1.4
August 7, 2019	9.50	631.4	9.50	700.1	9.44	646.2	9.50	717.5	17.8	-0.34	1.3
August 8, 2019	9.48	617.1	9.49	699.4	9.40	617.5	9.50	695.0	20.2	-0.34	1.4
August 9, 2019	9.78	709.5	9.54	703.1	9.57	675.8	9.51	696.6	16.9	-0.34	1.5
August 10, 2019	9.50	643.6	9.49	699.8	9.50	670.1	9.50	698.7	15.6	-0.34	1.5
August 11, 2019	9.50	634.2	9.50	699.8	9.50	667.6	9.50	699.3	15.8	-0.34	1.5
August 12, 2019	9.50	635.7	9.50	700.2	9.50	667.8	9.50	698.4	16.3	-0.34	1.3
August 13, 2019	9.48	638.8	9.49	700.3	9.50	674.1	9.50	639.9	17.3	-0.34	0.8
August 14, 2019	9.51	682.2	9.50	700.3	9.50	669.4	9.50	699.6	18.0	-0.34	0.9
August 15, 2019	9.50	637.5	9.50	699.8	9.50	666.0	9.50	698.9	20.0	-0.34	1.4
August 16, 2019	9.51	683.3	9.47	506.6	9.50	672.7	9.50	683.3	16.3	-0.34	1.0
August 17, 2019	9.50	628.8	9.50	700.1	9.50	669.2	9.50	696.0	14.2	-0.34	1.0
August 18, 2019	9.50	637.0	9.50	699.9	9.50	667.7	9.50	702.8	14.1	-0.34	1.5
August 19, 2019	9.49	630.3	9.48	711.1	9.50	665.6	9.50	712.5	14.8	-0.34	1.4
August 20, 2019	9.49	670.2	9.51	734.0	9.50	665.6	9.50	700.5	16.9	-0.34	1.1
August 21, 2019	9.45	691.8	9.47	737.1	9.51	673.4	9.50	687.0	20.4	-0.34	1.3
August 22, 2019	9.57	599.4	9.48	672.3	9.50	671.3	9.50	701.0	18.8	-0.34	0.7
August 23, 2019	9.49	624.0	9.49	701.0	9.50	667.4	9.49	580.5	16.9	-0.34	1.6
August 24, 2019	9.50	655.8	9.50	699.9	9.50	674.8	9.51	608.9	17.1	-0.34	1.6
August 25, 2019	9.51	668.8	9.49	699.7	9.50	664.0	9.50	699.5	16.4	-0.34	1.5
August 26, 2019	9.50	635.3	9.48	699.6	9.50	668.1	9.50	700.3	15.4	-0.34	1.6
August 27, 2019	9.49	634.9	9.50	700.6	9.50	668.1	9.50	699.4	14.9	-0.34	1.5
August 28, 2019	9.50	636.6	9.54	704.7	9.50	673.4	9.50	614.9	16.0	-0.34	0.6
August 29, 2019	9.50	639.8	9.47	699.0	9.50	663.3	9.50	700.5	13.8	-0.34	1.6
August 30, 2019	9.50	644.1	9.51	701.7	9.51	582.8	9.50	642.9	13.8	-0.34	1.6
August 31, 2019	9.50	642.5	9.51	701.1	9.49	46.5	9.50	685.4	13.4	-0.34	1.6

Comments:

West Scrubber bleach pump maintenance on Aug 1 -2, <48 hours downtime.

West Scrubber bleach pump maintenance on Aug 31, <48 hours downtime.

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
September 2019

Date	East Scrubber		Fermenter Scrubber		West Scrubber		EPT Scrubber		GRF Scrubber		
	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	Temperature In (°C)	Pressure In (kPa)	H_2S Out (ppb)
September 1, 2019	9.50	641.0	9.49	699.8	9.51	735.7	9.50	697.5	13.2	-0.34	1.6
September 2, 2019	9.50	640.2	9.50	700.1	9.50	716.9	9.50	663.9	15.8	-0.34	1.6
September 3, 2019	9.43	722.5	9.49	704.8	9.51	671.2	9.49	692.2	16.4	-0.34	1.6
September 4, 2019	9.52	613.8	9.49	699.8	9.51	595.1	9.50	700.8	17.6	-0.34	0.6
September 5, 2019	9.50	648.1	9.49	699.9	9.50	668.5	9.50	699.7	16.9	-0.34	1.0
September 6, 2019	9.50	640.2	9.50	699.9	9.50	668.0	9.50	699.0	16.4	-0.34	0.6
September 7, 2019	9.50	640.6	9.49	700.1	9.50	671.3	9.50	699.8	17.2	-0.34	1.6
September 8, 2019	9.51	642.8	9.52	700.5	9.50	675.0	9.50	675.4	14.2	-0.34	1.6
September 9, 2019	9.55	610.2	9.43	700.1	9.50	679.7	9.50	702.2	12.8	-0.34	1.5
September 10, 2019	10.85	596.0	9.48	699.6	9.50	666.2	9.50	699.2	11.9	-0.34	2.0
September 11, 2019	10.16	635.3	9.47	699.8	9.50	670.5	9.50	698.4	12.8	-0.34	2.0
September 12, 2019	9.51	651.3	9.49	699.9	9.50	663.2	9.50	699.2	14.4	-0.34	1.2
September 13, 2019	9.50	639.4	9.50	700.0	9.49	646.4	9.50	698.9	15.8	-0.34	1.0
September 14, 2019	9.50	641.7	9.37	700.2	9.50	669.2	9.50	699.9	14.5	-0.34	0.8
September 15, 2019	9.50	645.0	9.47	699.4	9.50	666.4	9.50	700.3	15.0	-0.34	1.3
September 16, 2019	9.50	645.1	9.41	700.3	9.50	662.9	9.50	696.9	15.6	-0.34	0.7
September 17, 2019	9.50	631.5	9.49	700.2	9.50	672.2	9.50	565.5	14.3	-0.34	2.4
September 18, 2019	9.50	639.7	8.73	624.6	9.50	670.4	10.26	702.0	12.9	-0.34	1.3
September 19, 2019	9.50	641.1	9.50	699.8	9.50	664.6	9.85	700.1	13.4	-0.34	1.7
September 20, 2019	9.50	639.1	9.50	700.0	9.50	668.3	9.73	700.6	14.1	-0.34	2.5
September 21, 2019	9.50	640.1	9.50	700.1	9.50	665.1	9.66	700.0	13.6	-0.34	2.5
September 22, 2019	9.50	639.3	9.50	685.4	9.50	664.4	9.59	699.8	15.3	-0.34	1.8
September 23, 2019	9.51	591.0	9.50	699.7	9.50	659.8	9.63	699.4	14.0	-0.34	1.1
September 24, 2019	9.50	639.8	9.50	700.1	9.50	663.8	9.64	700.1	12.9	-0.34	1.0
September 25, 2019	9.50	639.6	9.39	698.7	9.50	666.7	9.74	700.0	13.1	-0.34	1.3
September 26, 2019	9.48	625.5	9.34	699.0	9.47	634.8	9.67	697.8	10.5	-0.34	2.3
September 27, 2019	9.52	666.9	9.54	700.4	9.50	675.5	9.98	703.9	6.3	-0.34	3.0
September 28, 2019	9.50	638.0	9.48	699.6	9.49	652.9	9.98	699.8	9.8	-0.34	2.9
September 29, 2019	9.50	639.8	9.49	699.8	9.50	672.0	9.96	700.0	10.4	-0.34	2.2
September 30, 2019	9.50	635.3	9.27	605.4	9.51	648.2	9.98	700.0	10.4	-0.34	0.8

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
October 2019

Date	East Scrubber		Fermenter Scrubber		West Scrubber		EPT Scrubber		GRF Scrubber		
	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	Temperature In (°C)	Pressure In (kPa)	H_2S Out (ppb)
October 1, 2019	9.50	641.0	9.49	700.0	9.46	718.8	9.91	699.3	11.8	-0.34	2.4
October 2, 2019	9.47	629.1	9.51	700.4	9.61	574.8	9.51	690.0	13.6	-0.34	2.0
October 3, 2019	9.50	634.2	9.49	699.3	9.50	652.2	9.50	702.6	13.4	-0.34	1.7
October 4, 2019	9.50	641.9	9.46	698.9	9.50	659.0	9.50	699.4	15.3	-0.34	2.3
October 5, 2019	9.50	639.5	9.51	699.6	9.50	655.5	9.50	700.0	17.1	-0.34	1.6
October 6, 2019	9.50	640.0	9.50	700.0	9.50	651.4	9.49	701.9	18.0	-0.34	2.1
October 7, 2019	9.50	637.2	9.49	699.9	9.50	658.3	9.49	675.9	16.7	-0.34	2.1
October 8, 2019	9.51	649.5	9.50	700.6	9.50	675.0	9.51	707.3	10.3	-0.34	2.0
October 9, 2019	9.50	640.4	9.51	699.2	9.50	663.7	9.51	706.9	8.6	-0.34	1.6
October 10, 2019	9.50	637.0	9.46	700.7	9.63	635.4	9.49	696.0	14.0	-0.34	2.6
October 11, 2019	9.50	639.3	9.47	699.2	9.50	658.0	9.50	699.4	22.7	-0.34	2.6
October 12, 2019	9.50	638.9	9.48	699.4	9.50	656.6	9.50	700.6	23.8	-0.34	2.6
October 13, 2019	9.50	637.4	9.47	702.9	9.50	645.8	9.48	690.4	25.0	-0.34	2.1
October 14, 2019	9.51	655.8	9.53	700.4	9.50	686.5	9.50	716.1	25.1	-0.34	1.5
October 15, 2019	9.50	635.1	9.49	699.5	9.50	648.7	9.53	707.5	25.0	-0.34	2.6
October 16, 2019	9.50	635.5	9.51	700.3	9.72	44.3	9.44	695.0	23.4	-0.34	1.6
October 17, 2019	9.50	641.3	9.50	700.1	9.07	153.9	8.98	609.4	23.4	-0.34	1.9
October 18, 2019	9.50	640.4	9.48	699.4	9.54	645.8	9.10	492.9	23.6	-0.34	0.6
October 19, 2019	9.50	640.4	9.49	699.2	9.50	646.4	9.50	695.1	24.0	-0.34	2.1
October 20, 2019	9.50	639.4	9.49	700.0	9.50	649.3	9.50	701.8	24.7	-0.34	2.6
October 21, 2019	9.50	640.7	9.48	700.3	9.50	650.7	9.50	700.2	24.4	-0.34	-0.6
October 22, 2019	9.50	638.8	9.49	701.5	9.57	645.0	9.51	701.7	24.8	-0.34	0.6
October 23, 2019	9.50	641.0	9.32	703.1	9.50	665.0	9.50	703.2	25.1	-0.34	0.5
October 24, 2019	9.49	638.9	9.06	701.8	9.50	658.9	9.50	700.3	24.2	-0.34	1.0
October 25, 2019	9.51	642.4	8.59	679.4	9.50	657.7	9.50	698.2	24.5	-0.34	1.5
October 26, 2019	9.50	639.2	9.76	703.2	9.48	660.5	9.49	700.0	24.1	-0.34	1.1
October 27, 2019	9.50	642.2	9.64	700.0	9.50	722.6	9.50	702.5	23.9	-0.34	1.4
October 28, 2019	9.50	640.1	9.56	699.7	9.52	712.8	9.70	696.9	23.3	-0.34	1.5
October 29, 2019	9.50	636.7	9.50	700.0	9.50	655.7	9.73	699.2	22.5	-0.34	1.5
October 30, 2019	9.50	639.5	9.50	699.9	9.49	625.3	9.49	692.6	24.0	-0.34	1.3
October 31, 2019	9.50	640.6	9.50	699.9	9.51	633.4	9.51	713.3	24.8	-0.34	1.4

Comments:
Planned Scrubber outage for EPT and West Scrubber Oct 16 06:00 - Oct 17 16:00

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
November 2019

Date	East Scrubber		Fermenter Scrubber		West Scrubber		EPT Scrubber		GRF Scrubber		
	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	Temperature In (°C)	Pressure In (kPa)	H_2S Out (ppb)
November 1, 2019	9.50	638.6	9.50	699.7	9.74	650.7	9.50	700.1	24.7	-0.34	1.2
November 2, 2019	9.50	640.4	9.52	642.4	9.49	649.1	10.00	703.4	24.9	-0.34	1.0
November 3, 2019	9.51	638.2	9.49	694.5	9.51	661.1	9.64	700.4	24.8	-0.34	1.0
November 4, 2019	9.47	687.1	9.51	609.5	9.50	664.6	9.59	700.2	24.3	-0.34	1.3
November 5, 2019	9.50	740.6	9.49	698.9	9.50	664.7	9.58	701.6	23.2	-0.34	1.5
November 6, 2019	9.50	728.1	9.50	700.2	9.47	667.9	9.89	700.0	21.9	-0.34	1.5
November 7, 2019	9.50	720.2	9.49	699.1	9.49	664.3	9.97	699.7	22.9	-0.34	1.3
November 8, 2019	9.51	707.7	9.51	701.6	9.52	680.8	10.42	699.0	24.8	-0.34	1.0
November 9, 2019	9.51	636.2	9.50	701.2	9.49	653.1	12.15	697.8	22.8	-0.34	1.1
November 10, 2019	9.50	638.1	9.50	699.6	9.49	661.3	12.13	698.4	20.8	-0.34	0.9
November 11, 2019	9.50	638.6	9.50	699.7	9.50	666.1	12.13	702.6	20.6	-0.34	0.7
November 12, 2019	9.50	638.2	9.50	700.1	9.53	669.3	11.20	908.9	22.7	-0.34	0.9
November 13, 2019	9.50	640.6	9.49	699.7	10.42	642.1	9.50	845.5	22.2	-0.34	0.7
November 14, 2019	9.50	637.3	9.51	700.6	9.50	665.0	9.50	698.3	22.4	-0.34	1.0
November 15, 2019	9.50	636.2	9.50	699.1	9.49	655.9	9.49	694.3	22.4	-0.34	0.9
November 16, 2019	9.50	641.4	9.50	699.8	9.51	676.4	9.50	702.4	22.4	-0.34	0.6
November 17, 2019	9.50	639.6	9.50	699.4	9.49	665.4	9.48	658.8	21.5	-0.34	0.9
November 18, 2019	9.49	638.7	9.51	706.8	9.51	677.9	9.55	711.2	20.0	-0.34	0.1
November 19, 2019	9.51	700.8	9.49	699.2	9.50	641.7	9.51	700.8	20.5	-0.34	0.1
November 20, 2019	9.54	661.2	9.49	698.6	9.64	641.3	9.30	677.1	21.7	-0.27	0.1
November 21, 2019	9.50	639.1	9.50	670.1	9.49	661.3	9.25	669.3	21.9	-0.27	0.9
November 22, 2019	9.50	640.5	9.50	670.1	9.50	670.6	9.57	612.8	22.0	-0.27	0.6
November 23, 2019	9.50	641.0	9.49	669.4	9.49	660.4	9.50	701.3	21.8	-0.27	1.3
November 24, 2019	9.50	639.3	9.50	670.1	9.50	662.8	9.49	641.2	22.4	-0.27	2.1
November 25, 2019	9.50	640.6	9.50	669.9	9.50	669.2	9.51	705.0	22.1	-0.27	2.0
November 26, 2019	9.51	642.6	9.50	670.1	9.50	669.9	9.51	700.6	21.1	-0.27	1.8
November 27, 2019	9.50	639.1	9.51	670.6	9.50	668.7	9.50	701.4	20.4	-0.27	1.1
November 28, 2019	9.50	641.3	9.50	668.9	9.49	663.8	9.50	649.1	16.0	-0.27	3.0
November 29, 2019	9.49	757.2	9.50	670.0	9.50	669.7	9.50	700.5	20.0	-0.27	2.1
November 30, 2019	9.52	680.8	9.50	669.9	9.50	667.1	9.50	700.6	19.1	-0.27	2.1

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
December 2019

Date	East Scrubber		Fermenter Scrubber		West Scrubber		EPT Scrubber		GRF Scrubber		
	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	pH	ORP (mV)	Temperature In (°C)	Pressure In (kPa)	H_2S Out (ppb)
December 1, 2019	9.50	638.3	9.50	670.0	9.45	671.9	9.50	700.8	19.5	-0.27	1.1
December 2, 2019	9.50	638.6	9.50	670.1	9.49	658.1	9.50	697.8	21.3	-0.27	1.6
December 3, 2019	9.50	639.5	9.50	670.0	9.49	660.0	9.50	700.2	22.1	-0.27	1.6
December 4, 2019	9.50	644.8	9.51	670.2	9.51	673.4	9.50	706.9	21.8	-0.27	2.6
December 5, 2019	9.50	640.9	9.50	670.1	9.52	679.4	9.50	702.5	20.3	-0.27	1.1
December 6, 2019	9.50	638.5	9.49	642.4	9.47	662.1	9.50	700.3	20.6	-0.27	2.5
December 7, 2019	9.50	641.0	9.50	670.0	9.53	667.8	9.50	701.8	20.6	-0.27	2.6
December 8, 2019	9.50	640.1	9.50	670.0	9.50	669.1	9.50	704.0	19.6	-0.27	1.0
December 9, 2019	9.50	639.6	9.49	673.2	9.49	660.7	9.50	698.6	20.0	-0.27	1.0
December 10, 2019	9.50	654.6	9.51	698.6	9.50	666.6	9.50	700.3	19.6	-0.27	1.5
December 11, 2019	9.49	677.7	9.50	700.0	9.50	663.0	9.76	678.1	19.0	-0.27	0.7
December 12, 2019	9.49	793.7	9.50	699.7	9.50	663.7	9.50	697.7	19.2	-0.27	2.6
December 13, 2019	9.53	722.2	9.50	700.0	9.51	661.1	9.53	697.1	19.2	-0.27	3.2
December 14, 2019	9.50	670.1	9.50	700.0	9.49	659.1	9.50	698.6	19.7	-0.27	3.0
December 15, 2019	9.50	670.0	9.50	700.1	9.50	655.1	9.50	700.1	20.5	-0.27	2.6
December 16, 2019	9.50	670.1	9.50	699.8	9.51	658.1	9.50	700.2	20.8	-0.27	1.4
December 17, 2019	9.50	670.1	9.50	700.1	9.49	659.4	9.50	699.7	21.3	-0.27	0.2
December 18, 2019	9.51	673.9	9.50	700.2	9.52	661.2	9.50	700.0	20.9	-0.27	0.7
December 19, 2019	9.50	670.1	9.50	699.9	9.50	659.6	9.50	699.7	20.7	-0.27	0.5
December 20, 2019	9.50	670.0	9.50	703.1	9.49	659.7	9.50	650.2	20.4	-0.27	0.8
December 21, 2019	9.50	669.9	9.50	699.8	9.51	669.9	9.51	701.2	20.6	-0.27	0.8
December 22, 2019	9.50	670.0	9.50	699.8	9.50	669.4	9.50	701.4	20.6	-0.27	0.8
December 23, 2019	9.50	670.1	9.50	699.9	9.51	675.4	9.50	699.9	20.3	-0.27	0.8
December 24, 2019	9.50	670.0	9.50	700.1	9.50	670.4	9.50	700.3	20.1	-0.27	0.8
December 25, 2019	9.51	669.9	9.50	699.9	9.52	597.2	9.50	700.7	20.4	-0.27	0.8
December 26, 2019	9.50	670.1	9.50	700.2	9.49	592.6	9.50	702.2	19.3	-0.27	0.6
December 27, 2019	9.50	670.1	9.50	699.9	9.49	676.4	9.50	698.1	20.2	-0.27	0.7
December 28, 2019	9.50	670.0	9.50	700.0	9.41	680.4	9.50	636.7	20.2	-0.27	0.6
December 29, 2019	9.50	670.0	9.50	699.9	9.58	669.3	9.50	700.8	20.6	-0.27	0.7
December 30, 2019	9.50	669.9	9.50	699.7	9.51	670.4	9.50	700.1	20.4	-0.27	0.9
December 31, 2019	9.49	675.5	9.50	700.1	9.55	660.8	9.42	699.0	21.5	-0.27	0.7

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Fenceline H_2S Readings
July 2019

Date	H_2S (ppb)								Comments
	1	2	3	4	5	6	7	8	
July 1, 2019	0	0	0	0	0	0	0	0	
July 2, 2019	0	0	0	0	0	0	0	0	
July 3, 2019	0	0	0	0	0	0	0	0	
July 4, 2019	0	0	0	0	0	0	0	0	
July 5, 2019	0	0	0	0	0	0	0	0	
July 6, 2019	3.16	0	0	8.06	0	0	0	0	
July 7, 2019	0	0	0	0	0	0	0	0	
July 8, 2019	0	0	0	0	0	0	0	0	
July 9, 2019	0	11.3	0	0	0	0	0	0	
July 10, 2019	3.73	0	0	0	0	0	21.62	0	
July 11, 2019	0	6.29	0	0	0	0	0	0	
July 12, 2019	0	0	0	0	0	0	0	0	
July 13, 2019	0	0	0	0	0	0	0	0	
July 14, 2019	0	0	0	0	0	0	0	0	
July 15, 2019	6.66	5.55	0	6.27	0	0	0	0	
July 16, 2019	9.37	0	3.24	3.2	0	0	0	0	
July 17, 2019	22.59	0	0	0	0	0	0	0	
July 18, 2019	0	0	0	0	0	0	0	0	
July 19, 2019	0	0	0	0	0	0	0	0	
July 20, 2019	0	0	0	0	0	#N/A	0	0	No access available to Location 6
July 21, 2019	0	0	0	0	0	0	0	0	
July 22, 2019	0	0	0	0	0	0	0	0	
July 23, 2019	0	0	0	0	0	0	0	0	
July 24, 2019	3.04	0	0	0	0	0	0	0	
July 25, 2019	0	8.63	0	0	0	0	0	0	
July 26, 2019	0	0	0	0	0	0	0	0	
July 27, 2019	0	0	0	0	0	0	0	0	
July 28, 2019	0	0	0	0	0	0	0	0	
July 29, 2019	0	0	0	0	0	0	0	0	
July 30, 2019	3.33	0	0	5.16	0	0	0	0	
July 31, 2019	0	0	0	0	0	0	0	0	

PROVIDING MORE EPCOR

Gold Bar Wastewater Treatment Plant
Fenceline H_2S Readings
August 2019

Date	H_2S (ppb)								Comments
	1	2	3	4	5	6	7	8	
August 1, 2019	3.43	0	0	0	0	0	0	0	
August 2, 2019	8.1	0	0	11.35	0	0	0	0	
August 3, 2019	0	0	0	0	0	0	0	0	
August 4, 2019	0	0	0	0	0	3.42	0	0	
August 5, 2019	0	0	0	0	0	0	0	0	
August 6, 2019	0	0	0	0	0	0	0	0	
August 7, 2019	0	0	0	5.76	0	0	0	0	
August 8, 2019	0	0	0	0	0	0	0	0	
August 9, 2019	0	0	0	0	0	0	0	0	
August 10, 2019	12.18	0	0	0	0	0	0	0	
August 11, 2019	9.38	0	4.47	0	0	0	0	0	
August 12, 2019	7.72	0	0	0	0	0	0	0	
August 13, 2019	0	0	0	0	0	0	0	0	
August 14, 2019	4.09	0	0	0	0	0	0	0	
August 15, 2019	0	0	0	0	0	0	0	0	
August 16, 2019	0	0	0	0	0	0	0	0	
August 17, 2019	0	0	0	0	0	0	0	0	
August 18, 2019	0	0	0	9.34	0	0	0	0	
August 19, 2019	0	0	0	0	0	0	0	0	
August 20, 2019	4.53	0	0	0	0	0	0	0	
August 21, 2019	0	0	0	0	0	0	0	0	
August 22, 2019	0	0	0	0	0	0	0	0	
August 23, 2019	3.27	0	0	0	0	0	0	0	
August 24, 2019	0	0	0	0	0	0	0	0	
August 25, 2019	0	0	0	0	0	0	0	0	
August 26, 2019	0	0	0	0	0	0	0	0	
August 27, 2019	0	0	0	0	0	0	0	0	
August 28, 2019	0	0	0	0	0	0	0	0	
August 29, 2019	0	0	0	0	0	0	0	0	
August 30, 2019	0	0	0	0	0	0	0	0	
August 31, 2019	0	0	0	0	0	0	0	0	

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Gold Bar Wastewater Treatment Plant

Fenceline H_2S Readings

September 2019

Date	H_2S (ppb)								Comments
	1	2	3	4	5	6	7	8	
September 1, 2019	0	0	0	0	0	0	0	0	
September 2, 2019	0	6.27	0	8.51	0	0	0	0	
September 3, 2019	0	0	0	0	0	0	0	0	
September 4, 2019	5.58	8.76	0	4.26	0	0	0	0	
September 5, 2019	18.93	0	0	0	0	0	0	0	
September 6, 2019	0	3.11	0	5.2	0	0	0	4.08	
September 7, 2019	24.55	0	0	0	0	0	0	0	
September 8, 2019	0	0	0	0	0	0	0	0	
September 9, 2019	4.42	0	0	5.83	0	0	0	0	
September 10, 2019	6.87	0	3.43	4.82	0	0	0	0	
September 11, 2019	6.97	0	0	4.42	0	0	0	0	
September 12, 2019	7.13	0	0	0	0	0	0	0	
September 13, 2019	0	5.03	0	0	0	0	0	0	
September 14, 2019	5.05	0	0	0	0	0	0	0	
September 15, 2019	0	8.24	3.81	0	3.76	0	0	4.13	
September 16, 2019	0	0	0	0	0	0	0	0	
September 17, 2019	21.78	0	0	3.28	0	0	0	0	
September 18, 2019	47	0	4.94	0	0	0	0	0	
September 19, 2019	6.83	0	0	0	0	0	0	0	
September 20, 2019	3.05	3.03	4.41	0	0	5.64	0	0	
September 21, 2019	4.67	0	0	0	0	0	0	0	
September 22, 2019	10.85	0	0	0	0	0	0	0	
September 23, 2019	0	0	0	0	0	0	0	0	
September 24, 2019	0	0	0	0	0	0	0	0	
September 25, 2019	20.35	0	0	0	0	0	0	0	
September 26, 2019	2.035	0	0	0	0	0	0	0	
September 27, 2019	4.38	0	0	3.2	0	0	0	0	
September 28, 2019	0	5.74	0	3.95	0	0	0	0	
September 29, 2019	13.66	0	0	0	0	0	0	0	
September 30, 2019	31.29	0	0	5.67	0	0	0	0	

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Gold Bar Wastewater Treatment Plant
Fenceline H_2S Readings
October 2019

Date	H_2S (ppb)								Comments
	1	2	3	4	5	6	7	8	
October 1, 2019	0	0	0	0	0	0	0	0	
October 2, 2019	0	0	0	0	0	0	0	0	
October 3, 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Missed readings, AEP Ref. # 359790
October 4, 2019	0	0	0	0	0	0	0	0	
October 5, 2019	0	0	0	0	0	0	0	0	
October 6, 2019	0	0	0	0	0	0	0	0	
October 7, 2019	4.2	0	0	0	0	0	0	0	
October 8, 2019	0	0	0	0	0	0	0	0	
October 9, 2019	5.19	0	0	0	0	0	0	0	
October 10, 2019	0	0	0	0	0	0	0	0	
October 11, 2019	6.28	0	0	0	0	0	0	0	
October 12, 2019	3.7	0	0	0	0	0	0	0	
October 13, 2019	3.38	0	0	0	0	0	0	0	
October 14, 2019	0	0	0	0	0	0	0	0	
October 15, 2019	0	0	0	0	0	0	0	0	
October 16, 2019	17.36	0	4.74	0	0	0	0	0	
October 17, 2019	0	0	6.37	0	0	0	3.61	0	
October 18, 2019	0	0	0	0	0	0	0	0	
October 19, 2019	0	0	0	0	0	0	0	0	
October 20, 2019	0	0	0	0	0	0	0	0	
October 21, 2019	0	0	0	0	0	0	0	0	
October 22, 2019	0	0	0	0	0	0	0	0	
October 23, 2019	30.59	4.21	0	0	0	0	0	0	
October 24, 2019	0	3.05	0	0	0	0	0	0	
October 25, 2019	0	4.45	0	0	0	0	0	0	
October 26, 2019	0	0	0	0	0	0	0	0	
October 27, 2019	0	0	0	0	0	0	0	0	
October 28, 2019	0	3.53	0	0	0	0	0	0	
October 29, 2019	5.54	0	0	0	0	0	0	0	
October 30, 2019	4.54	5.52	0	0	0	0	0	0	
October 31, 2019	0	5.93	3.27	3.18	0	0	0	0	

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Gold Bar Wastewater Treatment Plant
Fenceline H_2S Readings
November 2019

Date	H_2S (ppb)								Comments
	1	2	3	4	5	6	7	8	
November 1, 2019	4.03	0	0	0	0	3.47	0	0	
November 2, 2019	0	0	0	0	0	0	0	0	
November 3, 2019	0	6.3	0	0	0	0	0	0	
November 4, 2019	4.53	0	0	0	0	0	0	0	
November 5, 2019	5.3	0	0	0	0	0	0	0	
November 6, 2019	7.39	0	0	0	0	0	0	0	
November 7, 2019	6.66	0	0	0	0	0	0	0	
November 8, 2019	0	0	0	0	0	0	8.31	0	
November 9, 2019	0	0	0	0	0	0	0	0	
November 10, 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
November 11, 2019	6.48	0	0	0	0	0	0	0	
November 12, 2019	0	0	0	0	0	0	0	0	
November 13, 2019	0	0	0	0	0	0	0	0	
November 14, 2019	6.69	0	0	0	0	0	4.78	0	
November 15, 2019	0	0	0	0	0	0	0	0	
November 16, 2019	0	0	0	0	0	0	0	0	
November 17, 2019	0	0	0	0	0	0	0	0	
November 18, 2019	0	4.7	0	0	0	0	0	0	
November 19, 2019	7.83	0	0	0	0	0	0	0	
November 20, 2019	5.82	0	0	0	0	0	0	0	
November 21, 2019	5.84	0	0	0	0	4.68	0	0	
November 22, 2019	0	0	0	0	0	0	0	0	
November 23, 2019	10.96	0	0	0	0	0	0	0	
November 24, 2019	0	0	0	0	0	0	0	0	
November 25, 2019	4.35	6.56	5.24	5.11	0	0	0	0	
November 26, 2019	9.33	3.57	7.18	0	0	0	0	0	
November 27, 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
November 28, 2019	3.27	0	0	0	0	0	0	3.41	
November 29, 2019	3.87	0	0	0	0	0	0	0	
November 30, 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
December 1, 2019	0	0	0	0	0	0	0	0	

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Gold Bar Wastewater Treatment Plant
Fenceline H_2S Readings
December 2019

Date	H_2S (ppb)								Comments
	1	2	3	4	5	6	7	8	
December 1, 2019	0	0	0	0	0	0	0	0	
December 2, 2019	8.12	0	0	0	0	0	0	0	
December 3, 2019	3.67	0	0	0	0	0	0	0	
December 4, 2019	8.08	5.24	0	9.72	0	0	0	3.52	
December 5, 2019	6.2	0	0	0	0	0	4.11	0	
December 6, 2019	0	0	0	0	0	0	0	0	
December 7, 2019	0	0	0	0	0	0	0	0	
December 8, 2019	4.55	0	0	0	0	0	3.14	0	
December 9, 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
December 10, 2019	17.58	0	4.53	0	0	0	0	0	
December 11, 2019	10.66	0	0	5.75	0	0	0	5.07	
December 12, 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
December 13, 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
December 14, 2019	3.82	0	0	0	0	0	0	0	
December 15, 2019	0	0	0	0	0	0	0	0	
December 16, 2019	6.46	0	0	0	0	0	0	0	
December 17, 2019	11.64	3.82	0	0	0	6.61	3.03	0	
December 18, 2019	5.87	11.13	6.06	9.12	0	0	0	7.42	
December 19, 2019	0	0	0	0	0	0	3.21	4.9	
December 20, 2019	0	3.76	0	0	0	0	0	0	
December 21, 2019	23.86	0	0	0	0	0	0	0	
December 22, 2019	0	0	0	0	0	0	0	0	
December 23, 2019	39.95	0	0	0	0	0	0	0	
December 24, 2019	11.29	0	0	0	0	0	0	0	
December 25, 2019	11.24	3.11	22.71	0	0	0	0	0	
December 26, 2019	0	0	0	0	3.64	0	0	0	
December 27, 2019	3.79	0	0	0	0	0	0	0	
December 28, 2019	31.31	0	0	0	4.05	3.22	6.45	0	
December 29, 2019	6.84	4.93	3.74	3.16	3.07	0	0	0	
December 30, 2019	4.02	4.32	0	12.87	0	0	0	0	
December 31, 2019	12.72	6.27	5	0	3.26	0	0	0	

Appendix E – 2019 Biosolids Field Application Rates

Substance Loading Rates on Nutrigold Fields - 2019

Nutrigold Field #2019SW045518					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
1090	21.28440367	232	32	13	17.8	TP	22400	5197	400				
						TN	34300	7958	612				
						NH3-N	11300	2622	202				
Landowner		Terry Eleniak				As	4.8	1.11	0.086				
Legal Description		SW-04-55-18-4				Cd	3.1	0.73	0.056	10924	1500	7134	600
Start Date		24-Dec-18				Cr	62	14.3	1.10	557	20	364	8
End Date		13-Jan-19				Cu	489	113	8.73	70	15	46	6
Soil Class		Class 1				Pb	32.3	7.5	0.576	1062	20	693	8
Biosolids Type		Digested				Mn	290	67	5.18				
		Gravity Thickened				Hg	0.85	0.197	0.015	40353	3000	26353	1100
						Ni	33.8	7.8	0.603	1015	100	663	40
						Se	5.1	1.18	0.091				
						Zn	723	168	12.9	47	10	31	4
						Co	5.6	1	0.1				

Nutrigold Field #2019SW055517					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
1033	23.5	226	65	26	8.7	TP	22400	5062	195				
						TN	34300	7752	298				
						NH3-N	11300	2554	98				
Landowner		Darren Eleniak				As	4.8	1.08	0.042				
Legal Description		SW-05-55-17-4				Cd	3.1	0.71	0.027	10924	1500	7134	600
Start Date		14-Jan-19				Cr	62	13.9	0.54	557	20	364	8
End Date		16-Jan-19				Cu	489	111	4.25	70	15	46	6
Soil Class		Class 3				Pb	32.3	7.3	0.281	1062	20	693	8
Biosolids Type		Digested				Mn	290	66	2.52				
		Gravity Thickened				Hg	0.85	0.192	0.007	40353	3000	26353	1100
						Ni	33.8	7.6	0.294	1015	100	663	40
						Se	5.1	1.15	0.044				
						Zn	723	163	6.3	47	10	31	4
						Co	5.6	1	0.0				

Nutrigold Field #2019SW285619					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
1400	24.5	303	87	35	9.0	TP	22400	6787	194				
						TN	34300	10393	297				
						NH3-N	11300	3424	98				
Landowner		Twigg/Stach				As	4.8	1.45	0.042				
Legal Description		SW-28-56-17-4				Cd	3.1	0.95	0.027	10924	1500	7134	600
Start Date		25-Jan-19				Cr	62	18.7	0.53	557	20	364	8
End Date		28-Jan-19				Cu	489	148	4.23	70	15	46	6
Soil Class		Class 3				Pb	32.3	9.8	0.280	1062	20	693	8
Biosolids Type		Digested				Mn	290	88	2.51				
		Gravity Thickened				Hg	0.85	0.258	0.007	40353	3000	26353	1100
						Ni	33.8	10.2	0.293	1015	100	663	40
						Se	5.1	1.55	0.044				
						Zn	723	219	6.3	47	10	31	4
						Co	5.6	2	0.0				

Nutrigold Field #2019SW325318					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
1900	22	413	64	26	15.0	TP	26600	10986	423				
						TN	46100	19039	732				
						NH3-N	8730	3605	139				
Landowner		Jim George				As	4.6	1.90	0.073				
Legal Description		SW-32-53-18-4				Cd	3.3	1.37	0.053	13886	1500	8012	600
Start Date		20-Jan-19				Cr	82	33.7	1.30	564	20	326	8
End Date		31-Jan-19				Cu	458	189	7.28	101	15	58	6
Soil Class		Class 1				Pb	41.4	17.1	0.658	1114	20	643	8
Biosolids Type		Digested				Mn	370	153	5.88				
		Centrifuge Dewatered				Hg	1.18	0.487	0.019	39068	3000	22542	1100
						Ni	32.3	13.3	0.513	1427	100	824	40
						Se	4.7	1.94	0.075				
						Zn	675	279	10.7	68	10	39	4
						Co	5.6	2	0.1				

Nutrigold Field #2019SE295319					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
3697	22	793	125	51	16.0	TP	25600	20301	398				
						TN	53500	42426	832				
						NH3-N	7580	6011	118				
Landowner		Roy Reinhardt				As	4.3	3.41	0.067				
Legal Description		SE-29-53-19-4				Cd	3.9	3.06	0.060	13860	1500	6632	600
Start Date		19-Feb-19				Cr	97	76.9	1.51	552	20	264	8
End Date		14-May-19				Cu	587	465	9.13	91	15	44	6
Soil Class		Class 1				Pb	40.2	31.9	0.625	1331	20	637	8
Biosolids Type		Digested				Mn	310	246	4.82				
		Centrifuge Dewatered				Hg	1.09	0.864	0.017	49083	3000	23486	1100
						Ni	35.6	28.2	0.554	1503	100	719	40
						Se	5	3.97	0.078				
						Zn	730	579	11.4	73	10	35	4
						Co	5.5	4	0.1				

Nutrigold Field #2019NW015716					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
4908	7.5	366	105	43	9.0	TP	23100	8455	197				
						TN	32000	11712	272				
						NH3-N	15200	5563	129				
Landowner		Leighton Blashko				As	7.70	2.82	0.066				
Legal Description		NW-01-57-16-4				Cd	1.81	0.66	0.015	17680	1500	12762	600
Start Date		13-May-19				Cr	100	36.6	0.85	320	20	231	8
End Date		20-May-19				Cu	251	92	2.14	127	15	92	6
Soil Class		Class 3				Pb	26.1	9.6	0.222	1226	20	885	8
Biosolids Type		Digested				Mn	320	117	2.72				
		Gravity Thickened				Hg	1.31	0.479	0.011	24427	3000	17634	1100
						Ni	90.2	33.0	0.768	355	100	256	40
						Se	12.7	4.65	0.108				
						Zn	479	175	4.1	67	10	48	4
						Co	9.40	3	0.1				

Nutrigold Field #2019SW075317					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
6608	8.1	536	77	31	17.0	TP	23100	12382	399				
						TN	32000	17152	553				
						NH3-N	15200	8147	263				
Landowner		Myron Fill				As	7.70	4.13	0.133				
Legal Description		SW-07-53-17-4				Cd	1.81	0.97	0.031	17680	1500	12762	600
Start Date		21-May-19				Cr	100	53.6	1.73	320	20	231	8
End Date		24-May-19				Cu	251	135	4.34	127	15	92	6
Soil Class		Class 1				Pb	26.1	14.0	0.451	1226	20	885	8
Biosolids Type		Digested				Mn	320	172	5.53				
		Gravity Thickened				Hg	1.31	0.702	0.023	24427	3000	17634	1100
						Ni	90.2	48.3	1.560	355	100	256	40
						Se	12.7	6.81	0.220				
						Zn	479	257	8.3	67	10	48	4
						Co	9.40	5	0.2				

Nutrigold Field #2019NW075317					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
1408	22	311	45	18	17.0	TP	26300	8179	454				
						TN	49100	15270	848				
						NH3-N	7580	2357	131				
Landowner		Josh Taschuck				As	4.5	1.40	0.078				
Legal Description		NW-07-53-17-4				Cd	3.3	1.01	0.056	15108	1500	8092	600
Start Date		17-May-19				Cr	101	31.4	1.75	486	20	260	8
End Date		22-May-19				Cu	474	147	8.19	104	15	55	6
Soil Class		Class 1				Pb	35.1	10.9	0.606	1399	20	749	8
Biosolids Type		Digested				Mn	310	96	5.36				
		Centrifuge Dewatered				Hg	1.15	0.358	0.020	42696	3000	22870	1100
						Ni	40.5	12.6	0.700	1212	100	649	40
						Se	4.8	1.49	0.083				
						Zn	701	218	12.1	70	10	38	4
						Co	5.8	2	0.1				

Nutrigold Field #2019NE125318					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
2663	7.5	200	30	12	17.0	TP	23100	4620	385				
						TN	32000	6400	533				
						NH3-N	15200	3040	253				
Landowner		Josh Taschuck				As	7.70	1.54	0.128				
Legal Description		NE-12-53-18-4				Cd	1.81	0.36	0.030	17680	1500	12762	600
Start Date		28-May-19				Cr	100	20.0	1.67	320	20	231	8
End Date		29-May-19				Cu	251	50	4.18	127	15	92	6
Soil Class		Class 1				Pb	26.1	5.2	0.435	1226	20	885	8
Biosolids Type		Digested				Mn	320	64	5.33				
		Gravity Thickened				Hg	1.31	0.262	0.022	24427	3000	17634	1100
						Ni	90.2	18.0	1.503	355	100	256	40
						Se	12.7	2.54	0.212				
						Zn	479	96	8.0	67	10	48	4
						Co	9.40	2	0.2				

Nutrigold Field #2019NE145214					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
8827	7.7	678	100	40	17.0	TP	23100	15662	392				
						TN	32000	21696	542				
						NH3-N	15200	10306	258				
Landowner		Earnie Warawa				As	7.70	5.22	0.131				
Legal Description		NE-14-52-14-4				Cd	1.81	1.23	0.031	17680	1500	12762	600
Start Date		30-May-19				Cr	100	67.8	1.70	320	20	231	8
End Date		4-Jun-19				Cu	251	170	4.25	127	15	92	6
Soil Class		Class 2				Pb	26.1	17.7	0.442	1226	20	885	8
Biosolids Type		Digested				Mn	320	217	5.42				
		Gravity Thickened				Hg	1.31	0.888	0.022	24427	3000	17634	1100
						Ni	90.2	61.2	1.529	355	100	256	40
						Se	12.7	8.61	0.215				
						Zn	479	325	8.1	67	10	48	4
						Co	9.40	6	0.2				

Nutrigold Field #2019SE215520					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
1795	22.5	302	52	21		TP	22400	6765	322				
						TN	34300	10359	493				
						NH3-N	11300	3413	163				
Landowner		Armin Kottke				As	4.8	1.45	0.069				
Legal Description		SE-21-55-20-4				Cd	3.1	0.95	0.045	10924	1500	7134	600
Start Date		29-May-19				Cr	62	18.6	0.89	557	20	364	8
End Date		1-Jun-19				Cu	489	148	7.03	70	15	46	6
Soil Class		Class 2				Pb	32.3	9.8	0.465	1062	20	693	8
Biosolids Type		Digested				Mn	290	88	4.17				
		Centrifuge Dewatered				Hg	0.85	0.257	0.012	40353	3000	26353	1100
						Ni	33.8	10.2	0.486	1015	100	663	40
						Se	5.1	1.54	0.073				
						Zn	723	218	10.4	47	10	31	4
						Co	5.6	2	0.1				

Nutrigold Field #2019NW295318					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
7990	7	561	80	32	17.5	TP	23100	12959	400				
						TN	49200	27601	852				
						NH3-N	15200	8527	263				
Landowner		Marcel Bernard				As	7.70	4.32	0.133				
Legal Description		NW-29-53-18-4				Cd	1.81	1.02	0.031	27182	1500	12762	600
Start Date		7-Jun-19				Cr	100	56.1	1.73	492	20	231	8
End Date		8-Aug-19				Cu	251	141	4.35	196	15	92	6
Soil Class		Class 1				Pb	26.1	14.6	0.452	1885	20	885	8
Biosolids Type		Digested				Mn	320	180	5.54				
		Gravity Thickened				Hg	1.31	0.735	0.023	37557	3000	17634	1100
						Ni	90.2	50.6	1.562	545	100	256	40
						Se	12.7	7.12	0.220				
						Zn	479	269	8.3	103	10	48	4
						Co	9.40	5	0.2				

Nutrigold Field #2019SW095519					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
7006	8	495	80	30	17.5	TP	28000	13860	462				
						TN	28900	14306	477				
						NH3-N	15400	7623	254				
Landowner		Randy Bobke				As	6.10	3.02	0.101				
Legal Description		SW-09-55-19-4				Cd	3.15	1.56	0.052	9175	1500	8889	600
Start Date		22-Jul-19				Cr	183	90.6	3.02	158	20	153	8
End Date		3-Aug-19				Cu	320	158	5.28	90	15	88	6
Soil Class		Class 1				Pb	58.8	29.1	0.970	491	20	476	8
Biosolids Type		Digested				Mn	350	173	5.78				
		Gravity Thickened				Hg	1.14	0.564	0.019	25351	3000	24561	1100
						Ni	41	20.3	0.677	705	100	683	40
						Se	15.1	7.47	0.249				
						Zn	627	310	10.3	46	10	45	4
						Co	9.40	5	0.2				

Nutrigold Field #2019NW205519					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
4032	7	281	40	16	17.0	TP	23100	6491	401				
						TN	49200	13825	853				
						NH3-N	15200	4271	264				
Landowner		Trevor Schinkinger				As	7.70	2.16	0.134				
Legal Description		NW-20-55-19-4				Cd	1.81	0.51	0.031	27182	1500	12762	600
Start Date		11-Aug-19				Cr	100	28.1	1.73	492	20	231	8
End Date		14-Aug-19				Cu	251	71	4.35	196	15	92	6
Soil Class		Class 1				Pb	26.1	7.3	0.453	1885	20	885	8
Biosolids Type		Digested				Mn	320	90	5.55				
		Gravity Thickened				Hg	1.31	0.368	0.023	37557	3000	17634	1100
						Ni	90.2	25.3	1.565	545	100	256	40
						Se	12.7	3.57	0.220				
						Zn	479	135	8.3	103	10	48	4
						Co	9.40	3	0.2				

Nutrigold Field #2019SE355319					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
5512	7	388	56	20	19.4	TP	28000	10864	543				
						TN	28900	11213	561				
						NH3-N	15400	5975	299				
Landowner		Ross Gavigan				As	6.10	2.37	0.118				
Legal Description		SE-35-53-19-4				Cd	3.15	1.22	0.061	9175	1500	8889	600
Start Date		10-Aug-19				Cr	183	71.0	3.55	158	20	153	8
End Date		14-Aug-19				Cu	320	124	6.21	90	15	88	6
Soil Class		Class 1				Pb	58.8	22.8	1.141	491	20	476	8
Biosolids Type		Digested				Mn	350	136	6.79				
		Gravity Thickened				Hg	1.14	0.442	0.022	25351	3000	24561	1100
						Ni	41	15.9	0.795	705	100	683	40
						Se	15.1	5.86	0.293				
						Zn	627	243	12.2	46	10	45	4
						Co	9.80	4	0.2				

Nutrigold Field #2019NE355518					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
5743	7	420	60	24	17.5	TP	28000	11760	484				
						TN	28900	12138	500				
						NH3-N	15400	6468	266				
Landowner		Lawrence Hryniw				As	6.10	2.56	0.105				
Legal Description		NE-35-55-18-4				Cd	3.15	1.32	0.054	9175	1500	8889	600
Start Date		15-Aug-19				Cr	183	76.9	3.16	158	20	153	8
End Date		27-Aug-19				Cu	320	134	5.53	90	15	88	6
Soil Class		Class 2				Pb	58.8	24.7	1.016	491	20	476	8
Biosolids Type		Digested				Mn	350	147	6.05				
		Gravity Thickened				Hg	1.14	0.479	0.020	25351	3000	24561	1100
						Ni	41	17.2	0.709	705	100	683	40
						Se	15.1	6.34	0.261				
						Zn	627	263	10.8	46	10	45	4
						Co	9.80	4	0.2				

Nutrigold Field #2019SE315317					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
8532	7	601	67	27	22.0	TP	28000	16828	623				
						TN	28900	17369	643				
						NH3-N	15400	9255	343				
Landowner		Lilian Sabo				As	6.10	3.67	0.136				
Legal Description		SE-31-53-17-4				Cd	3.15	1.89	0.070	9175	1500	8889	600
Start Date		15-Aug-19				Cr	183	110.0	4.07	158	20	153	8
End Date		20-Aug-19				Cu	320	192	7.12	90	15	88	6
Soil Class		Class 1				Pb	58.8	35.3	1.309	491	20	476	8
Biosolids Type		Digested				Mn	350	210	7.79				
		Gravity Thickened				Hg	1.14	0.685	0.025	25351	3000	24561	1100
						Ni	41	24.6	0.913	705	100	683	40
						Se	15.1	9.08	0.336				
						Zn	627	377	14.0	46	10	45	4
						Co	9.80	6	0.2				

Nutrigold Field #2019SW105418					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
10272	7.4	755	84	34	22.0	TP	28000	21140	622				
						TN	28900	21820	642				
						NH3-N	15400	11627	342				
Landowner		Steve Beamer				As	6.10	4.61	0.135				
Legal Description		SW-10-54-18-4				Cd	3.15	2.38	0.070	9175	1500	8889	600
Start Date		21-Aug-19				Cr	183	138.2	4.06	158	20	153	8
End Date		28-Aug-19				Cu	320	242	7.11	90	15	88	6
Soil Class		Class 1				Pb	58.8	44.4	1.306	491	20	476	8
Biosolids Type		Digested				Mn	350	264	7.77				
		Gravity Thickened				Hg	1.14	0.861	0.025	25351	3000	24561	1100
						Ni	41	31.0	0.910	705	100	683	40
						Se	15.1	11.40	0.335				
						Zn	627	473	13.9	46	10	45	4
						Co	9.80	7	0.2				

Nutrigold Field #2019SE345419					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
4762	7.4	350	80	32	16.0	TP	28000	9800	306				
						TN	28900	10115	316				
						NH3-N	15400	5390	168				
Landowner		Daryl Kuchmak				As	6.10	2.14	0.067				
Legal Description		SE-34-54-19-4				Cd	3.15	1.10	0.034	9175	1500	8889	600
Start Date		29-Aug-19				Cr	183	64.1	2.00	158	20	153	8
End Date		3-Sep-19				Cu	320	112	3.50	90	15	88	6
Soil Class		Class 3				Pb	58.8	20.6	0.643	491	20	476	8
Biosolids Type		Digested				Mn	350	123	3.83				
		Gravity Thickened				Hg	1.14	0.399	0.012	25351	3000	24561	1100
						Ni	41	14.4	0.448	705	100	683	40
						Se	15.1	5.29	0.165				
						Zn	627	219	6.9	46	10	45	4
						Co	9.80	3	0.1				

Nutrigold Field #2019SE255619					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
6096	7.4	449	50	20	17.0	TP	28000	12572	629				
						TN	28900	12976	649				
						NH3-N	15400	6915	346				
Landowner		Bob Starko				As	6.10	2.74	0.137				
Legal Description		SE-25-56-19-4				Cd	3.15	1.41	0.071	9175	1500	8889	600
Start Date		29-Aug-19				Cr	183	82.2	4.11	158	20	153	8
End Date		4-Sep-19				Cu	320	144	7.18	90	15	88	6
Soil Class		Class 1				Pb	58.8	26.4	1.320	491	20	476	8
Biosolids Type		Digested				Mn	350	157	7.86				
		Gravity Thickened				Hg	1.14	0.512	0.026	25351	3000	24561	1100
						Ni	41	18.4	0.920	705	100	683	40
						Se	15.1	6.78	0.339				
						Zn	627	282	14.1	46	10	45	4
						Co	9.80	4	0.2				

Nutrigold Field #2019SE215519					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
4669	7.5	350	50	20	17.5	TP	28000	9800	490				
						TN	28900	10115	506				
						NH3-N	15400	5390	270				
Landowner		Adrian Stach				As	6.10	2.14	0.107				
Legal Description		SE-21-55-19-4				Cd	3.15	1.10	0.055	9175	1500	8889	600
Start Date		4-Sep-19				Cr	183	64.1	3.20	158	20	153	8
End Date		6-Sep-19				Cu	320	112	5.60	90	15	88	6
Soil Class		Class 1				Pb	58.8	20.6	1.029	491	20	476	8
Biosolids Type		Digested				Mn	350	123	6.13				
		Gravity Thickened				Hg	1.14	0.399	0.020	25351	3000	24561	1100
						Ni	41	14.4	0.718	705	100	683	40
						Se	15.1	5.29	0.264				
						Zn	627	219	11.0	46	10	45	4
						Co	9.80	3	0.2				

Nutrigold Field #2019SW175318					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
14517	6.9	997	106	43	23.0	TP	28000	27916	649				
						TN	28900	28813	670				
						NH3-N	15400	15354	357				
Landowner		Lorraine Way				As	6.10	6.08	0.141				
Legal Description		SW-17-53-18-4				Cd	3.15	3.14	0.073	9175	1500	8889	600
Start Date		7-Sep-19				Cr	183	182.5	4.24	158	20	153	8
End Date		16-Sep-19				Cu	320	319	7.42	90	15	88	6
Soil Class		Class 1				Pb	58.8	58.6	1.363	491	20	476	8
Biosolids Type		Digested				Mn	350	349	8.12				
		Gravity Thickened				Hg	1.14	1.137	0.026	25351	3000	24561	1100
						Ni	41	40.9	0.951	705	100	683	40
						Se	15.1	15.05	0.350				
						Zn	627	625	14.5	46	10	45	4
						Co	9.80	10	0.2				

Nutrigold Field #2019SW045619					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
10303	7.6	776	86	35	22.0	TP	28000	21728	621				
						TN	28900	22426	641				
						NH3-N	15400	11950	341				
Landowner		Grant Hackett				As	6.10	4.73	0.135				
Legal Description		SW-04-56-19-4				Cd	3.15	2.44	0.070	9175	1500	8889	600
Start Date		25-Sep-19				Cr	183	142.0	4.06	158	20	153	8
End Date		12-Oct-19				Cu	320	248	7.09	90	15	88	6
Soil Class		Class 1				Pb	58.8	45.6	1.304	491	20	476	8
Biosolids Type		Digested				Mn	350	272	7.76				
		Gravity Thickened				Hg	1.14	0.885	0.025	25351	3000	24561	1100
						Ni	41	31.8	0.909	705	100	683	40
						Se	15.1	11.72	0.335				
						Zn	627	487	13.9	46	10	45	4
						Co	9.80	8	0.2				

Nutrigold Field #2019SW045619					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
226	23	52	6	2	22.0	TP	24700	1284	535				
						TN	34600	1799	750				
						NH3-N	7800	406	169				
Landowner		Grant Hackett				As	4.1	0.21	0.089				
Legal Description		SW-04-56-19-4				Cd	2.8	0.14	0.060	12446	1500	8885	600
Start Date		25-Sep-19				Cr	48	2.5	1.04	718	20	512	8
End Date		12-Oct-19				Cu	435	23	9.43	80	15	57	6
Soil Class		Class 1				Pb	31.2	1.6	0.676	1109	20	792	8
Biosolids Type		Digested				Mn	340	18	7.37				
		Centrifuge Dewatered				Hg	0.95	0.049	0.021	36421	3000	26000	1100
						Ni	30.1	1.6	0.652	1150	100	821	40
						Se	4.7	0.24	0.102				
						Zn	651	34	14.1	53	10	38	4
						Co	5.2	0	0.1				

Lambourne Field #2019NE354918					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
7528	5.31	400	91	37	10.8	TP	30600	12240	331				
						TN	70400	28160	761				
						NH3-N	25100	10040	271				
Landowner		Ken Hillerud				As	5.00	2.00	0.05				
Legal Description		NE-35-49-18-4				Cd	4.97	1.99	0.05	14165	1500	6157	600
Start Date		24-May-19				Cr	193	77.2	2.09	365	20	159	8
End Date		2-Jun-19				Cu	452	181	4.89	156	15	68	6
Soil Class		Class 1				Pb	74	29.6	0.80	951	20	414	8
Biosolids Type		Digested				Mn	360	144	3.89				
		Gravity Thickened				Hg	1.88	0.752	0.02	37447	3000	16277	1100
						Ni	40.2	16.1	0.43	1751	100	761	40
						Se	4.4	1.76	0.05				
						Zn	699	279.60	7.56	101	10	44	4
						Co	5.76	2.30	0.06				

Lambourne Field #2019SW31,NW304916					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
6227	5.35	333	84	34	9.8	TP	23200	7726	227				
						TN	65400	21778	641				
						NH3-N	20400	6793	200				
Landowner		Gene Hrabec				As	4.39	1.46	0.04				
Legal Description		SW-31& NW-30-49-16-4				Cd	4.71	1.57	0.05	13885	1500	4926	600
Start Date		4-Jun-19				Cr	153	50.9	1.50	427	20	152	8
End Date		14-Jul-19				Cu	447	149	4.38	146	15	52	6
Soil Class		Class 1				Pb	57.2	19.0	0.56	1143	20	406	8
Biosolids Type		Digested				Mn	273	91	2.67				
		Gravity Thickened				Hg	1.24	0.413	0.01	52742	3000	18710	1100
						Ni	37.2	12.4	0.36	1758	100	624	40
						Se	4.15	1.38	0.04				
						Zn	617	205.46	6.04	106	10	38	4
						Co	5.79	1.93	0.06				

Lambourne Field #2019NE214918					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
13129	5.60	735	158	64	11.5	TP	25800	18963	296				
						TN	59000	43365	678				
						NH3-N	30600	22491	351				
Landowner		Gene Hrabec				As	4.80	3.53	0.06				
Legal Description		NE-21-49-18-4				Cd	8.78	6.45	0.10	6720	1500	2938	600
Start Date		14-Jun-19				Cr	444	326.3	5.10	133	20	58	8
End Date		25-Aug-19				Cu	434	319	4.98	136	15	59	6
Soil Class		Class 1				Pb	107	78.6	1.23	551	20	241	8
Biosolids Type		Digested				Mn	356	262	4.09				
		Gravity Thickened				Hg	1.61	1.183	0.02	36646	3000	16025	1100
						Ni	41.4	30.4	0.48	1425	100	623	40
						Se	4.22	3.10	0.05				
						Zn	698	513.03	8.02	85	10	37	4
						Co	6.8	5.00	0.08				

Lambourne Field #2019NE/NW235117					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
18009	6.32	1138	274	111	10.3	TP	39400	44837	404				
						TN	55400	63045	568				
						NH3-N	25800	29360	265				
Landowner		Gene Hrabec				As	5.60	6.37	0.06				
Legal Description		NE/NW-23-51-17-4				Cd	6.22	7.08	0.06	8907	1500	6334	600
Start Date		25-Aug-19				Cr	236	268.6	2.42	235	20	167	8
End Date		21-Sep-19				Cu	471	536	4.83	118	15	84	6
Soil Class		Class 1				Pb	67.7	77.0	0.69	818	20	582	8
Biosolids Type		Digested				Mn	400	455	4.10				
		Gravity Thickened				Hg	1.74	1.980	0.02	31839	3000	22644	1100
						Ni	42.1	47.9	0.43	1316	100	936	40
						Se	5.4	6.15	0.06				
						Zn	819	932.02	8.40	68	10	48	4
						Co	6	6.83	0.06				

Olstad_EPCOR Field # TS-01					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
5936	7.35	436	86	35	12.5	TP	28000	12208	349				
						TN	28900	12600	360				
						NH3-N	15400	6714	192				
Landowner		Terry Strawson				As	6.1	2.66	0.076				
Legal Description		NE-12-56-24-W4				Cd	3.15	1.37	0.039	9175	1500	8889	600
Start Date		16-Jul-19				Cr	183	79.8	2.28	158	20	153	8
End Date		2-Aug-19				Cu	320	140	3.99	90	15	88	6
Soil Class		Class 2				Pb	58.8	25.6	0.732	491	20	476	8
Biosolids Type		Digested				Mn	350	153	4.36				
		Gravity Thickened				Hg	1.14	0.497	0.014	25351	3000	24561	1100
						Ni	41	17.9	0.511	705	100	683	40
						Se	15.1	6.58	0.188				
						Zn	627	273.37	7.811	46	40	45	4
						Co	9.8	4	0.1				

Olstad_EPCOR Field # SA-02					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
24692	7.14	1763	188	76	23.2	TP	28000	49364	650				
						TN	28900	50951	670				
						NH3-N	15400	27150	357				
Landowner		Singmar Acres				As	6.1	10.75	0.142				
Legal Description		NW-25-57-22-W4 / SW-36-57-22-W4				Cd	3.15	5.55	0.073	9175	1500	8889	600
Start Date		6-Aug-19				Cr	183	322.6	4.25	158	20	153	8
End Date		25-Aug-19				Cu	320	564	7.42	90	15	88	6
Soil Class		Class 1				Pb	58.8	103.7	1.364	491	20	476	8
Biosolids Type		Digested				Mn	350	617	8.12				
		Gravity Thickened				Hg	1.14	2.010	0.026	25351	3000	24561	1100
						Ni	41	72.3	0.951	705	100	683	40
						Se	15.1	26.62	0.350				
						Zn	327	576.50	7.586	46	40	45	4
						Co	9.8	17	0.2				

Olstad_EPCOR Field # DW-03					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
7459	7.15	534	134	54	9.9	TP	28000	14952	277				
						TN	28900	15433	286				
						NH3-N	15400	8224	152				
Landowner		Dave Woywitka				As	6.1	3.26	0.060				
Legal Description		NE-35-57-24-W4				Cd	3.15	1.68	0.031	9175	1500	8889	600
Start Date		26-Aug-19				Cr	183	97.7	1.81	158	20	153	8
End Date		29-Aug-19				Cu	320	171	3.16	90	15	88	6
Soil Class		Class 3				Pb	58.8	31.4	0.581	491	20	476	8
Biosolids Type		Digested				Mn	350	187	3.46				
		Gravity Thickened				Hg	1.14	0.609	0.011	25351	3000	24561	1100
						Ni	41	21.9	0.405	705	100	683	40
						Se	15.1	8.06	0.149				
						Zn	627	334.82	6.200	46	40	45	4
						Co	9.8	5	0.1				

Olstad_EPCOR Field # DS-04					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
12024	7.31	879	100	40	22.0	TP	28000	24612	615				
						TN	28900	25403	635				
						NH3-N	15400	13537	338				
Landowner		Darren Schmidt				As	6.1	5.36	0.134				
Legal Description		SE-27-49-22-W4				Cd	3.15	2.77	0.069	9175	1500	8889	600
Start Date		4-Sep-19				Cr	183	160.9	4.02	158	20	153	8
End Date		16-Sep-19				Cu	320	281	7.03	90	15	88	6
Soil Class		Class 1				Pb	58.8	51.7	1.292	491	20	476	8
Biosolids Type		Digested				Mn	350	308	7.69				
		Gravity Thickened				Hg	1.14	1.002	0.025	25351	3000	24561	1100
						Ni	41	36.0	0.901	705	100	683	40
						Se	15.1	13.27	0.332				
						Zn	627	551.13	13.778	46	40	45	4
						Co	9.8	9	0.2				

Olstad_EPCOR Field # GS-05					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
12244	6.97	854	96	39	21.9	TP	28000	23912	613				
						TN	28900	24681	633				
						NH3-N	15400	13152	337				
Landowner		Garry Mizera				As	6.1	5.21	0.134				
Legal Description		SW-25-50-22-W4				Cd	3.15	2.69	0.069	9175	1500	8889	600
Start Date		11-Sep-19				Cr	183	156.3	4.01	158	20	153	8
End Date		21-Sep-19				Cu	320	273	7.01	90	15	88	6
Soil Class		Class 1				Pb	58.8	50.2	1.288	491	20	476	8
Biosolids Type		Digested				Mn	350	299	7.66				
		Gravity Thickened				Hg	1.14	0.974	0.025	25351	3000	24561	1100
						Ni	41	35.0	0.898	705	100	683	40
						Se	15.1	12.90	0.331				
						Zn	627	535.46	13.730	46	40	45	4
						Co	9.8	8	0.2		40		

Olstad_EPCOR Field # AF-06					Loading Rate		Biosolids	Field Loading			Minimum		Minimum
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	Ha	Tonnes/Ha	Substance	mg/Kg	Kg	Kg/Ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
30164	7.55	2277	248	100	22.8	TP	28000	63756	638				
						TN	28900	65805	658				
						NH3-N	15400	35066	351				
Landowner		Allam Farms (Chris Allam)				As	6.1	13.89	0.139				
Legal Description		NW_NE-08-54-21-W4				Cd	3.15	7.17	0.072	9175	1500	8889	600
Start Date		23-Sep-19				Cr	183	416.7	4.17	158	20	153	8
End Date		12-Oct-19				Cu	320	729	7.29	90	15	88	6
Soil Class		Class 1				Pb	58.8	133.9	1.339	491	20	476	8
Biosolids Type		Digested				Mn	350	797	7.97				
		Gravity Thickened				Hg	1.14	2.596	0.026	25351	3000	24561	1100
						Ni	41	93.4	0.934	705	100	683	40
						Se	15.1	34.38	0.344				
						Zn	627	1427.68	14.277	46	40	45	4
						Co	9.8	22	0.2				

Appendix F – 2019 Biosolids Land Application Management Report

EPCOR

2019 BIOSOLIDS LAND APPLICATION MANAGEMENT REPORT

GENERAL

Project Name: BIOSALIX

AER Approval/Reference Number: 00011364-03-00

Project Start Date: April 1, 2019

Project End Date: December 31, 2020

Biosolids Type: Dewatered

Total Solids Content (%): Average 24.0%

Target Biosolids Utilization – Dry Tonnes (dt): 6,000.0 (in 2019)

Actual Biosolids Utilization (dt): 5998.3 have been delivered. Approximately 3,065.6 dt have been land applied and 2,932.7 dt are stockpiled at the land application site. Biosolids in stockpiles will be land applied and incorporated in spring 2020.

PROJECT TYPE

- ☐ Agricultural (Thickened) – Nutri Gold
- ☐ Agricultural (Dewatered)
- ☒ Mine Reclamation
- ☐ Marginal Land Improvement
- ☐ Biomass Plantation Establishment
- ☐ Off-spec Agricultural Land (i.e. outside the purview of the guidelines)
- ☐ Other (please specify below)

REGULATORY ADMINISTRATION

- ☐ Guideline
- ☐ Letter of No Objection
- ☒ Other (please specify below)

AER Approval with Guidelines Notification

AER Approval Number: 00011364-03-00

CONTACTS

EPCOR (Owner / Biosolids Generator)

Name: David Curran
Address: 9504 49 St NW, Edmonton AB, T6B 2M9
Phone: 780-718-2126
Email: david.curran@epcor.ca

Contractor and Qualified Professional: SYLVIS Environmental
Name: Kasia Caputa
Address: 301-10171 Saskatchewan Dr, NW, Edmonton AB, T6E 4R5
Phone: 780-932-6135
Email: kcaputa@sylvis.com
Core Responsibilities: Regulatory approval, demonstration project design, environmental monitoring and reporting; transportation supervision; stockpiling and land application supervision

Subcontractor: Whiterock Ventures

Name: Kal Kingra
Address: 2235 76 Ave, Edmonton, AB, T6P 1P6
Phone: 780-469-0819
Email: kal@whiterockventures.ca
Core Responsibilities: Biosolids transportation

Landowner / Leaser: Westmoreland Coal Company, Paintearth Coal Mine

Name: Mark Matthews
Address: 1100-10123 99 Street NW, Edmonton, AB
Phone: 780-420-5896
Email: Mmatthews@westmoreland.com

Regional Regulatory Liaison

Name: Fengqin Wang
Agency: Alberta Environment and Parks
Address: 111 Twin Atria Building, 4999-98 Ave, Edmonton AB, T6B 2X3
Email: Fengqin.wang@gov.ab.ca

LOCATION OF THE LAND APPLICATION SITES

Name: Paintearth Coal Mine

Physical Address: Highway 855, Forestburg, AB

Application Sites:

The application sites are historically reclaimed land located within the footprint of the Paintearth Coal Mine. There are six main sites for which biosolids was delivered in 2019, which are described in Table 1, below.

Table 1: Location of biosolids application sites for the Biosalix project in 2019.

Site Name	Classification	Legal Descriptions	Biosolids Application Dates
Site 1	Class 2	south half and a portion of the north half of section 5-40-14-W4	October – November 2019; April – May 2020
Site 2	Class 1	south half of Section 7-40-15-W4	October – November 2019; April – May 2020
Site 3	Class 1	Portion of south half of section 36-40-15-W4 and north half of section 25-40-15-W4.	August – October 2019;
Site 4	Class 1	South half of section 25-40-15-W4 and the north half of section 24-40-15-W4.	August – October 2019; April – May 2020
Site 5	Class 1	portion of the southeast quarter of section 22, the east half of section 15, the northeast quarter of section 10, the west half of section 11, and the north half of section 2-40-15-W4	April – May 2020
Site 6	Class 3	Portion of the north west quarter of section 19-40-15-W4	April – May 2020

Truck Route Description from Edmonton Waste Management Centre, EWMC (distances estimated):

Exit EWMC, turn right onto Aurum Road NE; Take the ramp and merge unto AB-216, head south on AB-216 for 17.3 km; Exit onto AB-14 E and continue for 77.6 km; Turn right onto AB-855 S, follow AB-855 S for 91.8 km; Turn left to enter Paintearth Coal Mine.

Distance from EWMC: Approximately 188 km

Vegetation prior to biosolids application:

pasture grasses, annual crops, or unvegetated, freshly placed topsoil.

Vegetation following biosolids applications for next three growing seasons:

Hybrid coppice willow plantation.

SUPPORTING DOCUMENTATION (FILL OUT APPLICABLE FIELDS AS REQUIRED)

Road Use Agreement (if applicable):

Issuing county: County of Paintearth No. 18

Contact: Colm Fitz-Gerald, Community Peace Officer, 403-740-2997

Roads and distances: Township Road 400 – Rural Road 155 to Highway 855, Township Road 404 to mine property

Road bans (if applicable): Not Applicable for the hauling period

Value of bond posted: Not Applicable

Agreement Date: Agreement made effective on August 28, 2019

Post-project inspection completion date: A post-haul inspection may be conducted at the County's sole discretion. The County shall notify SYLVIS the date and time of the inspection.

SITE MAP

Site maps are provided in Appendix Two.

Figure 1 provides an overview of all application areas completed in 2019 and planned for spring 2020 as well as the stockpile locations.

Figure 3 through Figure 5 detail the biosolids application areas and rates in Sites 2, 3, and 4, respectively. Areas in Site 2 that were planted with coppice willow in 2019 are shown in Figure 2.

Table 2, below described the distances from specified features for all the application sites.

Table 2: Distances from specified features for all application sites.

Features	Buffer from Feature	Minimum Guideline Buffer
Property Boundaries	> 10 m	10 m
Watercourses, Drainage Courses, Surface Waters	> 30 m	30 m
Water Wells	> 20 m	20 m
Public Roads	> 30 m	30 m
Areas Zoned Residential or Urban Use	> 500 m	500 m
Occupied Dwellings	> 60 m	60 m
Public Buildings	> 60 m	60 m
School Yard Boundaries (in session)	> 200 m	200 m
Cemeteries, Playgrounds, Parks, Campgrounds	> 200 m	200 m

HISTORICAL BIOSOLIDS APPLICATIONS

None.

CURRENT PROJECT APPLICATION RATES AND METHODOLOGY

Biosolids Type: Digested and Dewatered

Biosolids stockpiled? Yes

Stockpile Duration: June 2019 to May 2020

Application Method: Surface application with rear-discharge manure spreaders and incorporation with agricultural tillage equipment

Application rate: Up to 24 dt/ha

Have other amendments (e.g. lime) been co-applied? If so, specify material and application rate: No

POST-APPLICATION MONITORING

Required?: No. All applications in 2019 meet the Guidelines for the Application of Municipal Wastewater Sludges to Agricultural Lands

Matrix (e.g. soil, crop, surface waste): Not Applicable

Constituents: Not Applicable

Frequency and duration: Not Applicable

Application of results: Not Applicable

APPENDIX ONE - TABLES

Table 3: trace element (TE) concentrations and minimum acceptable ratios of nitrogen (N) and phosphorus (P) to TEs.

Constituent	Concentration (mg/kg)	N/TE	Guideline N/TE Minimum Ratio	P/TE	Guideline P/TE Minimum Ratio
Trace Elements					
Cadmium	3.22	10,785	1,500	7,778	600
Chromium	62.9	551	20	398	8
Copper	522	66	15	48	6
Lead	37.2	934	20	674	8
Mercury	1.06	32,736	3,000	23,608	1,100
Nickel	35.4	982	100	708	40
Zinc	743	47	10	34	4
Fertility Parameters					
Nitrogen[2]	34,700	-	-	-	-
Total Phosphorus	25,025	-	-	-	-

[1] Average concentration based on a total of 7 samples collected from stockpiled biosolids on site and at the dewatering plant. Results are reported in Element Lab report 1392835 and EPCOR lab reports 201904020030, 201904300003, and 201907170029.

[2] Sum of organic N, nitrate, ammonium and ammonia.

[3] Minimum ratios as specified in the *Guidelines for the Application of Municipal Wastewater Sludges to Agricultural Lands, 2001.*

Table 4: Trace element and nutrient additions based on the maximum biosolids application rate of 24 dt/ha.

Constituent	Biosolids Concentration	Unit	Loading Rate (kg/ha)	Guideline Limit[1] (where applicable))
Trace Elements				
Arsenic	4.8	mg/kg	0.12	-
Cadmium	3.22	mg/kg	0.08	-
Chromium	62.9	mg/kg	1.5	-
Copper	522	mg/kg	13	-
Lead	37.2	mg/kg	0.9	-
Manganese	308	mg/kg	7.38	-
Mercury	1.06	mg/kg	0.03	-
Nickel	35.4	mg/kg	0.8	-
Selenium	5.2	mg/kg	0.12	-
Zinc	743	mg/kg	18	-
Fertility Parameters				
Total Phosphorus	25,025	mg/kg	601	-
Total Nitrogen	34,700	mg/kg	833	-
Available Nitrogen	8,123	mg/kg	195	-

[1] Maximum Cumulative Additions to Class 1 Sites for a single application from the *Guidelines for the Application of Municipal Wastewater Sludges to Agricultural Land, 2001.*

PROJECT CHALLENGES

Table 5: Documentation of challenges experienced during the project and actions to improve project execution.

Challenge	Project Impact	Solution to Mitigate Challenge / Process Improvement
Technical issues at dewatering facility leading to insufficient materials to complete planned hauling or total shut-down.	Schedule: Biosolids hauling had to be postponed, or trucks had to be sent back after the first round of the day.	Frequent communication was established with the primary contact at the dewatering facility to monitor silo levels and plan hauling on a day-to-day basis.
Higher than normal precipitation in June and July resulting in unsuitable road and site conditions for biosolids hauling and application in late summer.	Schedule: Biosolids hauling was postponed until roads were dry enough and/or graded. Application was postponed.	To make up for hauling delays, the daily number of trucks was increased incrementally from September onwards and Saturday hauls started in October. Refer to Table **6**, Appendix One.
Deterioration of access to stockpiling locations in October and November due to a combination of snowfall, frost, and higher daytime temperatures causing thawing.	Schedule: Delays in biosolids hauling.	Early morning hauls were arranged by loading the trucks with biosolids the evening prior so that deliveries would be complete before the site began to thaw in the afternoon.
Soft spots in application sites leading to tractors sinking and getting stuck in the field.	Schedule: Delay in biosolids applications until equipment could be towed.	SYLVIS staff started doing detailed walkthroughs for every site before application began. Potential soft and wet spots were identified and flagged with wood stakes and warning tape, signalling that operators should avoid application in these areas.

Table 6: Documentation of daily biosolids transfers to the project site.

Date	Target Biosolids Tonnage (dt)	Actual Biosolids Tonnage (dt)	Running Total (dt)	Daily Variance (dt)	Reason for Significant Variances
June 25, 2019	26	27.34	27.34	0.97	
June 27, 2019	26	22.85	50.19	-3.51	
June 28, 2019	26	24.47	74.66	-1.90	
July 3, 2019	53	39.73	114.39	-13.01	Contractor provided fewer trucks than expected.
July 4, 2019	26	25.54	139.93	-0.83	
July 5, 2019	26	22.69	162.62	-3.67	
July 8, 2019	26	23.40	186.03	-2.96	
July 9, 2019	35	30.94	216.97	-4.22	
July 14, 2019	53	18.00	234.97	-34.73	Insufficient materials to haul.
July 15, 2019	53	54.19	289.16	1.46	
July 16, 2019	53	54.44	343.60	1.70	
July 17, 2019	53	55.44	399.04	2.70	
July 18, 2019	53	35.81	434.85	-16.92	Insufficient materials to haul.
July 19, 2019	53	37.66	472.51	-15.08	Insufficient materials to haul.
July 21, 2019	53	18.62	491.13	-34.12	Insufficient materials to haul.
July 22, 2019	53	74.33	565.46	21.59	Additional trucks to speed up haul.
July 23, 2019	53	54.56	620.01	1.82	
July 24, 2019	53	55.84	675.86	3.11	
July 25, 2019	53	64.45	740.30	11.71	
July 26, 2019	53	19.11	759.41	-33.62	Insufficient materials to haul.
July 28, 2019	70	18.51	777.92	-51.81	Insufficient materials to haul.
July 29, 2019	70	67.10	845.02	-3.21	
July 30, 2019	70	66.38	911.40	-3.93	
July 31, 2019	53	54.41	965.81	1.67	
August 1, 2019	53	58.87	1024.68	6.14	

Table 7 (cont'd): Documentation of daily biosolids transfers to the project site.

Date	Target Biosolids Tonnage (dt)	Actual Biosolids Tonnage (dt)	Running Total (dt)	Daily Variance (dt)	Reason for Significant Variances
August 2, 2019	53	39.10	1063.78	-13.64	Insufficient materials to haul.
August 5, 2019	53	19.18	1082.96	-33.56	Insufficient materials to haul.
August 6, 2019	53	57.27	1140.23	4.53	
August 7, 2019	53	55.86	1196.09	3.12	
August 8, 2019	53	37.65	1233.74	-15.08	Contractor provided fewer trucks than expected.
August 9, 2019	53	56.37	1290.11	3.64	
August 12, 2019	53	56.81	1346.93	4.08	
August 13, 2019	53	54.47	1401.40	1.74	
August 14, 2019	53	65.86	1467.26	13.12	Additional trucks to speed up haul.
August 15, 2019	44	47.92	1515.18	3.97	
August 20, 2019	44	48.80	1563.98	4.85	
August 21, 2019	44	29.48	1593.46	-14.47	Haul stopped due to bad weather conditions.
September 3, 2019	53	49.19	1642.65	-3.55	
September 4, 2019	53	57.30	1699.95	4.57	
September 5, 2019	70	62.85	1762.80	-7.46	
September 6, 2019	70	64.22	1827.02	-6.10	
September 9, 2019	70	72.27	1899.29	1.95	
September 10, 2019	70	63.38	1962.67	-6.93	
September 16, 2019	88	80.54	2043.21	-7.35	
September 17, 2019	88	89.49	2132.70	1.59	
September 18, 2019	88	83.79	2216.49	-4.10	
September 19, 2019	88	89.17	2305.66	1.27	
September 20, 2019	88	91.23	2396.89	3.34	
September 23, 2019	88	92.67	2489.55	4.77	
September 24, 2019	88	88.44	2578.00	0.55	
September 25, 2019	88	88.82	2666.82	0.93	
September 26, 2019	88	80.58	2747.40	-7.31	

Table 7 (cont'd): Documentation of daily biosolids transfers to the project site.

Date	Target Biosolids Tonnage (dt)	Actual Biosolids Tonnage (dt)	Running Total (dt)	Daily Variance (dt)	Reason for Significant Variances
September 27, 2019	88	88.94	2836.34	1.05	
October 1, 2019	88	89.38	3016.03	1.49	
October 2, 2019	70	70.82	3086.85	0.82	
October 3, 2019	70	70.41	3157.26	0.41	
October 4, 2019	53	51.73	3208.99	-1.00	
October 10, 2019	88	80.93	3289.92	-6.97	
October 11, 2019	88	87.18	3377.10	-0.72	
October 12, 2019	88	83.12	3460.22	-4.77	
October 15, 2019	88	43.18	3503.40	-44.71	Haul stopped due to bad weather conditions.
October 16, 2019	88	89.33	3592.73	1.43	
October 17, 2019	88	88.72	3681.46	0.83	
October 18, 2019	88	85.85	3767.31	-2.04	
October 19, 2019	88	86.61	3853.92	-1.28	
October 21, 2019	88	57.73	3911.65	-30.16	Insufficient materials to haul.
October 23, 2019	88	67.42	3979.07	-20.47	Insufficient materials to haul.
October 25, 2019	88	87.37	4066.44	-0.52	
October 26, 2019	88	70.14	4136.58	-17.76	Insufficient materials to haul.
October 28, 2019	88	78.30	4214.88	-9.59	Contractor provided fewer trucks than expected.
October 29, 2019	88	69.33	4284.22	-18.56	Contractor provided fewer trucks than expected.
October 30, 2019	88	86.10	4370.32	-1.79	
October 31, 2019	88	73.92	4444.24	-13.97	Insufficient materials to haul.
November 1, 2019	70	70.04	4514.27	0.04	
November 2, 2019	70	68.92	4583.20	-1.08	
November 4, 2019	88	87.27	4670.47	-0.62	
November 5, 2019	88	26.38	4696.85	-61.51	Haul stopped due to bad weather conditions.
November 6, 2019	88	33.51	4730.37	-54.38	Insufficient materials to haul.
November 11, 2019	88	42.70	4773.07	-45.19	Haul stopped due to bad weather conditions.

Table 7 (cont'd): Documentation of daily biosolids transfers to the project site.

Date	Target Biosolids Tonnage (dt)	Actual Biosolids Tonnage (dt)	Running Total (dt)	Daily Variance (dt)	Reason for Significant Variances
November 12, 2019	88	87.06	4860.13	-0.83	
November 13, 2019	88	69.01	4929.14	-18.88	Contractor provided fewer trucks than expected.
November 14, 2019	88	129.42	5058.56	41.53	Pre-loading started in the evening for early morning haul the next day.
November 15, 2019	88	65.63	5124.19	-22.26	Insufficient materials to haul.
November 17, 2019	44	39.76	5163.95	-4.18	
November 18, 2019	88	67.08	5231.03	-20.81	Contractor provided fewer trucks than expected.
November 19, 2019	88	85.06	5316.10	-2.83	
November 20, 2019	88	89.35	5405.45	1.35	
November 21, 2019	105	98.52	5503.97	-6.95	
November 22, 2019	105	101.80	5605.77	-3.67	
November 23, 2019	70	67.31	5673.08	-3.00	
November 25, 2019	70	67.30	5740.38	-3.02	
November 26, 2019	88	81.55	5821.93	-6.34	
November 27, 2019	70	65.65	5887.58	-4.66	
November 28, 2019	53	45.61	5933.20	-7.12	
November 29, 2019	62	56.92	5990.12	-4.60	
December 5, 2019	18	8.21	5998.33	-9.37	A truck went off the road and did not arrive on site.

APPENDIX TWO - FIGURES

Figure 1: Overview map of application areas for biosolids delivered to the Biosalix project in 2019.

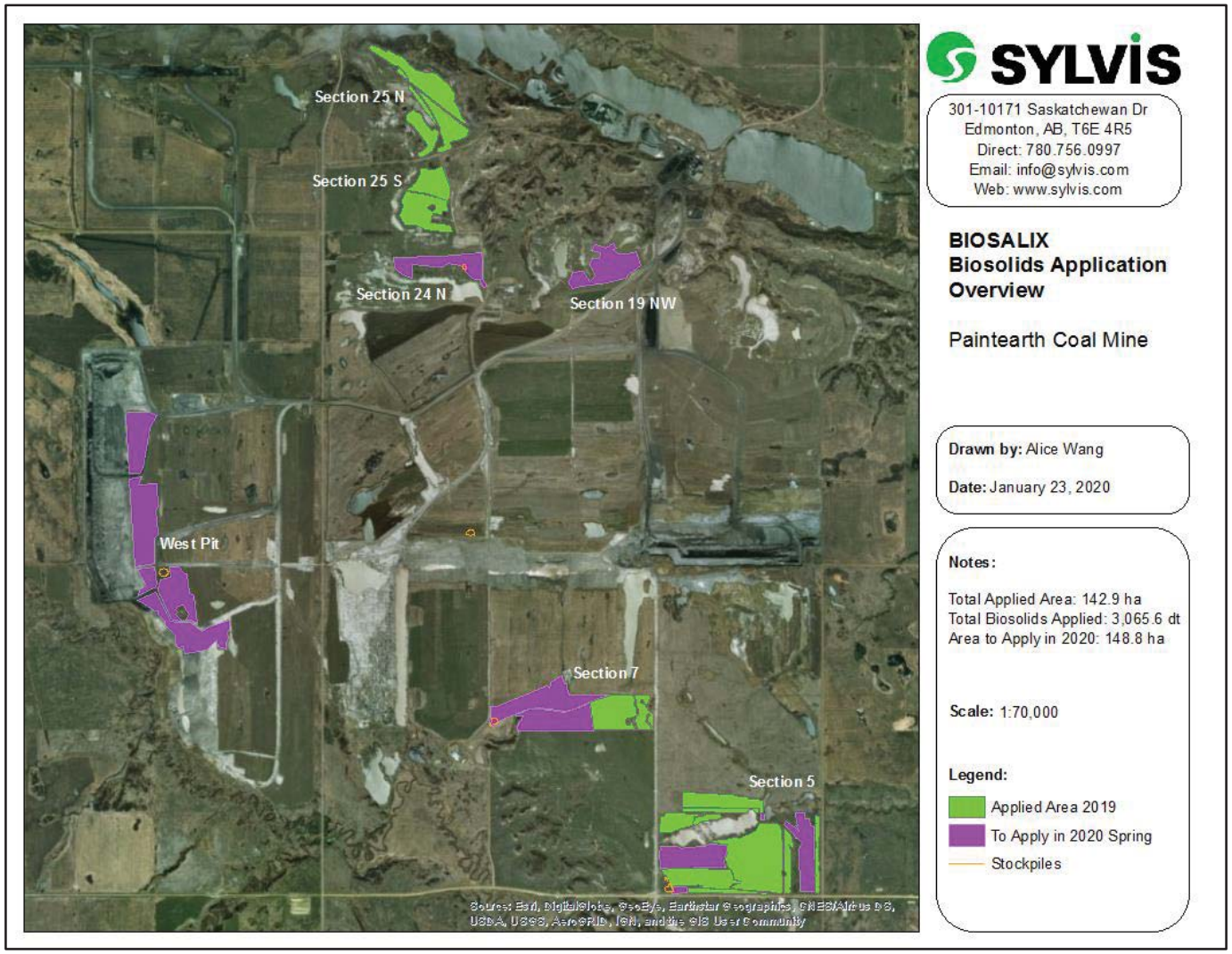


Figure 2: Biosolids application areas and vegetation by year in Site 1 of the Biosalix project.

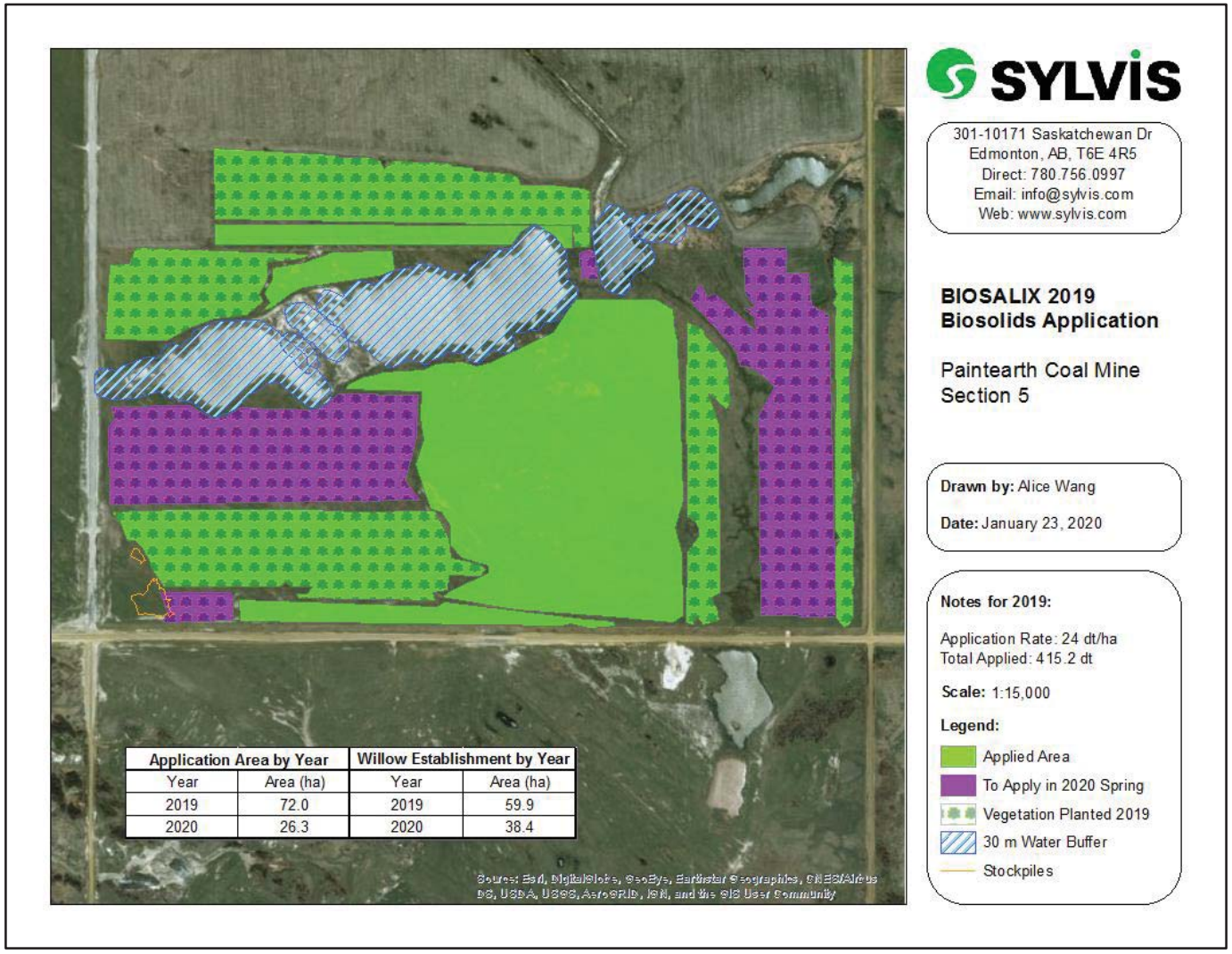


Figure 3: Biosolids application areas and vegetation by year in Site 2 of the Biosalix project.

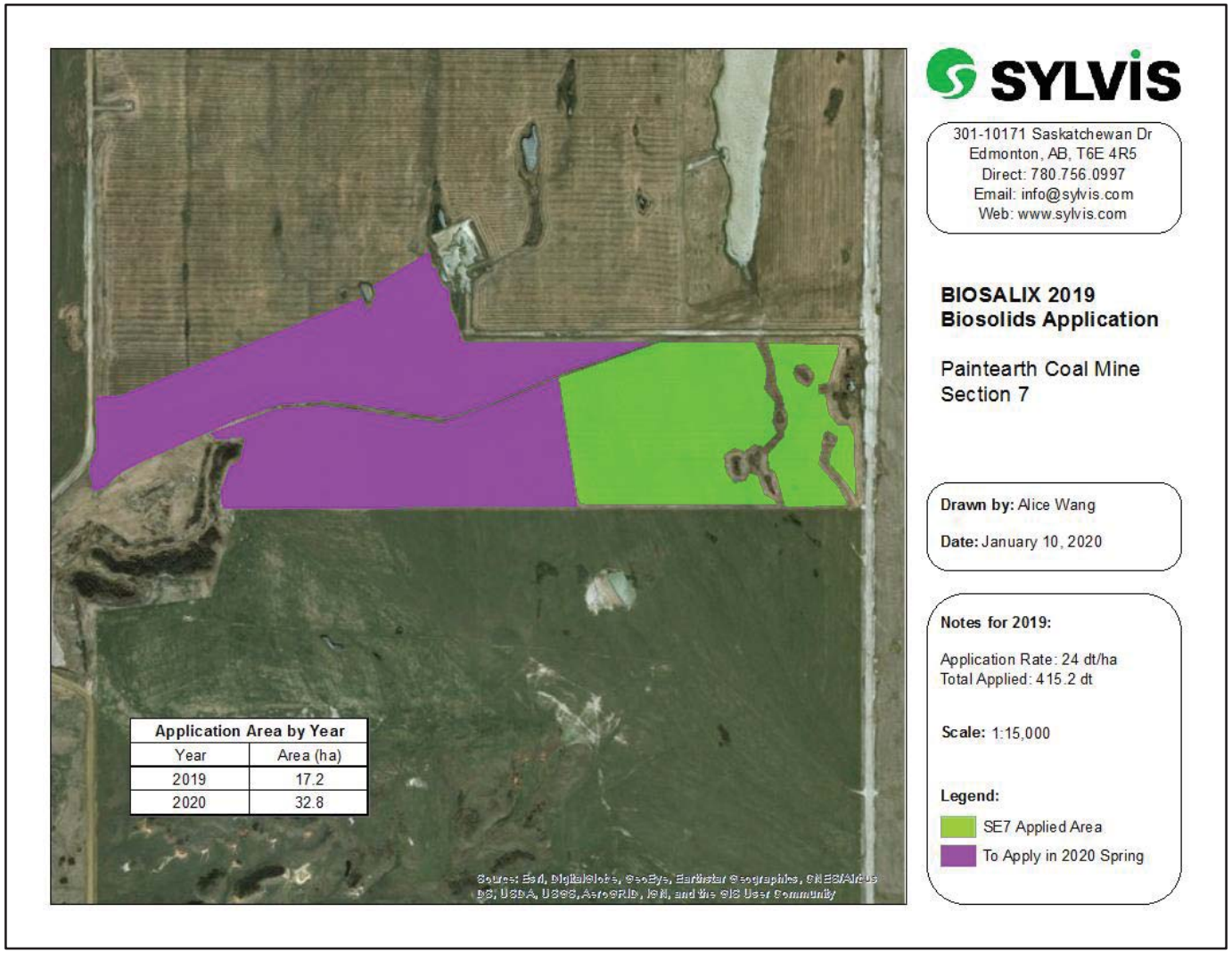


Figure 4: Biosolids application area in Site 3 of the Biosalix project.

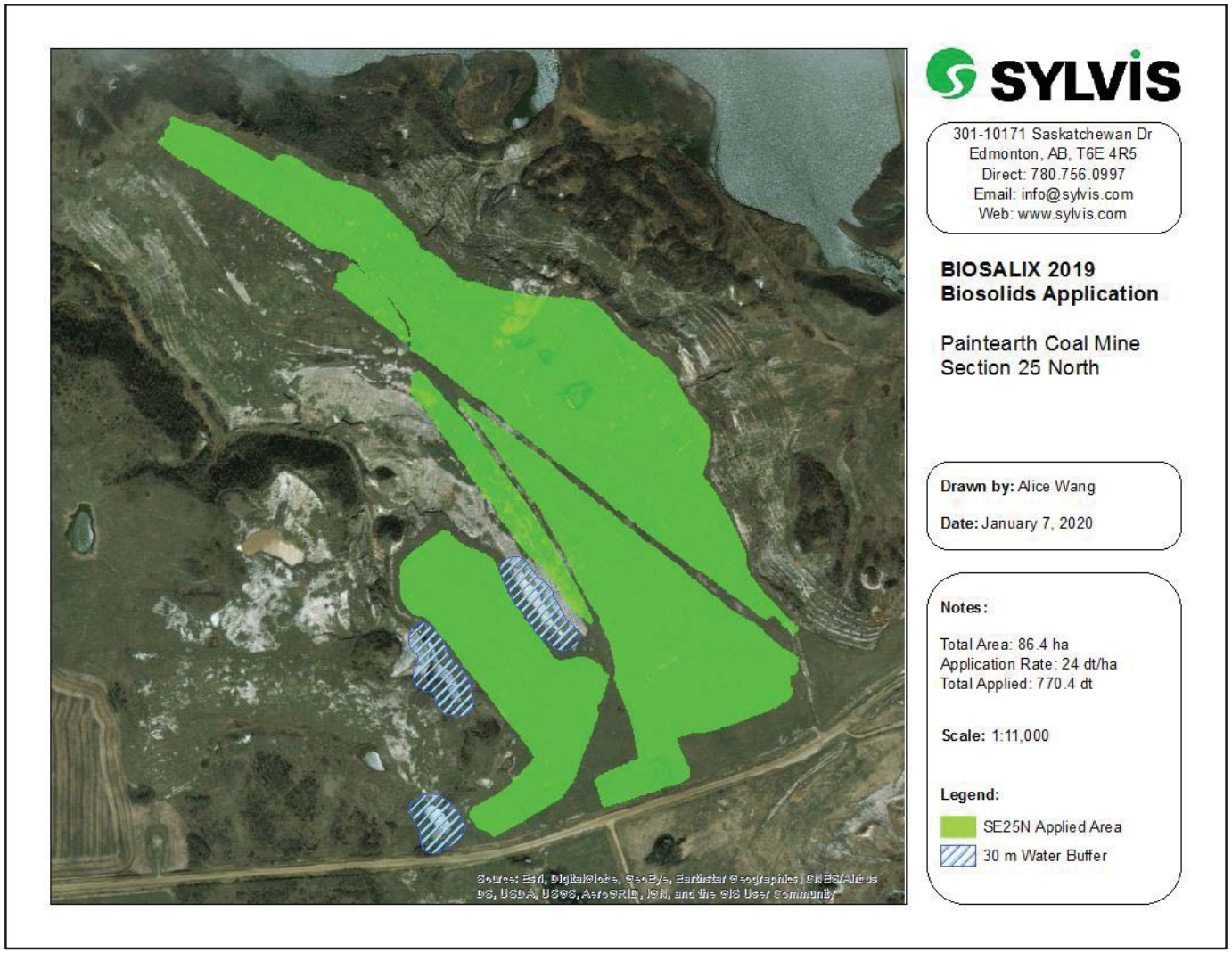
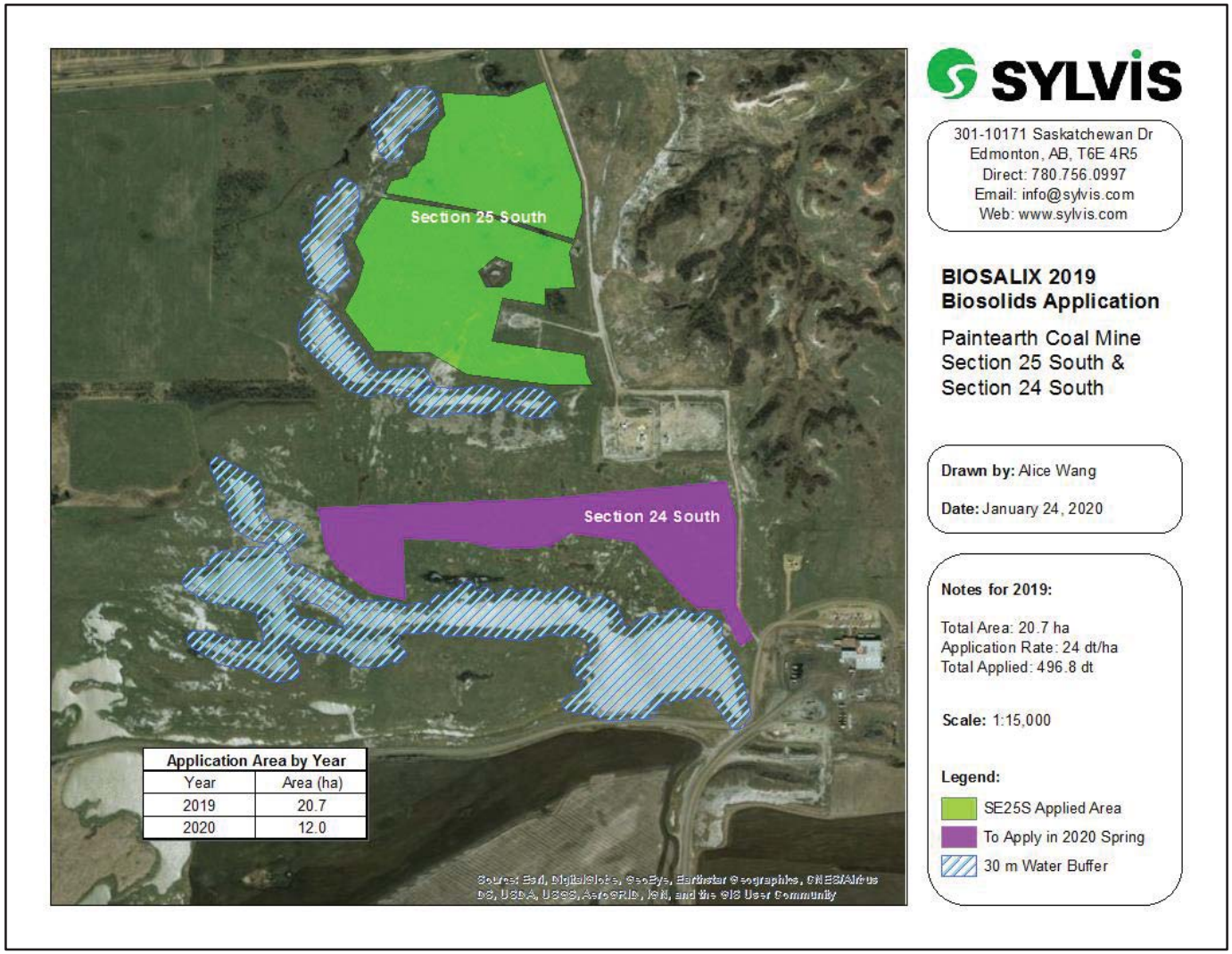


Figure 5: Biosolids application area in Site 3 of the Biosalix project.



Appendix G – Greenhouse Gas Emissions (N_2O, CH_4 and CO_2) and Barley Productivity as Affected by Land Application of Biosolids

GREENHOUSE GAS EMISSIONS (N_2O, CH_4 AND CO_2) AND BARLEY PRODUCTIVITY AS AFFECTED BY LAND APPLICATION OF BIOSOLIDS

Agricultural soils are associated with the release of 14% of global anthropogenic emissions of greenhouse gases (GHG) such as N_2O, CO_2 and CH_4 (IPCC, 2014). Biosolids are by- products from municipal wastewater treatment plants that can be managed by land applied for agricultural, forestry, and land reclamation purposes. However, GHG emissions is one of the concerns that arise from this practice. The objective of this study was to quantify the GHG emissions from a cropland fertilized using several types of biosolids: mesophilic anaerobic digested (BM), alkaline stabilized (BA) and composted biosolid (BC), under different placement application (surface and incorporation).

To determine the GHG emissions from biosolid application, 15 nutrient management treatments (including a control) were arranged in a randomized complete block design with four replications (Table 1). Urea was also used as a commercial control. Treatments with a mix of biosolid and urea in a proportion of 50%-50% were also evaluated. Aboveground biomass of barley yield was quantified at the end of the growing season in dry matter basis production.

Table 1: Treatments evaluated

Treatment	Placement	Acronym
Control	n/a	C
Urea	surface	URS
Urea	incorporation	URI
Biosolid mesophilic anaerobic digested	surface	BMS
Biosolid alkaline-stabilized	surface	BAS
Biosolid composted	surface	BCS
Biosolid mesophilic anaerobic digested	incorporation	BMI
Biosolid alkaline-stabilized	incorporation	BAI
Biosolid composted	incorporation	BCI
Biosolid mesophilic anaerobic digested + 50% urea	surface	BMURS

Treatment	Placement	Acronym
Biosolid alkaline-stabilized + 50% urea	surface	BAURS
Biosolid composted + 50% urea	surface	BCURS
Biosolid mesophilic anaerobic digested + 50% urea	incorporation	BMURI
Biosolid alkaline-stabilized + 50% urea	incorporation	BAURI
Biosolid composted + 50% urea	incorporation	BCURI

The amount of nutrient source applied was based on the rate of 96 kg-N ha^{-1}, the nitrogen content of each type of biosolid and considering 50% of N availability for the crop. Considering that the mesophilic anaerobic digested biosolid had 0.75 % of nitrogen (Total Kjeldahl Nitrogen methodology), the total amount required for that biosolid was 2116.8 kg. The Table 2 shows the quantity of this biosolid added per plot for each type of treatment.

Table 2: Addition of biosolid liquid mesophilic anaerobic digested

Type of treatment	Amount per plot[a] (kg)	Total[b] (kg)
Treatments with 100% biosolid	176.4	1411.2
Treatments with 50% biosolid-50% urea	88.2	705.6

[a] Each plot has 16 m^2

[b] Considering 8 plots for each type of treatment

Greenhouse gas fluxes measurements were done using static gas chambers method (rectangular shape). Three samples were taken at each plot at 16, 32, and 48 minutes time step sampling. Gas samples were collected through the headspace of chamber using a 20-ml syringe and translated immediately to a 12-ml glass vial previously evacuated. Additionally, six ambient samples were taken at chamber height level adjacent to the chamber. The gas samples were analyzed using a gas chromatograph to determine the concentration of nitrous oxide (N_2O), methane (CH_4) and carbon dioxide (CO_2).

Treatments were applied on June 4-5 2019 and the first gas sampling was done on June 6, 2018. Gas sampling collection continued along the growing season, being the last sampling collected prior the soil gets snow covered (October 25, 2019).

PART II: Wastewater Collection System Report