



EPCOR Water Services Inc.
Edmonton, Alberta

2022
Annual Wastewater System Report

Submitted to:
The Province of Alberta
Alberta Environment and Protected Areas (AEPA)

As per requirements of:
Approval to Operate No. 639-03-07

February 2023

Executive Summary

The following report contains two parts, Part I: Wastewater Treatment Plant and Part II: Wastewater Collection System, in order to meet the requirements of Approval to Operate No. 639-03-07.

The 2022 Annual Wastewater Treatment Plant Report is separated into an Annual Wastewater Treatment Report, an Annual Air Pollution Control System Report, an Annual Ambient Air Report, and a summary of contraventions reported, as outlined in the Approval to Operate.

The 2022 Annual Wastewater Collection System Report includes a summary of completed projects and planned major rehabilitation projects, the interconnection control strategy, and storm and CSO volumes and loadings in addition to other requirements outlined in the Approval to Operate.

Part I: Wastewater Treatment Plant Report



EPCOR Water Services Inc.
Gold Bar Wastewater Treatment Plant
Edmonton, Alberta

2022
Annual Wastewater Treatment Plant Report

Submitted to:
The Province of Alberta
Alberta Environment and Protected Areas (AEPA)

As per requirements of:
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February 2023

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Acronyms

ACRWC	Alberta Capital Region Wastewater Commission
AEPA	Alberta Environment and Protected Areas
CALA	Canadian Association for Laboratory Accreditation
CBBRF	Clover Bar Biosolids Recycling Facility
CBOD	Carbonaceous Biological Oxygen Demand
CSO	Combined Sewer Overflow
EPE	Enhanced Primary Effluent
EPEPS	Enhanced Primary Effluent Pumping Station
EPT	Enhanced Primary Treatment
FE	Final Effluent
FEC	Final Effluent Combined
GBWWTP	Gold Bar Wastewater Treatment Plant
H ₂ S	Hydrogen Sulfide
HSE	Health, Safety, and Environment
ISO	International Organization for Standardization
ML	Megalitres
MLD	Megalitres per Day
MLSS	Mixed Liquor Suspended Solids
NH ₃ -N	Ammonia-Nitrogen
NSR	North Saskatchewan River
ORP	Oxidation-Reduction Potential
PE	Primary Effluent
SOP	Standard Operating Procedure
TKN	Total Kjeldahl Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
UV	Ultraviolet
WELP	Wastewater Effluent Limit Performance
WWT	Wastewater Treatment
WWTP	Wastewater Treatment Plant

2022 Overview

The Gold Bar Wastewater Treatment Plant (WWTP) located on the banks of the North Saskatchewan River in Edmonton, Alberta maintains the ISO 14001:2015 (Environmental Management System) and the ISO 45001:2018 (Occupational Health and Safety Management System) certificates for its Integrated Management System.

Notable events in 2022 include completion of the Ambient Air Quality Monitoring Station, Diversion Structure structural rehabilitation, Secondary 3 structural and mechanical rehabilitation, the Plant Wide Monitoring System, and UV transformer. There was also ongoing construction of Secondary 2 inDENSE, Scrubber 5 and 6, Maintenance Hygiene Facility, and Operations Centre.

The true dry weather flow in 2022 was 266 MLD. 2022 hosted a larger number of significant wet weather events (14) compared to the previous year (6) which resulted in an increased number of secondary bypasses (63). The plant performed very well with a Wastewater Effluent Limit Performance (WELP) index of 16.7%.

2022 Annual Wastewater Treatment Report

Gold Bar WWTP Performance

The Gold Bar WWTP final effluent discharge limits of Approval to Operate 639-03-07 are listed in Table 1 and the monitoring requirements are outlined in Table 2.

Table 1: Limits for Treated Wastewater (Approval to Operate Table 5-1)

Parameter	Limit
CBOD ₅	≤ 20 mg/L monthly arithmetic mean of daily composite samples
TSS	≤ 20 mg/L monthly arithmetic mean of daily composite samples
Total Phosphorus	≤ 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 mg/L monthly arithmetic mean of daily composite samples
<i>E. Coli</i>	≤ 126 per 100 mL/monthly geometric mean
pH	6.5-8.5

Table 2: Monitoring - Wastewater System (Approval to Operate Table 6-1)

Parameter	Frequency (Minimum)	Sample Type	Sampling Location
UNTREATED WASTEWATER			
pH BOD ₅ TSS Total Phosphorus Total Ammonia-nitrogen	Once per day	Composite	Untreated wastewater entering the wastewater treatment plant
Volume of Flow	Continuous, recorded daily	Calculated	Untreated wastewater entering the wastewater treatment plant
TREATED WASTEWATER			
pH BOD ₅ TSS Total Phosphorus Total Ammonia-nitrogen	Once per day	Composite	Wastewater treated plant effluent prior to release to the North Saskatchewan River
<i>E. Coli</i>	Once per day	Grab	After ultraviolet (UV) disinfection
Acute Toxicity	Monthly	Grab	Wastewater treatment plant effluent prior to release to the North Saskatchewan River
Chronic Toxicity	Quarterly	Grab	Wastewater treatment plant effluent prior to release to the North Saskatchewan River
Volume	Continuous, recorded daily	Calculated	Wastewater treatment plant effluent prior to release to the North Saskatchewan River
Volume	Continuous, recorded daily	Calculated	Reuse water transmission main

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WASTEWATER TREATMENT PLANT BYPASS			
Release Volume	Continuous during bypass event, recorded daily	Calculated	Primary and secondary treatment bypass of wastewater at the wastewater treatment plant
pH BOD ₅ TSS Total Phosphorus Total Ammonia-nitrogen	Any bypass event lasting > 2 hours	Composite	
<i>E. Coli</i>	Any bypass event lasting > 2 hours	Grab	
SLUDGE DISPOSAL			
Sludge Volume	Total volume	Estimated	Prior to leaving the wastewater treatment plant
Sludge Mass	Total mass	Estimated	Amount of sludge being disposed of as per the <i>Biosolids Management Plan</i>
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 BOD ₅ TSS Total Phosphorus Total Ammonia-nitrogen <i>E. Coli</i>	Each discharge event	Composite	Rat Creek CSO outfall
		Grab	Unauthorized release point
The amount of any substance other than wastewater or storm water that is spilled or discharged accidentally or intentionally into the wastewater collection system	Each event	Estimated volume or mass	Unauthorized release point

Table 3 summarizes the monthly minimum, mean, and maximum values for parameters in Table 1 from January 1 to December 31, 2022. All analytical data in the table were developed on 24-hour composite samples collected using autosamplers at the sampling location specified in Table 2. The discrete samples for *Escherichia coli* (*E. coli*) determinations were collected at random times each day. Appendix A contains the monthly Plant Performance Reports.

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Table 3: 2022 Gold Bar WWTP Performance

Month		Flows (ML)					pH				TSS (mg/L)				BOD ₅ (mg/L)				CBOD ₅ (mg/L)				TP (mg PL)				NH ₃ (mg NL)				TKN (mg NL)				NO ₃ +NO ₂ (mg NL)				Chloride (mg/L)				E. coli Counts/100 mL				Total Digested Sludge (ML)						
		Raw	Outfall 30	MPW	Outfall 20	EPEPS	Outfall 10		Raw	Outfall 30	Outfall 20	Outfall 10	Raw	Outfall 30	Outfall 20	EPEPS	Outfall 10		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											
							FEC	FE									FEC	FE					FEC	FE					FEC	FE					FEC				X10 ⁶	X10 ⁶	X10 ⁶	FEC											
January	Avg/Geomean	258.4	3.4	11.4	0.0	0.0	243.6	243.6	7.4	7.4	7.6	297	122	---	---	4.8	4.8	320	174	---	---	3	3	7.84	5.31	---	---	0.31	0.31	39.1	34.4	---	---	3.35	3.35	59.6	44.3	---	---	5.32	< 0.01	0.05	---	6.10	156	476	---	---	163	2.1	2.5	---	4
	Min	240.6	0.0	10.7	0.0	0.0	229.6	229.6	7.3	7.4	7.4	224	76	---	---	2.9	2.9	274	146	---	---	2	2	5.78	3.86	---	---	0.20	0.20	25.4	26.3	---	---	2.00	2.00	43.4	34.3	---	---	3.40	< 0.01	< 0.01	---	4.20	67.3	312	---	---	76.2	1.8	2.0	---	1
	Max	311.2	66.9	12.3	0.0	0.0	281.5	281.5	7.6	7.6	7.8	384	192	---	---	7.6	7.6	389	194	---	---	5	5	12.6	6.48	---	---	0.49	0.49	49.5	40.4	---	---	5.63	5.63	89.2	53.4	---	---	7.90	0.01	0.18	---	11.0	411	705	---	---	353	2.4	2.9	---	10
February	Avg/Geomean	269.9	13.1	11.5	0.0	0.0	245.4	245.4	7.4	7.5	---	320	83	---	---	3.5	3.5	305	132	---	---	2	2	7.62	3.90	---	---	0.23	0.23	39.2	32.3	---	---	3.89	3.89	58.6	41.8	---	---	5.49	0.02	0.13	---	9.74	173	381	---	---	163	2.1	1.4	---	2
	Min	245.2	0.0	9.8	0.0	0.0	231.7	231.7	7.3	7.2	---	164	46	---	---	2.6	2.6	185	105	---	---	< 2	2	4.93	2.27	---	---	0.18	0.18	22.7	23.3	---	---	1.86	1.86	34.8	29.9	---	---	3.30	< 0.01	0.01	---	5.80	86.8	180	---	---	94.9	1.7	0.7	---	1
	Max	515.7	212.9	12.5	0.0	0.0	290.3	290.3	7.5	8.0	---	536	128	---	---	5.1	5.1	394	164	---	---	4	4	9.89	6.04	---	---	0.30	0.30	45.5	43.8	---	---	7.78	7.78	69.1	57.6	---	---	9.70	0.04	0.26	---	11.5	417	698	---	---	334	2.5	3.7	---	11
March	Avg/Geomean	310.8	43.0	11.6	0.0	0.0	256.1	256.1	7.3	7.4	---	325	80	---	---	4.6	4.6	280	99	---	---	3	3	6.39	4.42	---	---	0.26	0.26	31.8	29.5	---	---	2.65	2.65	49.5	37.8	---	---	4.18	0.01	0.64	---	10.45	148	210	---	---	155	1.6	1.2	---	3
	Min	240.6	0.0	10.8	0.0	0.0	228.1	228.1	7.2	7.3	---	71	54	---	---	2.0	2.0	156	46	---	---	< 2	2	4.31	3.14	---	---	0.14	0.14	22.7	20.5	---	---	1.05	1.05	36.3	28.5	---	---	2.10	< 0.01	0.01	---	7.53	96.0	124	---	---	110	1.1	0.1	---	1
	Max	453.2	152.7	13.3	0.0	0.0	293.6	293.6	7.5	7.6	---	536	102	---	---	10.9	10.9	561	139	---	---	5	5	9.42	5.90	---	---	0.48	0.48	42.1	35.8	---	---	4.39	4.39	83.7	45.9	---	---	6.60	0.02	2.68	---	12.7	290	443	---	---	240	2.3	1.8	---	7
April	Avg/Geomean	282.3	9.5	10.4	0.0	0.0	262.4	262.4	7.4	7.4	---	371	151	---	---	5.2	5.2	309	95	---	---	3	3	7.18	3.92	---	---	0.29	0.29	35.1	27.5	---	---	3.36	3.36	57.1	39.7	---	---	5.29	0.02	0.91	---	7.85	93	124	---	---	100	1.3	1.2	---	3
	Min	251.0	0.0	8.5	0.0	0.0	241.9	241.9	7.2	7.3	---	186	93	---	---	2.7	2.7	116	59	---	---	< 2	2	2.64	2.23	---	---	0.16	0.16	16.5	20.8	---	---	0.83	0.83	19.6	27.5	---	---	2.30	< 0.01	0.15	---	4.55	73.5	88.6	---	---	48.3	1.2	0.9	---	1
	Max	516.7	182.6	12.5	0.0	0.0	324.3	324.3	7.5	7.4	---	520	234	---	---	11.1	11.1	391	114	---	---	5	5	19.3	5.24	---	---	0.54	0.54	40.2	31.0	---	---	5.64	5.64	126	47.6	---	---	8.00	0.02	1.83	---	12.1	154	144	---	---	139	1.4	2.3	---	14
May	Avg/Geomean	277.3	9.1	10.4	0.0	0.0	257.8	257.8	7.5	7.6	---	419	120	---	---	3.4	3.4	313	112	---	---	3	3	7.00	2.65	---	---	0.25	0.25	32.9	28.5	---	---	1.36	1.36	58.7	34.2	---	---	3.28	< 0.01	0.79	---	9.35	85.8	84.3	---	---	95.5	2.2	0.7	---	3
	Min	254.1	0.0	8.3	0.0	0.0	242.6	242.6	7.4	7.4	---	332	26	---	---	2.6	2.6	211	44	---	---	< 2	2	5.90	0.68	---	---	0.20	0.20	16.1	19.3	---	---	0.32	0.32	42.7	6.6	---	---	2.20	< 0.01	0.22	---	6.19	62.0	66.3	---	---	79.4	2.0	0.3	---	1
	Max	421.0	127.1	11.7	0.0	0.0	292.8	292.8	7.7	7.8	---	736	262	---	---	4.2	4.2	406	188	---	---	3	3	8.24	4.62	---	---	0.76	0.76	40.0	44.9	---	---	2.85	2.85	70.9	59.4	---	---	5.20	< 0.01	2.24	---	11.8	98.0	116	---	---	105	2.4	2.3	---	8
June	Avg/Geomean	384.7	81.9	11.8	0.0	0.0	291.0	291.0	7.5	7.6	---	331	74	---	---	3.6	3.6	246	84	---	---	2	2	5.28	2.91	---	---	0.20	0.20	26.8	24.4	---	---	0.50	0.50	45.6	33.5	---	---	2.02	0.03	0.90	---	8.77	77.3	78.1	---	---	88.9	1.0	1.0	---	3
	Min	257.0	0.0	10.2	0.0	0.0	245.3	245.3	7.4	7.4	---	212	48	---	---	2.2	2.2	91	39	---	---	< 2	2	2.05	1.09	---	---	0.13	0.13	9.21	11.7	---	---	< 0.03	0.03	16.7	19.3	---	---	1.10	< 0.01	0.02	---	3.53	33.7	53.9	---	---	51.9	0.5	0.2	---	< 1
	Max	943.1	606.9	12.7	0.0	0.0	337.9	337.9	7.7	7.8	---	592	134	---	---	8.8	8.8	338	157	---	---	6	6	6.88	5.33	---	---	0.49	0.49	40.6	39.8	---	---	1.51	1.51	59.7	52.5	---	---	3.10	0.08	3.98	---	11.4	94.6	110	---	---	103	2.2	2.6	---	12
July	Avg/Geomean	327.6	26.4	10.6	0.0	0.0	290.6	290.6	7.6	7.6	---	337	70	---	---	2.8	2.8	253	76	---	---	2	2	5.60	2.82	---	---	0.19	0.19	25.8	24.5	---	---	0.40	0.40	46.6	32.4	---	---	1.92	< 0.01	0.51	---	8.50	85.5	78.2	---	---	94.3	1.8	0.9	---	4
	Min	265.4	0.0	9.3	0.0	0.0	254.6	254.6	7.3	7.3	---	226	38	---	---	1.5	1.5	148	44	---	---	< 2	2	2.80	1.46	---	---	0.06	0.06	11.7	15.8	---	---	0.11	0.11	27.3	21.5	---	---	1.40	< 0.01	0.25	---	5.93	44.8	54.8	---	---	71.0	1.4	0.4	---	1
	Max	709.2	358.3	11.3	0.0	0.0	347.8	347.8	7.8	7.7	---	568	109	---	---	5.4	5.4	335	140	---	---	3	3	7.48	5.48	---	---	0.70	0.70	50.3	40.6	---	---	1.60	1.60	59.1	52.5	---	---	3.80	< 0.01	1.00	---	9.91	102	104	---	---	109	2.2	1.6	---	16
August	Avg/Geomean	281.1	5.2	11.2	0.0	0.0	264.7	264.7	7.6	7.5	---	328	54	---	---	3.6	3.6	287	79	---	---	2	2	6.52	3.04	---	---	0.22	0.22	29.3	23.5	---	---	0.50	0.50	49.4	32.3	---	---	1.95	< 0.01	0.49	---	9.35	83.8	72.6	---	---	89.4	3.9	1.4	---	6
	Min	261.0	0.0	10.3	0.0	0.0	249.7	249.7	7.3	7.3	---	238	33	---	---	1.8	1.8	157	48	---	---	< 2	2	4.23	1.72	---	---	0.10	0.10	9.8	9.05	---	---	0.12	0.12	28.7	19.2	---	---	1.00	< 0.01	0.03	---	7.10	37.5	52.5	---	---	71.8	3.2	0.9	---	1
	Max	481.2	139.3	12.0	0.3	0.0	331.3	331.3	7.8	7.7	---	440	81	---	---	11.3	11.3	348	130	---	---	3	3	7.87	5.08	---	---	0.41	0.41	35.7	39.3	---	---	1.94	1.94	57.4	50.3	---	---	4.00	< 0.01	0.96	---	11.1	104	97.9	---	---	97.0	4.8	2.2	---	22
September	Avg/Geomean	287.0	3.5	11.5	0.0	0.0	252.0	252.0	7.6	7.6	---	379	82	---	---	4.6	4.6	295	119	---	---	3	3	7.51	4.30	---	---	0.40	0.40	30.7	19.8	---	---	1.42	1.42	51.4	36.7	---	---	3.14	< 0.01	0.86	---	10.90	79.1	71.4	---	---	83.7	3.5	1.4	---	4
	Min	259.9	0.0	11.1	0.0	0.0	239.3	239.3	7.3	7.4	---	267	52	---	---	3.3	3.3	216	22	---	---	2	2	6.18	2.12	---	---	0.28	0.28	21.6	1.95	---	---	0.26	0.26	45.4	22.6	---	---	2.00	< 0.01	0.10	---	7.55	62.1	49.9	---	---	63.0	2.7	0.2	---	1
	Max	330.0	67.9	12.3	0.0	0.0	282.7	282.7	7.7	7.8	---	893	135	---	---	6.0	6.0	403	197	---	---	4	4	8.96	5.48	---	---	1.00	1.00	34.3	29.3	---	---	5.95	5.95	57.9	49.1	---	---	8.00	< 0.01	1.66	---	15.0	92.6	102	---	---	98.8	4.5	3.4	---	13
October	Avg/Geomean	261.0	0.0	10.0	0.0	0.0	251.0	251.0	7.5	---	---	323	---	---	---	3.9	3.9	303	---	---	---	3	3	7.52	---	---	---	0.30	0.30	39.2	---	---	---	0.93	0.93	56.9	---	---	---	2.46	&												

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Table 4 summarizes the reclaimed water quality sample data from January 1 to December 31, 2022. All parameters except *E. coli* were developed on daily 24-hour composite samples of the reclaimed water. The *E. coli* testing was conducted on discrete samples collected on a daily basis.

Table 4: 2022 Reclaimed Water Quality

Month		Flow (ML)	Total Alkalinity (mg CaCO ₃ /L)	Ammonia (mg N/L)	Biochemical Oxygen Demand (mg/L)	Chemical Oxygen Demand (mg/L)	Chloride (mg Cl/L)	Conductivity (mS/cm)	<i>E. coli</i> (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	11.4	170	1.68	<2	32	163	1117	<1	8.0	<1.0	9.0	0.10	636	0.20
	Min	10.7	156	0.21	<2	20	78.6	844	<1	7.9	<1.0	7.2	0.07	497	0.12
	Max	12.3	179	4.24	<2	46	355	1,660	<1	8.1	<1.0	10.0	0.14	915	0.32
February	Avg	11.5	155	0.99	<2	26	167	1,092	<1	7.9	<1.0	8.4	0.10	629	0.16
	Min	9.8	150	0.10	<2	20	97.9	874	<1	7.7	<1.0	6.9	0.07	513	0.12
	Max	12.5	164	3.38	<2	32	328	1,550	<1	8.0	<1.0	9.3	0.14	864	0.28
March	Avg	11.6	139	0.33	<2	27	157	1,058	<1	7.7	<1.0	8.5	8.51	616	0.15
	Min	10.8	120	0.07	<2	20	114.0	885	<1	7.5	<1.0	7.7	7.70	519	0.11
	Max	13.3	154	1.01	<2	36	247	1,340	<1	8.0	<1.0	9.4	9.40	761	0.20
April	Avg	10.4	142	0.45	<2	27	105.1	968	<1	7.9	<1.0	9.5	0.09	599	0.24
	Min	8.5	136	0.05	<2	20	87.3	872	<1	7.8	<1.0	8.2	0.04	554	0.16
	Max	12.5	151	1.60	<2	36	140	1,040	<1	8.1	<1.0	13.4	0.15	643	0.35
May	Avg	10.4	179	0.59	<2	32	98.1	1,019	<1	8.0	<1.0	10.0	0.09	633	0.34
	Min	8.3	174	0.10	<2	22	85.5	865	<1	7.8	<1.0	9.1	0.06	534	0.23
	Max	11.7	188	1.51	<2	43	109.0	1,090	<1	8.1	<1.0	11.0	0.13	675	0.44
June	Avg	11.8	168	0.30	<2	31	91.2	1,065	<1	8.0	<1.0	9.9	0.07	679	0.36
	Min	10.2	117	0.03	<2	21	53.6	679	<1	7.9	<1.0	7.4	0.04	407	0.21
	Max	12.7	225	1.90	<2	47	103.0	1,250	<1	8.9	<1.0	11.7	0.12	850	0.46
July	Avg	10.6	177	0.09	<2	27	96.0	1,138	<1	8.0	1	10.0	0.08	737	0.24
	Min	9.3	165	0.05	<2	20	70.6	984	<1	7.9	<1.0	8.6	0.03	627	0.13
	Max	11.3	194	0.22	<2	36	110.0	1,260	<1	8.2	1.6	12.4	0.11	854	0.63
August	Avg	11.2	178	0.15	<2	28	92.9	954	<1	8.0	<1.0	9.1	0.09	596	0.22
	Min	10.3	152	0.04	<2	20	70.0	820	<1	7.8	<1.0	8.5	0.05	498	0.11
	Max	12.0	199	1.30	<2	45	102.0	1,040	<1	8.1	<1.0	10.3	0.16	691	0.34
September	Avg	11.5	136	0.23	<2	27	87.4	889	<1	8.0	<1.0	9.1	0.19	544	0.18
	Min	11.1	130	0.05	<2	21	62.5	794	<1	7.9	<1.0	8.5	0.09	490	0.13
	Max	12.3	141	3.38	<2	36	100.0	977	<1	8.0	<1.0	10.0	1.34	612	0.28
October	Avg	10.0	136	0.11	<2	27	85.3	857	<1	7.9	<1.0	8.9	0.14	526	0.21
	Min	6.0	129	0.05	<2	21	77.1	809	<1	7.8	<1.0	7.8	0.10	494	0.12
	Max	12.5	143	0.31	4	34	93	901	<1	8.0	<1.0	10.0	0.63	554	0.33
November	Avg	12.4	143	0.24	<2	26	116	959	<1	8.0	<1.0	8.6	0.10	561	0.20
	Min	10.5	134	0.03	<2	20	86.8	842	<1	7.9	<1.0	7.6	0.08	523	0.14
	Max	13.9	160	1.31	4	35	187	1,200	<1	8.1	1.4	9.8	0.13	685	0.30
December	Avg	12.0	145	0.67	<2	28	117	945	<1	7.9	<1.0	8.6	0.10	564	0.17
	Min	11.0	143	0.07	<2	20	87.4	822	<1	7.8	<1.0	8.1	0.06	475	0.13
	Max	12.7	146	3.10	<2	41	180	1,180	<1	8.0	<1.0	9.1	0.13	697	0.30
Annual Summary	Avg	11.2	156	0.49	<2	28	115	1005	<1	7.9	<1	9.1	0.81	610	0.22
	Min	6.0	117	0.03	<2	20	54	679	<1	7.5	<1	6.9	0.03	407	0.11
	Max	13.9	225	4.24	4	47	355	1660	<1	8.9	2	13.4	9.40	915	0.63

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

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Table 5 summarizes the effluent chronic and acute toxicity testing. 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 were observed in 2022.

Table 5: 2022 Effluent Toxicity

Dates	Quarter	Microtox	Daphnia Magna	Rainbow Trout	Ceriodaphnia Dubia	Fathead Minnows	Pseudokirchneriella				
		% of Control	LC ₅₀ (% vol/vol) ¹	LC ₅₀ (% vol/vol)	LC ₅₀ (% vol/vol)	LC ₅₀ (% vol/vol)	IC ₂₅ (% vol/vol) ²	NOEL(%) ³	LOEL(%) ⁴	TOEL (%) ⁵	Toxic Units(TU) ⁶
1/19/2022	1	>82	>100	>100	---	---	---	---	---	---	---
2/9/2022		>82	>100	>100	>100	>100*	>90.91	1.42	2.841	2.009	70.42
3/10/2022		>82	>100	>100	---	---	---	---	---	---	---
4/7/2022	2	>82	>100	>100	---	---	---	---	---	---	---
5/10/2022		>82	>100	>100	>100	>100	>90.91	1.42	2.841	2.009	70.4
6/8/2022		>82	>100	>100	---	---	---	---	---	---	---
7/7/2022	3	>82	>100	>100	---	---	---	---	---	---	---
8/10/2022		>82	>100	>100	>100	>100	>90.90	<1.42	1.42	NR	70.4
9/8/2022		>82	>100	>100	---	---	---	---	---	---	---
10/13/2022	4	>82	>100	>100	---	---	---	---	---	---	---
11/2/2022		>82	>100	>100	>100	>100	>90.90	<1.42	1.42	NR	>70.4
12/8/2022		>82	>100	>100	---	---	---	---	---	---	---

*sampled on 2022/02/28

NR = no result

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

Table 6 summarizes the proficiency testing of the Gold Bar WWTP Laboratory. It includes the Laboratory z-scores achieved from analyzing proficiency testing (PT) samples for constituents required by the Approval to Operate. The 2022 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.

Table 6: 2022 Summary of Gold Bar Wastewater Proficiency Testing

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
PTC	Mar-22	87	0.85	98	0.00	97	-0.06	96	0.29	98	0.14	98	0.10	96	-0.22
PTC	Oct-22	95	-0.10	94	-0.48	93	-0.41	93	0.47	91	0.60	96	0.01	94	-0.11

pH by manual meter; NH3-N by AA3; TP by AA3, E.coli by MF

In 2022, a total of 105,095 million litres (ML) of wastewater was conveyed to the plant. Secondary treatment and UV disinfection was provided to 95,076 ML (90.5%) of the total raw influent flow with 4,103 ML (3.9%) of reclaimed water provided to industrial customers.

Assessment of Annual Monitoring Results

The Gold Bar WWTP Effluent Limit Performance (WELP) index for 2022 was 16.7% (Figure 1). The 2022 index was lower than the five-year average of 21.3% due to having more process tanks/equipment available than in previous years and good performance of Ostara Nutrient Recovery Facility for supernatant treatment. Figure 2 shows the annual WELP from 2005 to 2022, including the five-year average.

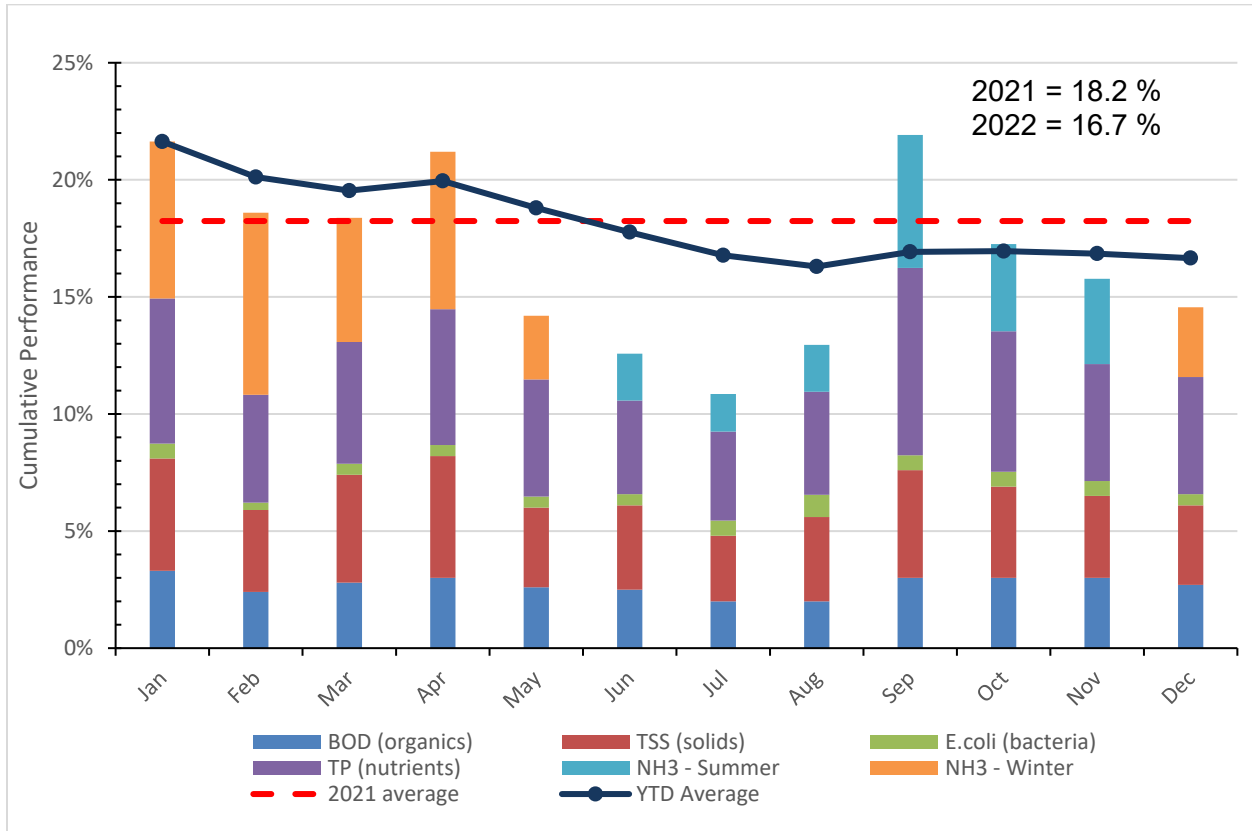


Figure 1: 2022 Monthly Gold Bar WWTP Wastewater Effluent Limit Performance (WELP) Index

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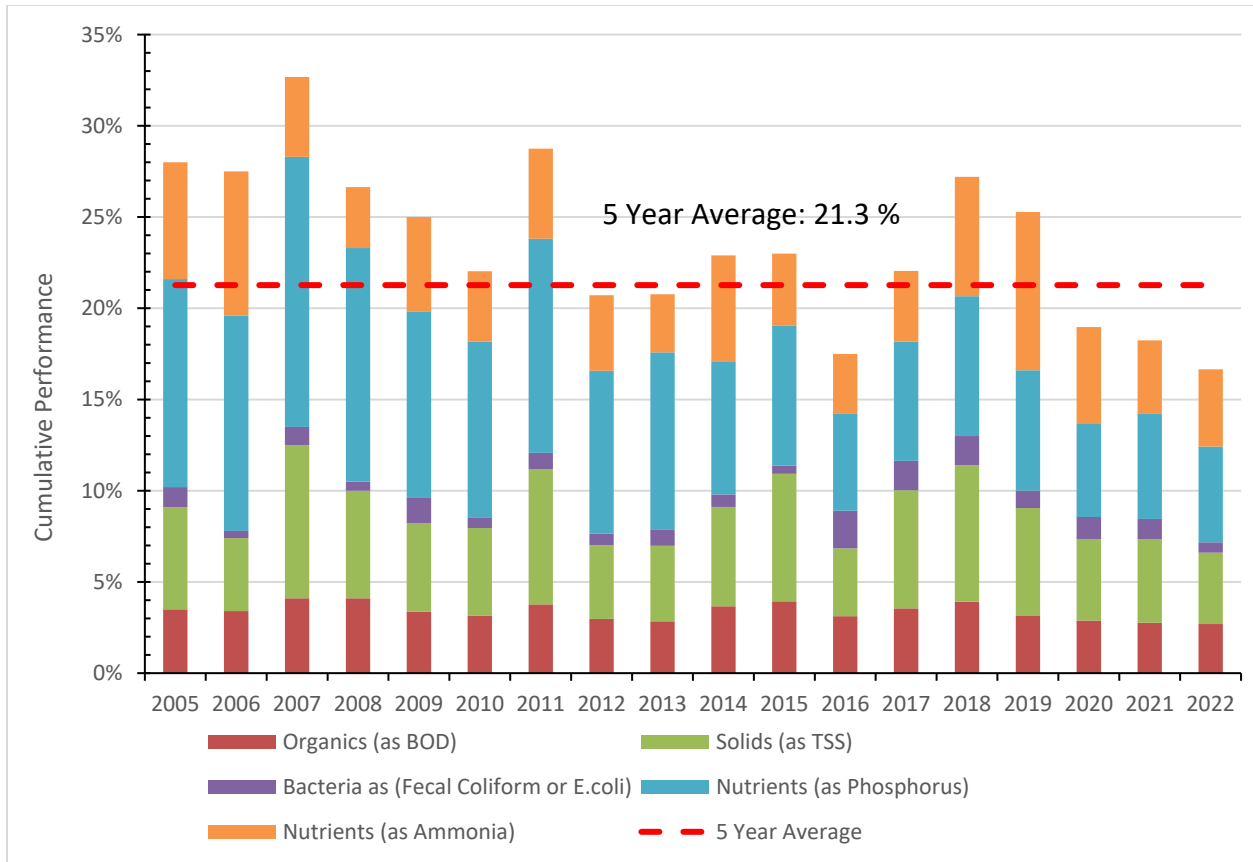


Figure 2: Gold Bar WWTP Wastewater Effluent Limit Performance (WELP Index) 2005-2022

For 2022, all of the monthly limits for Approval to Operate discharge parameters (Table 1) were met.

Chemicals Added to the Wastewater Treatment Process

As per Section 6 of the Operations Plan, the following chemicals are used in the wastewater treatment process:

- Secondary Alum
- EPT Alum
- EPT Polymer
- DAF Polymer
- Membrane Bleach
- Ostara Magnesium Chloride
- Ostara Caustic

Daily and monthly consumption of these chemicals is summarized in Appendix B.

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Names of Supervising Operators

Table 7 lists all certified wastewater treatment operators, their level of certification, and their positions at Gold Bar WWTP as of December 2022. Supervising operators are also listed in the Operations Monthly Summaries in Appendix C.

Table 7: List of Certified Wastewater Treatment Operators (as of December 2022)

Name	Title	WWT Certification Level
Grossell, Ken M	Manager, Operations	IV
Schneider, Brian P	WWTP Operator Foreman	IV
Jones, Kira I	WWTP HEI Coordinator	IV
Kwan, Tom	WWTP Operator Foreman	IV
Espinosa, Diego F	WWTP Operator Foreman	IV
Lekamwasam, Janaka	WWTP Operator Foreman	IV
Nunes, Michael	WWTP Operator Foreman	IV
Penner, Jody	WWTP Lead Operator	IV
Sanche, Dagny	WWTP Training Coordinator	IV
Sandouga, Sam	WWTP Lead Operator	IV
Baker, Cole	WWTP Operator Foreman	IV
Nieuwenhuis, Andrew	WWTP Lead Operator	IV
Kelly, Adam	WWTP Operator	IV
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 Foreman	III
Holden, Derek	WWTP Operator	III
Jordan, Bradley	WWTP Lead Operator	III
Vogelgesang, Ryan	WWTP Operator	III
Diletzoy, Kyle	WWTP Lead Operator	III
Rees, Emma	WWTP Operator	III
Downey, Anthony	WWTP Operator	III
Paglicauan, Jermine	WWTP Operator	III
Omeragic, Armen	WWTP Operator	III
Ozimko, Michael	WWTP Operator	II
Price, Jeremy	WWTP Operator	II
Furber, Brandyn	WWTP Operator	I
Cassell, Blake	WWTP Operator	I

Uncommitted Hydraulic Reserve Capacity

In 2022, Gold Bar WWTP received a total dry weather volume of 99,179 ML. This volume is the sum total of Outfall 10 effluent (95,076 ML) and membrane reclaimed water (4,103 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 secondary bypass events.

The average dry weather flow in 2022 was 272 million litres per day (MLD). However, the true dry weather flow was lower than 272 MLD and was approximately 266 MLD. The true dry weather average flow excludes additional flow to the plant during snow melt or rainfall, but includes inflow and infiltration (I&I). The total true dry weather volume was approximately 97,248 ML.

Based on 310 MLD of average secondary treatment capacity and a true dry weather average flow of 266 MLD, the uncommitted hydraulic reserve capacity for secondary treatment in 2022 was 44 MLD.

Wet Weather Summary

In 2022, Gold Bar WWTP had 78 days with secondary and primary plant bypasses. The total volume of secondary bypass was 5,913 ML. In addition, the total primary bypass volume was 123 ML.

There were 14 significant wet weather events with inflows to the plant greater than 1,200 MLD. The plant received a peak flow rate of approximately 2,298 MLD on June 28, 2022.

Summary of Operational Issues

Key operational activities, issues, and remedial actions are outlined in the Operations Monthly Summaries in Appendix C.

2022 Annual Air Pollution Control System Report

Table 8 and Table 9 describe the air pollution control system and ambient air monitoring limits and monitoring requirements. Note scrubber 5 and scrubber 6 were excluded from the report as they were not yet operational in 2022.

Table 8: Air Pollution Control System Operating Limits (Approval to Operate Table 5-2)

Air Pollution Control System	Monitoring Location	Parameter	Limit
East scrubber-scrubber 1; West scrubber-scrubber 2; EPT scrubber-scrubber 3; Fermenter scrubber-scrubber 4	Blowdown recirculation line before chemical makeup of each wet scrubber	pH	≥ 8.0
		ORP	≥ 300 mV
N/A	Ambient air monitoring station	H ₂ S, NO ₂ , and SO ₂	After ambient air monitoring station commissioned: Meet the latest <i>Alberta Ambient Air Quality Objectives</i>

Table 9: Monitoring and Reporting - Air Pollution Control Systems and Ambient Air (Approval to Operate Table 6-2)

Source	Parameter	Frequency	Method of Monitoring	Sample Location
Carbon scrubber for grit recovery facility, during operation seasons	Temperature	Continuous	Online temperature transmitter, record daily average	Influent air stream
	Differential air pressure	Continuous	Online differential air pressure gauge, record daily average	Influent and effluent air stream
Carbon scrubber for grit recovery facility, during operation seasons; Carbon scrubber for screening building 2/3; Carbon scrubber for grit building 2	H ₂ S	Continuous	Online H ₂ S sensor, record daily average	Effluent air stream of each carbon scrubber
	H ₂ S	Annually	Manual stack survey, as per the latest <i>Alberta Stack Sampling Code</i>	Effluent air stream of each carbon scrubber
Carbon scrubber for Clover Bar biosolids dewatering building	H ₂ S	Weekly	Portable low range H ₂ S analyzer, as per the manufacturer's specifications, grab sample	Effluent air stream of the carbon scrubber
	H ₂ S	Annually	Manual stack survey, as per the latest <i>Alberta Stack Sampling Code</i>	Effluent air stream of the carbon scrubber
East scrubber-scrubber 1; West scrubber-scrubber 2; EPT scrubber-scrubber 3; Fermenter scrubber-scrubber 4	pH	Continuous	Online pH sensor, record daily average	Recirculation blowdown line, before addition of chemical makeup of each wet scrubber
	ORP	Continuous	Online ORP sensor, record daily average	

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East scrubber-scrubber 1; West scrubber-scrubber 2; EPT scrubber-scrubber 3; Fermenter scrubber-scrubber 4	H ₂ S	Continuous	Online H ₂ S sensor, record daily average	Influent air stream of each wet scrubber
	H ₂ S	Continuous	Online H ₂ S sensor, record daily average	Effluent air stream of each wet scrubber
	H ₂ S	Annually	Manual stack survey, as per the latest <i>Alberta Stack Sampling Code</i>	Effluent air stream of each wet scrubber
Ambient air	H ₂ S	Before ambient air monitoring station commissioned: Daily, when ambient air temperature > 0 °C	Portable low range H ₂ S analyzer, as per the manufacturer's specifications, grab sample	Fence line of Gold Bar Wastewater Treatment Plant
	H ₂ S, NO ₂ , and SO ₂	After ambient air monitoring station commissioned: Continuous	<i>Air Monitoring Directives</i> , as amended, record 1-hour average and 24-hour average	Ambient air monitoring station
	Temperature			
	Wind speed			
Wind direction				
Public odour complaints	N/A	When occurring	Document when Gold Bar Wastewater Treatment Plant is alleged and confirmed to be odour source	N/A

2022 Annual Wastewater Treatment Plant Report

Summary of Air Pollution Control System Monitoring

Table 10 and Table 11 contain a monthly summary of the air pollution control system monitoring data. The data is split into two tables for ease of viewing. Note there is no H₂S Out value for the Dewatering Facility Scrubber for December as the facility was not in operation. Appendix D contains the daily air pollution control system data.

Table 10: Air Pollution Control System Report - Part I

Month		East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber			
		pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)
January	Avg	9.8	670.1	0.3	0.0	9.8	670.0	12.7	30.4	9.8	667.0	4.9	0.0	9.8	680.6	4.1	336.1
February	Avg	9.8	671.2	0.1	0.0	9.8	670.1	7.5	18.9	9.8	667.6	3.8	0.0	9.8	679.8	2.8	126.7
March	Avg	9.8	663.4	0.1	163.8	9.8	669.9	5.4	292.1	9.8	669.7	1.2	86.8	9.9	683.7	1.2	902.9
April	Avg	9.8	667.7	0.0	0.0	9.8	665.2	11.6	71.8	9.8	669.0	1.4	0.0	9.8	687.1	0.2	1758.1
May	Avg	9.8	669.8	0.1	5.9	9.8	670.4	20.4	196.3	9.8	667.6	2.1	0.0	9.8	679.9	3.2	638.4
June	Avg	9.8	671.3	0.1	1.2	9.8	670.3	11.7	41.4	9.8	667.5	3.1	2.0	9.8	680.2	2.9	357.7
July	Avg	9.8	671.2	0.2	8.5	9.8	670.0	15.4	39.6	9.8	664.7	5.6	0.1	9.8	674.4	4.1	1224.2
August	Avg	9.8	670.8	0.1	4.3	9.8	669.7	29.8	765.6	9.8	660.0	9.6	2.6	9.8	679.5	5.4	2047.5
September	Avg	9.8	670.1	0.1	3.3	9.8	670.0	42.5	3328.8	9.8	666.3	9.3	4.1	9.8	682.4	5.3	1918.7
October	Avg	9.8	670.3	0.0	8.4	9.8	662.4	27.0	1881.3	9.8	666.1	14.6	0.0	9.8	679.5	6.0	1534.9
November	Avg	9.8	668.7	0.1	29.6	9.8	667.0	25.0	2682.5	9.8	666.1	7.9	14.6	9.8	680.5	4.4	1091.8
December	Avg	9.8	676.7	0.0	50.2	9.8	670.0	14.6	2923.6	9.8	668.7	4.3	2.2	9.8	678.7	2.7	444.2

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Table 11: Air Pollution Control System Report - Part II

Month		Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
		H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
January	Avg	0.0	64.7	20.0
February	Avg	0.0	17.3	8.3
March	Avg	3.5	235.3	18.5
April	Avg	26.2	34.9	32.6
May	Avg	0.1	36.0	102.3
June	Avg	1.2	3.8	6.5
July	Avg	0.0	1.4	17.5
August	Avg	0.0	4.6	30.4
September	Avg	4.1	56.7	28.6
October	Avg	8.8	148.0	15.5
November	Avg	3.2	589.8	11.3
December	Avg	2.3	580.3	N/A

The annual manual stack survey was submitted to AEPA on September 29, 2022.

Assessment of Monitoring Results

For each scrubber, the daily average ORP and pH was maintained above 300 mV and 8, respectively, throughout the year. Refer to Table 12, Summary of Scrubber Operational Issues for more information.

Chemicals Consumed by Scrubbers

As per Section 6 of the Operations Plan, sodium hypochlorite (bleach) and caustic soda are used in the scrubbers for oxidization of H₂S and pH control, respectively. Daily and monthly consumption of these chemicals is summarized in Appendix E.

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Summary of Air Pollution Control System Operational Issues

Table 12 is a summary of operational issues encountered by each air pollution control system, and the remedial actions taken to resolve the issues.

Table 12: Summary of Scrubber Operational Issues

Scrubber Name	Date/Time of Shutdown	Date/Time Returned to Service	Total Time Shutdown (hr)	Fence Line H2S Readings Taken?	Operational Issue	Actions Taken
East	2/16/2022 7:00	2/16/2022 14:27	7.5	No - temperature too low	Shutdown for media replacement.	Not complete, back in service.
West	2/26/2022 21:34	2/27/2022 1:30	3.9	Yes	Blower tripped out and unable to reset due to motor overload fault.	E&I was called in and emergency WR 42037 entered; currently no read back to DeltaV from blower so operator will need to watch blower to ensure status.
EPT	3/8/2022 6:55	3/8/2022 14:00	7.1	Yes	Blower offline due to maintenance/repairs.	Blower back online after maintenance work completion.
East	3/29/2022 6:00	3/29/2022 21:05	15.1	Yes	Shutdown for acid cleaning.	Scrubber back online after acid cleaning.
Fermenter	4/17/2022 4:30	4/17/2022 7:52	3.4	Yes	Both bleach pumps (PDP 65314 and 65313) developed tube failure and the scrubber was shutdown.	Entered a WR and Mech will be notified to come in for corrective maintenance.
East	5/10/2022 6:30	5/11/2022 15:35	33.1	Yes	Shut down East Scrubber for media replacement.	Back online at 3:35 pm. Blower GEF 47150, Recirc Pump PCP 28529 and Bleach Transfer Pump PDP 15166 can only be ran in hand locally. Alarms and interlocks are still active but can only start and stop locally. DeltaV configuration will be finished tomorrow.
West	6/28/2022 7:12	6/28/2022 13:31	6.3	Yes	Planned power outage and recirculation pump failure.	Recirculation pump replacement was planned for June 29, but did not restart after planned power outage.
West	6/28/2022 14:03	6/28/2022 14:12	0.1	No - shutdown <2 hours	Continued work on recirculation pump.	Continued work on recirculation pump.
EPT, West	6/29/2022 20:00	6/29/2022 20:18	0.3	No - shutdown <2 hours	Appears to have been low makeup water flow, but could not confirm via Logbook.	Makeup water flow restarted.
West	7/30/2022 11:35	7/30/2022 11:53	0.3	No - shutdown <2 hours	Plugging on recirc pump discharge to stilling well causing loss of ORP readings.	WR entered, line unplugged. Request to add routine check/unplugging to probe calibration PM.
West, EPT	8/2/2022 10:08	8/2/2022 11:07	1.0	No - shutdown <2 hours	Planned maintenance. Drilling vibration ports.	N/A

2022 Annual Wastewater Treatment Plant Report

West	8/16/2022 2:40	8/16/2022 5:15	2.6	Yes	Bleach pump tube failure on both bleach pumps.	Shut off scrubber until repaired. Called in Maintenance.
West, EPT	8/17/2022 6:55	8/17/2022 7:17	0.4	No - shutdown <2 hours	Planned preventative maintenance. Caustic pump PM.	N/A
EPT	9/12/2022 6:09	9/13/2022 13:06	30.9	Yes	Low recirculation flow.	Planned shutdown for nozzle replacement and other maintenance.
Grit 6/7	9/20/2022 23:47	9/21/2022 0:10	0.4	No - shutdown <2 hours	Tripped on air temperature	Running in hand.
EPT	9/21/2022 8:35	9/21/2022 13:06	4.5	Yes	Decreasing H2S removal efficiency.	Replaced spray bars, feed line, and recirculation pump.
West	N/A	12-Oct-22	0	No shutdown	Ongoing water softener issues.	New water softener installed on Oct 12, 2022.
Fermenter	10/18/2022 7:00	10/22/2022 11:21	100.4	Yes	Decreasing H2S removal efficiency. Additional issues with media support base failure.	Acid clean media. After base failure, removed media, repaired base and replaced with new media.
Fermenter	11/3/2022 10:33	11/3/2022 16:41	6.1	Yes	Low recirculation flow.	Clean pump/lines after media replacement
West	11/8/2022 6:58	11/8/2022 15:35	8.6	No - temperature too low	Preparation for acid clean and other maintenance repairs.	Repair isolation valve to ORP well, replace ORP drain, replace recirculation pump, replace drain on fan housing.
East	11/20/2022 6:13	11/20/2022 8:00	1.8	No - shutdown <2 hours	Foaming in scrubber tower.	Drained and flushed scrubber.
East	12/7/2022 7:18	12/7/2022 8:52	1.6	No - shutdown <2 hours	Foaming in scrubber tower.	Drained and flushed scrubber.
East	12/20/2022 7:50	12/20/2022 8:29	0.7	No - shutdown <2 hours	Ice build up on fan.	Cleared ice build-up.
East	12/25/2022 1:28	12/25/2022 2:17	0.8	No - shutdown <2 hours	Foaming in scrubber tower.	Drained and flushed scrubber.
East	12/25/2022 6:43	12/25/2022 7:44	1.0	No - shutdown <2 hours	Foaming in scrubber tower.	Drained and flushed scrubber.
Fermenter	12/29/2022 12:56	12/29/2022 13:51	0.9	No - shutdown <2 hours	Recirculation pump motor tripping.	Recirculation pump motor calibration.

2022 Annual Ambient Air Report

The ambient air quality monitoring station was commissioned as of June 30, 2022. Prior to the commissioning of the ambient air monitoring station, ambient air monitoring was completed using a portable low range H₂S analyzer and no assessment of results was included as per Section 6.3.3 (a) (iii) (B) of the Approval to Operate for this data. Ambient air monitoring for July to December was completed using the ambient air quality monitoring station.

Summary of Ambient Air Monitoring

Table 13 shows a summary of the ambient air monitoring results prior to commissioning of the ambient air monitoring station (January to June). The grab samples were taken daily when the ambient air temperature was > 0°C using a portable, low-range H₂S analyzer along the fence line of the Gold Bar Wastewater Treatment Plant. Figure 3 depicts the monitoring locations. Appendix F contains the daily ambient air monitoring data.

Table 13: Summary of Ambient Air Monitoring Results – Low Range H₂S Analyzer

Month		H ₂ S (ppb)							
		1	2	3	4	5	6	7	8
January	Avg	4.38	3.76	2.18	2.36	2.71	5.40	5.89	1.57
	Min	0	0	0	0	0	0	0	0
	Max	21.54	13.41	6.31	7.72	8.86	21.05	25.63	5.11
February	Avg	2.48	1.25	1.67	1.28	0.54	1.27	2.91	0.81
	Min	0	0	0	0	0	0	0	0
	Max	9.99	4.74	9.18	7.86	4.63	7.47	26.95	4.33
March	Avg	7.17	2.44	1.93	2.19	1.74	1.12	1.93	1.85
	Min	0	0	0	0	0	0	0	0
	Max	28.54	12.08	10.69	11.51	7.93	8.32	13.78	9.59
April	Avg	5.96	1.81	1.58	1.38	1.06	1.09	3.11	2.16
	Min	0	0	0	0	0	0	0	0
	Max	40	10	10	10	10	10	20	20
May	Avg	4.76	4.70	2.59	3.77	1.74	1.72	2.08	1.04
	Min	0	0	0	0	0	0	0	0
	Max	22.05	30.76	11.45	14.02	9.44	11.12	8.73	15.27
June	Avg	4.49	3.37	1.85	3.18	0.50	1.10	1.23	1.85
	Min	0	0	0	0	0	0	0	0
	Max	36.74	24.37	10.69	11.56	7.44	6.53	5.08	12.44

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Figure 3: Location of H₂S Monitoring

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Table 14 shows the monthly summary of results from the ambient air monitoring station including H₂S, NO₂, SO₂, temperature, wind speed, and wind direction. The table shows the results of the 1-hour average data from July to December.

Table 14: Summary of Ambient Air Monitoring Results – Ambient Air Monitoring Station

Month	Parameter	Min	Avg	Max
July	SO ₂ (ppbv)	0.0	1.4	36.9
	NO ₂ (ppbv)	0.0	4.3	17.7
	H ₂ S (ppbv)	0.0	0.7	10.9
	Wind Speed (m/s)	0.0	1.3	4.3
	Wind Direction (°)	-	194.0	-
	Temperature (°C)	7.2	19.5	31.9
August	SO ₂ (ppbv)	0.0	1.5	54.6
	NO ₂ (ppbv)	0.7	6.2	26.3
	H ₂ S (ppbv)	0.0	2.0	29.1
	Wind Speed (m/s)	0.0	1.4	5.7
	Wind Direction (°)	-	205.3	-
	Temperature (°C)	8.0	20.3	32.5
September	SO ₂ (ppbv)	0.0	1.4	37.0
	NO ₂ (ppbv)	0.7	7.6	29.6
	H ₂ S (ppbv)	0.0	2.5	61.5
	Wind Speed (m/s)	0.0	1.3	5.3
	Wind Direction (°)	-	217.4	-
	Temperature (°C)	2.5	14.9	33.7
October	SO ₂ (ppbv)	0.0	1.5	47.0
	NO ₂ (ppbv)	1.0	10.3	37.6
	H ₂ S (ppbv)	0.0	1.8	59.8
	Wind Speed (m/s)	0.0	1.4	5.8
	Wind Direction (°)	-	223.2	-
	Temperature (°C)	-3.7	8.8	25.0
November	SO ₂ (ppbv)	0.0	2.8	34.5
	NO ₂ (ppbv)	1.2	15.9	49.0
	H ₂ S (ppbv)	0.2	1.9	21.1
	Wind Speed (m/s)	0.0	1.6	4.6
	Wind Direction (°)	-	229.5	-
	Temperature (°C)	-20.7	-5.6	7.6
December	SO ₂ (ppbv)	0.1	2.8	37.5
	NO ₂ (ppbv)	2.4	19.5	46.1
	H ₂ S (ppbv)	0.0	1.1	8.3
	Wind Speed (m/s)	0.0	1.3	4.4
	Wind Direction (°)	-	216.6	-
	Temperature (°C)	-33.5	-15.1	-1.1

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Assessment of Monitoring Results

Table 15 shows an assessment of the monthly results from the ambient air monitoring station for H₂S, NO₂, and SO₂ as compared to the *Alberta Ambient Air Quality Objectives* (AAAQO). In 2022 (June 30 to December 31), there were a total of 158 1-hour H₂S exceedances and 28 24-hour H₂S exceedances of the AAAQO. There were no exceedances of the 1-hour or 24-hour AAAQO for NO₂ or SO₂.

Table 15: Assessment of Results of Ambient Air Monitoring

Month	Parameter	1-hour AAAQO	# of 1-hour Exceedances	24-hour AAAQO	# of 24-hour Exceedances
July	H ₂ S (ppbv)	10	3	3	0
	NO ₂ (ppbv)	159	0	N/A	N/A
	SO ₂ (ppbv)	172	0	48.0	0
August	H ₂ S (ppbv)	10	41	3	5
	NO ₂ (ppbv)	159	0	N/A	N/A
	SO ₂ (ppbv)	172	0	48.0	0
September	H ₂ S (ppbv)	10	61	3	11
	NO ₂ (ppbv)	159	0	N/A	N/A
	SO ₂ (ppbv)	172	0	48.0	0
October	H ₂ S (ppbv)	10	36	3	8
	NO ₂ (ppbv)	159	0	N/A	N/A
	SO ₂ (ppbv)	172	0	48.0	0
November	H ₂ S (ppbv)	10	17	3	4
	NO ₂ (ppbv)	159	0	N/A	N/A
	SO ₂ (ppbv)	172	0	48.0	0
December	H ₂ S (ppbv)	10	0	3	0
	NO ₂ (ppbv)	159	0	N/A	N/A
	SO ₂ (ppbv)	172	0	48.0	0
Total	H₂S (ppbv)	10	158	3	28
	NO₂ (ppbv)	159	0	N/A	N/A
	SO₂ (ppbv)	172	0	48.0	0

There were also no exceedances of the 30-day objective for SO₂ (11 ppbv). The annual objectives of 24 ppbv for NO₂ and 8.0 ppbv for SO₂ will be assessed once a full year of data is collected.

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Summary of Public Odour Complaints

Table 16 shows the 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, corroboration with odour model software, ambient H₂S monitoring results, and plant operations/maintenance.

Table 16: Summary of Gold Bar WWTP Odour Complaints

Month	Number of Odour Complaints	Number of Complaints where Gold Bar WWTP is the Confirmed Source of Odour
January	0	0
February	0	0
March	2	1
April	0	0
May	0	0
June	0	0
July	0	0
August	0	0
September	4	2
October	3	1
November	2	0
December	0	0
Total	11	4

Appendix G contains a detailed list of odour complaints including the steps taken to identify the odour sources and remedial actions taken to resolve the odour issues.

2022 Summary of Contraventions and Notifications to AEPA

Table 17 summarized the contraventions to Approval to Operate 639-03-07. There was one contravention in 2022.

Table 17: Summary of Contraventions

Date	Summary of Contravention	AEPA Reference Number
7/13/2022 11:00 am	A hose leaked during a liquid transfer between cells at Clover Bar lagoons. An estimated 0.5 cubic meters of supernatant liquid drained down the berm road into the City of Edmonton Cure site area. There was little to no liquid pooling and no drainage to any catch basins or water body. The incident was reported to AEP on July 13, 2022 at 11:00 hours.	401317

Table 18 summarizes the notifications to AEPA under Approval to Operate 639-03-07 as per the 2022 Operations Plan. There were seventeen notifications in 2022.

Table 18: Summary of Notifications to AEPA

Date	Summary of Notifications	AEPA Reference Number
2/15/2022 10:05 am AEP Operator: Taryn	AEP was notified via the 24-hour hotline of a planned outage of the East Odour Scrubber to take place starting at 7am on 2/16/2022 for equipment maintenance. The scrubber outage is planned to be less than 48 hours in duration.	387913
3/28/2022 10:15 am AEP Operator: Raymond	AEP was notified via the 24-hour hotline of a planned outage of the East Odour Scrubber to take place starting at 600hrs until approximately 2100 hrs on 3/29/2022 for equipment maintenance. The scrubber outage is planned to be less than 48 hours in duration. Additional odour monitoring is completing throughout the outage, as well as the use of a potable odour scrubber.	389036
3/28/2022 10:15 am AEP Operator: Raymond	AEP 24-hour hotline was also notified of a planned UV outage from 6am to 9am on March 30, 2022 for planned maintenance on the electrical system. It was noted that EPCOR purposely plans the shutdowns to take place when wastewater flows are low, and impact to the river is minimized.	389036
3/29/2022 4:00 pm AEP Operator: Raymond	AEP 24-hour hotline was notified that the previously planned UV outage for March 30, 2022 600 hrs to 900 hrs has been canceled. It will be rescheduled for a later date, and EPCOR will notify AEP in advance.	389036
3/30/2022 12:49 pm AEP Operator: Raymond	AEP 24 hour hotline was notified that the previously planned UV outage associated with this reference number has been rescheduled to March 31, 2022 600 hrs to 900 hrs.	389036
5/9/2022 12:05 pm AEP Operator: Natasha	AEP was notified via the 24-hour hotline of a planned outage of the East Odour Scrubber to take place starting at 630 am on 5/10/2022 for equipment maintenance. The scrubber outage is planned to be less than 48 hours in duration.	390352

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6/27/2022 2:05 pm AEP Operator: Darren	AEP 24-hour hotline was notified of a planned UV outage for less than 30 minutes starting at 7am June 28 - 30, 2022 for planned power feed switching to support maintenance on the electrical system. The power will switch back to the primary feeder on June 29 th at 7 am and will result in a second UV outage that is expected to last less than 30 minutes. It was noted that EPCOR purposely plans the shutdowns to take place when wastewater flows are low, and impact to the river is minimized.	400719
6/27/2022 2:05 pm AEP Operator: Darren	AEP was notified via the 24-hour hotline of a planned outage of the EPT Odour Scrubber to take place starting at 700 hrs for less than 6 hrs on 6/29/2022 for equipment maintenance. Additional odour monitoring is completing throughout the outage	400720
9/8/2022 10am AEP Operator: Darren	AEP was notified via the 24-hour hotline of a planned outage of the EPT Odour Scrubber to take place starting at 600 hrs for less than 48 hrs on 9/12/2022 for equipment maintenance. Additional odour monitoring is completed throughout the scrubber outage.	404073
9/19/2022 1pm AEP Operator: Steven	AEP was notified via the 24-hour hotline of a planned outage of the West Odour Scrubber to take place starting at 600 hrs for 12 hours on 9/21/2022 for equipment maintenance. Additional odour monitoring is completed throughout the scrubber outage.	404556
9/20/2022 10:35am AEP Operator: Nancy	AEP was notified via the 24-hour hotline to update ref#404556 that now the EPT Odour Scrubber (not the West Scrubber as previously notified) has a planned outage to take place starting at 600 hrs for less than 12 hours on 9/21/2022 for equipment maintenance. Additional odour monitoring is completed throughout the scrubber outage.	404556
10/17/2022 10:28 am AEP Operator: Erin	AEP was notified via the 24-hour hotline of a planned outage of the Fermenter Odour Scrubber to take place starting at 6:00 am on 10/18/2022 for equipment maintenance. The scrubber is planned to be back online by 6pm on October 19, 2022. A temporary odour scrubber will be employed and additional fence line monitoring for Odour / H2S will take place during the outage.	405685
10/19/2022 11:35 am	AEP was notified via the 24-hour hotline that the planned outage of the Fermenter Odour Scrubber that began at 6:00 am on 10/18/2022 for equipment maintenance has been extended. EPCOR estimates that the work will be complete and the scrubber back in operation by 9am on Monday October 24, 2022. A temporary odour scrubber will continue to be employed and additional fence line monitoring for Odour / H2S will take place during the outage.	405685
10/22/2022 2:29 pm	AEP was notified with the 24-hour reporting line that the fermenter scrubber was back in full service by 11:30 am on October 22, 2022, ahead of schedule.	405685
11/03/2022 10:46 am AEP Operator: Darren	AEP was notified via the 24-hour hotline of a planned outage of the Fermenter Odour Scrubber to take place starting at 11:00 am on 11/03/2022 for equipment maintenance. The scrubber is planned to be back online by 4pm on 11/03/2022. Additional fence line monitoring for Odour / H2S will take place during the outage.	406419
11/07/2022 3:36 pm AEP Operator: Nancy	AEP was notified via the 24-hour hotline of a planned outage of the West Odour Scrubber to take place starting at 8:00 am on 11/08/2022 for equipment maintenance. The scrubber is planned to be back online by 4pm on 11/08/2022. Additional fence line monitoring for Odour / H2S will take place during the outage.	406546

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12/13/2022 13:46 AEP Operator: Darren	AEP was notified via the 24-hour hotline of a planned power outage of the UV during a switch from the backup power feed to the main power feed at approximately 14:00 today. 7-day letter is not required as per Operations Plan.	407691
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2022 Biosolids Program Summary

In 2022, the biosolids management program was able to remove 19,785 dry tonnes (DT) of biosolids from the Clover Bar Lagoons for beneficial reuse. Biosolids production from Gold Bar and ACRWC was 25,446 DT, which increased the storage inventory by 5,661 DT.

Table 19: Summary of Biosolids Program

Beneficial Application Use Method	Application Weight (dry tonnes)	Application Volume (m³)
Nutri-Gold (dewatered material)	2,675 (908 in stockpile)	11,481
Nutri-Gold (thickened material)	5,007	85,170
Agricultural Land Application (3rd party)	7,797	131,229
Non-Agricultural Land Application	4,305	17,500
Total	19,785	245,380

Appendices H, I, and J contain summaries of the Nutri-Gold, third party agricultural, and non-agricultural land application programs, respectively.

Appendices

Appendix A – Monthly Plant Performance Reports

Appendix B – WWTP Chemicals

Appendix B - WWTP Chemicals

2022 EPT Alum Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	0	0	2159	0	0	0	0	0	0	0
2	0	0	0	0	1113	0	6776	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	87	8197	0	0	0	0
5	0	0	0	0	0	0	18104	2731	0	0	0	0
6	0	3898	0	0	3172	6363	9123	0	0	0	0	0
7	0	5359	0	0	0	4612	3870	0	2472	0	0	0
8	0	2686	0	0	0	1416	6751	0	0	0	0	0
9	0	4261	0	0	0	0	2919	0	0	0	0	0
10	0	12131	0	0	0	0	0	0	0	0	0	0
11	0	1953	0	0	0	0	0	0	0	0	0	0
12	0	0	7212	0	0	5502	0	0	0	0	0	0
13	0	3738	0	0	0	1054	0	0	0	0	0	0
14	0	401	0	0	0	27707	0	0	0	0	0	0
15	0	0	5794	0	0	24747	0	0	6321	0	0	0
16	0	0	7408	0	0	2186	0	0	1118	0	0	0
17	2847	3521	8476	0	0	11260	0	0	0	0	0	0
18	0	0	9031	0	0	5736	0	0	0	0	0	0
19	4	637	8008	6366	11448	0	0	0	1539	0	0	0
20	0	0	6239	8366	2564	0	0	0	0	0	0	0
21	0	0	6534	0	0	1952	0	0	0	0	0	0
22	3922	0	9876	0	0	10200	0	0	0	0	0	0
23	4454	0	10656	0	0	13159	0	0	0	0	0	0
24	1763	0	9320	0	0	21011	0	0	0	0	0	0
25	0	0	4356	0	2777	6481	2463	0	0	0	0	0
26	0	0	3627	115	3746	2029	0	0	0	0	0	0
27	0	0	5673	14183	1810	0	0	2942	0	0	0	0
28	0	0	5177	0	1769	0	0	0	0	0	0	0
29	0		5660	0	0	4200	0	0	0	0	0	0
30	0		5215	0	0	0	0	0	0	0	0	0
31	0		3959		0		6606	287		0		0
Total (kg)	12,990	38,584	122,223	29,031	30,558	149,617	56,700	14,158	11,451	0	0	0

Appendix B - WWTP Chemicals

2022 EPT Polymer Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	0	0	6	0	0	0	0	0	0	0
2	0	0	0	0	3	0	35	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	1	23	0	0	0	0
5	0	0	0	0	0	0	51	8	0	0	0	0
6	0	7	0	0	6	14	26	0	0	0	0	0
7	0	10	0	0	0	13	11	0	4	0	0	0
8	0	5	0	0	0	4	19	0	0	0	0	0
9	0	8	0	0	0	0	8	0	0	0	0	0
10	0	24	0	0	0	0	0	0	0	0	0	0
11	0	3	0	0	0	0	0	0	0	0	0	0
12	0	0	17	0	0	16	0	0	0	0	0	0
13	0	7	0	0	0	3	0	0	0	0	0	0
14	0	1	0	0	0	77	0	0	0	0	0	0
15	0	0	16	0	0	70	0	0	9	0	0	0
16	0	0	21	0	0	6	0	0	3	0	0	0
17	5	6	24	0	0	32	0	0	0	0	0	0
18	0	0	25	0	0	16	0	0	0	0	0	0
19	0	1	22	14	29	0	0	0	3	0	0	0
20	0	0	17	24	7	0	0	0	0	0	0	0
21	0	0	18	0	0	5	0	0	0	0	0	0
22	7	0	28	0	0	28	0	0	0	0	0	0
23	9	0	30	0	0	37	0	0	0	0	0	0
24	3	0	26	0	0	59	0	0	0	0	0	0
25	0	0	12	0	5	18	5	0	0	0	0	0
26	0	0	9	0	8	6	0	0	0	0	0	0
27	0	0	16	38	5	0	0	4	0	0	0	0
28	0	0	15	0	5	0	0	0	0	0	0	0
29	0		16	0	0	13	0	0	0	0	0	0
30	0		15	0	0	0	0	0	0	0	0	0
31	0		11		0		13	0		0		0
Total (kg)	25	71	339	76	73	417	169	36	20	0	0	0

Appendix B - WWTP Chemicals

2022 DAF Polymer Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	33	29	34	41	35	33	27	29	30	35	34	30
2	32	29	34	43	33	35	26	29	26	32	33	30
3	32	29	33	45	35	33	24	28	27	29	33	29
4	34	27	33	50	36	32	30	27	31	29	32	30
5	39	30	33	48	33	32	32	24	35	26	30	31
6	36	30	33	50	35	30	31	23	37	26	30	32
7	34	31	19	51	36	30	30	23	40	23	29	33
8	35	18	39	49	35	30	30	23	34	24	30	31
9	33	32	42	49	35	29	30	22	33	30	28	31
10	25	31	42	49	34	30	30	23	35	32	32	32
11	25	32	34	48	31	31	29	25	28	38	32	31
12	32	32	33	50	32	31	30	25	27	39	30	30
13	31	28	31	41	32	28	30	25	28	39	29	28
14	31	23	36	41	32	28	30	24	29	38	28	30
15	28	26	35	39	31	25	29	24	29	36	30	30
16	34	32	30	35	31	27	31	24	27	38	31	32
17	35	36	39	35	19	25	25	20	29	38	31	31
18	35	36	35	37	32	25	28	24	30	38	32	30
19	34	37	39	34	33	25	28	27	29	38	32	30
20	29	40	37	34	32	20	32	27	33	33	33	31
21	31	41	36	30	34	25	34	28	33	27	32	30
22	31	34	35	44	32	28	30	28	29	30	32	30
23	29	23	32	47	31	25	26	27	28	34	33	30
24	28	31	36	48	30	25	28	37	34	34	32	29
25	30	31	39	45	30	24	31	34	39	31	33	30
26	29	32	39	44	26	22	34	39	38	30	31	29
27	29	33	40	42	32	23	33	36	37	33	31	29
28	27	31	40	34	31	19	32	31	33	35	30	29
29	28		42	36	27	18	30	26	29	35	30	30
30	29		42	36	32	26	30	28	28	38	30	31
31	29		43		32		29	28		37		31
Total (kg)	967	864	1,116	1,275	989	815	919	838	945	1,027	933	940

2022 Membrane Bleach Usage (L as delivered 16% sodium hypochlorite solution)

	January	February	March	April	May	June	July	August	September	October	November	December
1	375	281	640	184	448	703	476	392	545	513	620	447
2	381	297	635	236	412	570	507	643	514	483	649	364
3	303	325	391	248	468	316	318	498	486	458	627	294
4	174	611	429	754	280	605	480	494	695	622	627	411
5	310	549	431	578	422	316	475	410	560	623	639	294
6	232	558	457	637	459	373	368	461	527	383	534	460
7	299	610	458	514	392	535	470	428	387	324	658	346
8	384	495	477	562	290	549	463	534	122	588	581	268
9	368	449	423	523	318	490	459	627	400	352	508	510
10	359	511	477	458	229	673	453	622	538	400	428	513
11	565	334	472	533	358	603	574	605	374	464	241	431
12	431	288	593	553	647	506	702	534	215	253	498	398
13	421	355	499	506	370	539	722	491	481	589	571	411
14	469	580	345	380	586	491	527	502	357	479	497	343
15	575	465	630	610	542	264	379	661	477	384	611	532
16	459	472	483	415	330	388	460	496	309	471	584	576
17	419	286	385	461	625	366	542	458	660	250	483	370
18	339	309	481	452	592	457	525	561	463	244	485	370
19	230	239	508	388	447	532	307	400	456	266	690	371
20	295	300	393	552	582	587	511	626	636	594	676	280
21	356	236	457	573	644	570	449	547	547	690	575	583
22	297	298	548	466	398	575	520	385	502	661	559	485
23	404	303	467	469	379	494	547	562	709	811	492	369
24	349	449	480	549	532	320	461	606	650	494	564	359
25	270	650	385	485	447	446	617	475	566	593	594	390
26	452	764	314	617	711	518	516	396	644	567	231	231
27	493	306	469	422	374	496	431	357	453	450	463	527
28	408	371	493	319	436	530	585	355	313	497	365	346
29	571		461	412	474	503	498	609	494	550	419	416
30	507		434	470	457	430	342	632	462	572	313	413
31	541		434		463		515	457		468		422
Total (L)	12,036	11,692	14,551	14,324	14,113	14,746	15,199	15,826	14,541	15,093	15,783	12,530

Appendix B - WWTP Chemicals

2022 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	0	0	0	6284	6473	6300	5633	0	0	0
2	0	0	0	0	0	6293	6318	6150	6653	0	0	0
3	0	0	0	0	0	8499	6416	5449	6640	0	0	0
4	0	0	0	0	1508	6181	6436	6597	6472	0	0	0
5	0	0	0	0	5004	6189	4335	6595	6365	0	0	0
6	0	0	0	0	5365	6222	6584	6481	6429	0	0	0
7	0	0	0	0	5457	6242	6526	6862	6241	0	0	0
8	0	0	0	0	5450	6081	6485	6239	6594	0	0	0
9	0	0	0	0	5575	5981	6508	6411	6280	0	0	0
10	0	0	0	0	4836	6232	6428	5080	6390	0	0	0
11	0	0	0	0	4115	6131	6462	6414	6300	0	0	0
12	0	0	0	0	4143	5876	6495	6424	6199	0	0	0
13	0	0	0	0	5649	6103	5567	6252	1408	0	0	0
14	0	0	0	0	5875	6008	6466	5548	0	0	0	0
15	0	0	0	0	5876	6200	6514	4568	0	0	0	0
16	0	0	0	0	5402	0	5548	3633	0	0	0	0
17	0	0	0	0	5711	0	6048	4670	0	0	0	0
18	0	0	0	0	5732	0	1825	4805	0	0	0	0
19	0	0	0	0	5741	0	2623	5797	0	0	0	0
20	0	0	0	0	5591	0	4388	5806	0	0	0	0
21	0	0	0	0	5632	0	3456	5819	0	0	0	0
22	0	0	0	0	5634	0	6508	6414	0	0	0	0
23	0	0	0	0	5587	0	6499	4881	0	0	0	0
24	0	0	0	0	5556	4294	6446	6016	0	0	0	0
25	0	0	0	0	6157	5757	6405	5635	0	0	0	0
26	0	0	0	0	5711	5734	6416	6187	0	0	0	0
27	0	0	0	0	5937	5819	5053	6032	0	0	0	0
28	0	0	0	0	5875	6158	6349	6501	0	0	0	0
29	0		0	0	5666	6107	6359	6369	0	0	0	0
30	0		0	0	6084	6391	6388	5711	0	0	0	0
31	0		0		6007		6043	6053		0		0
Total (L)	0	0	0	0	150,876	134,783	180,366	181,701	77,604	0	0	0

Appendix B - WWTP Chemicals

2022 Ostara Caustic Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	0	0	0	0	0	752	659	786	697	0	0	0
2	0	0	0	0	0	664	555	811	815	0	0	0
3	0	0	0	0	0	639	609	678	752	0	0	0
4	0	0	0	0	192	580	647	889	812	0	0	0
5	0	0	0	0	703	626	560	765	751	0	0	0
6	0	0	0	0	673	625	567	745	685	0	0	0
7	0	0	0	0	782	519	729	761	670	0	0	0
8	0	0	0	0	728	678	648	755	781	0	0	0
9	0	0	0	0	709	576	584	745	697	0	0	0
10	0	0	0	0	690	736	667	749	595	0	0	0
11	0	0	0	0	627	623	729	860	683	0	0	0
12	0	0	0	0	419	548	822	537	612	0	0	0
13	0	0	0	0	776	637	475	674	224	0	0	0
14	0	0	0	0	705	695	737	611	0	0	0	0
15	0	0	0	0	1008	535	427	441	0	0	0	0
16	0	0	0	0	918	285	466	327	0	0	0	0
17	0	0	0	0	930	0	525	420	0	0	0	0
18	0	0	0	0	731	0	174	614	0	0	0	0
19	0	0	0	0	239	0	438	487	0	0	0	0
20	0	0	0	0	611	0	609	365	0	0	0	0
21	0	0	0	0	588	0	704	358	0	0	0	0
22	0	0	0	0	574	0	712	527	0	0	0	0
23	0	0	0	0	632	0	722	561	0	0	0	0
24	0	0	0	0	461	345	717	644	0	0	0	0
25	0	0	0	0	526	394	761	755	0	0	0	0
26	0	0	0	0	582	318	824	710	0	0	0	0
27	0	0	0	0	501	437	542	711	0	0	0	0
28	0	0	0	0	457	487	795	804	0	0	0	0
29	0		0	0	519	462	641	836	0	0	0	0
30	0		0	0	492	553	729	867	0	0	0	0
31	0		0		618		743	681		0		0
Total (kg)	0	0	0	0	17,389	12,713	19,518	20,476	8,771	0	0	0

Appendix C – Operations Monthly Reports



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

Approval 639-03-07
Gold Bar Waste Water Treatment Plant Operations Monthly Summary

2022

SENIOR MANAGER, OPERATIONS MANAGER, OPERATIONS	<ul style="list-style-type: none"> • ALFREDO SUAREZ • KEN GROSSELL (LEVEL IV)
LEVEL IV OPERATORS	<ul style="list-style-type: none"> • TOM KWAN • DIEGO ESPINOSA • JANAKA LEKAMWASAM • MIKE NUNES • JODY PENNER • COLE BAKER • ANDREW NIEUWENHUIS • ISMAIL SANDOUGA • ADAM KELLY

January

- Draining EPT 11/12 for inspection – Jan 2nd
- Primary 7/8 in service – Jan 2nd
- Ferm 1 rake drive failed – breaker replaced – Jan 3rd
- Pre-screen 1 repaired – Jan 4th
- PSV lifted again for Boiler 9 – Engineering MOC entered to investigate – Jan 4th
- Pre-screen 5 chain catching scraper bar, repaired – Jan 5th
- Bio air control valves freezing due to cold temp and condensate in air line – Jan 5th
- Bio 6 VFA supernatant valve replaced – Jan 6th
- Prim 5 thru 8 idler gear frozen – called out Maintenance – Jan 7th
- Bio/Sec 7 O/S & drained for chain repair – Jan 9th
- P.E. sampler failed – dead display – repaired – Jan 9th
- Blower 5 transmitter failed – replaced Jan 10th
- Outfall 30 ice buildup cleared – sump pump running again – Jan 12th
- Sec/Bio 7 filling – back in service – Jan 14th
- EPT 9 cross conveyor – broken shear pin – Jan 17th
- Membrane Train 7 & 8 drain valve replacement – Jan 17-19th

- Power bump – No impact on Sec Blowers or UV – Some pre-treat/primary equipment needed reset in field – Jan 23rd
- Dig 3 heat exchanger check valve leak – Jan 24th
- Grit 5 pre-screen horizontal conveyor plug – Jan 24th
- Chain repair Sec/Bio 7 – Jan 27th – back in service same day
- Membrane bleach tank fitting leak Jan 28th. 3 totes rush ordered as back up. Leak repaired Jan 31st.
- Raw sampler failed Jan 30th – back in service Jan 31st
- Dig 6 HEX flush and acid clean Jan 31st/Feb 1st

February

- 7 secondary bypass events – Feb 6th, 7th, 8th, 9th - 11th, 13th, 17th & 19th
- 9 total dead ducks found U.V. building for Feb
- New raw sampler installed – Feb 1st
- Dig 6 heat exchanger acid clean complete – Feb 2nd
- Bios 1 thru 8 in winter mode – Feb 3rd
- U.V. channel 4 influent gate failure – Feb 6th
- U.V. channel 4 influent gate repaired – Feb 8th
- Solids shutdown – Feb 8th
- Dig 6 PSVs replaced – Feb 9th
- Alum ordered for EPT – 10 loads – Feb 9th
- Broke shear pin EPT 9 – Feb 12th
- Outfall 20 flow meter calibrated – Feb 14th
- East scrubber shutdown for media replacement – not complete, back in service – Feb 16th
- Broken shear pin EPT 9 cross collector – Feb 17th
- 4" elbow pipe fitting dropped in Sec 3 cross collector area – Feb 18th
- Hypo cleans done at membrane – Feb 23rd
- EPT blower tripped out – E/I called out – Feb 26th
- Sec 3 Cell 5 coupling failure – Feb 27th
- Sec 8 Cell 3 shear pin failure – Feb 27th
- Membrane Train 5 off line – cassettes switched to Train 7 – Feb 28th
- Filling Influent Channel 3, Grit Tanks 6/7, Screens 7/8 started Feb 28th

March

- 18 secondary bypass events – Mar 12th, 15th, 16th - 17th, 17th - 18th, 18th - 19th, 19th - 20th, 20th, 21st, 22nd - 23rd, 23rd - 24th, 24th - 25th, 25th, 26th, 27th, 28th, 29th, 30th & 31st
- 3 dead ducks found U.V. Building for March
- Influent Channel 3, Grit Tanks 6/7 filling and in service – Mar 1st
- EPT 11/12 in service – Mar 2nd
- Membrane Train 7 in service after coating installed – Mar 2nd
- Membrane Train 5 O/S for coating – Mar 2nd
- 1500 L of butterwash released – notified by Compliance Team – Mar 3rd
- Solids shutdown – Mar 7th
- Broken shear pin EPT 9 cross collector – Mar 7th
- MLSS meters calibrated – Mar 9th

- Raw backup sampler tripping on under voltage – Mar 10th
- Dig 6 gas space level radar freezing up – Mar 11th
- Temporary heat to Grit Building 2 – Mar 11th
- Grit 4 incline conveyor belt has a tear on side of belt – new one ordered Mar 11th
- Broken seal water line on east scrubber recirc pump – off 01:30 hrs – Mar 11th
- Odour complaints Mar 13th & 15th
- Modulating gates for Influent Channel 2/3 confirmed working – Mar 14th
- Screen 4 inspection complete – Mar 15th
- TWAS pump for DAF 3/4 failed & replaced – Mar 17th
- Capital Region flow reduced from 0.6 MLD to 0.3 MLD – Mar 17th
- Sec 4 broken shear pin – repaired – Mar 19th
- Broken scraper bar Pre-screen 5 – repaired – Mar 19th
- Main raw sampler not working – backup sampler working – Repaired Mar 21st
- Screen 5 O/S for inspection – Mar 22nd
- Capital Region flow off – Mar 23rd
- Ferm 3 TPS pump 28584 O/S for repair – Mar 22nd, repaired Mar 24th
- WAS 8 O/S for impeller replacement – Mar 23rd
- Product water pump PCP 26632 check valve replaced – Mar 23rd
- 10 loads of alum ordered for EPT – March 24th
- Outfall 30 sump level issues – reading high Mar 26th – repaired Mar 29th
- Broken shear pin Sec 8 Cell 3 – Mar 26th
- Voltus shutdown – 5 min – Mar 26th
- Broken shear pin EPT 9 Cell 8 – Mar 27th
- Screen 6 O/S for inspection – Mar 29th
- Low flow Train D – switched to Train C – Mar 29th
- East Scrubber off line for acid clean – off for 15 hours – fence line monitoring done – Mar 29th
- Sec 2 Bio in summer mode – Mar 30th
- U.V. planned outage 3 hrs – Mar 31st
- Sec 6,7,8 Bios in summer mode – Mar 31st

April

- 3 secondary bypass events – Apr 19th, 20th, 26th - 27th
- 4 dead ducks found at U.V.
- 2 Voltus shutdowns – Apr 20th & 22nd
- 10 loads of alum ordered for EPT
- EPT 9/10 O/S draining for inspection – Apr 1st
- North blend tank mixer motor fault – using recycle pump – Apr 2nd
- All bios back in summer mode – Apr 4th
- Grit Tank 4 horizontal conveyor motor fault – Apr 4th – motor replaced Apr 6th
- Train D flushed, HEI complete for inspection – Apr 5th
- East Scrubber shutdown 1 hr & 10 min to work on bleach pumps – Apr 6th
- East Scrubber bleach pump PCP 65315 tube failure – Apr 6th
- Broken shear pin Ferm 1 TPS 28432 – Apr 7th
- Citric cleans for membrane tanks started – Apr 7th
- Broken shear pin Ferm 1 TPS 28432 – Apr 8th
- Caustic spill Labatt Brewery 62.7 cubic meters – pH of 12 – Apr 10th

- Sec 8 Cell 4 broken shear pin – Apr 9th
- Boiler 1 blowdown line plugged – cleaned out Apr 11th
- Ferm 1 TPS 28432 broken shear pin – Apr 11th
- EPT 12 broken shear pin east pass – Apr 12th
- Ferm 1 TPS 28430 broken shear pin – Apr 14th
- Bio/Sec 1 drained for chain repair – Apr 15th
- Ferm scrubber bleach pump 65313 & 65314 tube failure – both pumps – Apr 17th
- Sec/Bio 1 back in service – Apr 21st
- RAS 1 volute leak – Apr 21st – RAS pump replaced – Apr 22nd
- Weir cleaning started Apr 24th
- Capital Region supernatant flow started at 0.3 MLD – Apr 25th
- Ferm 2 dewatering started to empty for Projects – Apr 26th
- GRF truck – Apr 27th
- Broken shear pin EPT 11 & 12 – Apr 27th
- Draining Grit Tank 7 for east horizontal auger repair – Apr 28th
- Lot of security cameras not working – WR entered

May

- 5 secondary bypass events – May 1st - 2nd, May 6th, May 19th - 20th, May 25th - 26th, & May 27th - 28th
- 4 dead ducks found at U.V.
- 3 Voltus shutdown events – May 10th, 24th & 25th
- 9 trucks at GRF
- Grit Tank 7 back in service – May 3rd
- Grit Tank 4 O/S for inspection – May 3rd
- Ops Retreat – May 3rd
- Ferm 4 TPS pump 28645 piston leaking – O/S May 4th
- Supernatant to Capital Region increased from 0.3 MLD to 0.6 MLD May 6th
- Sec 8 Cell 3 shear pin failure – May 7th
- Bio 3 Cell 8 mixer failure – May 8th
- Dig 6 O/S for PRV leaking May 9th – replaced May 18th
- East Scrubber O/S for media replacement – May 10th
- East Scrubber back in service after media replacement – May 11th
- Capital Region supernatant increased from 0.6 MLD to 0.75 MLD – May 12th
- Broken shear pin Sec 4 Cell 4 – May 14th
- EPT 11 cross collector broken shear pin – May 15th
- Capital Region supernatant return increased from 0.75 MLD to 0.9 MLD – May 17th
- EPT 12 west sludge collector drive shear pin failure – May 18th
- South blend tank O/S for inspection – May 17th – back in service – May 20th
- Grit Tank 5 O/S for inspection – May 18th
- Sec 3 Cell 1 shear pin failure – May 22nd
- Sec 8 Cell 1 shear pin failure – May 23rd
- Prim 3 sludge pump 19536 check valve failure – May 26th
- EPT sludge lines flushed with F.E. for line inspection – May 26th
- Prim 7 sludge pump failure 19616 – replaced May 28th
- North blend tank drained & O/S for inspection May 29th

- EPT gas detection panel failed – repaired – May 30th
- EPT 9/10 back in service – May 31st
- Grit Tank 5 back in service – May 31st
- Main power feeder bump H-14 – trip on H-17, some loss of equipment/restarted May 31st
- EPT scrubber recirc pump off for 1.5 hours due to power bump - May 31st

June

- 14 secondary bypass events – June 6th, June 6th - 7th, June 8th, June 12th - 13th, June 14th - 16th, June 17th, June 17th - 18th, June 18th, June 21st - 22nd, June 22nd - 23rd, June 23rd - June 25th, June 25th, June 26th, & June 29th
- GRF – 11 trucks
- 20 loads of alum ordered for EPT
- North blend tank back in service after inspection – June 1st
- Grit Tank 2/Screen 2 O/S for inspection – June 5th
- Capital Region supernatant flow increase from 0.8 MLD to 1.0 MLD – June 6th
- Secondary weir cleaning complete – June 6th
- Primary 4 dewatered for cleaning and chain replacement – June 7th
- Bypass gates 2736 lost communication / local control only – June 8th
- Spill of 1200 L of milk from Saputo – June 9th
- Grit Tank 5 incline auger jammed/cable – still in service for wet weather – June 12th
- Membrane product water pump PDP45348 broken check valve – June 13th
- Sec 9 cross collector broken shear pin – June 13th
- Sec 8 east drive broken shear pin – June 15th
- Sec bypass gate control issues – went back to old power supply for gates 35/36/49/50 – June 12th
- Blower 1 tripped – blown fuse – June 16th
- Grit Tank 2/Screen 2 back in service after inspection – June 16th
- 10 loads of alum ordered for EPT – June 16th
- Broken shear pin Sec 3 Cell 1 – June 17th
- Outfall 30 flodar repaired due to failure – June 17th
- Grit Tank 1/Screen 1 O/S drained for inspection – June 19th
- Density meter changed for EPT 9/10 – June 20th
- EPT 12 shear pin failure – June 21st
- Density meter changed for EPT 11/12 – June 21st
- New RAS 10 pump installed – June 21st
- Both raw samplers failed – grab samples taken – June 21st
- Sec 4 Cell 3 broken shear pin – June 22nd
- Both raw samplers failed – grab samples taken – June 22nd
- Membrane Train 3 aeration valve FV-8600 failed – June 22nd
- Supernatant flow to Capital Region increased to 0.7 MLD – June 22nd
- Broken shear pin EPT 12, Sec 4 Cell 3, Sec 10 Cell 1, Sec 8 Cell 3 – June 22nd
- Main raw sampler not working again – June 22nd
- Pre-screen 5 horizontal conveyor jammed with rags – June 22nd
- Raw samplers plugged – grab samples taken – June 23rd
- East scrubber chlorine detector AIT-0955 failed – calibration needed – June 23rd

- Membrane Train 6 cyclic air valve changed – June 23rd
- EPT 12 broken shear pin – June 24th
- Outfall 30 sump pump level indicator stopped reading – June 24th
- Train D west pump 45528 tripped – switched to Train C – June 24th
- Pre-screen 4 incline grit auger keeps tripping on VFD fault – June 24th
- 6 bags of poly delivered to DAF – June 24th
- Drainage reported spill of 2000L of skim milk from Saputo – June 25th
- Grit 4 incline auger belt broken & repaired – June 26th
- Broken shear pin Sec 3 – June 26th
- EPT 9 - 12 scum tank level indicator nor starting scum pumps – June 30th

July

- 8 secondary bypass events – July 2nd, 5th - 6th, 6th - 7th, 7th - 8th, 8th, 9th, 25th, & 31st
- GRF – 5 trucks
- Raw sampler issues – bottle switching – July 1st
- Sec 9 cross collector shear pin broken – July 1st
- Capital Region supernatant flow increased to 1.1 MLD – July 3rd
- EPT poly tote ordered – July 4th
- 1300 L of milk released to sewer by Saputo reported – July 7th
- Sec 10 RAS pump used for Sec 11 – RAS 11 pump O/S for repair – July 7th
- Grit Tank 3 O/S for cleaning & inspection – July 8th
- Broken shear pin Sec 8 Cell 3 – July 10th
- Sec 9 cross collector broken shear pin – July 10th
- Draining Grit Tank 5 to start to clean out grit – July 11th – returned July 12th
- Grit Tank 4 broken auger – July 11th
- Membrane west contact tank sample pump failed, using east pump – July 14th
- RAS 4 pump will not run in cascade – card failure – July 16th
- RAS 2 tripping – card failure – July 16th
- Bio/Sec 11 O/S for cleaning & inspection – July 16th
- Dig Square 1 transfer pump 20053 pin hole leak in spool – July 17th
- 4 Voltus shutdowns – July 16th, 18th, 26th, & 31st
- Grit Tank 4 O/S for auger repair – July 19th
- Grit Tank 4 back in service – July 21st
- Broken shear pin EPT 12 east drive – July 21st
- Sec 11/Bio 11 back to Ops – July 21st
- 3 Gold Bar WWTP AQMS H₂S exceedances – July 22nd, 25th, & 30th
- Membrane Train 1 air valve issues – resolved – July 26th
- Power interruption at Ostara. Blown fuse on power pole – July 27th
- 600-700 L of chromic acid released to sewer – July 27th
- EPT Scrubber recirc pump discharge for stilling well plugged, loss of ORP readings – July 30th
- PE sampler fridge not cooling – July 30th

August

- 3 secondary bypass events – Aug 4th, 5th, & 27th
- 11 trucks at GRF

- 1 dead duck found at U.V. – Aug 1st
- Membrane Train 6 permeate flow issue, off Aug 1st – back in service Aug 3rd
- Bypass Gate FG-2749 I/O input failure – Aug 2nd
- 45 Gold Bar AQMS H₂S exceedances
- Labatts caustic release 10 m³ to collection system – Aug 3rd
- Broken shear pin on Sec 8 Cell 4 – Aug 4th
- Broken shear pin on Sec 8 Cell 3 – Aug 5th
- Cell 5 dredge pumping started – Aug 5th
- Hidrostal loading pump failed – using backup pump – Aug 7th
- Dig 7/8 HEX inspection planned – Aug 8th
- UV transformer – planned for Aug 8th
- Pinhole leak RAS 11 discharge – Aug 8th – repaired Aug 9th
- Dewatered Grit Tank 5 to clean/repair auger/repair failed – Aug 9th
- Fermenter 2 in service – Aug 9th
- Draining Fermenter 3 for projects & inspection – Aug 9th
- Fire drill Admin Building – Aug 9th
- Broken shear pin Sec 9 Cell 3 – Aug 11th
- Membrane Train 1 aeration valve failed – Aug 11th – repaired Aug 15th
- Sec 10 Cell 1 broken shear pin – Aug 15th
- West Scrubber both bleach pumps tube failure – Aug 16th
- Transfer pump 20055 Digester Square 1 breaker failure – using backup pump – Aug 17th
- DAF 3/4 drained for inspection – Aug 17th
- Broken shear pin Primary 8 – Aug 19th
- DAF supernatant sent to headworks to help odour control – Aug 19th
- Labatts reported ammonia spill – no volume mentioned – Aug 21st
- Short term Outfall 30 sampler replaced – Aug 23rd
- Broken shear pin Sec 2 Cell 3 – Aug 23rd
- East scrubber ORP/pH meter pots plugged – hose setup to drain – Aug 23rd
- Broken shear pin Sec 4 Cell 5 – Aug 24th
- Broken shear pin Sec 9 – Aug 26th
- EPT 11 broken shear pin – Aug 27th
- Sec 10/Bio 10 O/S for clarifier inspection – Aug 28th
- Labatts reported spill 17.9 cubic meters of liquid with pH of 12 – Aug 28th
- External glycol spill reported by Drainage going to Gold Bar several thousand gallons – Aug 30th
- Outfall 10 flow meter replaced – Aug 30th

September

- 3 secondary bypass events – Sept 7th, 15th & 19th
- 5 trucks to GRF
- 5 Voltus shutdowns – Sept 1st, 11th, 13th, 15th & 27th
- Sec 10 back in service after inspection – Sept 2nd
- Broken shear pin Sec 8, Cell 3 – Sept 6th
- Recirc pump for blend tank replaced – Sept 6th
- Membrane bleach tote setup for day tank repair – Sept 7th
- Broken shear pin Sec 10, Cell 1 – Sept 7th

- BNR sampling completed – Sept 7th & 28th
- Membrane day tank repaired – Sept 8th
- Alum dosing for EPT set to mass – Sept 8th
- Sec 6 O/S for draining/inspection – Sept 11th
- EPT scrubber off line for nozzle & pump repair – Sept 13th
- Outfall 10 new sampler not working – E/I called in – Sept 15th
- Grit Tank 5 incline conveyor broken shear pin – Sept 17th
- Bio 1 MLSS meter failed – new one on order – Sept 19th
- Ostara off line – draining for end of season – Sept 19th
- Bio 1, Cell 3 mixer failed – Sept 21st
- Grit 6/7 carbon scrubber tripped due to low suction temp – running on hand – Sept 21st
- EPT 11 west collector drive broken shear pin – Sept 22nd
- Sec 7/Bio 7 in service after inspection – Sept 23rd
- EPT 12 cross collector broken shear pin – Sept 24th
- Sec 8, Cell 3 broken shear pin – Sept 25th
- Boiler house 1 boiler on line – Sept 26th
- Grit Building Carbon Scrubber media replaced – Sept 27th
- Sec 11, Cells 3/4 flights skipping – drive replaced – Sept 29th
- Dig 6 back in service after heat exchanger cleaning completed – Sept 29th
- DAF 1 O/S drained for cleaning and chain replacement – Sept 29th
- Broken shear pin Sec 10, Cell 1 – Sept 30th

October

- Secondary bypass events – 0 events
- GRF – 2 trucks – Oct 6th, 7th
- Broken shear pin Sec 2, Cell 3 – Oct 1st
- Labatts brewery reported 11 cubic meters of liquid with pH of 12 discharged to collection system – Oct 2nd
- Sec 6 dewatered & O/S for cleaning/inspection – Oct 2nd
- PE sampler not working, taking grab samples – pump replaced – Oct 2nd
- New curtain installed in Outfall 30 – Oct 4th
- Dig 8 PSVs replaced – Oct 4th
- K-102 O/S for Maintenance work – Oct 5th
- Broken shear pin Sec 8, Cell 3 – Oct 5th
- West Scrubber bleach tank level indicator level freezing up – Oct 7th
- Screen 1 has broken metal on chain track – O/S – Oct 8th
- Sec 6 back in service – Oct 9th
- Broken shear pin Sec 9, Cell 7/8 – Oct 9th
- EPT 12 broken shear pin cross collector – Oct 9th
- DAF 6 broken shear pin – Oct 10th
- EPT 12 broken shear pin – Oct 11th
- Ferm 3 back to Operations – ready for service – Oct 12th
- North flare set as lead to see if it helps with odors around plant – Oct 13th
- DAF 6 poly pump small leak at packing – Oct 13th
- Broken shear pin Sec 8, Cell 3 – Oct 15th
- UV Channel 3 O/S for bulb replacements – Oct 16th

- DAF 2 O/S for chain replacement – Oct 16th
- RAS 9 O/S for replacement – Oct 17th
- DeltaV upgrade started at Cloverbar/Ostara – Oct 17th
- DAF saturation tank failure – hole in tank – Oct 18th
- Acid clean Fermenter Scrubber/media replacement – Oct 18th – Back in service Oct 22nd
- Sec 7 drained for chain tightening – Oct 19th – Back in service Oct 21st
- FI-4003 Outfall 10 flow meter failure – all UV channels on line – Oct 20th
- Membrane bleach pump 26627 leaking – Oct 23rd
- Sec 1 dewatered for chain tightening – Oct 24th – In service Oct 27th
- Monitoring compliance called – City of Edmonton released 1000L of calcium chloride – Oct 23rd
- Train 2 membrane flow controller actuator failed – Oct 23rd
- EPT scum tank level indicator failed high – Oct 26th
- Broken shear pin EPT 12 east pass – Oct 26th
- West Scrubber recirc flow dropped off to zero – line has build up in it – Oct 27th
- Bleach pump 65318 tube failure – West Scrubber – Oct 28th
- West Scrubber bleach tank level indicator dropping out – Oct 28th
- EPT 9 shear pin switch keeps tripping – Oct 29th
- Switched flare back to south – north flare pilot keeps shutting down due to wind – Oct 29th
- Grit Tank 5 O/S for auger repair/inspection – Oct 29th
- UV Channel 1 only 79 bulbs on – set to lag 4 – Oct 30th
- Sec 10, Cell 1 broken shear pin – Oct 31st

November

- Secondary bypass events – 0 events
- 13 dead ducks found Sec/UV for Nov
- GRF off for season – 2 trucks at GRF Nov 3rd
- Grit Tank 5 auger repaired – back in service – Nov 3rd
- Fermenter Scrubber recirculation flow low – cleaned pumps/lines, media replaced – Nov 3rd
- Sec 7, Cell 7/8 broken shear pin – Nov 7th
- West Scrubber outage – Nov 8th
- DAF 5/6 TWAS pump replaced – Nov 9th
- West Scrubber bleach tank level indicator replaced – Nov 9th
- Outfall 30 short & long term samplers calibrated and commissioned – Nov 9th
- Sec 9 cross collector broken shear pin – Nov 9th
- Exhaust fan for lab not working – cold building – E/I called out – Nov 10th
- Sec 10, Cell 1 broken shear pin – Nov 10th
- Network outage – fiber cable cut – Nov 11th
- DAF 1 broken shear pin – Nov 11th
- Ferm 3 back in service – Ferm 4 O/S for sampling line modifications – Nov 15th
- South poly system auger not working – Nov 15th
- Channel 1 in service – Channel 3 O/S to drain Grit Tank 7 and to get the influent gate closed – Nov 15th

- Ferm Scrubber bleach pump failure – Nov 15th
- Influent Channel 3 back in service after Grit Tank 7 influent gate closed – Nov 17th
- PE sampler controller failed – replaced – Nov 17th
- EPT 11 broken shear pin – Nov 18th
- Blower 5 discharge valve failed to close – contactor failed O/S – Nov 18th
- East Scrubber foaming issues – Nov 20th
- Raw sampler not drawing sufficient sample – Nov 21st
- RAS 9 suction pipe leak – temp repair done – Nov 24th
- Fiber optic cable repaired for Ostara – Nov 24th
- Broken shear pin Sec 10, Cell 1 – Nov 26th
- Bleach pump to membrane plant leaking – O/S, totes ordered – Nov 28th
- Primary sludge line 1 elbow leak – changed to line 2 – Nov 30th
- Bleach pump to membrane facility repaired, back in service – Nov 30th

December

- Secondary bypass events – 0 events
- 29 dead ducks for the month of Dec
- 1 Voltus call – Dec 21st
- Fermenter 4 drained – Dec 1st
- RAS 9 suction piping leak patched – Dec 5th
- EPT poly system flushed with mineral oil – Dec 5th
- Prim 5 to 8 hot water scum tank cleaning – Dec 6th
- EPT 9/10 O/S for cleaning and inspection – Dec 4th
- East Scrubber nozzles replaced – Dec 7th
- Sec 9 cross collector broken shear pin – Dec 7th
- Sec 10 cross collector broken shear pin – Dec 9th
- P.E. sampler failed – grab samples taken – Dec 12th
- Plant power outage @ 10:20 – switch from Kennedale to Hardisty feed – UV lost for ~4 minutes – Dec 13th
- Planned power outage to switch back from Hardisty to Kennedale feed – UV lost for ~9 minutes @ 14:13 – Dec 13th
- Secondary 5 broken flight – Dec 14th – back in service Dec 15th
- RAS 11 leak patched – Dec 14th
- Vac/flusher truck cleaning out Scum 5 to 8 lines – Dec 15th
- Blower 5 repaired and available for use – Dec 19th
- Heater setup for grit tank 4/5 basement due to no heat – potable lines cracked/frozen sumps – Dec 19th
- DAF 3 in service after pressure tank repair – Dec 20th
- East Scrubber fan icing over, off 45 minutes to clean up – Dec 20th
- Water line from lab to Maint. Trailer leaking/cracked pipe/isolated – Dec 25th
- Air handling unit in DAF not working – Dec 26th
- Broken shear pin Sec 10 Cell 1 – Dec 27th
- Ferm Scrubber recirc pump tripping – E/I called in – Dec 29th
- Prim 7 scum discharge line plugged – Dec 29th
- Prim 8 scum pumps check valves plugged – Dec 30th

Appendix D – Air Pollution Control System Data

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
January 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
January 1, 2022	9.8	670.1	0.0	0.0	9.8	669.6	9.0	44.0	9.8	670.0	0.7	0.0	9.8	680.1	10.4	1178.1	24.3	-0.4	0.4	0.1	0.0		645.4
January 2, 2022	9.8	670.2	0.0	0.0	9.8	670.1	9.0	106.0	9.8	669.0	1.1	0.0	9.8	679.9	6.9	618.2	23.6	-0.4	0.4	0.1	0.0		608.2
January 3, 2022	9.8	670.0	0.0	0.0	9.8	670.1	8.8	1.5	9.8	670.0	2.8	0.0	9.8	680.1	5.2	405.1	23.4	-0.4	0.4	0.1	0.0		339.4
January 4, 2022	9.8	670.2	0.0	0.0	9.8	670.4	8.3	9.0	9.8	669.9	3.6	0.0	9.8	680.1	5.1	459.5	4.2	0.0	0.1	0.1	0.0		219.1
January 5, 2022	9.8	670.0	0.0	0.0	9.8	670.6	6.2	69.8	9.8	669.9	3.3	0.0	9.8	680.0	4.0	387.4	-3.0	0.0	0.0	0.1	0.0		100.5
January 6, 2022	9.8	670.1	0.0	0.0	9.8	670.0	4.0	157.8	9.8	669.7	3.2	0.0	9.8	680.1	4.9	494.6	11.3	0.0	0.0	0.2	0.0		0.0
January 7, 2022	9.8	670.0	0.0	0.0	9.8	669.7	5.0	31.1	9.8	670.2	2.9	0.0	9.8	680.2	4.7	447.0	2.6	0.0	0.0	0.1	0.0		11.16
January 8, 2022	9.8	670.1	0.0	0.0	9.8	669.8	6.0	1.0	9.8	669.9	0.4	0.0	9.8	680.1	2.7	200.1	-17.0	0.0	0.0	0.1	0.0		0.0
January 9, 2022	9.8	670.1	0.0	0.0	9.8	669.4	7.8	4.0	9.8	670.5	0.0	0.0	9.8	680.3	1.7	143.7	-6.4	0.0	0.0	0.1	0.0		0.0
January 10, 2022	9.8	669.8	0.0	0.0	9.8	671.1	9.1	10.6	9.8	669.2	0.9	0.0	9.8	680.1	1.6	107.7	3.8	0.0	0.0	0.1	0.0		0.0
January 11, 2022	9.8	669.9	0.0	0.0	9.7	665.6	29.7	151.3	9.8	667.1	7.6	0.0	9.8	680.0	4.1	350.8	13.7	-0.1	0.1	0.1	0.0		0.0
January 12, 2022	9.8	670.1	0.0	0.0	9.8	670.6	35.8	78.5	9.8	667.9	6.9	0.0	9.8	680.1	3.2	252.6	24.4	0.1	0.0	0.1	0.0		0.0
January 13, 2022	9.8	672.0	0.0	0.0	9.8	670.3	22.7	112.9	9.8	665.9	5.7	0.0	9.8	687.1	2.7	181.7	20.3	0.1	0.0	0.1	0.0		0.0
January 14, 2022	9.8	669.8	0.0	0.0	9.8	669.5	21.4	4.2	9.8	671.0	6.0	0.0	9.8	680.0	2.7	182.1	19.8	0.1	0.7	0.1	0.0		0.0
January 15, 2022	9.8	669.7	0.1	0.0	9.8	670.3	20.4	4.5	9.8	666.1	7.7	0.0	9.8	680.1	3.9	288.8	20.0	-0.4	0.4	0.1	0.0		0.0
January 16, 2022	9.8	667.6	0.3	0.0	9.8	669.7	20.5	5.6	9.8	630.1	7.8	0.0	9.8	679.9	3.8	279.4	20.0	-0.4	0.4	0.1	0.0		0.0
January 17, 2022	9.8	672.4	0.5	0.0	9.8	670.8	21.3	43.1	9.8	664.6	7.7	0.0	9.8	680.2	4.9	382.2	20.3	-0.4	2.1	0.1	0.0		0.0
January 18, 2022	9.8	669.3	0.3	0.0	9.8	670.9	10.2	10.3	9.8	669.3	3.3	0.0	9.8	680.1	3.3	312.8	22.1	-0.4	10.6	0.1	0.0		12.0
January 19, 2022	9.8	669.5	0.6	0.0	9.8	669.8	8.0	20.9	9.8	669.0	4.5	0.0	9.8	680.1	3.7	360.5	21.9	-0.4	10.5	0.1	0.0		37.2
January 20, 2022	9.8	670.8	1.3	0.0	9.8	669.8	10.5	5.7	9.8	667.6	6.1	0.0	9.8	680.0	4.1	344.6	21.3	-0.4	2.5	0.1	0.0		0.5
January 21, 2022	9.8	670.4	0.7	0.0	9.8	669.9	12.3	2.0	9.8	667.2	6.9	0.0	9.8	680.1	3.8	312.9	14.8	-0.2	0.2	0.1	0.0		0.1
January 22, 2022	9.8	669.9	0.6	0.0	9.8	670.0	12.0	4.9	9.8	665.2	7.0	0.0	9.8	680.1	4.8	370.9	5.2	0.0	0.0	0.1	0.0		0.0
January 23, 2022	9.8	670.4	0.6	0.0	9.8	670.3	9.9	16.6	9.9	665.4	4.3	0.0	9.8	680.1	4.0	313.9	10.3	-0.1	0.1	0.1	0.0		1.0
January 24, 2022	9.8	669.8	0.3	0.0	9.8	670.1	8.5	1.0	9.8	669.0	1.6	0.0	9.8	680.3	2.2	158.7	7.9	-0.2	0.2	0.1	0.0		12.7
January 25, 2022	9.8	671.7	0.5	0.0	9.8	668.4	9.7	2.4	9.8	667.7	4.7	0.0	9.8	690.0	3.7	315.8	3.7	-0.1	0.1	0.1	0.0		19.4
January 26, 2022	9.8	669.8	0.6	0.0	9.9	672.3	9.8	4.1	9.8	668.3	5.5	0.0	9.8	680.3	3.7	228.4	3.3	0.0	0.0	0.1	0.0		0.1
January 27, 2022	9.8	669.9	0.8	0.0	9.8	669.3	13.5	15.1	9.8	668.0	5.9	0.0	9.8	680.0	2.8	165.1	-0.1	0.0	0.0	0.1	0.0		0.0
January 28, 2022	9.8	669.8	0.9	0.0	9.8	670.2	12.9	1.0	9.8	667.4	7.9	0.0	9.8	680.1	4.1	263.9	-1.3	0.0	0.0	0.1	0.0		0.0
January 29, 2022	9.8	670.0	0.7	0.0	9.8	670.2	10.8	18.7	9.8	667.2	8.9	0.0	9.8	680.0	4.7	294.6	2.5	0.0	0.0	0.1	0.0		0.0
January 30, 2022	9.8	670.1	0.6	0.0	9.8	670.0	11.3	2.0	9.8	667.0	9.7	0.0	9.8	680.1	5.2	330.1	2.1	0.0	0.0	0.1	0.0		0.0
January 31, 2022	9.8	670.5	0.4	0.0	9.8	670.5	8.8	1.1	9.8	666.8	7.2	0.0	9.8	680.2	4.4	287.8	-9.4	0.0	0.0	0.1	0.0		10.2
Avg	9.8	670.1	0.3	0.0	9.8	670.0	12.7	30.4	9.8	667.0	4.9	0.0	9.8	680.6	4.1	336.1	10.0	-0.1	0.9	0.1	0.0		64.7
Min	9.8	667.6	0.0	0.0	9.7	665.6	4.0	1.0	9.8	630.1	0.0	0.0	9.8	679.9	1.6	107.7	-17.0	-0.4	0.0	0.1	0.0		3.85
Max	9.8	672.4	1.3	0.0	9.9	672.3	35.8	157.8	9.9	671.0	9.7	0.0	9.8	690.0	10.4	1178.1	24.4	0.1	10.6	0.2	0.0		645.4

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
February 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grift 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber	
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	
February 1, 2022	9.80	669.6	0.28	0.0	9.80	670.0	7.90	0.1	9.80	667.5	6.12	0.0	9.80	680.2	3.8	262.6	-15.7	0.04	0.00	0.1	0.0	48.1	0.0	
February 2, 2022	9.78	672.1	0.09	0.0	9.80	670.2	7.01	0.8	9.80	668.4	5.35	0.0	9.80	680.1	3.3	231.8	-18.3	0.04	0.00	0.1	0.0	50.5	0.0	
February 3, 2022	9.83	669.9	0.13	0.0	9.80	670.2	6.28	2.0	9.80	668.5	4.91	0.0	9.80	680.2	3.0	196.9	-1.4	-0.12	0.15	0.1	0.0	7.4	8.16	
February 4, 2022	9.79	669.9	0.23	0.0	9.79	669.2	9.43	15.5	9.80	666.6	5.79	0.0	9.80	680.0	3.4	234.4	22.7	-0.40	0.44	0.1	0.0	0.4	0.0	
February 5, 2022	9.80	670.0	0.17	0.0	9.80	669.8	11.11	161.5	9.79	666.6	6.47	0.0	9.80	680.1	4.0	267.0	20.8	-0.43	0.44	0.1	0.0	0.0	0.0	
February 6, 2022	9.80	670.1	0.18	0.0	9.80	670.2	11.94	0.5	9.81	666.7	5.72	0.0	9.79	679.9	5.1	353.9	19.6	-0.44	0.45	0.1	0.0	0.0	0.0	
February 7, 2022	9.79	670.8	0.09	0.0	9.80	669.8	11.71	5.3	9.68	664.2	2.73	0.0	9.79	686.3	3.0	151.2	19.4	-0.44	0.43	0.1	0.0	0.0	0.0	
February 8, 2022	9.80	670.1	0.21	0.0	9.79	669.4	8.65	2.3	9.77	669.8	2.77	0.0	9.80	680.3	2.9	133.3	19.2	-0.45	0.44	0.1	0.0	0.0	0.0	
February 9, 2022	9.80	670.0	0.11	0.0	9.80	670.4	11.46	0.3	9.81	670.3	2.86	0.0	9.81	680.3	2.4	99.9	19.3	-0.44	0.44	0.1	0.0	135.8	0.0	
February 10, 2022	9.81	669.9	0.06	0.0	9.80	671.1	4.96	0.2	9.80	669.9	0.09	0.0	9.80	680.6	0.5	3.0	18.9	-0.46	0.43	0.1	0.0	3.8	0.0	
February 11, 2022	9.81	670.1	0.00	0.0	9.81	669.7	4.33	21.6	9.80	670.0	0.26	0.0	9.80	680.2	0.6	5.3	19.8	-0.44	0.43	0.1	0.0	0.0	8.16	
February 12, 2022	9.80	669.7	0.00	0.0	9.80	669.8	6.03	20.7	9.82	668.5	2.32	0.0	9.80	680.1	2.1	83.0	19.9	-0.44	0.44	0.1	0.0	0.0	0.0	
February 13, 2022	9.80	670.2	0.00	0.0	9.79	669.4	6.57	7.9	9.79	668.1	3.17	0.0	9.78	680.0	3.4	153.2	19.3	-0.44	0.43	0.1	0.0	0.0	0.0	
February 14, 2022	9.80	670.0	0.00	0.0	9.80	669.8	9.09	8.5	9.80	668.3	3.40	0.0	9.81	680.2	2.6	111.2	19.7	-0.42	0.44	0.1	0.0	0.0	0.0	
February 15, 2022	9.80	670.1	0.00	0.0	9.80	669.9	9.30	4.2	9.80	666.4	4.38	0.0	9.80	680.1	3.5	169.4	20.0	-0.42	0.44	0.1	0.0	0.0	0.0	
February 16, 2022	9.81	697.9	0.08	0.0	9.80	670.0	10.38	19.1	9.80	661.1	3.22	0.0	9.80	680.1	2.9	140.8	20.6	-0.41	0.45	0.1	0.0	12.6	0.0	
February 17, 2022	9.79	670.3	0.00	0.0	9.80	670.1	11.07	19.3	9.80	667.5	3.10	0.0	9.79	680.0	3.6	158.7	19.9	-0.43	0.42	0.1	0.0	8.4	8.24	
February 18, 2022	9.81	669.6	0.00	0.0	9.80	670.0	7.92	9.0	9.80	666.2	3.00	0.0	9.81	680.2	2.7	119.6	20.2	-0.41	0.44	0.1	0.0	13.0	0.0	
February 19, 2022	9.79	670.4	0.00	0.0	9.80	670.0	7.94	12.0	9.79	664.1	4.32	0.0	9.80	680.1	3.6	148.1	19.6	-0.43	0.43	0.1	0.0	7.6	0.0	
February 20, 2022	9.81	669.7	0.00	0.0	9.80	669.7	9.54	5.1	9.81	664.4	3.98	0.0	9.80	680.1	3.0	144.9	21.0	-0.40	0.44	0.1	0.0	22.7	0.0	
February 21, 2022	9.80	669.9	0.00	0.0	9.80	669.8	10.25	1.3	9.80	666.6	3.33	0.0	9.80	680.1	2.8	140.8	21.3	-0.41	0.45	0.1	0.0	15.1	0.0	
February 22, 2022	9.80	670.0	0.00	0.0	9.80	670.0	8.60	6.0	9.80	667.2	3.28	0.0	9.80	680.2	2.8	122.4	21.4	-0.41	0.44	0.1	0.0	5.0	0.0	
February 23, 2022	9.80	669.8	0.00	0.0	9.81	677.5	3.17	8.1	9.80	667.8	4.82	0.0	9.80	680.1	3.0	43.7	21.1	-0.41	0.43	0.1	0.0	16.0	0.0	
February 24, 2022	9.78	673.7	0.00	0.0	9.79	668.5	2.08	19.7	9.72	669.8	4.53	0.0	9.80	683.4	2.3	10.8	22.3	-0.41	0.41	0.1	0.0	7.0	8.83	
February 25, 2022	9.80	670.0	0.00	0.0	9.79	668.8	2.94	40.5	9.80	669.5	3.96	0.0	9.80	680.2	2.3	0.0	25.9	-0.41	0.42	0.1	0.0	61.6	0.0	
February 26, 2022	9.80	670.2	0.00	0.0	9.80	670.3	3.86	54.8	9.80	669.2	4.36	0.0	9.97	668.9	3.0	0.0	25.4	-0.42	0.41	0.1	0.0	63.3	0.0	
February 27, 2022	9.80	670.1	0.00	0.0	9.80	670.1	3.71	56.5	9.80	668.3	4.75	0.0	9.99	671.6	2.4	13.4	25.6	-0.41	0.42	0.1	0.0	5.6	0.0	
February 28, 2022	9.81	670.2	0.09	0.0	9.80	670.1	3.60	25.8	9.80	669.2	4.19	0.0	9.80	680.1	1.7	48.3	25.7	-0.41	0.41	0.1	0.0	6.6	0.0	
Avg	9.80	671.2	0.06	0.0	9.80	670.1	7.53	18.9	9.79	667.6	3.81	0.0	9.81	679.8	2.8	126.7	17.6	-0.38	0.39	0.1	0.0	17.3	8.35	
Min	9.78	669.6	0.00	0.0	9.79	668.5	2.08	0.1	9.68	661.1	0.09	0.0	9.78	668.9	0.5	0.0	-18.3	-0.46	0.00	0.0	0.0	0.0	8.16	0.0
Max	9.83	697.9	0.28	0.0	9.81	677.5	11.94	161.5	9.82	670.3	6.47	0.0	9.99	686.3	5.1	353.9	25.9	0.04	0.45	0.1	0.0	135.8	8.83	

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
March 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber			GRF Scrubber				Grift 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber			
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)		
March 1, 2022	9.74	671.2	0.19	0.0	9.77	669.8	3.55	15.6	9.80	668.2	4.93	0.0	9.80	680.1	1.8	90.9	25.6	-0.41	0.42	0.1	0.0	0.1			
March 2, 2022	9.80	670.1	0.18	0.0	9.80	670.2	3.43	13.5	9.80	668.9	3.94	0.0	9.80	680.0	1.9	0.0	25.5	-0.41	0.43	0.1	0.0	0.0	54.9	9.02	
March 3, 2022	9.80	670.0	0.07	0.0	9.80	669.9	3.35	14.8	9.80	669.3	2.29	0.0	9.80	680.0	1.7	0.0	25.5	-0.41	0.43	0.1	0.0	0.0	93.0		
March 4, 2022	9.80	670.1	0.03	0.0	9.80	670.0	3.04	11.0	9.79	668.6	2.74	0.0	9.79	680.0	3.5	0.0	26.2	-0.40	0.42	0.1	0.0	0.0	7.4		
March 5, 2022	9.80	669.9	0.00	0.0	9.80	670.1	3.31	17.8	9.80	667.1	3.79	0.0	9.80	680.3	1.2	0.0	26.3	-0.41	0.43	0.1	0.0	0.0	1.2		
March 6, 2022	9.80	670.1	0.00	0.0	9.80	669.9	3.15	12.6	9.80	667.1	4.08	0.0	9.81	680.4	0.7	0.0	25.5	-0.41	0.42	0.1	0.0	0.0	14.0		
March 7, 2022	9.80	670.2	0.14	9.4	9.80	669.9	2.65	13.1	9.80	664.5	2.82	0.0	9.80	680.3	0.7	0.0	25.1	-0.43	0.40	0.1	0.0	0.0	1.3		
March 8, 2022	9.80	670.0	0.26	21.6	9.80	670.0	3.85	13.8	9.80	670.3	2.06	0.0	9.96	713.7	2.0	0.0	25.9	-0.41	0.42	0.1	0.0	0.0	8.7		
March 9, 2022	9.80	670.0	0.24	175.6	9.80	670.0	6.10	387.8	9.80	670.3	1.95	0.0	9.80	680.3	1.0	53.8	26.3	-0.40	0.42	0.1	0.0	0.0	47.9	23.55	
March 10, 2022	9.80	674.4	0.00	343.1	9.80	669.9	10.72	1217.5	9.78	670.3	1.51	158.5	9.78	686.2	1.3	402.0	26.5	-0.40	0.42	0.1	35.6	728.0			
March 11, 2022	9.80	672.8	0.00	291.7	9.80	669.7	11.81	1153.8	9.80	669.7	1.13	233.9	9.80	680.5	0.9	1939.2	26.2	-0.40	0.42	0.1	0.3	2290.5			
March 12, 2022	9.80	670.2	0.00	374.0	9.79	670.2	14.02	1385.7	9.79	670.2	0.92	220.1	9.79	673.0	1.7	3318.0	24.6	-0.42	0.42	0.1	2.5	1303.4			
March 13, 2022	9.80	670.1	0.00	395.9	9.81	670.0	9.14	879.5	9.80	669.7	0.67	197.8	9.81	695.7	0.6	942.1	25.5	-0.41	0.41	0.1	2.0	778.1			
March 14, 2022	9.80	669.9	0.00	391.7	9.79	669.7	11.25	1032.1	9.81	670.4	0.80	172.6	9.78	693.8	1.2	1840.4	25.2	-0.41	0.42	0.1	3.2	543.2			
March 15, 2022	9.80	670.0	0.00	348.4	9.79	670.5	11.93	876.0	9.82	669.9	0.55	158.7	10.77	727.0	2.2	5786.8	24.6	-0.42	0.40	0.1	3.1	36.5			
March 16, 2022	9.79	670.0	0.18	335.3	9.81	670.5	6.37	364.1	9.82	670.2	0.59	148.7	10.53	686.1	0.7	392.9	24.4	-0.43	0.41	0.1	7.2	24.0	26.07		
March 17, 2022	9.81	670.0	0.00	266.5	9.81	670.4	3.20	214.0	9.80	670.8	0.01	184.0	9.80	680.6	0.3	232.5	24.4	-0.42	0.41	0.1	6.2	257.7			
March 18, 2022	9.80	669.8	0.00	375.4	9.80	669.9	2.03	126.2	9.80	670.5	0.00	190.1	9.80	680.6	0.3	269.9	24.3	-0.42	0.41	0.1	0.6	187.3			
March 19, 2022	9.80	670.1	0.00	282.8	9.81	670.1	3.14	212.7	9.81	670.8	0.00	179.9	9.81	680.5	0.2	63.8	24.5	-0.42	0.41	0.1	1.9	168.1			
March 20, 2022	9.80	670.1	0.00	266.8	9.80	670.1	3.03	223.4	9.79	671.5	0.00	174.9	9.79	680.1	0.4	199.5	24.6	-0.42	0.41	0.1	0.9	287.0			
March 21, 2022	9.78	673.7	0.00	137.2	9.78	667.2	2.79	199.0	9.80	670.8	0.03	119.0	9.78	680.6	0.5	244.2	24.7	-0.42	0.42	0.1	3.6	265.3			
March 22, 2022	9.80	669.9	0.76	349.5	9.80	669.9	4.65	285.2	9.81	670.4	0.02	152.4	9.81	680.3	0.3	127.5	24.0	-0.43	0.42	0.1	2.8	171.5	22.08		
March 23, 2022	9.80	670.0	0.00	0.0	9.81	670.2	5.24	143.4	9.79	668.5	0.00	135.9	9.79	680.3	0.2	45.4	23.9	-0.43	0.40	0.1	3.2	0.0			
March 24, 2022	9.80	670.4	0.00	7.5	9.80	670.0	2.72	60.6	9.80	670.0	0.00	107.5	9.80	680.2	0.3	51.9	24.5	-0.43	0.41	0.1	0.0	0.0			
March 25, 2022	9.80	669.9	0.00	51.7	9.80	669.9	3.57	23.1	9.79	670.5	0.04	87.4	9.81	680.1	0.5	142.1	24.9	-0.42	0.42	0.1	1.3	3.5			
March 26, 2022	9.80	670.0	0.00	168.7	9.80	669.9	5.24	31.8	9.81	670.9	0.27	46.5	9.80	680.2	1.2	763.7	25.1	-0.41	0.41	0.1	1.1	2.5			
March 27, 2022	9.80	670.0	0.00	120.8	9.80	669.9	4.75	10.1	9.79	669.0	0.33	8.6	9.80	679.9	1.7	1365.2	24.9	-0.40	0.41	0.1	1.1	2.3			
March 28, 2022	9.80	670.0	0.00	124.4	9.80	669.9	6.09	6.2	9.80	670.7	0.39	10.0	9.80	674.6	2.2	2149.2	24.9	-0.42	0.55	0.1	0.9	3.2			
March 29, 2022	8.68	451.8	0.00	74.0	9.80	670.3	4.33	0.9	9.81	671.2	0.23	1.6	9.80	679.9	1.3	849.2	24.8	-0.42	1.06	0.1	5.7	2.4	11.83		
March 30, 2022	9.75	672.2	0.00	129.6	9.80	669.6	5.13	22.0	9.79	668.9	0.28	2.0	9.79	679.7	2.7	2666.0	24.1	-0.43	0.41	0.1	11.0	10.2			
March 31, 2022	9.80	670.0	0.03	45.2	9.80	669.9	4.82	84.8	9.80	669.8	0.06	1.9	9.80	680.2	3.5	4052.4	23.6	-0.34	0.78	0.1	11.3	2.1			
Avg	9.76	663.4	0.07	163.8	9.80	669.9	5.43	292.1	9.80	669.7	1.18	86.8	9.86	683.7	1.2	902.9	25.0	-0.41	0.45	0.1	3.5	235.3	18.51		
Min	8.68	451.8	0.00	0.0	9.77	667.2	2.03	0.9	9.78	664.5	0.00	0.0	9.78	673.0	0.2	0.0	23.6	-0.43	0.40	0.0	0.0	0.0	9.02		
Max	9.81	674.4	0.76	395.9	9.81	670.5	14.02	1385.7	9.82	673.0	4.93	233.9	10.77	727.0	3.5	5786.8	26.5	-0.34	1.06	0.1	35.6	2290.5	26.07		

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
April 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
April 1, 2022	9.80	669.8	0.00	0.0	9.80	669.8	6.18	74.7	9.80	668.5	0.59	0.0	9.82	680.5	2.4	2469.0	23.2	-0.28	0.99	0.1	12.8	73.2	
April 2, 2022	9.82	595.3	0.00	0.0	9.80	669.9	7.65	73.0	9.80	668.4	1.02	0.0	9.80	680.2	0.8	458.5	23.0	-0.29	0.99	0.1	16.2	190.5	
April 3, 2022	9.79	692.8	0.00	0.0	9.80	669.9	8.07	192.4	9.82	669.1	1.11	0.0	9.80	680.1	0.7	270.9	22.8	-0.29	0.97	0.1	14.2	38.4	
April 4, 2022	9.80	667.0	0.00	0.0	9.80	669.9	9.81	219.0	9.80	670.5	1.08	0.0	9.81	680.9	0.7	227.2	22.8	-0.29	0.97	0.1	16.8	22.4	
April 5, 2022	9.95	635.5	0.00	0.0	9.79	669.2	10.66	138.1	9.76	672.1	0.91	0.0	9.83	690.3	0.4	234.8	22.8	-0.31	1.02	0.1	44.4	0.0	
April 6, 2022	9.79	680.8	0.00	0.0	9.80	670.2	10.33	59.8	9.79	668.5	0.93	0.0	9.80	729.8	0.3	817.2	23.3	-0.24	0.99	0.1	81.3	39.6	
April 7, 2022	9.80	682.5	0.00	0.0	9.80	670.4	9.66	207.3	9.81	670.3	1.00	0.0	9.80	738.2	0.4	5020.2	22.9	-0.33	1.09	0.1	78.3	41.8	
April 8, 2022	9.80	669.9	0.06	0.0	9.79	669.5	9.64	209.3	9.79	669.0	1.60	0.0	9.80	716.3	0.4	5808.6	22.4	-0.31	1.00	0.1	90.2	0.0	3.84
April 9, 2022	9.81	670.4	0.00	0.0	9.80	669.9	9.78	194.6	9.80	668.5	1.79	0.0	9.80	689.7	0.5	3254.8	23.0	-0.30	1.00	0.1	82.7	63.3	
April 10, 2022	9.80	670.1	0.00	0.0	9.80	669.7	11.54	75.5	9.80	669.0	1.67	0.0	9.80	685.2	0.1	622.0	23.1	-0.30	1.01	0.1	60.9	14.1	
April 11, 2022	9.80	670.2	0.00	0.0	9.81	670.1	13.40	153.0	9.79	668.5	1.46	0.0	9.80	694.6	0.0	4521.1	23.2	-0.29	1.02	0.1	30.9	42.1	4.27
April 12, 2022	9.80	669.9	0.00	0.0	9.80	670.1	11.78	139.7	9.81	669.9	1.63	0.0	9.80	680.1	0.0	1753.1	23.3	-0.27	1.03	0.1	21.2	59.9	
April 13, 2022	9.80	670.0	0.00	0.0	9.80	670.1	10.58	143.3	9.79	668.9	1.32	0.0	9.80	680.2	0.0	1605.5	23.4	-0.28	1.03	0.1	16.9	55.3	
April 14, 2022	9.80	670.0	0.00	0.0	9.80	670.1	9.83	81.5	9.80	669.4	1.45	0.0	9.80	680.1	0.0	1725.5	23.5	-0.28	1.04	0.1	32.0	2.2	
April 15, 2022	9.80	670.0	0.00	0.0	9.80	669.7	10.62	0.6	9.79	668.2	1.86	0.0	9.80	680.1	0.0	1622.4	23.3	-0.28	1.03	0.1	35.7	12.1	
April 16, 2022	9.80	670.0	0.00	0.0	9.80	669.7	13.08	0.0	9.81	668.5	2.25	0.0	9.80	680.1	0.0	1288.2	23.2	-0.29	1.03	0.1	33.0	58.9	
April 17, 2022	9.80	669.9	0.00	0.0	9.80	527.7	15.21	30.4	9.77	665.9	2.32	0.0	9.80	680.1	0.0	1253.9	23.3	-0.29	1.03	0.1	35.0	38.8	
April 18, 2022	9.80	669.8	0.00	0.0	9.80	670.9	14.34	1.2	9.84	668.3	2.08	0.0	9.91	697.6	0.0	1887.9	23.0	-0.29	1.02	0.1	27.7	28.0	
April 19, 2022	9.81	670.8	0.00	0.0	9.79	669.7	15.94	41.1	9.84	672.1	1.67	0.0	9.84	687.6	0.2	2931.0	22.9	-0.28	1.05	0.0	19.6	8.5	
April 20, 2022	9.80	668.9	0.00	0.0	9.82	671.0	10.12	0.0	9.80	669.9	0.45	0.0	9.80	680.2	0.0	789.5	22.9	-0.28	1.14	0.1	12.5	1.7	
April 21, 2022	9.80	669.8	0.00	0.0	9.80	669.5	8.45	1.2	9.80	669.5	1.07	0.0	9.81	680.2	0.0	566.2	22.8	-0.29	1.02	0.1	7.4	8.9	
April 22, 2022	9.80	670.0	0.00	0.0	9.80	669.9	10.53	1.4	9.79	669.0	1.88	0.0	9.80	680.0	0.0	1079.8	22.9	-0.29	1.02	0.1	7.5	54.6	38.31
April 23, 2022	9.80	670.1	0.00	0.0	9.80	670.1	11.86	0.0	9.80	668.6	1.43	0.0	9.80	680.1	0.0	1353.1	22.5	-0.30	1.02	0.1	4.6	64.9	
April 24, 2022	9.80	669.7	0.00	0.0	9.80	669.8	13.17	3.1	9.81	668.2	1.95	0.0	9.80	680.0	0.0	1769.0	22.3	-0.30	1.02	0.1	2.7	83.4	
April 25, 2022	9.80	670.0	0.00	0.0	9.79	669.8	14.08	24.1	9.80	666.7	2.41	0.0	9.80	680.0	0.0	2260.8	22.2	-0.31	1.01	0.1	1.2	9.8	
April 26, 2022	9.80	669.9	0.00	0.0	9.80	669.4	17.82	53.2	9.80	667.0	2.57	0.0	9.80	679.9	0.0	2665.3	22.3	-0.29	1.01	0.1	0.7	0.3	
April 27, 2022	9.80	670.4	0.17	0.0	9.81	671.6	16.21	33.8	9.81	670.4	1.00	0.0	9.80	680.8	0.0	2474.2	22.6	-0.30	1.01	0.1	0.1	1.8	
April 28, 2022	9.79	669.2	0.00	0.0	9.77	669.3	8.75	0.0	9.80	669.0	0.34	0.0	9.80	680.2	0.0	58.8	22.6	-0.29	1.01	0.1	0.2	2.5	
April 29, 2022	9.79	670.3	0.10	0.0	9.80	670.0	14.86	2.4	9.80	669.4	0.67	0.0	9.80	680.0	0.0	657.6	22.5	-0.30	1.02	0.1	0.0	0.3	
April 30, 2022	9.81	669.3	0.00	0.0	9.81	669.7	12.93	0.0	9.81	668.6	1.16	0.0	9.80	680.0	0.0	1296.6	22.3	-0.31	1.02	0.1	0.0	29.7	83.89
Avg	9.81	667.7	0.01	0.0	9.80	665.2	11.56	71.8	9.80	669.0	1.42	0.0	9.81	687.1	0.2	1758.1	22.9	-0.29	1.02	0.1	26.2	34.9	32.58
Min	9.79	595.3	0.00	0.0	9.77	527.7	6.18	0.0	9.76	665.9	0.34	0.0	9.80	679.9	0.0	58.8	22.2	-0.33	0.97	0.0	0.0	0.0	3.84
Max	9.95	692.8	0.17	0.0	9.82	671.6	17.82	219.0	9.84	672.1	2.57	0.0	9.91	738.2	2.4	5808.6	23.5	-0.24	1.14	0.1	90.2	190.5	83.89

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
May 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
May 1, 2022	9.80	669.8	0.22	0.0	9.80	669.3	18.18	42.5	9.80	669.2	1.23	0.0	9.79	679.7	0.0	1968.2	22.1	-0.30	1.03	0.1	0.0	0.0	
May 2, 2022	9.80	670.1	0.00	0.0	9.80	670.7	13.84	56.7	9.79	670.4	1.39	0.0	9.79	680.2	0.0	1351.0	22.1	-0.30	1.01	0.1	0.1	0.0	
May 3, 2022	9.79	669.9	0.00	0.0	9.80	669.9	14.79	147.0	9.80	669.2	1.87	0.0	9.80	680.0	1.9	1406.5	22.5	-0.30	1.01	0.1	0.0	0.3	
May 4, 2022	9.80	670.3	0.03	0.0	9.80	670.0	14.14	266.9	9.80	668.8	1.87	0.0	9.80	680.1	7.1	1299.2	22.0	-0.31	1.01	0.1	0.0	15.6	
May 5, 2022	9.80	669.6	0.13	0.0	9.81	670.1	15.19	426.4	9.80	667.8	2.04	0.0	9.80	679.9	8.3	1655.9	22.1	-0.31	0.99	0.1	0.0	1.1	
May 6, 2022	9.81	670.6	0.12	0.0	9.80	670.1	15.10	735.7	9.80	669.0	1.80	0.0	9.80	680.3	9.8	2079.5	21.9	-0.31	0.99	0.1	0.0	4.0	380
May 7, 2022	9.80	670.2	0.02	0.0	9.80	669.7	16.15	509.2	9.79	668.3	1.76	0.0	9.80	680.0	8.0	1685.7	22.0	-0.30	1.00	0.1	0.0	30.5	
May 8, 2022	9.80	670.2	0.00	0.0	9.80	669.7	18.33	618.2	9.80	667.9	1.52	0.0	9.80	679.9	7.9	1677.7	22.3	-0.29	1.00	0.1	0.4	130.7	
May 9, 2022	9.80	670.2	0.35	79.4	9.80	670.0	20.07	0.0	9.80	667.8	1.65	0.0	9.80	680.1	7.6	1568.1	22.5	-0.29	1.01	0.1	0.0	320.2	
May 10, 2022	10.41	648.5	0.12	1.3	9.79	669.5	21.06	0.0	9.80	668.3	1.50	0.0	9.80	679.9	6.3	1547.5	22.8	-0.29	1.02	0.1	0.1	268.0	
May 11, 2022	10.69	597.2	0.01	13.9	9.81	670.1	19.49	0.0	9.77	667.0	1.75	0.0	9.80	680.0	2.3	210.0	22.3	-0.30	1.02	0.1	0.0	16.2	
May 12, 2022	9.81	672.8	0.00	0.0	9.80	669.7	22.08	50.1	9.80	666.3	1.96	0.0	9.80	679.9	2.2	189.6	21.7	-0.31	1.01	0.1	0.0	97.4	
May 13, 2022	9.80	674.3	0.00	0.0	9.80	670.1	22.33	123.1	9.80	666.5	1.76	0.0	9.80	679.9	2.2	175.3	22.2	-0.31	1.02	0.1	0.0	5.0	11.08
May 14, 2022	9.80	681.4	0.00	0.0	9.80	670.1	22.04	116.2	9.79	666.2	1.80	0.0	9.80	680.1	2.2	206.1	22.2	-0.31	1.01	0.1	0.0	1.6	
May 15, 2022	9.80	681.4	0.00	0.0	9.80	669.4	23.67	120.1	9.80	664.9	2.14	0.0	9.80	680.0	2.8	296.8	22.1	-0.32	1.01	0.1	0.0	100.5	
May 16, 2022	9.79	680.4	0.00	0.0	9.79	670.4	25.02	126.3	9.75	673.7	1.83	0.0	9.79	682.1	2.4	215.2	21.7	-0.32	1.01	0.1	0.0	2.9	
May 17, 2022	9.80	678.9	0.00	0.0	9.80	669.7	26.71	169.6	9.79	667.6	1.82	0.0	9.80	680.0	2.6	215.0	22.0	-0.31	1.01	0.0	0.0	0.4	
May 18, 2022	9.80	680.5	0.00	0.0	9.80	670.3	31.00	221.2	9.80	667.1	2.25	0.0	9.80	680.0	3.2	312.8	22.5	-0.31	1.01	0.1	0.0	13.2	
May 19, 2022	9.81	689.4	0.17	0.0	9.79	670.5	31.64	354.6	9.81	669.7	1.28	0.0	9.79	680.3	2.5	238.1	22.9	-0.30	0.99	0.1	0.0	0.6	11.46
May 20, 2022	9.79	683.8	0.00	0.0	9.82	671.0	20.92	168.9	9.79	668.7	0.85	0.0	9.81	680.1	0.5	5.3	22.9	-0.31	1.01	0.1	0.2	2.4	
May 21, 2022	9.80	669.5	0.00	0.0	9.79	669.2	20.80	85.3	9.80	668.2	1.81	0.0	9.80	680.0	1.6	129.2	22.5	-0.31	1.02	0.1	0.1	31.0	
May 22, 2022	9.80	670.2	0.00	0.0	9.80	670.2	23.28	105.8	9.80	667.8	1.70	0.0	9.80	680.0	1.7	136.3	22.0	-0.31	1.02	0.1	0.0	20.0	
May 23, 2022	9.79	669.5	0.01	0.0	9.80	669.8	22.45	113.1	9.80	666.7	2.03	0.0	9.80	680.1	1.7	135.7	22.0	-0.31	1.01	0.1	0.2	0.0	
May 24, 2022	9.73	669.9	0.12	0.0	9.48	678.9	23.47	625.3	9.80	664.6	2.47	0.0	9.80	680.1	1.9	127.8	21.9	-0.30	1.01	0.1	0.0	0.1	
May 25, 2022	9.74	667.9	0.89	87.3	9.83	672.8	24.61	158.8	9.80	664.9	3.02	0.0	9.78	679.6	2.5	250.3	21.9	-0.31	1.00	0.1	0.0	3.2	
May 26, 2022	9.81	668.2	0.00	0.0	9.81	671.4	16.36	117.3	9.81	669.5	1.68	0.0	9.82	681.0	1.3	87.9	21.9	-0.31	1.05	0.1	0.0	1.5	
May 27, 2022	9.80	668.9	0.24	0.0	9.79	669.6	14.71	82.4	9.80	666.2	3.67	0.0	9.78	679.5	1.9	156.6	21.6	-0.31	1.01	0.1	0.0	6.59	
May 28, 2022	9.81	671.2	0.04	0.0	9.80	670.1	14.06	79.4	9.81	667.8	2.14	0.0	9.82	681.0	1.2	60.7	21.8	-0.31	1.02	0.1	0.0	0.1	
May 29, 2022	9.80	669.3	0.35	0.0	9.79	668.8	17.43	153.2	9.80	666.2	3.48	0.0	9.80	680.0	1.6	109.2	22.1	-0.31	1.02	0.1	0.0	0.0	
May 30, 2022	9.80	670.3	0.15	0.0	9.80	669.8	21.38	143.1	9.79	665.9	3.53	0.0	9.80	680.1	1.5	98.5	22.1	-0.31	1.14	0.1	0.0	1.1	
May 31, 2022	9.80	669.8	0.41	0.0	9.81	670.3	23.30	169.8	9.87	664.2	4.14	0.0	9.96	672.4	1.9	196.1	22.0	-0.35	1.14	0.1	0.7	48.2	
Avg	9.84	669.8	0.11	5.9	9.79	670.4	20.44	196.3	9.80	667.6	2.06	0.0	9.80	679.9	3.2	638.4	22.1	-0.31	1.02	0.1	0.1	36.0	102.28
Min	9.73	597.2	0.00	0.0	9.48	668.8	13.84	0.0	9.75	664.2	0.85	0.0	9.78	672.4	0.0	5.3	21.6	-0.35	0.99	0.0	0.0	0.0	6.59
Max	10.69	689.4	0.89	87.3	9.83	678.9	31.64	735.7	9.87	673.7	4.14	0.0	9.96	682.1	9.8	2079.5	22.9	-0.29	1.14	0.1	0.7	320.2	380

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
June 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
June 1, 2022	9.80	672.2	0.15	0.0	9.59	668.0	21.77	540.8	9.80	666.6	4.26	0.0	9.80	679.9	2.6	269.4	22.2	-0.35	1.15	0.1	0.0	8.7	
June 2, 2022	9.80	668.7	0.15	0.0	9.81	670.5	19.77	61.1	9.79	667.1	4.47	0.0	9.80	680.6	3.0	342.8	22.1	-0.37	1.12	0.1	0.1	5.9	
June 3, 2022	9.80	669.6	0.20	0.0	9.80	669.6	18.52	34.6	9.80	666.3	4.92	0.0	9.80	681.0	3.3	393.6	22.8	-0.37	1.12	0.1	0.0	1.0	5.46
June 4, 2022	9.77	670.8	0.26	0.0	9.80	669.7	18.93	10.8	9.80	665.7	5.20	0.0	9.80	681.3	4.1	495.3	21.7	-0.36	1.12	0.1	0.0	1.3	
June 5, 2022	9.75	669.5	0.25	0.0	9.79	669.5	20.13	2.5	9.80	666.1	5.44	0.0	9.80	681.4	4.2	512.6	21.5	-0.36	1.12	0.1	0.0	0.9	
June 6, 2022	9.80	671.4	0.15	0.0	9.80	669.4	22.16	0.5	9.80	665.7	4.40	0.0	9.78	681.3	5.1	673.9	22.1	-0.35	1.08	0.1	0.0	0.3	
June 7, 2022	9.65	679.0	0.02	0.0	9.79	670.3	22.47	12.1	9.80	667.7	2.64	0.0	9.81	681.6	2.6	241.6	22.9	-0.34	1.10	0.1	0.0	3.0	
June 8, 2022	9.81	670.9	0.07	0.0	9.82	670.8	15.85	1.2	9.80	666.9	4.51	60.3	9.80	680.0	3.4	369.5	22.7	-0.34	1.12	0.1	34.6	39.9	
June 9, 2022	9.80	669.9	0.26	34.6	9.80	670.0	15.39	35.2	9.80	666.4	5.21	0.0	9.81	680.8	3.6	367.1	22.6	-0.34	1.11	0.1	0.0	11.2	
June 10, 2022	9.69	670.1	0.01	0.0	9.79	668.3	13.48	0.0	9.80	665.8	6.45	0.0	9.77	682.0	4.2	408.0	20.9	-0.36	1.10	0.1	0.0	0.9	4.3
June 11, 2022	9.81	671.0	0.02	0.0	9.80	670.6	15.83	0.0	9.80	663.6	7.84	0.0	9.80	681.2	6.0	772.9	20.9	-0.36	1.11	0.1	0.0	1.3	
June 12, 2022	9.80	670.7	0.04	0.0	9.81	670.2	13.25	0.1	9.81	664.6	6.45	0.0	9.80	681.6	5.8	771.2	20.1	-0.35	1.12	0.1	0.0	14.0	
June 13, 2022	9.80	677.7	0.00	0.0	9.81	680.6	12.53	7.5	9.81	667.6	4.22	0.0	9.79	680.8	2.4	168.4	20.7	-0.36	1.20	0.1	0.0	20.4	
June 14, 2022	9.82	672.5	0.02	0.0	9.79	670.5	15.91	210.9	9.82	670.8	1.44	0.0	9.80	680.6	3.6	459.0	19.9	-0.35	1.02	0.1	0.0	0.0	
June 15, 2022	9.80	670.1	0.00	0.0	9.82	671.3	6.37	51.2	9.80	669.9	0.00	0.0	9.81	680.5	0.2	2.4	20.1	-0.36	1.11	0.1	0.0	0.0	
June 16, 2022	9.80	669.7	0.00	0.0	9.80	669.8	3.40	0.0	9.80	669.7	0.09	0.0	9.80	680.1	0.2	0.0	20.6	-0.37	1.11	0.1	0.0	0.0	
June 17, 2022	9.79	670.1	0.00	0.0	9.80	670.1	4.20	7.4	9.80	669.7	0.34	0.0	9.78	680.0	1.6	60.7	20.6	-0.36	1.12	0.1	0.0	0.0	2.78
June 18, 2022	9.80	669.2	0.00	0.0	9.79	669.7	4.06	0.0	9.80	669.6	1.34	0.0	9.81	680.6	1.7	49.2	20.4	-0.35	1.06	0.1	0.0	0.0	
June 19, 2022	9.80	669.5	0.00	0.0	9.80	669.4	5.69	0.0	9.80	668.5	2.28	0.0	9.80	680.0	1.2	31.9	20.4	-0.36	1.10	0.1	0.0	0.0	
June 20, 2022	9.80	670.2	0.01	0.0	9.79	669.5	8.04	11.7	9.80	668.7	3.20	0.0	9.80	680.2	2.1	151.1	20.3	-0.37	1.10	0.1	0.0	0.0	
June 21, 2022	9.79	669.0	0.06	0.0	9.81	669.8	9.31	17.4	9.80	667.5	4.00	0.0	9.77	679.1	4.4	610.2	21.2	-0.36	1.11	0.1	0.0	0.2	
June 22, 2022	9.81	671.8	0.14	0.0	9.77	667.9	12.69	140.7	9.81	670.4	2.73	0.0	9.81	681.1	4.8	683.8	20.3	-0.35	1.14	0.1	0.0	5.3	
June 23, 2022	9.80	670.4	0.00	0.0	9.83	673.2	5.79	11.2	9.81	670.1	1.00	0.0	9.79	680.1	2.7	282.4	20.1	-0.35	1.10	0.1	0.0	0.1	
June 24, 2022	9.80	670.0	0.00	0.0	9.80	670.9	4.70	4.1	9.80	669.9	0.00	0.0	9.83	681.2	0.5	32.1	20.3	-0.35	1.11	0.1	0.0	0.0	9.69
June 25, 2022	9.80	668.7	0.00	0.0	9.81	670.1	3.11	0.8	9.80	669.8	0.11	0.0	9.80	680.5	0.8	32.8	20.5	-0.37	1.11	0.1	0.0	0.0	
June 26, 2022	9.79	669.9	0.01	0.0	9.80	669.2	4.40	0.0	9.80	669.8	0.63	0.0	9.80	680.1	1.3	99.3	21.2	-0.36	1.11	0.1	0.0	0.0	
June 27, 2022	9.80	680.9	0.00	0.0	9.77	668.4	6.94	0.0	9.79	669.3	1.39	0.0	9.46	670.5	1.2	26.0	20.2	-0.37	1.12	0.1	0.0	0.0	
June 28, 2022	9.87	670.4	0.01	0.0	9.81	670.8	8.82	24.0	9.86	661.3	2.82	0.0	9.60	679.2	4.6	1357.3	20.3	-0.35	0.92	0.1	0.0	0.0	
June 29, 2022	9.71	675.2	0.02	0.0	9.80	670.1	8.90	42.6	9.90	660.4	1.42	0.0	9.85	680.2	3.0	711.2	20.2	-0.37	0.95	0.1	0.0	0.6	
June 30, 2022	9.80	669.8	0.06	0.0	9.80	669.7	8.58	12.9	9.80	668.7	2.82	0.0	9.80	679.9	1.9	356.7	20.7	-0.36	1.10	0.1	0.0	0.0	10.08
Avg	9.79	671.3	0.06	1.2	9.79	670.3	11.70	41.4	9.81	667.5	3.05	2.0	9.78	680.2	2.9	357.7	21.0	-0.36	1.10	0.1	1.2	3.8	6.46
Min	9.65	668.7	0.00	0.0	9.59	667.9	3.11	0.0	9.79	660.4	0.00	0.0	9.46	670.5	0.2	0.0	19.9	-0.37	0.92	0.1	0.0	0.0	2.78
Max	9.87	680.9	0.26	34.6	9.83	680.6	22.47	540.8	9.90	670.8	7.84	60.3	9.85	682.0	6.0	1357.3	22.9	-0.34	1.20	0.1	34.6	39.9	10.08

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
July 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
July 1, 2022	9.80	670.4	0.00	0.0	9.81	670.0	9.37	11.0	9.80	668.3	3.28	0.0	9.80	680.0	2.7	633.4	20.1	-0.36	1.12	0.1	0.0	0.0	
July 2, 2022	9.80	670.8	0.01	0.0	9.80	670.1	10.79	60.5	9.81	670.8	1.48	0.0	9.80	680.0	2.2	505.5	19.8	-0.35	1.06	0.1	0.0	0.0	
July 3, 2022	9.80	669.2	0.00	0.0	9.80	669.6	8.66	22.3	9.79	668.7	1.60	0.0	9.80	680.0	1.0	140.0	20.5	-0.36	1.11	0.1	0.0	0.0	
July 4, 2022	9.80	670.2	0.00	0.0	9.80	669.8	10.30	14.7	9.80	667.7	3.16	0.0	9.80	679.9	1.8	334.8	20.5	-0.35	1.11	0.1	0.0	0.0	
July 5, 2022	9.80	671.0	0.00	0.0	9.81	671.1	11.59	71.4	9.81	670.0	1.55	0.0	9.80	680.1	3.1	794.8	20.0	-0.35	0.98	0.1	0.0	0.0	
July 6, 2022	9.80	669.7	0.00	0.0	9.80	669.8	7.24	2.5	9.80	669.8	0.23	0.0	9.80	680.2	1.0	161.4	20.4	-0.35	1.11	0.2	0.0	0.0	
July 7, 2022	9.79	668.6	0.02	0.0	9.79	669.7	6.57	0.1	9.80	668.8	1.34	0.0	9.79	679.7	1.7	336.6	20.8	-0.35	1.12	0.1	0.0	0.0	
July 8, 2022	9.79	669.2	0.05	0.0	9.80	670.1	6.11	1.8	9.79	668.5	1.61	0.0	9.81	680.3	2.0	411.3	21.2	-0.37	1.11	0.1	0.0	0.0	0
July 9, 2022	9.80	669.5	0.12	0.0	9.80	669.6	7.54	0.4	9.80	666.2	4.08	0.0	9.79	679.7	3.3	803.5	20.9	-0.37	1.10	0.1	0.0	0.0	
July 10, 2022	9.81	670.1	0.04	0.0	9.80	669.7	9.63	8.5	9.80	664.7	4.26	0.0	10.22	683.8	2.8	854.1	21.0	-0.38	1.09	0.1	0.0	0.0	
July 11, 2022	9.80	675.4	0.00	0.0	9.80	670.0	10.58	13.4	9.81	663.8	5.71	0.0	10.38	689.8	3.1	1438.0	21.8	-0.37	1.09	0.1	0.0	0.0	
July 12, 2022	9.80	669.8	0.03	0.0	9.79	671.1	12.26	37.1	9.80	665.8	4.82	0.0	9.80	679.9	2.5	467.4	23.8	-0.38	1.08	0.1	0.0	0.0	
July 13, 2022	9.80	670.5	0.00	0.0	9.80	669.7	13.72	38.8	9.79	663.9	6.12	0.0	9.80	679.9	3.2	705.5	21.0	-0.38	1.09	0.1	0.0	0.1	
July 14, 2022	9.78	670.6	0.01	0.0	9.80	669.5	16.26	88.1	9.80	664.5	6.99	0.0	9.80	680.0	4.2	1031.1	21.6	-0.40	1.08	0.1	0.0	3.6	
July 15, 2022	9.80	669.9	0.02	0.0	9.80	670.6	17.31	53.9	9.80	663.9	6.19	0.0	9.80	680.0	3.6	816.6	22.8	-0.38	1.08	0.1	0.0	0.0	6.36
July 16, 2022	9.80	670.2	0.09	0.0	9.80	669.7	17.32	63.1	9.79	664.1	6.98	0.0	9.80	680.0	4.6	1192.9	23.4	-0.38	1.08	0.1	0.0	0.3	
July 17, 2022	9.80	669.7	0.02	0.0	9.80	669.7	17.09	35.0	9.81	665.8	5.26	0.0	9.80	680.0	2.9	605.2	21.4	-0.37	1.10	0.1	0.0	0.3	
July 18, 2022	9.79	669.8	0.11	0.0	9.79	669.4	19.92	32.9	9.79	663.2	6.21	0.0	9.80	679.9	3.7	885.0	22.1	-0.36	1.09	0.1	0.0	0.0	
July 19, 2022	9.81	669.7	0.19	0.0	9.79	669.0	21.95	46.8	9.79	637.6	6.35	2.2	9.80	679.9	4.0	964.0	22.8	-0.37	1.09	0.1	0.0	0.7	
July 20, 2022	9.80	670.1	0.29	0.0	9.80	670.0	21.59	53.0	9.78	663.8	6.51	0.0	9.80	679.9	4.8	1257.6	20.3	-0.36	1.10	0.1	0.0	2.6	26.37
July 21, 2022	9.81	669.9	0.34	0.0	9.80	669.9	20.55	56.3	9.80	663.0	8.01	0.0	9.80	680.0	5.2	1501.8	21.6	-0.37	1.08	0.1	0.0	0.0	
July 22, 2022	9.80	670.0	0.25	0.0	9.81	670.9	18.48	22.5	9.80	664.6	8.14	0.0	9.80	679.9	5.0	1470.1	20.4	-0.37	1.10	0.1	0.0	0.1	
July 23, 2022	9.79	670.0	0.18	0.0	9.80	669.6	19.60	31.8	9.79	659.3	8.06	0.0	9.80	674.1	6.0	2024.3	20.0	-0.37	1.11	0.1	0.0	0.2	
July 24, 2022	9.81	670.4	0.22	0.0	9.80	669.1	22.15	43.1	9.81	663.6	8.63	0.0	9.79	658.7	6.5	2183.6	21.4	-0.37	1.10	0.1	0.0	0.0	
July 25, 2022	9.77	672.7	0.79	29.1	9.80	672.5	24.12	50.3	9.80	661.2	9.03	0.0	9.78	677.2	7.9	3464.5	19.6	-0.30	1.03	0.0	0.0	0.7	
July 26, 2022	9.81	671.5	0.45	0.0	9.81	670.3	18.86	194.7	9.80	666.2	8.83	0.0	9.81	642.7	6.1	1957.0	20.2	-0.37	1.11	0.1	0.0	3.4	
July 27, 2022	9.81	670.3	0.47	0.0	9.80	670.1	18.16	91.3	9.80	666.9	7.28	0.0	9.81	639.6	5.7	1901.6	22.6	-0.37	1.10	0.1	0.0	7.5	37.11
July 28, 2022	9.75	697.1	0.43	0.0	9.72	669.7	18.66	67.3	9.80	667.1	7.54	0.0	9.79	665.4	5.4	1840.0	24.0	-0.37	1.07	0.1	0.0	16.7	
July 29, 2022	9.80	669.1	0.49	0.0	9.79	669.2	20.50	11.4	9.80	666.4	8.76	0.0	9.81	650.7	5.5	1751.7	23.7	-0.37	1.09	0.1	0.0	0.5	
July 30, 2022	9.80	670.3	0.56	0.0	9.80	669.7	20.24	2.9	9.81	663.8	9.04	0.0	9.80	645.2	7.2	2274.9	22.5	-0.36	1.09	0.1	0.0	1.1	
July 31, 2022	9.79	670.9	0.74	235.0	9.80	669.5	19.88	0.3	9.81	662.8	6.94	0.0	9.80	680.3	9.1	3243.2	19.2	-0.35	1.12	0.1	0.0	4.6	
Avg	9.80	671.2	0.19	8.5	9.80	670.0	15.39	39.6	9.80	664.7	5.61	0.1	9.83	674.4	4.1	1224.2	21.3	-0.36	1.09	0.1	0.0	1.4	17.46
Min	9.75	668.6	0.00	0.0	9.72	669.0	6.11	0.1	9.78	637.6	0.23	0.0	9.78	639.6	1.0	140.0	19.2	-0.40	0.98	0.0	0.0	0.0	0
Max	9.81	697.1	0.79	235.0	9.81	672.5	24.12	194.7	9.81	670.8	9.04	2.2	10.38	689.8	9.1	3464.5	24.0	-0.30	1.12	0.2	0.0	16.7	37.11

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
August 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
August 1, 2022	9.80	667.5	0.40	0.0	9.82	671.4	15.31	0.4	9.79	664.8	8.45	0.0	9.79	679.7	5.0	1507.4	20.2	-0.35	1.12	0.2	0.0	27.3	
August 2, 2022	9.82	673.2	0.44	0.0	9.80	669.4	15.89	1.1	9.80	666.1	7.38	0.0	9.80	680.0	5.3	1702.8	18.6	-0.35	1.09	0.1	0.0	2.3	
August 3, 2022	9.80	669.4	0.37	0.0	9.80	669.6	17.38	14.8	9.80	665.8	8.61	0.0	9.80	680.1	5.6	1811.9	17.6	-0.36	1.11	0.1	0.0	0.4	28.8
August 4, 2022	9.81	671.9	0.51	110.4	9.80	670.3	20.54	72.4	9.80	667.1	6.16	0.0	9.79	679.5	6.4	2201.8	17.3	-0.36	1.06	0.1	0.0	11.7	
August 5, 2022	9.79	669.1	0.29	22.7	9.81	671.1	13.45	4.3	9.80	666.9	6.72	0.0	9.81	681.0	5.1	1666.8	15.3	-0.36	1.10	0.1	0.0	0.5	
August 6, 2022	9.80	669.8	0.23	0.0	9.80	669.7	18.05	44.8	9.80	667.1	6.24	0.0	9.80	680.1	3.7	1094.9	17.0	-0.37	1.11	0.1	0.0	0.4	
August 7, 2022	9.78	670.2	0.09	0.0	9.80	670.1	15.31	4.7	9.79	666.1	6.25	0.0	9.80	680.3	5.3	1791.3	21.0	-0.36	1.09	0.1	0.0	0.0	
August 8, 2022	9.82	669.8	0.23	0.0	9.79	670.6	17.39	5.4	9.80	665.9	7.55	0.0	9.80	680.0	4.4	1360.6	19.9	-0.37	1.07	0.1	0.0	1.4	
August 9, 2022	9.80	669.5	0.27	0.0	9.74	663.6	21.50	285.5	9.80	665.3	10.23	0.0	9.80	679.8	6.4	2109.1	18.3	-0.37	1.11	0.1	0.0	0.3	15.39
August 10, 2022	9.75	673.1	0.26	0.0	9.79	671.4	28.98	328.0	9.79	667.6	9.49	0.0	9.77	688.3	6.5	2290.7	20.5	-0.37	1.10	0.1	0.0	0.3	
August 11, 2022	9.82	669.3	0.16	0.0	9.82	671.7	22.05	201.6	9.80	666.0	8.78	0.0	9.80	680.0	5.1	1786.0	21.4	-0.36	1.09	0.1	0.0	3.7	
August 12, 2022	9.79	670.6	0.07	0.0	9.80	669.6	19.92	155.7	9.80	665.0	10.14	0.0	9.80	680.0	5.3	1937.2	21.7	-0.37	1.10	0.1	0.0	1.0	
August 13, 2022	9.80	669.4	0.04	0.0	9.80	669.7	20.72	155.2	9.80	665.4	9.18	0.0	9.79	679.6	6.5	2449.8	23.4	-0.37	1.09	0.1	0.0	3.2	
August 14, 2022	9.80	670.3	0.07	0.0	9.81	665.4	22.88	161.6	9.80	665.6	9.82	0.0	9.81	680.5	8.4	3272.4	21.5	-0.37	1.09	0.1	0.0	0.3	
August 15, 2022	9.80	667.8	0.09	0.0	9.79	674.1	22.71	106.2	9.80	665.2	9.35	0.0	9.80	680.0	5.8	2192.6	21.3	-0.38	1.10	0.1	0.0	2.7	
August 16, 2022	9.80	671.0	0.13	0.0	9.80	670.4	24.17	236.7	10.17	530.2	11.88	78.4	9.80	681.0	6.2	2475.9	21.6	-0.36	1.10	0.1	0.0	1.1	23.65
August 17, 2022	9.80	671.0	0.06	0.0	9.78	669.3	25.09	398.8	9.87	662.8	10.48	1.5	9.84	678.3	6.3	2662.2	21.4	-0.37	1.10	0.1	0.0	1.7	
August 18, 2022	9.80	670.4	0.09	0.0	9.80	669.8	30.05	385.1	9.80	665.5	11.89	0.0	9.80	676.5	6.2	2666.2	21.8	-0.37	1.10	0.1	0.0	11.0	
August 19, 2022	9.81	670.3	0.04	0.0	9.80	669.8	32.82	382.3	9.80	666.0	11.11	0.0	9.81	663.3	6.3	2881.0	24.1	-0.38	1.08	0.1	0.0	0.0	
August 20, 2022	9.79	670.5	0.04	0.0	9.79	669.4	31.97	326.2	9.80	666.4	10.78	0.0	9.80	679.9	4.8	2193.6	23.4	-0.37	1.09	0.1	0.0	1.8	
August 21, 2022	9.82	669.8	0.00	0.0	9.80	669.7	33.13	232.7	9.80	665.4	10.98	0.0	9.80	679.9	5.4	2353.5	21.7	-0.37	1.10	0.1	0.0	0.1	
August 22, 2022	9.79	669.8	0.01	0.0	9.80	669.5	35.78	335.3	9.80	666.1	10.57	0.0	9.80	680.1	5.3	2373.7	20.6	-0.37	1.11	0.1	0.0	0.8	
August 23, 2022	9.79	671.5	0.00	0.0	9.80	669.9	37.64	252.8	9.80	665.3	11.59	0.0	9.80	679.9	4.9	2168.9	21.2	-0.37	1.10	0.0	0.0	0.3	41.28
August 24, 2022	9.82	680.8	0.00	0.0	9.75	665.8	37.66	243.6	9.80	662.5	11.02	0.0	9.80	678.4	5.5	2443.8	21.2	-0.37	1.10	0.1	0.0	36.1	
August 25, 2022	9.80	669.7	0.00	0.0	9.73	670.1	41.44	1088.1	9.80	665.5	12.31	0.0	9.81	679.7	5.2	2183.7	22.2	-0.37	1.09	0.1	0.0	5.1	
August 26, 2022	9.79	670.0	0.00	0.0	9.79	669.0	43.19	1178.3	9.80	666.2	11.67	0.0	9.80	679.9	4.3	1680.3	22.7	-0.37	1.08	0.1	0.0	0.0	
August 27, 2022	9.81	670.0	0.00	0.0	9.80	670.8	51.12	3037.2	9.80	662.4	11.04	0.0	9.80	679.9	5.4	2159.6	19.0	-0.35	1.09	0.1	0.0	1.0	
August 28, 2022	9.81	671.2	0.00	0.0	9.80	671.2	51.34	3394.2	9.80	666.4	8.25	0.0	9.80	680.3	3.5	1291.8	18.2	-0.36	1.10	0.1	0.0	0.5	
August 29, 2022	9.78	677.3	0.00	0.0	9.79	669.1	55.12	3905.5	9.79	665.2	9.95	0.0	9.80	680.0	3.7	1381.0	18.7	-0.36	1.10	0.1	0.0	4.5	
August 30, 2022	9.80	671.2	0.00	0.0	9.81	669.5	50.49	3631.2	9.80	665.5	9.86	0.0	9.80	680.0	4.4	1776.0	21.4	-0.37	1.09	0.1	0.0	19.7	43.01
August 31, 2022	9.81	670.0	0.00	0.0	9.81	670.3	50.42	3163.7	9.80	627.1	10.41	0.0	9.80	680.0	4.1	1606.2	22.5	-0.37	1.09	0.1	0.0	3.2	
Avg	9.80	670.8	0.13	4.3	9.79	669.7	29.79	765.6	9.81	660.0	9.62	2.6	9.80	679.5	5.4	2047.5	20.6	-0.37	1.10	0.1	0.0	4.6	30.43
Min	9.75	667.5	0.00	0.0	9.73	663.6	13.45	0.4	9.79	530.2	6.16	0.0	9.77	663.3	3.5	1094.9	15.3	-0.38	1.06	0.0	0.0	0.0	15.39
Max	9.82	680.8	0.51	110.4	9.82	674.1	55.12	3905.5	10.17	667.6	12.31	78.4	9.84	688.3	8.4	3272.4	24.1	-0.35	1.12	0.2	0.0	36.1	43.01

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
September 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
September 1, 2022	9.81	670.1	0.00	0.0	9.80	669.4	51.45	3335.5	9.81	666.5	9.66	0.0	9.80	680.1	3.6	1375.1	20.6	-0.37	1.09	0.1	0.0	7.7	
September 2, 2022	9.80	669.9	0.00	0.0	9.81	671.2	51.94	3967.7	9.80	666.2	10.27	0.0	9.80	680.4	4.2	1680.0	20.5	-0.36	1.09	0.1	0.0	0.1	
September 3, 2022	9.78	670.3	0.00	0.0	9.80	670.1	51.39	4268.0	9.80	666.4	9.02	0.0	9.80	680.4	4.3	1759.0	22.2	-0.37	1.09	0.1	0.0	0.0	
September 4, 2022	9.81	670.1	0.00	0.0	9.80	668.3	54.44	4725.8	9.80	666.3	8.21	0.0	9.80	680.0	4.1	1705.0	21.7	-0.37	1.09	0.1	0.0	0.4	
September 5, 2022	9.81	670.2	0.00	0.0	9.80	670.0	54.26	4367.7	9.80	667.1	6.47	0.0	9.80	680.2	2.8	1093.8	18.6	-0.37	1.10	0.1	0.0	0.6	
September 6, 2022	9.80	669.5	0.00	0.0	9.81	671.3	51.67	4363.0	9.79	664.0	9.38	0.0	9.80	680.0	3.4	1400.9	16.3	-0.37	1.12	0.1	0.0	30.4	35.3
September 7, 2022	9.79	669.9	0.01	0.0	9.80	670.5	49.49	5000.7	9.79	662.1	13.18	0.0	9.78	679.1	7.5	3621.7	15.6	-0.36	1.12	0.1	0.0	49.0	
September 8, 2022	9.81	673.9	0.00	0.0	9.79	668.4	48.04	4762.4	9.81	660.4	11.06	0.0	9.81	682.6	6.2	2796.2	14.1	-0.36	1.12	0.1	0.0	32.9	
September 9, 2022	9.80	670.0	0.00	0.0	9.79	670.0	49.66	3628.4	9.80	667.4	9.19	0.0	9.80	680.2	4.8	2063.7	13.2	-0.37	1.13	0.1	0.0	8.3	
September 10, 2022	9.80	670.2	0.00	0.0	9.79	670.4	49.80	4122.2	9.80	667.0	5.74	0.0	9.80	680.1	4.0	1690.7	14.8	-0.37	1.12	0.1	0.0	11.4	
September 11, 2022	9.80	670.0	0.00	0.0	9.80	669.4	48.87	4010.4	9.80	667.4	0.03	0.0	9.80	680.1	3.4	1445.3	17.1	-0.37	1.11	0.1	0.0	1.2	
September 12, 2022	9.80	669.7	0.00	0.0	9.76	667.1	50.33	3211.9	9.79	666.4	0.00	0.0	9.66	722.5	5.0	1644.9	16.0	-0.37	1.12	0.2	0.0	2.9	
September 13, 2022	9.80	670.1	0.00	0.0	9.86	673.6	48.34	2633.5	9.80	665.9	0.00	0.0	9.04	687.8	3.8	776.7	15.8	-0.36	1.12	0.1	0.0	5.5	6.94
September 14, 2022	9.80	670.4	0.00	0.0	9.80	670.3	44.54	3288.2	9.80	666.0	0.00	0.0	9.80	680.3	4.2	1222.2	15.0	-0.36	1.13	0.1	0.0	52.8	
September 15, 2022	9.78	668.0	0.60	97.8	9.81	671.4	48.89	5144.5	9.79	665.8	5.65	122.9	9.76	679.8	8.5	4003.2	15.6	-0.37	1.13	0.1	113.5	869.0	
September 16, 2022	9.82	672.2	0.05	0.0	9.81	671.0	47.52	7996.1	9.81	667.5	10.08	0.0	9.85	683.4	4.4	2549.9	15.3	-0.36	1.20	0.1	0.0	56.9	
September 17, 2022	9.77	665.4	0.06	0.0	9.79	668.9	40.06	6954.5	9.80	667.8	11.28	0.0	9.80	680.5	5.3	3408.3	13.6	-0.37	1.11	0.1	0.0	28.3	
September 18, 2022	9.82	673.4	0.19	0.0	9.79	669.4	43.48	7397.4	9.80	667.4	11.83	0.0	9.80	680.9	5.0	3113.3	12.4	-0.37	1.13	0.1	0.0	3.3	
September 19, 2022	9.80	669.3	0.11	0.0	9.81	670.7	35.73	5339.2	9.80	667.0	10.14	0.0	9.80	681.7	4.2	2671.1	11.7	-0.37	1.10	0.1	0.0	15.7	
September 20, 2022	9.81	670.0	0.24	0.0	9.79	669.3	29.56	1797.7	9.79	666.2	11.39	0.0	9.77	688.5	4.8	2356.1	11.3	-0.37	1.13	0.1	0.0	7.9	15.99
September 21, 2022	9.80	670.0	0.06	0.0	9.79	669.7	31.36	1230.4	9.81	667.6	9.75	0.0	9.81	683.0	10.4	3255.8	11.9	-0.37	1.13	0.0	0.0	256.5	
September 22, 2022	9.80	669.3	0.13	0.0	9.81	669.6	33.27	1111.8	9.79	667.6	10.51	0.0	9.80	679.8	4.3	920.5	13.8	-0.37	1.11	0.1	0.0	17.4	
September 23, 2022	9.80	670.5	0.19	0.0	9.80	670.3	32.90	906.0	9.80	667.0	12.18	0.0	9.80	679.9	5.1	1109.9	13.2	-0.37	1.12	0.1	0.1	78.6	
September 24, 2022	9.80	670.9	0.06	0.0	9.80	670.4	32.34	978.6	9.80	666.6	12.37	0.0	9.80	679.9	6.2	1341.0	13.8	-0.39	1.12	0.1	0.8	55.2	
September 25, 2022	9.80	669.7	0.10	0.0	9.80	670.1	30.97	988.3	9.80	666.3	13.24	0.0	9.80	680.2	6.2	1381.2	13.5	-0.38	1.12	0.1	0.7	57.6	
September 26, 2022	9.80	669.8	0.15	0.0	9.80	670.0	29.54	954.7	9.80	666.3	13.72	0.0	9.80	679.8	5.7	1276.0	17.5	-0.37	1.12	0.1	0.0	42.1	
September 27, 2022	9.80	670.3	0.07	0.0	9.80	669.6	29.72	1036.4	9.80	666.8	13.67	0.0	9.80	680.5	5.6	1249.6	17.8	-0.36	1.11	0.1	3.5	9.3	56.29
September 28, 2022	9.79	670.3	0.08	0.0	9.79	669.1	32.79	1086.0	9.80	667.1	13.02	0.0	9.80	680.3	6.4	1420.8	16.1	-0.35	1.13	0.1	2.9	0.0	
September 29, 2022	9.81	670.1	0.02	0.0	9.80	669.6	35.95	802.8	9.80	666.2	13.62	0.0	9.80	680.0	6.7	1541.7	14.7	-0.35	1.13	0.1	0.0	0.0	
September 30, 2022	9.80	669.9	0.01	0.0	9.79	669.7	35.23	452.7	9.80	666.6	13.10	0.0	9.80	680.2	7.2	1688.2	15.3	-0.35	1.08	0.1	0.3	0.0	
Avg	9.80	670.1	0.07	3.3	9.80	670.0	42.45	3328.8	9.80	666.3	9.26	4.1	9.77	682.4	5.3	1918.7	15.6	-0.37	1.12	0.1	4.1	56.7	28.63
Min	9.77	665.4	0.00	0.0	9.76	667.1	29.54	452.7	9.79	660.4	0.00	0.0	9.04	679.1	2.8	776.7	11.3	-0.39	1.08	0.0	0.0	0.0	6.94
Max	9.82	673.9	0.60	97.8	9.86	673.6	54.44	7996.1	9.81	667.8	13.72	122.9	9.85	722.5	10.4	4003.2	22.2	-0.35	1.20	0.2	113.5	869.0	56.29

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
October 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
October 1, 2022	9.81	670.4	0.00	0.0	9.81	670.5	34.69	377.9	9.80	666.3	12.79	0.0	9.80	680.2	6.4	1425.5	13.6	-0.35	1.14	0.1	0.4	0.0	
October 2, 2022	9.79	669.5	0.00	0.0	9.79	668.1	37.44	438.5	9.79	665.9	14.98	0.0	9.79	679.8	5.0	1031.3	16.0	-0.37	1.12	0.1	0.0	0.0	
October 3, 2022	9.80	670.2	0.00	0.0	9.78	668.3	44.10	255.3	9.80	667.0	13.24	0.0	9.80	680.1	3.9	708.4	14.1	-0.40	1.11	0.1	0.1	0.0	
October 4, 2022	9.79	670.1	0.00	0.3	9.81	671.8	45.40	133.7	9.80	666.4	13.32	0.0	9.79	680.0	5.4	1168.4	13.3	-0.39	1.11	0.1	0.3	0.0	14.73
October 5, 2022	9.79	669.8	0.00	0.9	9.80	670.5	39.11	513.7	9.81	664.9	14.36	0.0	10.06	686.7	5.8	1106.7	10.2	-0.40	1.13	0.1	3.0	5.7	
October 6, 2022	9.82	676.7	0.00	1.5	9.80	671.8	37.83	623.8	9.80	665.8	15.38	0.0	9.67	680.1	6.4	1933.3	11.2	-0.38	1.14	0.1	5.6	10.3	
October 7, 2022	9.80	669.7	0.00	2.0	9.80	670.5	36.02	622.7	9.80	666.5	14.70	0.0	9.80	679.8	5.8	1561.4	11.8	-0.36	1.14	0.1	5.4	29.9	
October 8, 2022	9.81	670.2	0.00	1.1	9.80	670.4	31.59	476.2	9.81	667.4	12.66	0.0	9.80	680.1	6.6	1831.5	12.8	-0.37	1.14	0.1	6.8	2.5	
October 9, 2022	9.80	669.9	0.01	6.5	9.80	669.9	33.13	533.4	9.80	666.6	15.59	0.0	9.80	679.9	4.7	1186.4	12.5	-0.37	1.13	0.1	6.1	7.2	
October 10, 2022	9.79	669.0	0.13	58.7	9.80	669.6	33.79	746.4	9.80	666.7	14.48	0.0	9.80	680.0	6.9	1922.3	12.1	-0.38	1.11	0.1	14.1	1.1	
October 11, 2022	9.80	670.1	0.00	13.0	9.80	670.0	33.42	677.9	9.80	667.1	12.81	0.0	9.79	679.9	4.6	1176.3	10.3	-0.38	1.11	0.1	8.2	4.6	
October 12, 2022	9.68	665.6	0.00	16.5	9.80	670.0	29.22	485.5	9.80	667.3	13.21	0.0	9.80	680.0	4.5	1111.9	10.1	-0.28	0.70	0.1	8.9	13.1	40.25
October 13, 2022	9.80	670.5	0.01	8.1	9.80	671.2	31.01	616.9	9.80	666.8	14.01	0.0	9.80	680.0	5.1	1309.2	8.6	0.00	-0.03	0.1	11.7	66.7	
October 14, 2022	9.80	669.8	0.00	19.6	9.81	670.0	26.64	710.6	9.80	666.4	13.79	0.0	9.80	679.8	6.2	1720.7	12.4	0.00	-0.03	0.1	5.9	2.3	
October 15, 2022	9.80	670.0	0.00	24.1	9.79	669.2	30.01	630.4	9.81	666.8	12.88	0.0	9.81	680.1	5.8	1454.5	9.1	0.00	-0.02	0.1	16.3	3.7	
October 16, 2022	9.81	670.5	0.00	14.6	9.80	669.8	28.95	474.4	9.80	665.7	16.64	0.0	9.79	679.8	6.1	1551.9	9.3	0.00	-0.03	0.1	30.3	3.0	
October 17, 2022	9.80	679.1	0.12	31.6	9.79	668.3	30.92	536.3	9.79	665.6	15.76	0.0	9.79	679.6	8.7	2359.9	10.1	0.00	-0.03	0.1	16.9	3.6	
October 18, 2022	9.80	669.7	0.11	7.1	9.80	667.6	12.22	722.9	9.80	666.8	16.44	0.0	9.80	680.0	9.8	2658.8	10.0	0.00	-0.03	0.1	28.0	0.0	6.83
October 19, 2022	9.80	670.8	0.01	1.0	9.79	654.0	0.00	0.0	9.80	666.4	14.07	0.0	9.80	680.1	8.4	2224.8	10.2	0.00	-0.03	0.1	9.5	91.3	
October 20, 2022	9.80	668.9	0.01	16.5	9.73	638.0	1.96	5.3	9.81	667.3	12.93	0.0	9.80	680.1	6.5	1788.0	12.7	-0.01	0.02	0.1	3.8	191.0	
October 21, 2022	9.80	670.1	0.00	18.1	9.71	607.0	3.03	69.0	9.80	666.6	14.40	0.0	9.80	679.9	6.4	1733.2	9.4	0.00	0.03	0.1	16.5	336.2	
October 22, 2022	9.80	670.8	0.00	0.8	9.78	538.2	9.99	692.0	9.80	665.9	17.48	0.0	9.80	680.1	7.6	2033.6	5.5	0.01	-0.02	0.1	20.0	235.3	
October 23, 2022	9.80	670.5	0.00	11.2	9.80	676.1	12.31	0.0	9.80	665.1	15.36	0.0	9.80	679.8	6.7	1647.3	4.0	0.01	-0.02	0.1	20.9	190.9	
October 24, 2022	9.80	670.2	0.00	6.1	9.78	654.4	22.81	1154.3	9.80	666.8	16.07	0.0	9.81	680.2	5.7	1539.0	3.1	0.01	-0.01	0.1	14.5	294.9	
October 25, 2022	9.80	670.2	0.00	0.0	9.85	686.6	32.26	5135.5	9.78	665.6	15.85	0.0	9.80	656.9	5.6	1528.0	4.5	0.01	-0.12	0.1	9.3	357.7	0.22
October 26, 2022	9.80	669.9	0.00	0.1	9.71	671.1	31.52	8333.6	9.79	666.8	16.59	0.0	9.80	680.1	5.0	1306.4	1.9	0.01	-0.02	0.1	8.2	434.7	
October 27, 2022	9.77	670.7	0.00	0.8	9.80	669.9	23.90	6151.8	9.76	664.0	14.02	0.0	9.80	679.9	5.4	1534.2	8.2	0.00	-0.03	0.1	2.9	429.2	
October 28, 2022	9.80	670.2	0.00	0.0	9.79	669.1	25.93	7407.3	9.80	659.2	14.99	0.0	9.81	680.0	5.5	1466.3	9.1	0.00	-0.02	0.1	0.0	466.6	
October 29, 2022	9.81	670.0	0.00	0.0	9.81	670.6	24.06	6147.7	9.81	667.2	13.31	0.0	9.80	680.2	5.0	1254.0	7.7	0.00	-0.02	0.1	0.1	479.4	
October 30, 2022	9.80	669.9	0.00	0.0	9.80	670.0	24.01	6360.9	9.80	666.6	13.51	0.0	9.80	680.0	4.7	1236.5	8.6	-0.01	-0.03	0.1	0.1	453.4	
October 31, 2022	9.80	667.6	0.00	0.0	9.82	671.9	28.27	7287.7	9.80	664.6	16.53	0.0	9.79	680.9	4.5	1071.7	5.7	0.00	-0.02	0.2	0.3	474.3	
Avg	9.80	670.3	0.01	8.4	9.79	662.4	26.95	1881.3	9.80	666.1	14.58	0.0	9.80	679.5	6.0	1534.9	9.6	-0.14	0.41	0.1	8.8	148.0	15.51
Min	9.68	665.6	0.00	0.0	9.71	538.2	0.00	0.0	9.76	659.2	12.66	0.0	9.67	656.9	3.9	708.4	1.9	-0.40	-0.12	0.1	0.0	0.0	0.22
Max	9.82	679.1	0.13	58.7	9.85	686.6	45.40	8333.6	9.81	667.4	17.48	0.0	10.06	686.7	9.8	2658.8	16.0	0.01	1.14	0.2	30.3	479.4	40.25

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
November 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
November 1, 2022	9.80	669.2	0.01	0.0	9.80	670.1	29.83	4559.8	9.80	666.9	14.47	0.0	9.80	679.8	5.8	1428.9	6.3	0.01	-0.06	0.1	2.4	334.6	6.42
November 2, 2022	9.80	670.3	0.00	0.0	9.81	670.3	28.47	3589.8	9.81	668.5	9.29	0.0	9.81	680.6	3.6	787.6	1.2	0.02	1.32	0.1	10.0	383.6	
November 3, 2022	9.80	670.1	0.00	0.0	9.13	575.7	26.92	4444.8	9.80	667.3	12.11	0.0	9.80	680.2	5.2	1341.2	-3.1	0.02	1.36	0.1	6.4	622.6	
November 4, 2022	9.80	670.4	0.00	0.0	9.79	669.9	28.46	2169.4	9.80	667.9	12.21	0.0	9.80	680.3	4.5	1229.5	-2.3	0.02	-0.05	0.1	0.1	710.1	
November 5, 2022	9.80	669.9	0.00	0.0	9.82	670.4	26.53	2423.1	9.80	667.8	11.13	0.0	9.80	680.0	5.0	1362.7	4.1	0.02	-0.02	0.1	1.7	521.4	
November 6, 2022	9.80	669.9	0.00	0.0	9.80	670.0	24.15	2370.7	9.80	667.5	10.46	0.0	9.80	680.0	4.3	1046.2	-3.3	0.02	-0.02	0.1	0.9	293.7	
November 7, 2022	9.80	670.0	0.00	0.0	9.79	669.0	27.80	2748.8	9.81	667.2	11.30	0.0	9.80	680.0	3.8	933.9	2.7	0.03	-0.02	0.1	0.0	254.9	
November 8, 2022	9.80	670.3	0.00	0.0	9.80	670.4	27.45	2479.0	9.81	598.0	8.99	161.1	9.80	680.3	3.6	888.3	-9.5	0.03	-0.02	0.1	4.2	620.9	
November 9, 2022	9.80	669.8	0.00	0.0	9.80	670.2	27.91	2526.3	9.75	657.0	7.74	0.0	9.80	679.9	3.3	864.4	-13.4	0.04	-0.02	0.1	11.3	621.7	3.37
November 10, 2022	9.80	670.0	0.00	0.0	9.80	670.1	24.69	2193.0	9.84	681.5	7.39	0.0	9.80	680.1	2.9	725.9	-12.6	0.03	-0.02	0.1	15.8	626.2	
November 11, 2022	9.80	670.1	0.00	0.0	9.79	669.5	28.29	2762.7	9.81	669.3	7.87	0.0	9.80	680.0	3.6	988.5	-9.2	0.03	-0.02	0.1	20.0	686.1	
November 12, 2022	9.79	670.0	0.00	0.0	9.80	670.1	31.21	3237.3	9.80	669.0	7.99	0.0	9.80	680.1	3.9	1003.2	-1.2	0.02	-0.06	-3.0	4.8	615.4	
November 13, 2022	9.80	670.0	0.00	0.0	9.81	670.2	24.03	2426.0	9.80	668.4	7.82	0.0	9.80	680.1	2.9	697.2	-1.0	0.03	-0.02	-0.6	7.6	597.3	
November 14, 2022	9.79	670.0	0.00	0.0	9.78	669.8	32.18	3511.8	9.79	668.5	8.79	0.0	9.79	679.9	3.4	793.7	15.8	-0.16	0.47	0.1	3.8	570.4	12
November 15, 2022	9.77	663.4	0.37	84.4	9.79	673.2	38.47	4218.2	9.83	670.4	6.91	0.0	9.78	686.7	4.2	989.1	35.5	-0.37	0.80	0.1	4.6	427.1	
November 16, 2022	9.79	668.6	0.93	217.7	9.81	670.3	41.88	4853.3	9.45	663.2	7.46	2.4	9.80	680.1	5.6	1287.4	23.9	-0.46	0.43	0.1	0.0	265.7	
November 17, 2022	9.83	676.1	0.44	147.5	9.83	671.6	18.24	1938.4	9.80	668.6	8.01	0.0	9.81	680.2	4.7	1079.4	13.9	-0.46	0.47	0.1	0.1	373.2	
November 18, 2022	9.74	669.5	0.02	1.1	9.79	669.8	16.79	1844.0	9.80	669.0	6.16	0.0	9.80	680.0	4.8	1215.2	37.4	-0.44	0.41	0.1	0.0	516.9	
November 19, 2022	9.66	652.5	0.00	144.9	9.80	669.8	16.81	1769.3	9.80	668.6	6.46	0.0	9.79	679.8	5.4	1425.3	48.0	-0.43	0.39	0.1	0.0	955.4	
November 20, 2022	9.70	655.5	0.03	81.7	9.80	669.8	17.19	1641.3	9.79	667.8	7.58	0.0	9.80	680.2	5.9	1566.3	45.5	-0.41	0.40	0.1	0.0	996.8	
November 21, 2022	9.80	670.1	0.01	0.0	9.79	669.7	18.76	1714.3	9.81	669.0	6.42	0.0	9.80	680.1	4.5	1117.3	23.8	-0.47	0.43	0.1	0.1	564.7	
November 22, 2022	9.79	670.0	0.08	0.0	9.79	670.0	20.75	1977.1	9.80	667.7	7.40	0.0	9.79	680.0	5.4	1350.1	15.2	-0.48	0.42	0.1	0.0	824.9	23.5
November 23, 2022	9.80	660.5	0.01	0.0	9.77	670.6	19.18	1789.1	9.80	668.3	5.74	0.0	9.80	680.0	4.4	1008.7	30.9	-0.47	0.41	0.1	0.0	869.6	
November 24, 2022	9.80	669.1	0.09	0.0	9.80	670.2	20.32	2135.5	9.80	668.4	6.35	0.0	9.79	680.3	4.7	1166.5	29.4	-0.50	0.40	0.1	0.5	845.7	
November 25, 2022	9.80	670.3	0.09	8.5	9.80	670.3	19.81	1929.3	9.81	669.6	5.42	0.0	9.80	680.0	4.3	1059.1	16.1	-0.49	0.40	0.1	0.0	746.2	
November 26, 2022	9.80	666.9	0.00	0.0	9.80	669.3	22.44	2153.4	9.80	668.8	5.46	0.0	9.80	680.1	4.9	1256.4	16.2	-0.50	0.43	0.1	0.0	930.1	
November 27, 2022	9.81	672.4	0.06	1.9	9.80	669.9	28.94	2992.5	9.80	668.4	6.83	0.0	9.80	680.0	5.2	1346.7	15.0	-0.49	0.43	0.1	0.0	796.5	
November 28, 2022	9.82	672.2	0.00	0.0	9.81	669.8	21.83	2406.2	9.81	670.1	3.78	274.6	9.79	687.1	4.0	904.8	9.9	-0.50	0.44	0.1	0.0	385.9	Did not operate
November 29, 2022	9.81	674.2	0.00	25.3	9.81	670.9	21.33	2654.4	9.80	669.9	4.77	0.0	9.80	680.1	4.5	1028.5	9.5	-0.29	0.32	0.1	0.0	461.7	
November 30, 2022	9.81	670.7	0.00	175.3	9.80	670.0	20.05	3017.5	9.80	670.0	4.30	0.0	9.80	680.0	3.8	863.4	18.6	0.10	-0.01	0.1	0.8	275.1	
Avg	9.79	668.7	0.07	29.6	9.78	667.0	25.02	2682.5	9.79	666.1	7.89	14.6	9.80	680.5	4.4	1091.8	12.1	-0.22	0.31	-0.1	3.2	589.8	11.32
Min	9.66	652.5	0.00	0.0	9.13	575.7	16.79	1641.3	9.45	598.0	3.78	0.0	9.78	679.8	2.9	697.2	-13.4	-0.50	-0.06	-3.0	0.0	254.9	3.37
Max	9.83	676.1	0.93	217.7	9.83	673.2	41.88	4853.3	9.84	681.5	14.47	274.6	9.81	687.1	5.9	1566.3	48.0	0.10	1.36	0.1	20.0	996.8	23.50

Appendix D - Air Pollution Control System Data

Gold Bar Wastewater Treatment Plant
Daily Average Scrubber Report
December 2022

Date	East Scrubber				Fermenter Scrubber				West Scrubber				EPT Scrubber				GRF Scrubber				Grit 6/7 Building Scrubber	Screen 4-8 Building Scrubber	Dewatering Facility Scrubber
	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	pH	ORP (mV)	H ₂ S In (ppm)	H ₂ S Out (ppb)	Temperature In (°C)	Pressure In (kPa)	Pressure Out (kPa)	H ₂ S Out (ppm)	H ₂ S Out (ppb)	H ₂ S Out (ppb)	H ₂ S Out (ppb)
December 1, 2022	9.80	670.3	0.00	326.3	9.80	670.0	18.04	2896.3	9.80	670.2	4.40	0.0	9.80	679.9	5.1	1209.5	23.6	0.09	-0.02	0.1	0.0	679.7	
December 2, 2022	9.80	670.2	0.00	324.2	9.80	670.2	18.16	2998.1	9.80	669.7	3.90	0.0	9.80	679.9	6.5	1543.9	23.4	0.09	-0.02	0.1	0.0	726.1	
December 3, 2022	9.81	692.7	0.00	234.5	9.80	670.0	16.90	3044.8	9.79	668.3	6.05	0.0	9.80	679.9	6.9	1752.8	23.3	0.09	-0.02	0.1	0.0	959.1	
December 4, 2022	9.79	677.4	0.00	97.1	9.80	670.0	17.14	3143.7	9.80	667.0	11.98	0.0	9.81	680.3	4.9	1160.9	24.0	0.07	-0.02	0.1	0.0	1588.3	
December 5, 2022	9.81	670.8	0.00	53.7	9.80	670.0	18.54	3167.3	9.81	669.8	5.24	0.0	9.80	680.0	1.9	351.2	22.9	0.08	-0.01	0.1	0.5	600.6	
December 6, 2022	9.81	670.4	0.00	309.3	9.80	670.2	17.85	2902.4	9.81	670.0	3.88	0.0	9.80	680.0	2.1	464.6	22.7	0.09	0.00	0.1	0.2	552.8	
December 7, 2022	9.84	676.7	0.01	138.5	9.80	669.8	18.86	3100.7	9.79	669.6	4.01	0.0	9.80	680.0	1.9	430.3	23.8	0.09	-0.02	0.1	0.0	515.6	
December 8, 2022	9.80	673.2	0.00	0.0	9.80	670.0	17.33	2576.8	9.80	669.3	5.23	0.0	9.80	680.0	2.2	499.3	23.4	0.09	-0.02	0.1	0.0	874.6	
December 9, 2022	9.81	682.1	0.00	0.0	9.80	670.0	18.39	2680.4	9.80	667.8	7.63	0.0	9.80	679.9	2.7	628.0	23.4	0.08	-0.01	0.1	0.0	1160.8	
December 10, 2022	9.80	680.1	0.00	0.0	9.80	669.9	19.11	2641.2	9.81	667.7	8.56	0.0	9.81	680.0	3.2	763.2	23.5	0.09	-0.02	0.1	0.0	1146.1	
December 11, 2022	9.81	683.4	0.00	0.0	9.80	670.1	19.36	2383.4	9.80	668.4	6.22	0.0	9.80	680.0	3.0	652.1	23.0	0.09	-0.01	0.1	0.0	962.2	
December 12, 2022	9.80	684.2	0.00	0.0	9.81	670.1	20.45	2621.0	9.81	669.2	5.20	0.0	9.80	680.1	1.9	356.3	23.0	0.09	-0.01	0.1	0.0	555.3	
December 13, 2022	9.79	683.2	0.00	0.0	9.81	670.1	19.18	2491.9	9.89	665.6	5.24	0.0	9.86	681.6	2.6	553.3	22.8	0.09	-0.02	0.1	0.0	443.2	
December 14, 2022	9.81	682.0	0.00	0.0	9.76	669.9	15.54	2077.2	9.76	668.6	3.28	0.0	9.78	679.4	2.2	415.2	23.0	0.09	-0.02	0.1	0.0	348.3	
December 15, 2022	9.80	684.7	0.00	0.0	9.78	667.6	20.32	2723.5	9.80	669.4	4.03	0.0	9.80	679.7	2.1	136.9	22.6	0.10	-0.01	0.1	0.0	410.1	
December 16, 2022	9.79	669.4	0.00	0.0	9.80	670.0	16.83	2371.4	9.80	668.8	4.66	0.0	9.80	679.0	2.6	219.2	23.2	0.09	-0.01	0.1	0.0	467.9	
December 17, 2022	9.81	670.6	0.00	0.0	9.81	670.1	16.46	2187.4	9.80	668.6	4.17	0.0	9.79	676.6	2.4	158.4	22.8	0.08	-0.01	0.1	0.0	303.9	
December 18, 2022	9.80	670.0	0.00	0.0	9.80	670.0	16.74	2187.4	9.81	669.0	4.13	0.0	9.80	678.9	2.0	143.2	22.4	0.10	-0.01	0.1	0.0	247.3	
December 19, 2022	9.80	669.8	0.17	69.4	9.79	669.8	12.18	2237.7	9.80	669.7	3.14	69.3	9.80	681.8	1.8	119.4	22.2	0.11	-0.01	0.1	69.5	152.8	
December 20, 2022	9.81	677.8	0.00	0.0	9.80	670.2	7.52	2308.0	9.80	669.8	2.56	0.0	9.80	680.4	2.2	276.6	21.2	0.10	-0.01	0.1	0.0	195.7	
December 21, 2022	9.79	680.9	0.00	0.0	9.81	670.4	6.51	1870.3	9.79	671.3	2.60	0.0	9.80	680.2	2.3	161.9	20.7	0.09	-0.01	0.1	0.0	390.7	
December 22, 2022	9.80	678.8	0.00	0.0	9.81	670.3	4.06	1177.0	9.80	669.9	2.28	0.0	9.80	680.4	2.3	35.5	20.6	0.09	-0.02	0.1	0.0	361.2	
December 23, 2022	9.80	670.1	0.00	0.0	9.80	670.0	4.03	1062.7	9.80	669.3	2.77	0.0	9.80	679.8	2.3	4.0	21.4	0.09	-0.03	0.1	0.0	488.5	
December 24, 2022	9.73	672.0	0.00	0.7	9.80	669.9	4.23	944.0	9.79	668.9	2.92	0.0	9.79	679.4	2.1	7.0	22.6	0.08	-0.02	0.1	0.0	696.4	
December 25, 2022	9.72	708.8	0.00	2.1	9.81	670.0	4.67	786.9	9.80	669.1	2.61	0.0	9.80	677.1	2.0	0.4	22.6	0.08	-0.02	0.1	0.0	584.5	
December 26, 2022	9.80	679.8	0.00	0.0	9.79	669.5	5.89	1504.3	9.80	669.6	2.36	0.0	9.79	673.8	1.7	35.1	22.7	0.08	-0.02	0.1	0.0	514.5	
December 27, 2022	9.80	669.7	0.00	0.0	9.80	669.8	7.23	1672.1	9.80	669.3	2.55	0.0	9.80	680.1	1.7	180.5	22.6	0.08	-0.01	0.1	0.0	383.7	
December 28, 2022	9.78	667.4	0.00	0.0	9.82	670.8	7.15	1654.2	9.83	657.3	3.05	0.0	9.82	693.9	2.0	162.0	22.7	0.08	-0.01	0.1	0.3	441.5	
December 29, 2022	9.80	670.7	0.00	0.0	9.80	670.0	16.79	3840.0	9.80	669.4	2.70	0.0	9.80	638.9	1.7	438.2	22.9	0.08	-0.02	0.1	0.0	403.3	
December 30, 2022	9.80	669.7	0.00	0.0	9.80	669.9	24.08	4715.3	9.80	668.9	2.94	0.0	9.80	679.9	1.8	449.1	22.9	0.08	-0.01	0.1	0.0	409.8	
December 31, 2022	9.80	670.7	0.00	0.0	9.79	670.0	24.57	18665.5	9.80	669.6	2.86	0.0	9.80	680.2	2.0	462.6	22.6	0.09	-0.01	0.1	0.0	425.5	
Avg	9.80	676.7	0.01	50.2	9.80	670.0	14.65	2923.6	9.80	668.7	4.29	2.2	9.80	678.7	2.7	444.2	22.7	0.09	-0.01	0.1	2.3	580.3	N/A
Min	9.72	667.4	0.00	0.0	9.76	667.6	4.03	786.9	9.76	657.3	2.28	0.0	9.78	638.9	1.7	0.4	20.6	0.07	-0.03	0.1	0.0	152.8	N/A
Max	9.84	708.8	0.17	326.3	9.82	670.8	24.57	18665.5	9.89	671.3	11.98	69.3	9.86	693.9	6.9	1752.8	24.0	0.11	0.00	0.1	69.5	1588.3	N/A

Did not operate

Appendix E – Scrubber Chemicals

2022 Scrubber Bleach Usage (L as delivered 16% sodium hypochlorite solution)

	January	February	March	April	May	June	July	August	September	October	November	December
1	776	850	734	662	826	1102	848	1385	1737	1943	1112	751
2	736	581	840	669	848	1294	721	1554	1884	1826	442	718
3	888	653	712	744	815	1448	691	1214	1375	2348	1768	953
4	852	692	706	405	821	1565	888	1700	1917	2208	1145	915
5	656	817	834	577	912	1755	869	1157	1618	2430	1208	690
6	640	965	823	527	816	1752	551	1433	2087	1797	1145	567
7	583	723	934	457	792	1441	672	1343	2448	1183	1101	677
8	580	595	511	457	888	1437	695	1150	1774	2616	1036	647
9	487	729	631	502	1025	1666	1001	1278	1760	1826	1327	660
10	465	378	552	889	1069	1726	1131	1786	1626	1757	1108	823
11	1226	351	601	651	1006	2238	1100	1468	2054	1342	1087	698
12	1352	974	707	643	1127	2015	1243	1359	2319	2307	1206	654
13	1272	704	415	629	1061	1464	1302	1235	1887	1665	987	715
14	943	775	599	585	1166	808	1752	1074	1688	1423	984	795
15	1086	970	573	672	1376	471	1518	2188	1478	1757	1228	1119
16	1066	1202	524	745	1277	274	1405	1129	1667	2004	1342	1115
17	1103	1002	312	902	1134	508	1611	1184	1225	2002	1145	1470
18	785	971	241	827	1035	569	1899	1736	1472	1525	904	1132
19	719	860	119	519	1061	715	2388	1506	1373	893	890	962
20	881	1188	240	397	703	786	2211	1853	1571	730	1037	802
21	900	942	341	442	987	1031	1980	1610	1572	875	1007	655
22	1008	1087	357	684	1058	1065	1039	1244	1688	1970	1012	647
23	864	769	368	659	1167	583	3027	1869	1761	3182	1133	607
24	609	834	164	807	621	416	2137	1671	1689	2790	911	1016
25	708	603	362	812	1391	404	1627	1774	1712	1892	990	765
26	770	315	456	976	904	515	1520	1179	1707	1656	982	785
27	992	675	453	843	969	1038	1547	1095	1681	1652	1363	843
28	1024	603	499	350	736	1016	1710	7978	1784	1669	829	1258
29	968		564	676	1012	716	1812	2255	2002	1503	763	666
30	1057		563	724	1121	739	2027	1787	1933	1451	767	780
31	801		443		1262		1867	1123		1453		728
Total (L)	26,795	21,808	16,179	19,435	30,985	32,560	44,789	52,316	52,487	55,675	31,960	25,612

Appendix E - Scrubber Chemicals

2022 Scrubber Caustic Usage (kg)

	January	February	March	April	May	June	July	August	September	October	November	December
1	103	126	116	105	115	123	126	169	173	207	104	82
2	93	111	117	66	123	139	116	164	190	206	86	82
3	109	137	115	114	104	164	128	157	173	216	45	86
4	106	90	116	102	115	178	120	190	172	229	139	91
5	94	100	121	132	113	170	98	148	169	193	122	78
6	92	107	120	57	118	165	117	157	169	191	112	67
7	87	30	169	163	116	156	113	160	180	183	94	93
8	90	118	122	140	114	152	119	161	165	165	111	84
9	118	146	101	146	130	147	131	151	199	171	110	91
10	89	145	111	125	93	149	140	158	202	168	78	82
11	133	123	70	121	124	192	125	148	197	164	108	79
12	167	141	129	117	125	166	136	142	197	169	94	73
13	150	150	90	108	107	152	136	158	185	162	85	73
14	133	140	106	100	133	130	149	137	174	143	113	76
15	130	140	87	115	127	115	149	153	165	154	133	78
16	134	138	124	112	124	75	159	139	157	175	123	89
17	127	148	79	119	129	106	140	155	139	172	118	86
18	120	115	102	113	118	122	156	180	136	85	101	89
19	112	137	79	104	130	123	213	183	149	86	87	69
20	130	118	101	99	114	115	188	159	165	74	99	79
21	135	119	90	103	121	130	194	157	152	64	97	39
22	136	136	104	97	141	152	203	186	165	110	105	74
23	96	118	110	109	123	101	198	185	151	182	107	34
24	127	149	48	112	118	125	196	170	176	140	105	73
25	105	96	115	111	129	119	181	173	150	170	108	73
26	112	123	106	119	128	106	178	181	157	145	102	71
27	163	98	100	121	124	137	160	177	179	163	120	74
28	130	83	92	94	150	124	164	202	200	144	88	113
29	127		101	117	134	126	180	188	218	108	86	59
30	121		106	104	153	123	187	210	216	108	82	75
31	105		122		134		186	194		102		69
Total (kg)	3,676	3,382	3,272	3,344	3,827	4,077	4,785	5,192	5,221	4,748	3,061	2,378

Appendix F – Fence Line H₂S Readings



Gold Bar Wastewater Treatment Plant
Fenceline H₂S Readings
January 2022

Date	H ₂ S (ppb)								Comments
	1	2	3	4	5	6	7	8	
January 1, 2022	21.54	3.19	3.25	3.49	8.16	19.24	4.89	0	
January 2, 2022	0	4.8	0	0	0	0	0	0	
January 3, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 4, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 5, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 6, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 7, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 8, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 9, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 10, 2022	3.17	4.78	0	0	0	6.74	3.95	3.79	
January 11, 2022	5.5	3.35	3.42	4.07	8.86	21.05	10.65	5.11	
January 12, 2022	3.84	5.7	6.31	7.72	3.34	3.95	25.16	3.02	
January 13, 2022	6.91	7.98	4.12	3.18	3.6	3.29	3.34	3.55	
January 14, 2022	0	0	0	0	3.22	4.6	25.63	3.09	
January 15, 2022	0	13.41	0.127	0	4.08	14.66	0	0	
January 16, 2022	13.72	0	0	0	0	0	0	0	
January 17, 2022	3.38	7.75	5.25	3.93	3.46	0	4.02	0	
January 18, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 19, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
January 20, 2022	6.3	0	0	0	4.4	8.59	4.7	0	
January 21, 2022	0	4.61	4.49	6.55	0	0	0	0	
January 22, 2022	5.77	3.23	5.07	5.6	0	0	0	0	
January 23, 2022	3.93	3.19	3.06	4.27	0	4.35	14.16	4.17	
January 24, 2022	5.1	3.68	3.51	3.81	0	3.2	3.41	3.41	
January 25, 2022	0	0	0	0	3.89	4.47	8.87	0	
January 26, 2022	0	0	0	3.76	3.94	5.26	0	0	
January 27, 2022	3.85	5.14	3.71	3.22	3.23	6.46	7.06	0	
January 28, 2022	4.79	0	0	0	3.16	4.27	4.75	0	
January 29, 2022	0	8.24	0	0	3.61	0	0	3.18	
January 30, 2022	4.23	0	3.52	0	0	3.3	3	3.55	
January 31, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low

Avg	4.38	3.76	2.18	2.36	2.71	5.40	5.89	1.57
Min	0	0	0	0	0	0	0	0
Max	21.54	13.41	6.31	7.72	8.86	21.05	25.63	5.11



Gold Bar Wastewater Treatment Plant
Fenceline H₂S Readings
February 2022

Date	H ₂ S (ppb)								Comments
	1	2	3	4	5	6	7	8	
February 1, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
February 2, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
February 3, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
February 4, 2022	0	0	0	0	0	0	3.51	0	
February 5, 2022	0	0	0	0	0	0	0	0	
February 6, 2022	3.28	0	0	0	4.63	5.65	26.95	0	
February 7, 2022	0	0	0	0	0	6.94	0	3.28	
February 8, 2022	6.69	3.2	0	0	0	0	0.786	0	
February 9, 2022	9.99	3.43	3.83	0	0	0	5.1	0	
February 10, 2022	0	0	3.72	0	0	0	5.71	0	
February 11, 2022	0	0	3.12	0	0	0	0	0	
February 12, 2022	0	0	0	0	0	0	6.75	0	
February 13, 2022	0	3.78	0	0	0	0	0	0	
February 14, 2022	0	0	4.2	5.99	0	0	0	0	
February 15, 2022	0	0	0	0	0	0	0	0	
February 16, 2022	3.94	0	0	0	0	0	0	0	
February 17, 2022	6.58	0	0	0	0	0	0	0	
February 18, 2022	6.12	0	0	0	0	0	3.52	3.1	
February 19, 2022	0.15	0	0	0	0	0	0	0	
February 20, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
February 21, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
February 22, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
February 23, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
February 24, 2022	0	3.55	3.88	5.88	0	3.46	0	0	
February 25, 2022	5.02	3.03	3.32	3.11	3.29	7.47	0	3.02	
February 26, 2022	3.31	4.74	3.72	7.86	3.48	3.18	5.67	3.21	
February 27, 2022	0	0	0	0	0	0	0	4.33	
February 28, 2022	7	4.52	9.18	3.95	0	0	3.19	0	
Avg	2.48	1.25	1.67	1.28	0.54	1.27	2.91	0.81	
Min	0	0	0	0	0	0	0	0	
Max	9.99	4.74	9.18	7.86	4.63	7.47	26.95	4.33	



Gold Bar Wastewater Treatment Plant
Fenceline H₂S Readings
March 2022

Date	H ₂ S (ppb)								Comments
	1	2	3	4	5	6	7	8	
March 1, 2022	3.3	4.5	0	3.86	0	3.07	3.13	4.69	
March 2, 2022	9.25	4.13	3.61	3.34	0	0	0	6.79	
March 3, 2022	6.65	5.3	5.7	7.51	0	0	0	5.88	
March 4, 2022	4.22	4.46	4.29	4.23	3	0	0	3.08	
March 5, 2022	6.74	4.12	3.93	3.83	3.65	3.98	3.96	3.81	
March 6, 2022	11.36	7.98	3.41	3.08	3.51	3.26	4.83	0	
March 7, 2022	9.12	4.97	4.54	4.01	3.45	0	0	3.34	
March 8, 2022	12.35	4.04	4.61	4.66	3.08	0	3.92	0	
March 9, 2022	11.67	4.17	3.13	3.57	5.18	0	0	0	
March 10, 2022	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temperature too low
March 11, 2022	16.81	0	0	0	0	0	6.55	7.18	
March 12, 2022	3.42	4.05	3.72	3.39	7.93	4.49	0	0	
March 13, 2022	21.51	0	3.24	4.68	0	0	0	3.79	
March 14, 2022	11.72	0	0	0	0	0	13.02	0	
March 15, 2022	15.94	12.078	10.69	11.51	7.75	8.32	13.78	9.59	
March 16, 2022	0	0	3.08	0	0	0	0	0	
March 17, 2022	0	0	0	0	0	0	5.4	0	
March 18, 2022	3.02	0	0	4.83	0	3.41	0	0	
March 19, 2022	0	0	0	0	0	0	0	0	
March 20, 2022	0	4.33	0	0	0	0	0	0	
March 21, 2022	0	0	3.83	0	4.27	0	0	0	
March 22, 2022	0	0	0	3.12	3.33	0	3.16	3.59	
March 23, 2022	3.64	0	0	0	0	0	0	0	
March 24, 2022	0	0	0	0	0	0	0	0	
March 25, 2022	28.54	0	0	0	0	0	0	3.62	
March 26, 2022	0	0	0	0	0	0	0	0	
March 27, 2022	0	0	0	0	0	0	0	0	
March 28, 2022	0	0	0	0	0	0	0	0	
March 29, 2022	15.5	0	0	0	7.13	7	0	0	
March 30, 2022	20.3	8.99	0	0	0	0	0	0	
March 31, 2022	0	0	0	0	0	0	0	0	
Avg	7.17	2.44	1.93	2.19	1.74	1	1.93	1.85	
Min	0	0	0	0	0	0	0	0	
Max	28.54	12.078	10.69	11.51	7.93	8.32	13.78	9.59	



Gold Bar Wastewater Treatment Plant
Fenceline H₂S Readings
April 2022

Date	H ₂ S (ppb)								Comments
	1	2	3	4	5	6	7	8	
April 1, 2022	0	3.08	0	0	0	0	0	0	
April 2, 2022	0	0	0	0	0	0	4.05	0	
April 3, 2022	0	0	0	0	0	0	6.78	0	
April 4, 2022	0	0	0	0	0	0	5.11	3.16	
April 5, 2022	3.53	0	0	0	0	0	0	0	
April 6, 2022	0	0	0	0	0	0	0	0	
April 7, 2022	0	0	0	0	0	0	11.14	3.22	
April 8, 2022	0	0	0	0	0	3.55	0	3.46	
April 9, 2022	0	0	3.07	4.05	0	0	0	0	
April 10, 2022	0	0	0	0	0	0	0	0	
April 11, 2022	5.93	0	5.75	7.53	0	0	0	0	
April 12, 2022	3.59	3.26	0	0	0	0	0	0	
April 13, 2022	0	0	0	0	0	0	0	0	
April 14, 2022	5.93	0	0	0	0	0	0	0	
April 15, 2022	6.11	0	0	0	0	0	0	0	
April 16, 2022	35.13	0	0	0	0	0	0	0	
April 17, 2022	0	0	0	0	0	0	0	0	Measured by Odalog
April 18, 2022	40	10	10	10	10	10	10	20	Measured by Odalog
April 19, 2022	0	0	0	0	0	0	20	0	Measured by Odalog
April 20, 2022	10	10	0	0	0	0	10	10	Measured by Odalog
April 21, 2022	20	10	10	0	10	10	10	0	Measured by Odalog
April 22, 2022	4.45	0	0	0	0	0	3.66	0	
April 23, 2022	3.03	0	0	0	0	0	0	0	
April 24, 2022	12.43	6.49	6.78	6.87	5.1	6.07	5.58	6.79	
April 25, 2022	7.28	0	0	0	0	0	3.72	3.03	
April 26, 2022	9.44	0	5.46	0	0	0	0	11.19	
April 27, 2022	0	0	0	0	3.19	3.13	3.23	0	
April 28, 2022	0	3.03	0	6.37	0	0	0	0	
April 29, 2022	0	4.78	0	0	3.55	0	0	0	
April 30, 2022	11.91	3.6	6.29	6.53	0	0	0	4.07	
Avg	5.96	1.81	1.58	1.38	1	1.09	3.11	2.16	
Min	0	0	0	0	0	0	0	0	
Max	40	10	10	10	10	10	20	20	



Gold Bar Wastewater Treatment Plant
Fenceline H₂S Readings
May 2022

Date	H ₂ S (ppb)								Comments
	1	2	3	4	5	6	7	8	
May 1, 2022	0	0	0	3.52	0	0	8.13	3.25	
May 2, 2022	8.92	0	3.07	3.37	0	0	0	0	
May 3, 2022	0	0	0	4.03	0	0	0	0	
May 4, 2022	3.71	14	11.45	4.77	0	3.01	0	0	
May 5, 2022	7.15	4.57	3.5	8.95	0	0	4.02	15.27	
May 6, 2022	6.98	3.01	0	0	9.44	4.7	0	0	
May 7, 2022	0	0	3.34	0	7.3	3.1	3.36	0	
May 8, 2022	3.02	5.63	3.08	5.95	3.78	0	0	0	
May 9, 2022	6.46	0	3.8	0	0	0	7.26	0	
May 10, 2022	22.05	30.76	3.25	10.16	0	0	0	0	
May 11, 2022	4.52	0	0	0	3.2	5.31	0	0	
May 12, 2022	6.57	7.75	9.76	6.17	7.72	5.06	4.87	0	
May 13, 2022	17.35	24.1	0	3.12	3.27	3.72	6.91	0	
May 14, 2022	3.46	4.71	6.64	3.8	0	0	0	0	
May 15, 2022	4.02	3.45	4.5	4.42	3.15	4.08	5.03	3.57	
May 16, 2022	3.87	0	0	0	0	0	6.48	5.04	
May 17, 2022	3.47	6.09	4.61	9.63	0	0	0	0	
May 18, 2022	5.46	0	0	0	3.39	0	5.06	0	
May 19, 2022	0	16.06	0	4	0	0	8.73	0	
May 20, 2022	0	0	3.23	0	0	0	0	0	
May 21, 2022	3.79	5.52	0	0	0	4.32	0	0	
May 22, 2022	7.19	0	0	0	0	11.12	0	0	
May 23, 2022	0	0	0	0	0	3.65	0	0	
May 24, 2022	11.62	0	4.3	14.02	0	0	0	0	
May 25, 2022	5.02	4.28	3.69	5.54	3.94	5.37	4.73	5.12	
May 26, 2022	4.26	0	8.3	6.23	5.5	0	0	0	
May 27, 2022	8.54	0	0	0	0	0	0	0	
May 28, 2022	0	3.73	0	8.74	0	0	0	0	
May 29, 2022	0	5.1	0	0	3.31	0	0	0	
May 30, 2022	0	3.11	0	3.13	0	0	0	0	
May 31, 2022	0	3.95	3.69	7.44	0	0	0	0	

Avg	4.76	4.70	2.59	3.77	2	2	2	1.04
Min	0	0	0	0	0	0	0	0
Max	22.05	30.76	11.45	14.02	9	11.12	8.73	15.27

Appendix F - Fence Line H2S Readings



Gold Bar Wastewater Treatment Plant
Fenceline H₂S Readings
June 2022

Date	H ₂ S (ppb)								Comments
	1	2	3	4	5	6	7	8	
June 1, 2022	12.01	4.7	10.13	5.27	0	0	3.35	12.44	
June 2, 2022	10.84	15.36	10.69	10.45	7.44	6.53	5.08	4.5	
June 3, 2022	6	4.3	4.95	6.92	0	0	0	9.42	
June 4, 2022	6.36	3.58	5.52	5.28	0	0	4.71	5.41	
June 5, 2022	9.45	4.18	4.89	6.36	0	0	3.04	6.61	
June 6, 2022	8.55	4.09	5.5	5.83	0	0	0	7.88	
June 7, 2022	7.97	5.57	0	4.31	0	3.77	4.38	4.52	
June 8, 2022	0	0	0	0	3.75	0	3.29	0	
June 9, 2022	0	0	0	0	0	4.99	3.4	4.67	
June 10, 2022	0	3.74	0	5.91	0	0	0	0	
June 11, 2022	5.33	0	0	3.25	3.9	3.72	3.17	0	
June 12, 2022	9.02	6.1	3.92	6.41	0	3.03	0	0	
June 13, 2022	0	24.37	0	3.46	0	0	0	0	Grit bins being changed.
June 14, 2022	0	3.67	0	0	0	0	0	0	
June 15, 2022	0	0	0	0	0	0	0	0	
June 16, 2022	3.63	6.95	0	0	0	0	0	0	
June 17, 2022	0	0	0	0	0	4.31	0	0	
June 18, 2022	0	3.97	0	0	0	0	0	0	
June 19, 2022	0	0	0	0	0	0	0	0	
June 20, 2022	9.65	0	3.12	11.56	0	0	0	0	
June 21, 2022	0	0	0	4	0	3.28	3.28	0	
June 22, 2022	5.51	4.09	0	0	0	0	0	0	
June 23, 2022	0	0	0	0	0	0	0	0	
June 24, 2022	0	0	0	0	0	0	0	0	
June 25, 2022	0	0	0	0	0	0	0	0	
June 26, 2022	0	0	0	0	0	0	0	0	
June 27, 2022	36.74	0	3.05	3.78	0	0	0	0	Capital work at diversion structure.
June 28, 2022	3.75	0	3.82	9.6	0	0	3.16	0	
June 29, 2022	0	6.32	0	3.05	0	3.44	0	0	
June 30, 2022	0	0	0	0	0	0	0	0	
Avg	4	3	1.85	3.18	1	1	1	1.85	
Min	0	0	0	0	0	0	0	0	
Max	36.74	24.37	10.69	11.56	7.44	6.53	5.08	12.44	

Appendix G – Odour Complaints

Appendix G - Odour Complaints

#	Date	Location	Complaint Description	Call Back Details	Wind Direction	Scrubber Status	Maintenance Activities	Action Taken	Is GBWWTP the Likely Source (Y/N)	Consistent with EnviroSuite Model?
2022-001	3/13/2022	South of GBWWTP	control room received a call from water dispatch at about 11 am indicating that they had received an odour complaint from a local resident. Normal email protocol from drainage ops was not followed.	Called the customer back at 11 am Sunday. Caller was concerned there was a scrubber down or something. Caller was informed that scrubbers were all operational, but the plant was receiving high flows from Saturday afternoon, and likely higher than normal levels of H2S were being brought in from the collection system and being discharged out OUTFALL 30.	N	Operational	N/A	Operators conducted fence line monitoring - observed 20ppb reading at main gate / diversion structure. This reading was generally confirmed by EnviroSuite, and wind speed was low and direction was from the north. Scrubbers were all meeting ORP and pH set point. Plant was bypassing starting afternoon of Sat 12th into the morning	Y	Y
2022-02	3/15/2022	Beverley Area	water dispatch received an odour complaint at 7:56 am. Was forwarded to P&GA at 2:40 pm, who contacted Gold Bar ops at 3pm. standard email escalation through drainage ops was not followed. No information was initially provided. Caller info was	got their voicemail. Apologized for the late call back. Let them know scrubbers were all working properly. gave them a direct number for a call back. Without talking to the customer, it was difficult to determine when they smelled the odour.	S	Operational	N/A	plant was was not under secondary bypass at the time (that morning) but was the night previously. without talking to the caller, it was difficult to determine when they smelled the	N	Y
2022-03	9/15/2022	4615 109A Ave	Details of customer odour complaint: strong outside sewer odour last couple of nights, this morning it was extremely bad Odour inside or outside Outside Description of odour: Sewer smell Odour intensity (scale from 1-10): 10 Time noticed odour and for how long: Last couple of nights and again this morning	Called back Sept 15 at 10:28 AM: I did talk to customer to confirm time of evening he noticed the odours and mentioned it was from 8:30 to 9:30 pm on Tuesday and Wednesday evening, also a bit this morning. I mentioned we will continue to investigate now that we have pinpointed the time when doors were noticed and mentioned that during this time all odor scrubbers working as intended.	Not identified	Operational	N/A	H2S exceedances measured at the Gold Bar AQMS Tuesday evening, Wednesday evening, and Thursday morning.	Y	N
2022-04	9/19/2022	10803 52 st	Details of customer odour complaint: sewer smell Odour inside or outside: outside Description of odour: see above Odour intensity (scale from 1-10):not given Time noticed odour and for how long:Daily- worse at night Is it a reoccurring issue?yes	Called back to get more info from the customer, she is not sure if it is Goldbar but would like us to investigate. Started to notice odor last Thursday and has been every evening since and described the odour like burning wood or barbecue smell, I let her know we would look into the wind direction for those days to see if we may be a possible cause along with looking into any process issues, I will phone her back tomorrow with more info.	S, SE	Operational	N/A	Forwarded complaint to Drainage Ops: When we spoke with the caller this afternoon, they described the odour to us as more of a "Burn Wood / BBQ " smell . As you know these vague odour complaints can be difficult to investigate, but on the phone they specifically identified 10:45 pm last night (September 18th) as time when the odour was noticeable at their residence. When we ran an odour backtrack model (screenshots below), it indicates that based on the wind direction at that time, the odour was coming from the south / South East which is the opposite direction of Gold Bar.	N	N
2022-05	9/28/2022	5103 109A Ave	Details of customer odour complaint: Customer went outside to sit on deck and stated wind from coming from the north east and is getting a sewer odour outside Odour inside or outside Outside Description of odour: Sewer odour from treatment plant	Called back Sept 29 at 08:41. Let him know that we were not experiencing any irregular activities within the plant fence line and all scrubbers were working at that time. Wind direction was going his way northeast to southwest based on the modelling.	N	Operational	N/A	N/A	Y	Y
2022-06	9/30/2022	10804 65 St NW	description: What is going on at the sewage treatment plant in Gold Bar? For the past week or so, we are getting a lot of sewage odor which is causing us to have to move indoors and close our windows at night. Please fix the problem. We are on St. Gabriel School Road NW. It is 4:15 pm on Friday September 30, 2022. Accessibility/disability issue?: no location: 10804 65 STREET NW on street: 65 STREET NW from: HARDISTY DRIVE NW	Called back on October 1, 11:15 am. Call back and confirmed that we are not experiencing any plant issues but agree wind direction is going her way. Nothing out of the ordinary from fence line monitoring as well	NE	Operational	N/A	shift crew checked scrubber status, and fenceline monitoring. No process upsets, so source of H2S coming from plant identified. Sent complaint back to Drainage Ops	N	N
2022-07	10/21/2022	3814 Ada Blvd	Details of customer odour complaint: its really bad odour smell in the area, and she is getting headaches from the smell , within the last couple months its getting really bad. In all the years shes lived there this is the absolute worse , worse at night Odour inside or outside- outside Description of odour: sulfur smelling Odour intensity (scale from 1-10): 10	Call back and informed her that we do have a scrubber off line for repair and should have back on line by end of day Saturday. She was very understanding about the situation and made note that it was not for the last 2 months but on and off within the last couple of months and not daily.	Not identified	Fermenter Scrubber offline	Media replacement in Fermenter Scrubber	N/A	Y	N

Appendix G - Odour Complaints

#	Date	Location	Complaint Description	Call Back Details	Wind Direction	Scrubber Status	Maintenance Activities	Action Taken	Is GBWWTP the Likely Source (Y/N)	Consistent with EnviroSuite Model?
2022-08	10/28/2022	3622 109 Ave	<p>Details of customer odour complaint: Noticable odour in area for about the past month when wind comes from the west. He is with Beverly heights community league and has had others in area tell him the same thing.</p> <p>Odour inside or outside OUTSIDE</p> <p>Description of odour: SEWER FROM PLANT</p> <p>Odour intensity (scale from 1-10): 7</p> <p>Time noticed odour and for how long: FOR PAST</p>	<p>Call back this morning, the gentleman was very understanding and indicated that some sewer work was going on in Beverly during the month of October that was part of the odours that they noticed at their hall. Recently it has been much better now that the work was done, he lives near the plant and only when the wind is from the west does he notice a bit of odor from the plant.</p>	N/A	N/A	N/A	N/A	N	N
2022-09	10/30/2022	4428 109A Ave	<p>Details of customer odour complaint: Odour is smelling bad today</p> <p>Odour inside or outside Outside Odour</p> <p>Description of odour: Smells like sewer</p> <p>Odour intensity (scale from 1-10): it's a 10</p> <p>Time noticed odour and for how long: started at 16:30 tonight (Oct 30)</p>	<p>Call back to customer, received her voice mail and left a message that during the time of the complaint we did not notice and issues with odors or H2S coming from the south air quality monitoring station at that time. The plant was not experiencing any issues and all scrubbers were operating, mentioned that the wind was coming from the south west going north east most of the day but at the time</p>	NW	Operational	N/A	checked EnviroSuite, Scrubber status, AQMS, SIA. No obvious source of odour, but wind was high and blowing from the direction of the plant at the time of the complaint. No process upsets, everything was running fine.	N	N
2022-10	11/1/2022	4816 109 Ave	<p>Details of customer odour complaint: Odour is getting worse</p> <p>Odour inside or outside Outside odour</p> <p>Description of odour: Sewage</p> <p>Odour intensity (scale from 1-10): 7 or 8</p> <p>Time noticed odour and for how long: Today (this</p>	<p>Call back to customer. He mentioned that he noticed the odor this morning and is still ongoing as of right now. The odor is coming from his back alley and is ongoing. With Operations having a couple of extra staff today I am sending a Operator to the back alley of the address with the Jerome meter to see if we are picking up and hits and to see if their</p>	N	Operational	N/A	Operator went up to resident and measured in front of house and back alley with Jerome meter - all "zeros". Sam could not smell anything. NO odour of H2S detected.	N	N
2022-11	11/9/2022	4816 109 Ave	<p>Details of customer odour complaint: Every time they go outside it smells like a dead skunk. The smell burns their throats and nasal passages.</p> <p>Odour inside or outside Odour Outside</p> <p>Description of odour: smells like a skunk that burns your throat</p> <p>Odour intensity (scale from 1-10): 15</p> <p>Time noticed odour and for how long: last two</p>	<p>After talking to the customer she could not pin point which days this has been occurring and noted that it was on and off during a 2 month span. Goldbar is not experiencing and process issues at this time and mentioned that I would have Drainage follow up as well.</p> <p>The only thing she mentioned that at certain times she smelt sulfuric acid but let me know she will be more specific with the date and time so we can troubleshoot better. I</p>	N/A	Operational	N/A	N/A	N	N

Appendix H – Nutri-Gold Summary

Substance Loading Rates on Nutrigold Fields - 2022

Nutrigold Field #2022NE/NW0256204					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
6488	22.5	1461	191	77	19.0	TP	25900	37840	491					
						TN	35670	52114	677					
						NH4-N	10189	14886	193					
Landowner	Neil Woitas					As	5.0	7.31	0.095					
Legal Description	NE-02-56-20-4					Cd	2.8	4.09	0.053	12739	1500	9250	600	
Start Date	15-Jan-22					Cr	75	109.6	1.42	476	20	345	8	
End Date	10-Feb-22					Cu	5.7	8	0.11	6258	15	4544	6	
Soil Class	Class 1					Pb	34	49.7	0.645	1049	20	762	8	
Biosolids Type	Digested					Mn	335	489	6.36					
	Centrifuge Dewatered					Hg	1.07	1.563	0.020	33336	3000	24206	1100	
						Ni	33	48.2	0.626	1081	100	785	40	
						Se	5.6	8.18	0.106					
						Zn	770	1125	14.6	46	10	34	4	
						Co	5.7	8	0.1					

Nutrigold Field #2022NE315519					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
20978	5.60	1191	150	57	20.9	TP	27657	32939	578					
						TN	31581	37613	660					
						NH4-N	21100	25130	441					
Landowner	Kim Lopushinky					As	5.80	6.91	0.121					
Legal Description	NE-31-55-19-4					Cd	3.00	3.57	0.063	10527	1500	9219	600	
Start Date	24-May-22					Cr	144	171.5	3.01	219	20	192	8	
End Date	4-Jun-22					Cu	360	429	7.52	88	15	77	6	
Soil Class	Class 1					Pb	49.0	58.4	1.024	645	20	564	8	
Biosolids Type	Digested					Mn	310	369	6.48					
	Gravity Thickened					Hg	1.29	1.536	0.027	24481	3000	21440	1100	
						Ni	52	61.9	1.087	607	100	532	40	
						Se	25.3	30.13	0.529					
						Zn	702	836	14.7	45	10	39	4	
						Co	10.40	12	0.2					

Appendix H - Nutri-Gold Summary

Nutrigold Field #2022SE305317					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		Minimum		Minimum	
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
10533	5.80	620	74	30	20.7	TP	27657	17147	572				
						TN	31581	19580	653				
						NH4-N	21100	13082	436				
Landowner	Barry Piche					As	5.80	3.60	0.120				
Legal Description	SE-30-53-17-4					Cd	3.00	1.86	0.062	10527	1500	9219	600
Start Date	6-Jun-22					Cr	144	89.3	2.98	219	20	192	8
End Date	10-Jun-22					Cu	360	223	7.44	88	15	77	6
Soil Class	Class 1					Pb	49.0	30.4	1.013	645	20	564	8
Biosolids Type	Digested Gravity Thickened					Mn	310	192	6.41				
						Hg	1.29	0.800	0.027	24481	3000	21440	1100
						Ni	52	32.2	1.075	607	100	532	40
						Se	25.3	15.69	0.523				
						Zn	702	435	14.5	45	10	39	4
						Co	10.40	6	0.2				

Nutrigold Field #2022SE/SW015418					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		Minimum		Minimum	
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
42948	5.80	2511	298	121	20.8	TP	27657	69447	574				
						TN	31581	79300	655				
						NH4-N	21100	52982	438				
Landowner	Al Gavinchuk					As	5.80	14.56	0.120				
Legal Description	SW/SE-01-54-18-4					Cd	3.00	7.53	0.062	10527	1500	9219	600
Start Date	21-Jun-22					Cr	144	361.6	2.99	219	20	192	8
End Date	19-Aug-22					Cu	360	904	7.47	88	15	77	6
Soil Class	Class 1					Pb	49.0	123.0	1.017	645	20	564	8
Biosolids Type	Digested Gravity Thickened					Mn	310	778	6.43				
						Hg	1.29	3.239	0.027	24481	3000	21440	1100
						Ni	52	130.6	1.079	607	100	532	40
						Se	25.3	63.53	0.525				
						Zn	702	1763	14.6	45	10	39	4
						Co	10.40	26	0.2				

Appendix H - Nutri-Gold Summary

Nutrigold Field #2022SE155519					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		Minimum		Minimum	
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
10807	6.30	685	80	33	20.8	TP	27657	18945	574				
						TN	31581	21633	656				
						NH4-N	21100	14454	438				
Landowner	Rick Ruzyki					As	5.80	3.97	0.120				
Legal Description	SE-15-55-19-4					Cd	3.00	2.06	0.062	10527	1500	9219	600
Start Date	22-Aug-22					Cr	144	98.6	2.99	219	20	192	8
End Date	26-Aug-22					Cu	360	247	7.47	88	15	77	6
Soil Class	Class 1					Pb	49.0	33.6	1.017	645	20	564	8
Biosolids Type	Digested					Mn	310	212	6.43				
	Gravity Thickened					Hg	1.29	0.884	0.027	24481	3000	21440	1100
						Ni	52	35.6	1.079	607	100	532	40
						Se	25.3	17.33	0.525				
						Zn	702	481	14.6	45	10	39	4
						Co	10.40	7	0.2				

Nutrigold Field #2021NE255116					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		Minimum		Minimum	
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
3517	23.6	833	90	36	23.1	TP	25900	21575	599				
						TN	35670	29713	825				
						NH4-N	10189	8487	236				
Landowner	Ron Kozoway					As	5.0	4.17	0.116				
Legal Description	NE-25-51-17-4					Cd	2.8	2.33	0.065	12739	1500	9250	600
Start Date	18-Dec-21					Cr	75	62.5	1.74	476	20	345	8
End Date	12-Jan-22					Cu	5.7	5	0.13	6258	15	4544	6
Soil Class	Class 1					Pb	34	28.3	0.787	1049	20	762	8
Biosolids Type	Digested					Mn	335	279	7.75				
	Centrifuge Dewatered					Hg	1.07	0.891	0.025	33336	3000	24206	1100
						Ni	33	27.5	0.764	1081	100	785	40
						Se	5.6	4.66	0.130				
						Zn	770	641	17.8	46	10	34	4
						Co	5.7	5	0.1				

Appendix H - Nutri-Gold Summary

Nutrigold Field #2021SW305116					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
4602	23.9	1100	135	52	21.2	TP	25900	28490	548					
						TN	35670	39237	755					
						NH4-N	10189	11208	216					
Landowner	Ron Kozoway					As	5.0	5.50	0.106					
Legal Description	SW-30-51-16-4					Cd	2.8	3.08	0.059	12739	1500	9250	600	
Start Date	29-Oct-21					Cr	75	82.5	1.59	476	20	345	8	
End Date	16-Dec-21					Cu	5.7	6	0.12	6258	15	4544	6	
Soil Class	Class 1					Pb	34	37.4	0.719	1049	20	762	8	
Biosolids Type	Digested Centrifuge Dewatered					Mn	335	369	7.09					
						Hg	1.07	1.177	0.023	33336	3000	24206	1100	
						Ni	33	36.3	0.698	1081	100	785	40	
						Se	5.6	6.16	0.118					
						Zn	770	847	16.3	46	10	34	4	
						Co	5.7	6	0.1					

Nutrigold Field #2021SW225117					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
3790	23.3	885	105	43	20.6	TP	25900	22922	533					
						TN	35670	31568	734					
						NH4-N	10189	9017	210					
Landowner	Ron Kozoway					As	5.0	4.43	0.103					
Legal Description	SW-22-51-17-4					Cd	2.8	2.48	0.058	12739	1500	9250	600	
Start Date	9-Nov-21					Cr	75	66.4	1.54	476	20	345	8	
End Date	6-Dec-21					Cu	5.7	5	0.12	6258	15	4544	6	
Soil Class	Class 1					Pb	34	30.1	0.700	1049	20	762	8	
Biosolids Type	Digested Centrifuge Dewatered					Mn	335	296	6.89					
						Hg	1.07	0.947	0.022	33336	3000	24206	1100	
						Ni	33	29.2	0.679	1081	100	785	40	
						Se	5.6	4.96	0.115					
						Zn	770	681	15.8	46	10	34	4	
						Co	5.7	5	0.1					

Appendix H - Nutri-Gold Summary

Nutrigold Field #2022NE32492W5					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
6089	24.6	1498	144	58.3	25.7	TP	24473	36661	629					
						TN	34160	51172	878					
						NH4-N	6530	9782	168					
Landowner	Warburg Sylvis Project					As	4.5	6.7	0.12					
Legal Description	NE-32-49-2-5					Cd	3.25	4.87	0.0835	10511	1500	7530	600	
Start Date	22-Apr-22					Cr	97.3	146	2.50	351	20	252	8	
End Date	3-Oct-22					Cu	409	613	10.5	84	15	60	6	
Soil Class	Class 4					Pb	40.7	61.0	1.05	839	20	601	8	
Biosolids Type	Digested Centrifuge Dewatered					Mn	316	473	8.12					
						Hg	1.3	1.9	0.033	26277	3000	18825	1100	
						Ni	35.4	53.0	0.910	965	100	691	40	
						Se	5.1	7.6	0.13					
						Zn	718	1076	18.4	48	10	34	4	
						Co	5.5	8.2	0.14					

Nutrigold Field #2022NW33492W5					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
2593	24.6	638	65	26.5	24.1	TP	24473	15614	589					
						TN	34160	21794	822					
						NH4-N	6530	4166	157					
Landowner	Warburg Sylvis Project					As	4.5	2.9	0.11					
Legal Description	NW-33-49-2-5					Cd	3.25	2.07	0.0782	10511	1500	7530	600	
Start Date	9-Jun-22					Cr	97	62	2.3	351	20	252	8	
End Date	8-Oct-22					Cu	409	261	9.85	84	15	60	6	
Soil Class	Class 4					Pb	40.7	26.0	0.980	839	20	601	8	
Biosolids Type	Digested Centrifuge Dewatered					Mn	316	202	7.61					
						Hg	1.3	0.83	0.031	26277	3000	18825	1100	
						Ni	35.4	22.6	0.85	965	100	691	40	
						Se	5.1	3.3	0.12					
						Zn	718	458	17.3	48	10	34	4	
						Co	5.5	3.5	0.13					

Appendix H - Nutri-Gold Summary

Nutrigold Field #2022SW33492W5					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		Minimum	
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE	P/TE Ratio	
8817	24.6	2169	220	89.0	24.4	TP	24473	53082	596					
						TN	34160	74093	833					
						NH4-N	6530	14164	159					
Landowner	Warburg Sylvis Project					As	4.5	9.8	0.11					
Legal Description	SW-33-49-2-5					Cd	3.25	7.05	0.0792	10511	1500	7530	600	
Start Date	30-Aug-22					Cr	97	211	2.4	351	20	252	8	
End Date	1-Nov-22					Cu	409	887	9.97	84	15	60	6	
Soil Class	Class 4					Pb	40.7	88.3	0.992	839	20	601	8	
Biosolids Type	Digested					Mn	316	685	7.70					
	Centrifuge Dewatered					Hg	1.3	2.8	0.032	26277	3000	18825	1100	
						Ni	35.4	76.8	0.863	965	100	691	40	
						Se	5.1	11.1	0.12					
						Zn	718	1557	17.5	48	10	34	4	
						Co	5.5	11.9	0.13					

Appendix I – Third Party Agricultural Summary

Substance Loading Rates on Olstad turnkey Fields - 2022

Olstad Field OC-01					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
29089	5.50%	1602	210	85	18.8	TP	27657	44307	521					
						TN	31581	50593	595					
						NH4-N	21100	33802	398					
Landowner	Craig Sime					As	5.80	9.29	0.109					
Legal Description	NE-07-57-23					Cd	3.00	4.81	0.057	10527	1500	9219	600	
Start Date	5-May-22					Cr	144	230.7	2.71	219	20	192	8	
End Date	19-May-22					Cu	360	577	6.78	88	15	77	6	
Soil Class	Class 1					Pb	49.0	78.5	0.924	645	20	564	8	
Biosolids Type	Digested					Mn	310	497	5.84					
	Gravity Thickened					Hg	1.29	2.067	0.024	24481	3000	21440	1100	
						Ni	52	83.3	0.980	607	100	532	40	
						Se	25.3	40.53	0.477					
						Zn	702	1125	13.2	45	10	39	4	
						Co	10.40	17	0.2					

Olstad Field OC-02					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
20280	5.80%	1175	140	56	21.0	TP	27657	32497	580					
						TN	31581	37108	663					
						NH4-N	21100	24793	443					
Landowner	Larry Olstad					As	5.80	6.82	0.122					
Legal Description	NE-24-54-19-4					Cd	3.00	3.53	0.063	10527	1500	9219	600	
Start Date	11-Jun-22					Cr	144	169.2	3.02	219	20	192	8	
End Date	29-Jul-22					Cu	360	423	7.55	88	15	77	6	
Soil Class	Class 1					Pb	49.0	57.6	1.028	645	20	564	8	
Biosolids Type	Digested					Mn	310	364	6.50					
	Gravity Thickened					Hg	1.29	1.516	0.027	24481	3000	21440	1100	
						Ni	52	61.1	1.091	607	100	532	40	
						Se	25.3	29.73	0.531					
						Zn	702	825	14.7	45	10	39	4	
						Co	10.40	12	0.2					

Substance Loading Rates on Olstad turnkey Fields - 2022

Olstad Field OC-03					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
39580	6.00%	2394	300	122	19.6	TP	27657	66211	543					
						TN	31581	75605	620					
						NH4-N	21100	50513	414					
Landowner	Tim Milligan					As	5.80	13.89	0.114					
Legal Description	SW/SE-16-56-23-4					Cd	3.00	7.18	0.059	10527	1500	9219	600	
Start Date	26-Aug-22					Cr	144	344.7	2.83	219	20	192	8	
End Date	17-Sep-22					Cu	360	862	7.06	88	15	77	6	
Soil Class	Class 1/Class 2					Pb	49.0	117.3	0.962	645	20	564	8	
Biosolids Type	Digested					Mn	310	742	6.08					
	Gravity Thickened					Hg	1.29	3.088	0.025	24481	3000	21440	1100	
						Ni	52	124.5	1.020	607	100	532	40	
						Se	25.3	60.57	0.496					
						Zn	702	1681	13.8	45	10	39	4	
						Co	10.40	25	0.2					

Olstad Field OC-04					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		N/TE	Minimum		P/TE	Minimum P/TE Ratio
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha		N/TE Ratio	P/TE		
37433	6.10%	2303	285	110	20.9	TP	27657	63694	579					
						TN	31581	72731	661					
						NH4-N	21100	48593	442					
Landowner	Terry Vaculchik					As	5.80	13.36	0.121					
Legal Description	SW/SE-28-55-24-4					Cd	3.00	6.91	0.063	10527	1500	9219	600	
Start Date	17-Sep-22					Cr	144	331.6	3.01	219	20	192	8	
End Date	3-Oct-22					Cu	360	829	7.54	88	15	77	6	
Soil Class	Class 1					Pb	49.0	112.8	1.026	645	20	564	8	
Biosolids Type	Digested					Mn	310	714	6.49					
	Gravity Thickened					Hg	1.29	2.971	0.027	24481	3000	21440	1100	
						Ni	52	119.8	1.089	607	100	532	40	
						Se	25.3	58.27	0.530					
						Zn	702	1617	14.7	45	10	39	4	
						Co	10.40	24	0.2					

Substance Loading Rates on Olstad turnkey Fields - 2022

Olstad Field OC-05					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		Minimum		Minimum	
Wet Tonnes	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
5055	6.30%	323	40	16	20.2	TP	27657	8933	558				
						TN	31581	10201	638				
						NH4-N	21100	6815	426				
Landowner	Jason Lamoureux					As	5.80	1.87	0.117				
Legal Description	SW-14-55-23-4					Cd	3.00	0.97	0.061	10527	1500	9219	600
Start Date	6-Oct-22					Cr	144	46.5	2.91	219	20	192	8
End Date	12-Oct-22					Cu	360	116	7.27	88	15	77	6
Soil Class	Class 1					Pb	49.0	15.8	0.989	645	20	564	8
Biosolids Type	Digested					Mn	310	100	6.26				
	Gravity Thickened					Hg	1.29	0.417	0.026	24481	3000	21440	1100
						Ni	52	16.8	1.050	607	100	532	40
						Se	25.3	8.17	0.511				
						Zn	702	227	14.2	45	10	39	4
						Co	10.40	3	0.2				

Appendix J – Non-Ag Biosolids Management Report

EPCOR Water Services Inc.

Biosolids Land Application Annual Report

November 2022

Prepared for:

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1 PROJECT OVERVIEW

Project Name:	Warburg Marginal Land Improvement
Authorization/Reference Number:	639-29175-SLU
Authorization Date:	April 19, 2022, revised September 20,2022
Project Start Date:	April 19, 2022
Project End Date:	October 31, 2022
Biosolids Type:	Anaerobically digested, dewatered
Total Solids Content (%):	24.50
Target Biosolids Utilization (dt):	6,080.00
Actual Biosolids Utilization (dt):	4,304.41

2 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)

3 REGULATORY ADMINISTRATION

- Guideline
- Letter of Authorization
- Other (please specify below)

EPEA Approval Number: 639-03-06

4 BIOSOLIDS QUALITY

SYLVIS completed due diligence for biosolids quality assurance by reviewing laboratory results from February through October 2022. Comparison of average concentrations to current regulatory criteria for biosolids quality is provided in Table 1. All biosolids samples met the minimum ratios for nitrogen and phosphorous to trace element concentrations.

Table 1: Average trace element (TE) and nutrient concentrations and minimum acceptable ratios of nitrogen (N) and phosphorus (P) to trace elements in EPCOR biosolids from February to October 2022.

Parameters	Concentration ^a (mg/kg)	N/TE	Guideline N/TE Minimum Ratio ^(b)	P/TE	Guideline P/TE Minimum Ratio ^b
Trace Elements					
Cadmium	3.25	10,511	1,500	7,530	600
Chromium	97.3	351	20	252	8
Copper	409	84	15	60	6
Lead	40.7	839	20	601	8
Mercury	1.27	26,277	3,000	18,825	1,100
Nickel	35.4	965	100	691	40
Zinc	718	48	10	34	4
Nutrients					
Total Nitrogen	34,160	-	-	-	-
Total Phosphorous	24,473	-	-	-	-

a Concentrations are the geometric mean of data from the Quality Assurance Laboratory for Gold Bar for the months of February through October in 2022. EPCOR lab reports 202202280015, 202205300032, 202206220021, 202207260030, 202209020010, 202209270017, and 202210210054.

b Minimum Acceptable Ratios of Nitrogen and Phosphorous to Metals from Table 1 of the Guidelines for the Application of Municipal Wastewater Sludges to Agricultural Land (2001).

5 APPLICATION AREAS

Name/Landowner: Warburg Colony Farms

Physical Address: NE32-49-2-W5 and W33-49-2-W5

Distance from EWMC: 93.9 km

Vegetation prior to biosolids application: canola, wheat, barley rotation

Vegetation following biosolids applications for next three growing seasons: canola, wheat, barley rotation

Site Maps: See Figure B 1, Appendix B for a map of the applied areas.

6 HISTORIC BIOSOLIDS APPLICATIONS

No biosolids have been previously applied on these fields.

7 BIOSOLIDS APPLICATION AND LOADING RATES

Biosolids were applied at a target of 25 dt/ha to each field. Application details are provided in Table 2. Loading rates of nutrients and trace elements are summarized in Tables A1, 2 and 3, Appendix A.

Table 2: Biosolids application site details for 2022.

Site Name/Legal Description	Site Class	Biosolids Application Details				
		Target Rate (dt/ha)	Area (ha)	Total Applied (dt)	Actual Rate (dt/ha)	Stockpiling and Application Dates
Warburg Colony						
NE32-49-2-W5	4	25	58.3	1,498	25.7	April 22 nd – June 9 th and September 20 th – October 3 rd
NW33-49-2-W5	4	25	26.5	638	24.1	June 9 th – July 29 th and October 4 th – 8 th
SW33-49-2-W5	4	25	89.0	2,169	24.4	July 30 th – October 20 th and October 8 th – November 1 st

8 POST APPLICATION MONITORING

Required? Post-application monitoring is required

Matrix (e.g., soil, crop, surface waste): Soil and vegetation.

Constituents: trace elements.

Frequency and duration: Monitoring will occur at the end of the first growing seasons following biosolids applications, in the fall of 2023.

Application of results: Monitoring results will be provided to AEP in the 2023 annual report.

APPENDIX A – TABLES

Table A 1: Trace element and nutrient loading rates for NE32-49-2-W5

Parameters	Biosolids ^b (mg/kg)	Loading Rate (kg/ha)	Guideline Limit ^a	% Of Guideline Limit
Trace Elements				
Arsenic	4.5	0.12	-	-
Cadmium	3.25	0.0835	1.5	5.6
Chromium	97.3	2.50	100	2.5
Copper	409	10.5	200	5.3
Lead	40.7	1.05	100	1.0
Manganese	316	8.12	-	-
Mercury	1.3	0.033	0.5	6.0
Nickel	35.4	0.910	25	3.6
Selenium	5.1	0.13	-	-
Zinc	718	18.4	300	6.1
Cobalt	5.5	0.14	-	-
Fertility Parameters				
Total Phosphorous	24,473	629	-	-
Total Nitrogen	34,160	878	900	97.5
Ammonia Nitrogen	6,530	168	450	37.3
Total Solids	24.6%	25.7 dt/ha	-	-

^a 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). Where values are not provided, there is no applicable guideline

^b Concentrations are the geometric mean of data from the Quality Assurance Laboratory for Gold Bar for the months of February through October in 2022. EPCOR lab reports 202202280015, 202205300032, 202206220021, 202207260030, 202209020010, 202209270017, and 202210210054.

Table A 2: Trace element and nutrient loading rates for NW33-49-2-W5

Parameters	Biosolids ^b (mg/kg)	Loading Rate (kg/ha)	Guideline Limit ^a	% Of Guideline Limit
Trace Elements				
Arsenic	4.5	0.11	-	-
Cadmium	3.25	0.0782	1.5	5.2
Chromium	97.3	2.3	100	2.3
Copper	409	9.85	200	4.9
Lead	40.7	0.980	100	1.0
Manganese	316	7.61	-	-
Mercury	1.3	0.031	0.5	6.0
Nickel	35.4	0.85	25	3.4
Selenium	5.1	0.12	-	-
Zinc	718	17.3	300	5.8
Cobalt	5.5	0.13	-	-
Fertility Parameters				
Total Phosphorous	24,473	589	-	-
Total Nitrogen	34,160	822	900	91.4
Ammonia Nitrogen	6,530	157	450	34.9
Total Solids	24.6 %	24.1 dt/ha	-	-

^a 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). Where values are not provided, there is no applicable guideline

^b Concentrations are the geometric mean of data from the Quality Assurance Laboratory for Gold Bar for the months of February through October in 2022. EPCOR lab reports 202202280015, 202205300032, 202206220021, 202207260030, 202209020010, 202209270017, and 202210210054.

Table A 3: Trace element and nutrient loading rates for SW33-49-2-W5.

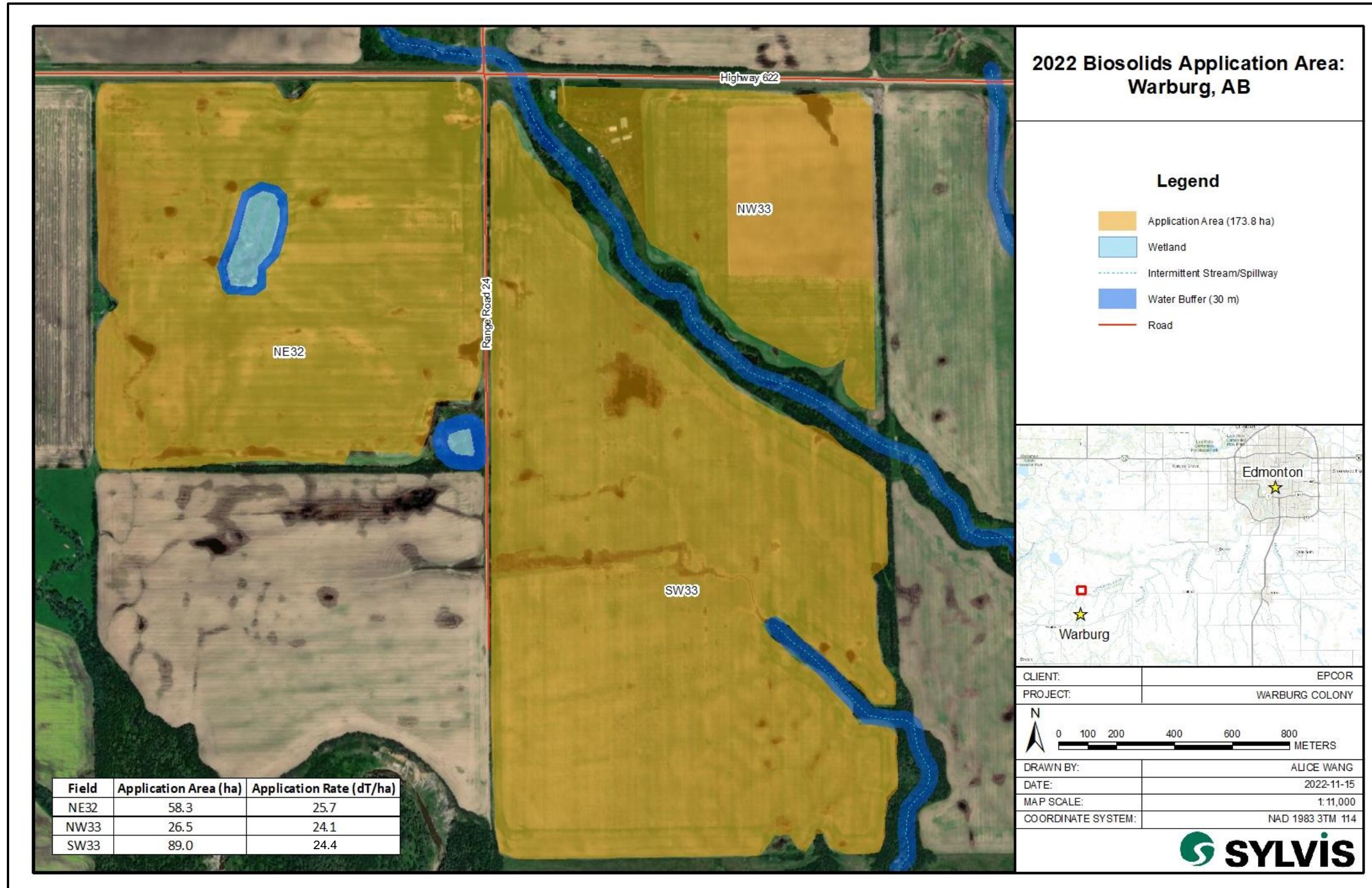
Parameters	Biosolids ^b (mg/kg)	Loading Rate (kg/ha)	Guideline Limit ^a	% Of Guideline Limit
Trace Elements				
Arsenic	4.5	0.11	-	-
Cadmium	3.25	0.0792	1.5	5.3
Chromium	97.3	2.4	100	2.4
Copper	409	9.97	200	5.0
Lead	40.7	0.992	100	1.0
Manganese	316	7.70		
Mercury	1.3	0.032	0.5	6.0
Nickel	35.4	0.863	25	3.5
Selenium	5.1	0.12	-	-
Zinc	718	17.5	300	5.8
Cobalt	5.5	0.13		
Fertility Parameters				
Total Phosphorous	24,473	596	-	-
Total Nitrogen	34,160	833	900	92.5
Ammonia Nitrogen	6,530	159	450	35.4
Total Solids	24.6 %	24.4 dt/ha	-	-

^a 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). Where values are not provided, there is no applicable guideline.

^b Concentrations are the geometric mean of data from the Quality Assurance Laboratory for Gold Bar for the months of February through October in 2022. EPCOR lab reports 202202280015, 202205300032, 202206220021, 202207260030, 202209020010, 202209270017, and 202210210054.

APPENDIX B – FIGURES

Figure B 1: Biosolids Application Areas



APPENDIX C – PHOTOGRAPHS



Photograph 1: Excavator digging soil pit for pre-application site assessments. (March 2022)



Photograph 2: Construction of the berm for the NE32 stockpile area. (April 2022)



Photograph 3: Biosolids are delivered to the stockpile in NE32. (May 2022)



Photograph 4: Biosolids are loaded into the manure spreader. (October 2022)



Photograph 5: Spreader applying biosolids to SW33. (October 2022)



Photograph 6: Tractor with disc incorporating biosolids into NE32. (September 2022)

Appendix J - Non-Ag Biosolids Management Report

Nutrigold Field #2022NE32492W5					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		Minimum		Minimum	
Wet Tonne:	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
6089	24.6	1498	144	58.3	25.7	TP	24473	36661	629				
						TN	34160	51172	878				
						NH4-N	6530	9782	168				
Landowner	Warburg Sylvis Project					As	4.5	6.7	0.12				
Legal Description	NE-32-49-2-5					Cd	3.25	4.87	0.0835	10511	1500	7530	600
Start Date	22-Apr-22					Cr	97.3	146	2.50	351	20	252	8
End Date	3-Oct-22					Cu	409	613	10.5	84	15	60	6
Soil Class	Class 4					Pb	40.7	61.0	1.05	839	20	601	8
Biosolids Type	Digested Centrifuge Dewatered					Mn	316	473	8.12				
						Hg	1.3	1.9	0.033	26277	3000	18825	1100
						Ni	35.4	53.0	0.910	965	100	691	40
						Se	5.1	7.6	0.13				
						Zn	718	1076	18.4	48	10	34	4
						Co	5.5	8.2	0.14				

Nutrigold Field #2022NW33492W5					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		Minimum		Minimum	
Wet Tonne:	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
2593	24.6	638	65	26.5	24.1	TP	24473	15614	589				
						TN	34160	21794	822				
						NH4-N	6530	4166	157				
Landowner	Warburg Sylvis Project					As	4.5	2.9	0.11				
Legal Description	NW-33-49-2-5					Cd	3.25	2.07	0.0782	10511	1500	7530	600
Start Date	9-Jun-22					Cr	97	62	2.3	351	20	252	8
End Date	8-Oct-22					Cu	409	261	9.85	84	15	60	6
Soil Class	Class 4					Pb	40.7	26.0	0.980	839	20	601	8
Biosolids Type	Digested Centrifuge Dewatered					Mn	316	202	7.61				
						Hg	1.3	0.83	0.031	26277	3000	18825	1100
						Ni	35.4	22.6	0.85	965	100	691	40
						Se	5.1	3.3	0.12				
						Zn	718	458	17.3	48	10	34	4
						Co	5.5	3.5	0.13				

Nutrigold Field #2022SW33492W5					Loading Rate Tonnes/ha	Substance	Biosolids mg/Kg	Field Loading		Minimum		Minimum	
Wet Tonne:	Ave. %TS	Dry Tonnes	Ac	ha				Kg	Kg/ha	N/TE	N/TE Ratio	P/TE	P/TE Ratio
8817	24.6	2169	220	89.0	24.4	TP	24473	53082	596				
						TN	34160	74093	833				
						NH4-N	6530	14164	159				
Landowner	Warburg Sylvis Project					As	4.5	9.8	0.11				
Legal Description	SW-33-49-2-5					Cd	3.25	7.05	0.0792	10511	1500	7530	600
Start Date	30-Aug-22					Cr	97	211	2.4	351	20	252	8
End Date	1-Nov-22					Cu	409	887	9.97	84	15	60	6
Soil Class	Class 4					Pb	40.7	88.3	0.992	839	20	601	8
Biosolids Type	Digested Centrifuge Dewatered					Mn	316	685	7.70				
						Hg	1.3	2.8	0.032	26277	3000	18825	1100
						Ni	35.4	76.8	0.863	965	100	691	40
						Se	5.1	11.1	0.12				
						Zn	718	1557	17.5	48	10	34	4
						Co	5.5	11.9	0.13				

Part II: Wastewater Collection System Report



EPCOR Water Services Inc.
Edmonton, Alberta

2022
Annual Wastewater Collection System Report

Submitted to:
The Province of Alberta
Alberta Environment and Protected Areas (AEPA)

As per requirements of:
Approval to Operate No. 639-03-07

February 2023

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2022 Overview

EPCOR Drainage Services provides wastewater and stormwater drainage services to City of Edmonton (the 'City') residents by planning, building, operating, and maintaining the pipes, tunnels, pump stations, and stormwater management facilities that make up the drainage network.

One Water Planning provides capital planning and long term planning functions in line with integrated resource planning and asset management plans.

Project Management and Engineering are responsible for projects that are in the preliminary design or detailed design phase. They manage in-house engineering design, cost estimation, and drafting. Projects include new sewer infrastructure projects like tunnels, pipes, manholes, green infrastructure such as wetlands, dry ponds, Low Impact Development (LID) facilities and storage and the coordination of sewer rehabilitation work.

Drainage construction is responsible for the in-house construction and emergency repairs on the collection systems. The rehabilitation construction team uses a wide variety of construction methods to rehabilitate the system and build for growth using open-cut and trenchless techniques. The customer construction group completes service connections, renews existing drainage assets, and completes emergency and high priority repairs.

Infrastructure like sewers and structures in the drainage system require ongoing maintenance. Drainage Services Operations — which includes pipeline maintenance, flow-control facilities, monitoring and compliance, and operations engineering — inspect and monitor drainage systems to ensure service to customers is maintained and to optimize the short-term maintenance required. They also reduce the possibility of customer sewer back-ups caused by service connection blockages and minimize disruptions to the public.

Drainage Services are supported by a number of other groups throughout EPCOR such as Public and Governmental Affairs, Supply Chain Management, Fleet and Equipment, Facilities and Finance.

Collection and conveyance of wastewater and stormwater is carried out through the drainage system which consists of sanitary and stormwater collection infrastructure.

The sanitary collection infrastructure includes more than 2,800 km of sanitary sewer, over 800 km of combined sanitary and storm sewer that connect all customers to sanitary trunk sewers. Sanitary trunks then deliver wastewater directly to the Gold Bar Wastewater Treatment Plant (WWTP).

A portion of the conveyance of wastewater is covered under a Wastewater Exchange Agreement between EPCOR and the Alberta Capital Region Wastewater Commission (ACRWC). The ACRWC Treatment Plant takes wastewater from Clareview in northeast Edmonton and from the Clover Bar Industrial Area. In exchange, the sanitary collection system conveys wastewater from the south members (City and County of Leduc, and the Town of Beaumont) for treatment at the Gold Bar WWTP.

The stormwater collection infrastructure includes over 3,300 km of storm sewer, 62,000 catch basins, and 12,800 catch basin manholes. This stormwater collection infrastructure is connected to stormwater trunk sewers. Storm trunks then discharge stormwater to natural watercourses, i.e.

creeks and the North Saskatchewan River, through one of 258 outfalls. Strategically placed within the stormwater collection system are 310 stormwater management facilities which provide flood prevention, peak-flow attenuation, and treatment through stormwater retention.

Between the sanitary/combined sewer system and stormwater system there are 95 pump stations which ensure proper servicing to EPCOR's customers in Edmonton.

In 2022, EPCOR's Drainage capital and operational projects focused on the improvement and expansion of the underground infrastructure system, reduction of odour nuisances and protection of the drainage infrastructure due to corrosion.

In 2019, Edmonton City Council approved EPCOR's Stormwater Integrated Resource Plan (SIRP) to provide a risk-based approach to prioritize investments in stormwater infrastructure. SIRP was identified by the City as one of the action items to support the overall City ability to adapt to changing climate conditions and aligned with the City's Climate Change Adaptation and Resiliency Strategy.

The risk methodology captures capacity, condition, environmental, and social factors on a risk grid overlaid on a map of the City's neighborhoods. SIRP is organized in the following themes: Slow, Move, Secure, Predict, and Respond to flooding. Key actions in 2022 under the SIRP themes included;

- Slow
 - In 2022, three dry pond projects were initiated at the following locations; Lauderdale, Parkdale and Ottewell. Drainage continues to proactively engage with the City of Edmonton as dry pond projects are initiated through established development mechanisms to ensure alignment with SIRP.
 - EPCOR built 37GHa (Green Hectares – close to 5,600m³ of surface or underground storage in a form of green infrastructure or small storage). Low Impact Development (LID) has been successfully integrated in EPCOR capital projects (dry ponds – Kenilworth; Outfall rehab projects; Water Treatment Plant Flood Hardening Projects – Rossdale and E.L. Smith).
 - EPCOR continued to work closely with COE and other stakeholders on the implementation of LID in conjunction with planned roadway construction and other infrastructure capital projects.
- Move
 - Incorporation of piping modifications required to accommodate approved dry ponds. In 2022 sewer separation and additional piping for Kenilworth dry pond has been initiated and partially completed. Each new dry pond adds approximately 300m of new underground infrastructure to convey surface runoff and separate portions of the system to better utilize gains in storage capacity.
- Secure
 - Continue the implementation of the maintenance program for Inflow/Infiltration reduction.
 - Phase I of Outfall Gates and Controls project has been completed with risk assessments having been completed for each outfall for risks associated with river flooding, surface flooding, sewer backup and customer surcharges. Outfall locations have been prioritized for the next phase of planning and capital project development.
 - Implementation of the Enhanced Flood Proofing Program with targeted outreach to at risk private properties.

- Predict
 - Continue the implementation and enablement of improved situational awareness of the storm and sanitary collection system including tracking of performance during flooding events and overall system awareness. This is accomplished through the modernization of interface software platforms used to access data and increased in-line monitoring installations.
 - In 2022, the Federal Government announced the approval of 17 million in funding for the Smart Pond Project which when complete will consist of a network of automatic gates linked with stormwater management facilities to enhance storage, better manage flows in the collection system and further increase awareness of the operability of the collection systems.
- Respond
 - Continue to support capital emergency response improvements in identified at risk areas which includes targeted education on emergency preparedness and response with residential, industrial, commercial and institutional property owners and the City of Edmonton. And allow EPCOR to better utilize existing storage/system prior and during the storms and further mitigate flood risk.
 - In 2022 EPCOR applied and was granted Disaster Mitigation and Adaptation Fund (DMAF), 2.0 funding. Projects included in application were the Gold Bar Waste Water Treatment Plant Flood Hardening and Drainage Smart Ponds Project (see above).

The formation and release of hydrogen sulphide (H₂S) gas from the sewer system negatively impacts communities, corrodes infrastructure, and makes maintenance and inspection challenging. The Corrosion and Odour Reduction (CORE) Strategy continued in 2022 with primary focus on pumping optimization and trunk line cleaning as monitoring data on the work completed to date for CORE has shown this to be most impactful to the system. Key actions for each CORE theme included;

- Prevent
 - Continue the design and construction process on the Duggan bypass tunnel.
 - Continue to construct access manholes and implement trunk inspection and cleaning activities.
 - Continue to implement rehabilitation projects in emerging locations.
- Optimize
 - Continue to implement the improvements to pump stations with chemical treatment capability.
 - Improved pumping performance at pump stations to reduce unnecessary wastewater stagnation
- Monitor
 - Completed city wide pump station monitoring
 - Designed permanent in-sewer monitoring stations for construction across the city.
- Control
 - Continue to modify existing drop structures.

Drainage Services is fully committed to the protection of the environment and the health and safety of its employees, customers, and neighbors. Health and safety and the environment (HSE), including public health safety, is one of the top priorities of EPCOR. In order to continually improve our environmental performance, Drainage Services operates with an ISO 14001:2015 registered Environmental Management System (EMS). Following a successful surveillance audit in 2022, Drainage continued to maintain registration of an integrated management system that operates

according to the ISO14001:2015 standard and the ISO 45001:2014 standard for Safety Management Systems.

As required by Approval #639-03-06, EPCOR - Drainage Services is submitting the 2022 Annual Wastewater Collection System Report.

This Annual Wastewater Collection System Report submission includes: 2022 Drainage Services Capital Program summary, Interconnection Control Strategy Annual Report, Environmental Monitoring results, Chemical usage, and Collection System Operational details.

TABLE 1: Summary of 2022 Completed Projects and Planned Major Rehabilitation Projects

Program/Project	Completion
Drainage System Expansion	
SWMF Safety Review	Aug-2022
50 Street Wide & CPR Sewer Relocate	Dec-2022
Servicing for Downtown Intensification (105 Sewer Lateral Project)	Dec-2023
Freeway Relocates (YHT)	Dec-2024
Drainage System Rehabilitation	
Dunluce Pump Station Upgrade	Aug-2022
Larkspur Pond Pump Replacement	Aug-2022
SAN-11 Double Barrel Rehab Phase 2: Install 3 Access MHs	Aug-2022
Kaskitayo Carma-2C Pump Station Upgrade	Sep-2022
2020 Drill Drop Manhole (DDMH) Rehabilitation/Replacement Projects	Sep-2022
Outfall 80 Rehab	Nov-2022
Gold Bar Utilidor (PW552 and 147) Rehabilitation	Dec-2022
NL1 Sanitary Chamber Rehabilitation	Dec-2022
2021 Pump Station Rehabilitation	Dec-2022
Pump Station #159 (Dunluce)	Dec-2022
2019-2020 Pump Station Rehabilitation	Jun-2023
2021 Drill Drop Manholes (DDMH) Rehabilitation	Jun-2023
Capital Line South LRT – Sewer Relocation	Dec-2023
Laurier Heights and Buena Vista Pump Station	Dec-2023
Whitemud Drive & 106 Street - Pump Station Upgrade	Dec-2023
2019-2020 Outfall Rehabilitation	Dec-2023
151 South Large Trunk Rehab	Dec-2023
Pump Station #171 (Walterdale)	Dec-2023
Large Trunk Sewer - NL2 Rehab	Dec-2023
San-11 Double Barrel Rehab	Dec-2023
Storm Trunk 85547 Rehabilitation	Dec-2023
Outfall 154 Rehabilitation	Jan-2024
2022-2023 Small Trunk Rehabilitation	Jan-2024
2022 Drill Drop Manholes (DDMH) Rehabilitation	Jan-2024
Trestle #5	Jul-2024
99 Avenue & 151 Street Sanitary - Trunk Rehab Phase II	Dec-2024

West Valley Line LRT Sewer Relocations	Dec-2024
2019 Trunk Sewer Rehabilitation - Area C-2	Dec-2024
2022 Outfall Rehabilitation	Dec-2024
Drill Drop Manhole 262262 Replacement	Dec-2024
Mill Creek Combined Trunk Rehabilitation	Dec-2026
Environmental Quality Enhance	
2020 Environmental Monitoring	Jul-2022
2019 - 2021 Drop Shaft Modifications	Aug-2022
2019 - 2021 Drop shaft Modification	Aug-2022
2021 Budget LID on PLC	Oct-2022
2021 Ventilation Control Program	Dec-2022
2021 Environmental Enhancement Program	Dec-2022
Kinnaird Opportunistic Sewer Separation	Dec-2022
2021 Environmental Monitoring	Dec-2022
2021 CORE Monitoring Control Equipment	Dec-2022
Pump Station Optimization CapEx	Apr-2023
2022 Access Manhole	Apr-2023
2021 Drop Structure Modifications	Jun-2023
2022 CORE Odour Monitoring	Jun-2023
2022 Drop Structure Modifications	Aug-2023
LID on Commercial/Industrial Sites	Sep-2023
2022 Environmental Monitoring	Oct-2023
2020 Pump Station Treatment	Dec-2023
Sanitary Catch Basin Lead Removal	Dec-2023
Brintnell Bannerman Syphon Ventilation	Dec-2023
2022-2023 Low Impact Development - Public Land	Dec-2023
2022-2023 Low Impact Development - Commercial	Dec-2023
2022 Environmental Enhancement Program	Dec-2023
2021 Pump Station Enhancements	Feb-2024
Duggan Tunnel Replacement	Aug-2025
Flood Mitigation	
2021 SIRP Monitoring and Control	Mar-2022
2021 Emergency Response Equipment	Aug-2022
Ermineskin / Steinhauer Flood Mitigation	Oct-2022
Rideau Park, Empire Park, Duggan Upgrade	Dec-2022
2020 Overland Drainage	Dec-2022

2021 Overland Drainage	Dec-2022
2021-2022 Proactive Manhole Sealing	Dec-2022
2022 Culvert Replacements	Dec-2022
2021 Outfalls and Automatic Gates	Jan-2023
2021-2022 Proactive Pipe Relining - Sanitary and Combined	Apr-2023
Gateway Boulevard Geysers Mitigation - Ventilation Manhole Installation	May-2023
2022 SIRP Monitoring and Controls	Jun-2023
North Griesbach Pump Station	Nov-2023
Malcolm Tweddle & Edith Rogers Dry Ponds	Dec-2023
Parkdale Dry Pond	Dec-2023
2022 Emergency Response Equipment	Dec-2023
2022 Overland Drainage	Dec-2023
2022-2023 Proactive Manhole Sealing	Dec-2023
2022-2023 Proactive Pipe Relining-Sanitary & Combined	Dec-2023
Kenilworth Dry Pond	Dec-2024
Lauderdale West Dry Pond	Jan-2025
Ottewell Dry Pond and Sewer Separation	Dec-2025
SSSF Projects	
NEST NC2 & NC3	Aug-2022
SESS SA10A	Aug-2022
SESS SW4	Dec-2023

Interconnection Control Strategy

SUMMARY

In response to a requirement in the 1995 Approval to Operate (No. 95-MUN-117), Drainage Services prepared an Interconnection Control Strategy. Through this Strategy, EPCOR embarked on its mitigation and monitoring program in the context of “perpetual monitoring and assessment” (Figure 1).

An interconnection is designed to allow sanitary or combined sewage to overflow into the storm system, in order to relieve the sewer system under high flow conditions. Since 1998, a program has been in place to minimize the contamination of stormwater with sanitary sewage by monitoring, assessing and eliminating or mitigating all interconnections between the two systems. This will reduce the total loading of contaminants to the North Saskatchewan River.

Under the current Approval (639-03-06), issued in 2020, EPCOR intends to continue with the existing processes and reporting through the Wastewater System Operations Plan. This report presents summaries of: status and mitigation activities for known and newly discovered interconnections (I/Cs); results of the 2022 monitoring program; and status of the Interconnection Rectification Assessment project.

Interconnection Status

During 2022, one interconnection was found and closed, another was found to be closed and a third was closed. The I/C count for December 31, 2022 stands at 115 open I/Cs and 289 corrected sites (total 404).

The total monies spent on remedial work for I/C control in 2022 was \$197,000.

Interconnection Monitoring

As of December 31, 2022, 106 of the 115 open I/Cs had monitoring devices. No dry weather overflows (DWO) were discovered in 2022.

Interconnection Rectification Assessment Project

Two consultants were hired in 2002 and 2003 to carry out the rectification assessment of about 90 and 40 sites, respectively. Their work focused mainly on active I/Cs and I/Cs with DWOs. Previous studies and monitoring data were utilized to quantify I/Cs activity, support sewer system assessment, and provide conceptual and preliminary design for remedial works. These assessment studies were completed in 2004 and EPCOR has been following up with the recommended mitigation work since. New focused, detailed assessment projects are ongoing as rectification projects are defined.

1.0 INTRODUCTION

An Interconnection Control Strategy was prepared by EPCOR in response to a requirement by Alberta Environment, as part of the 1995 Approval. This program to minimize the contamination of stormwater by sanitary sewage, has been in effect since 1998.

A key commitment of the Interconnection Control Strategy is perpetual monitoring and assessment for all unmitigated interconnections (see Figure 1). This consists of identification, maintenance of data, evaluation, monitoring, correction, elimination and mitigation.

The focus of interconnection monitoring activities is to collect information on the frequency and duration of discharges from all interconnection (I/C) sites. The evaluation of the data for all sites is the core component of the assessment. All sites are to be evaluated annually for further action. More detailed monitoring will be conducted at highly active sites. Corrective measures will be taken at inactive sites or active sites where sufficient data has been collected and analyzed indicating that they can be safely closed. Monitoring information will be used as the basis for decisions in terms of remedial activity.

As part of the current Approval (639-03-06) issued in 2020, the *Interconnection Identification and Control Strategy* is continuing to be a component of the *Wastewater Collection System Operations Plan*. The *Wastewater Collection System Monitoring Protocol* includes the collection of overflow data from open (active) interconnection sites. This Protocol was submitted to Alberta Environment in 2007 and has been maintained since.

Through the *Wastewater Collection System Operations Plan*, EPCOR has committed to continue with the Interconnection Control Strategy and annual reporting of the I/C status by February 28 of each year. The intent of the annual report is to document changes and status of the I/Cs, including any corrections or closures, and to provide an updated I/C database. The following documents the I/C status for 2022.

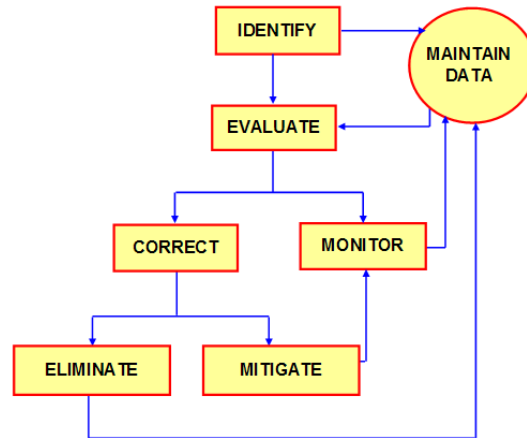


Figure 1 Interconnection Control Strategy Perpetual Monitoring and Assessment

2.0 MITIGATION MEASURES

On January 1, 2022 there were a total of 403 I/Cs. This consisted of 117 open I/Cs and 286 corrected (closed) I/Cs. One interconnection was found and closed in 2022, another was found to be closed and a third was closed. The I/C count for December 31, 2022 stands at 115 open I/Cs and 289 corrected sites (total 404).

The enclosed plan “2022 Status and DWO Locations” shows the locations of all of the open I/Cs in the city. A database of I/C sites is also included. Figure 2 shows the cumulative number of I/Cs over time.

2.1 CONSTRUCTION

The mitigation measures undertaken in 2022 include;

- An interconnection was closed in Callingwood.
- An interconnection was closed in Queen Mary Park.
- Conceptual design for abandonment of 6 interconnection locations in the Rossdale and Cloverdale areas was completed.

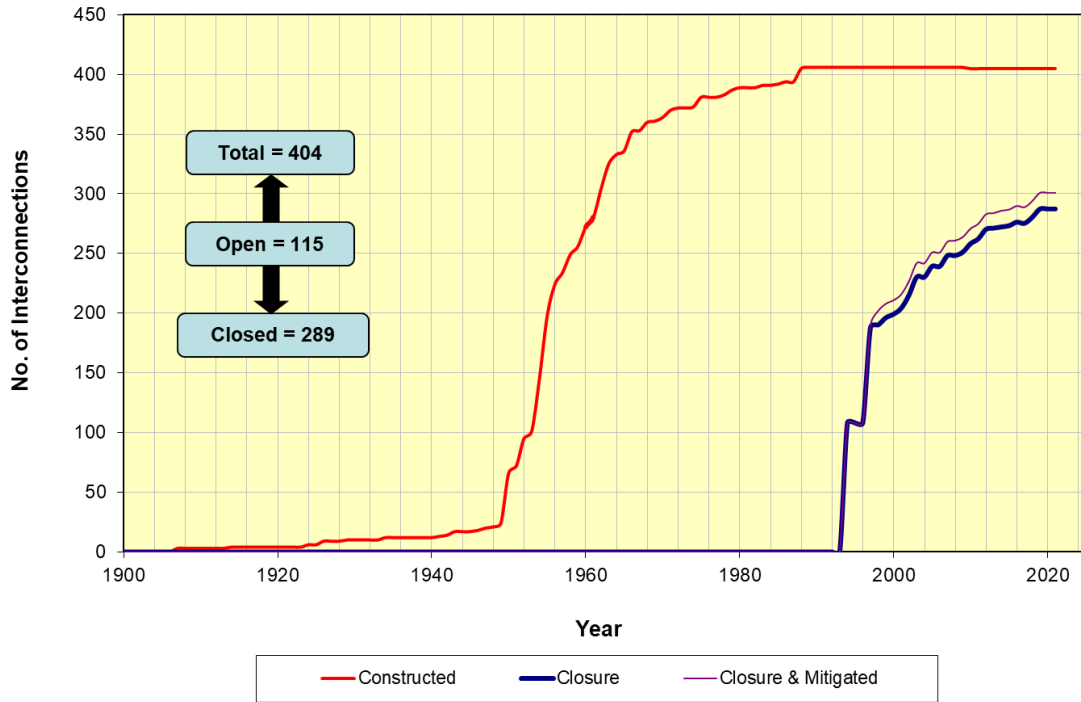


Figure 2 Cumulative Number of Interconnections

2.2 COSTS

In 2022, the amount spent was \$144,805 on construction work as well as \$47,598 for monitoring the network.

In summary, the expenditures for the Interconnection Control Strategy each year from 1994 to 2022 include:

- Monitoring program – approximately \$97,000 annually.
- Investigations consisting of inspection of the sewers to confirm or refute the occurrence of overflows – approximately \$9,000 annually, paid for under regular operating budget (repair, blockage removal or bypass pumping costs are not included).
- Correcting the interconnections based on I/C monitoring and assessment. This can involve closure of an interconnection to eliminate overflow or raising the weir to reduce overflow frequency - approximately \$497,000 annually.
- Assessing I/C sites for possible closure – approximately \$59,000 annually (although the assessments are conducted on an intermittent basis).

Table 1 Interconnection Control Strategy Expenditure Summary

Year	Dollars Spent				Total
	Monitoring	Investigation	Correcting	Assessing	
1994	\$0	\$0	\$195,000	\$50,000	\$245,000
1995	\$40,000	\$0	\$0	\$960,000	\$1,000,000
1996	\$50,000	\$0	\$30,000	\$0	\$80,000
1997	\$213,000	\$0	\$634,000	\$0	\$847,000
1998	\$140,000	\$2,205	\$197,500	\$0	\$339,705
1999	\$104,600	\$5,760	\$762,200	\$0	\$872,560
2000	\$103,000	\$8,100	\$834,000	\$0	\$945,100
2001	\$122,000	\$5,265	\$319,000	\$168,000	\$614,265
2002	\$149,204	\$3,360	\$210,000	\$133,319	\$495,883
2003	\$145,047	\$2,340	\$1,055,000	\$367,897	\$1,570,284
2004	\$97,910	\$3,350	\$1,221,300	\$1,033	\$1,323,593
2005	\$91,280	\$3,600	\$1,067,400	\$16,896	\$1,179,176
2006	\$92,871	\$2,600	\$350,000	\$0	\$445,471
2007	\$137,920	\$3,197	\$100,259	\$0	\$241,376
2008	\$124,345	\$3,329	\$1,505,424	\$0	\$1,633,098
2009	\$128,668	\$3,570	\$740,507	\$0	\$872,746
2010	\$134,362	\$5,300	\$29,931	\$0	\$169,594
2011	\$105,796	\$7,950	\$122,210	\$0	\$235,955
2012	\$90,512	\$11,918	\$193,000	\$0	\$295,430
2013	\$85,936	\$21,491	\$539,171	\$0	\$646,598
2014	\$97,713	\$23,606	\$1,750,427	\$0	\$1,871,747
2015	\$127,257	\$22,507	\$1,022,873	\$0	\$1,172,636
2016	\$98,399	\$11,338	\$688,140	\$0	\$797,877
2017	\$66,869	\$8,884	\$304,455	\$0	\$380,208
2018	\$70,803	\$15,907	\$108,640	\$0	\$195,349
2019	\$59,305	\$29,360	\$130,000	\$0	\$218,665
2020	\$44,696	\$40,056	\$145,548	\$0	\$230,299
2021	\$39,225	\$10,919	\$22,500	\$0	\$72,644
2022	\$47,598	\$4,215	\$144,805	\$0	\$196,617
Total	\$2,808,315	\$260,127	\$14,423,290	\$1,697,145	\$19,188,877
Annual Avg.	\$96,838	\$8,970	\$497,355	\$58,522	\$661,685
Proportion	14.6%	1.4%	75.2%	8.8%	

3.0 MONITORING AND ASSESSMENT RESULTS

In 2017, a project was initiated to replace the loggers at all monitored interconnection sites. Data collection from the old style of logger was completed by driving a vehicle past each site, sometimes having to stop in traffic and place an antenna through the manhole cover. The new loggers are now equipped with cellular communication and no longer require a 'drive-by' to retrieve data.

Benefits to upgrading the loggers include;

- Decrease the safety risk exposure of the contractor by not requiring vehicle based data collection
- Increased data collection frequency from weekly to every 6 hours
- More data streams collected including battery voltage, signal strength, and temperature.
- Cost reduction by using cellular technology. Labour costs of collecting data are eliminated which were more than cellular service fees.
- Improved asset management as battery replacement can be planned to occur at the correct time, not too early or too late. Other data streams will help diagnose other problems as well.
- Sites not accessible by vehicle can now have sensors and loggers installed.

In the Interconnection Control Strategy, EPCOR committed to perpetual monitoring and assessment of all I/Cs. As of December 31, 2022, 106 of the 115 I/Cs had crest gauge type monitors equipped with cellular data loggers.

The rectification studies completed in the past, alongside the historical activity data for the I/C sites sets a well-defined history to draw on to inform management decisions on a go forward basis.

3.1 DRY WEATHER OVERFLOWS (DWOS)

In 2022, 22 investigations of possibly overflowing sites were made with 0 Dry Weather Overflows discovered.

3.2 INTERCONNECTION SITE ACTIVITY CHARACTERISTICS SUMMARY

As shown in Table 2 below, about 3% of the sites were found to have dry weather overflows each year during monitoring from 1997 to 2021, with an average of 2% over the past 5 years. These are the events of critical concern to the environment. Although only 2% of the sites experience dry weather overflow in a given year, different sites overflow each year. A total of 29% of the known open I/Cs (34 sites) have had a dry weather overflow event.

Table 2 Interconnection Site Activity Characteristics Summary

Year	Known I/C Sites	I/C Sites Monitored	Dry Weather Overflow	Rainfall Correlated	Inactive Sites	Unverified Overflows
1997	186	182	N/A	65	109	8
1998	188	179	3	72	64	43
1999	188	176	6	48	92	29
2000	186	173	6	36	76	56
2001	185	174	7	37	75	55
2002	179	161	6	29	110	16
2003	167	153	5	34	102	12
2004	155	139	5	64	51	19
2005	150	131	9	16	88	18
2006	151	131	5	39	70	17
2007	142	126	2	21	87	16
2008	142	126	3	25	75	24
2009	141	127	2	10	81	28
2010	133	118	3	17	72	26
2011	129	118	3	---	---	---
2012	121	113	4	---	---	---
2013	121	113	1	---	---	---
2014	124	113	2	---	---	---
2015	123	112	0	---	---	---
2016	120	112	0	---	---	---
2017	121	68	4	---	---	---
2018	116	93	4	---	---	---
2019	117	103	3	---	---	---
2020	117	110	2			
2021	117	110	1			
2022	115	106	0			
Average	144	130	4	37	82	26
Proportion of Monitored Sites			2.8%	28%	64%	20%

4.0 RECTIFICATION ASSESSMENT PROJECT SUMMARY

Two consultants were hired in 2002 and 2003 to carry out the second phase of a large-scale Interconnection Rectification Assessment project. The first project included about 90 I/C sites and the second included about 40 sites. Their work was focused mainly on active and DWO I/Cs. This work identified many I/Cs that could be closed if funds are available.

Previous studies and monitoring data collected between 1998 and 2003 were utilized to quantify interconnection activity, support sewer system assessment, and provide conceptual and preliminary design for remedial works. Major work requirements for this rectification assessment included:

- Perform sewer system data collection and field surveys
- Carry out sewer condition and hydraulic assessment
- Evaluate various remedial measures
- Develop conceptual and preliminary design plans
- Provide Cost estimates

A computer model called MOUSE (Model For Urban Sewers) developed by DHI (Danish Hydraulics Institute) was employed in these studies to simulate the existing system and recommend remedial measures under various wet weather flow conditions. Simulation results such as hydraulic grade line and by-pass volume were summarized and evaluated to ensure that an improved level of control can be achieved, and that proposed improvements would not cause other system problems.

These two assessment projects were completed in 2004 and we have been following up with construction of the recommended mitigation works since that time. The assessments identified a long list of construction works that will absorb the funding for the next several years. New assessment projects will commence once this construction is largely complete.

In 2018, a review of select neighbourhoods was done in addition to the rectification detailed design works. Further recommendations for interconnection closure work has been developed beyond the conceptual design phase. EPCOR will evaluate these recommendations alongside infrastructure plans of other programs such as neighborhood rehab and the Stormwater Integrated Resource Plan (SIRP).

**Interconnection Database
December 31, 2022**

IC Site#	Plan	IC MH#	CADASTRAL	SAN_MH	STRM_MH	STREET	AVENUE	OF_NUM	IC_AGE	SAN_AGE	STRM_AGE	ICTYPE	Delete date	CORRECTED	OF_LOC1	OF_LOC2	OF_DIA	NHOOD	COUNT
ACTIVE INTERCONNECTIONS																			
12	97-177	241869	313225	046	T3	146	SUMMIT	30	71	30	49	HIGH PIPE		FALSE	RIVER	LEFT	1650	Crestwood	1
14	96-041	315813	313224	803		W142	S. SUMMIT	30	61	55	61	OVERFLOW		FALSE	RIVER	LEFT	1650	Glenora	2
15	97-174	256174	343204	880		136	S102	138	43	43		OVERFLOW		FALSE	CREEK	LEFT	375	Glenora	3
16	96-040	239447	313223	801		ST GEORGE		122	55	29	55	LOW PIPE		FALSE	RIVER	LEFT	200	Glenora	4
17	97-176	239449	313223	802		E135	SVICTORIA	123		43				FALSE					5
18	96-085	255955	343203	813	435	134	ST GEORGE	124	64	29	64	HIGH PIPE		FALSE	CREEK	LEFT	200	Glenora	6
19	96-084	255954	343203	812	404	133	ST GEORGE	126	55	55	55	OVERFLOW		FALSE	CREEK	LEFT	200	Glenora	7
20	96-086	316420	343203	826		132	TWEEDSNAKE	134	49	29	49	OVERFLOW/WEIR		FALSE	CREEK	LEFT	200	Glenora	8
21	96-088	255983	343203	839		E132	S103	273	54					FALSE				Glenora	9
25	97-128	255832	343202	820	445	W123	102	46	50	52	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	10
26	97-127	255697	343202	827	456	W122	102	46	50	9	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	11
27	97-126	255840	343202	832	506	W121	102	46	50	78	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	12
28	97-125	255512	343201	805	402	W120	102	46	50	90	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	13
29	97-124	255520	343201	816	411	W119	102	46	50	13	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	14
30	97-123	255525	343201	830	416	W118	102	46	50	12	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	15
31	97-120	255534	343201	843	425	W117	102	46	50	11	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	16
32	97-119	255539	343201	855	431	W116	102	46	50	11	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	17
33	97-118	255562	343201	884	448	W114	102	46	50	8	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	18
34	97-117	265676	343605	805	805	W113	102	46	50	8	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	19
35	97-116	265685	343605	817	430	W112	102	46	50	8	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	20
36	97-115	265684	343605	821	412	112	102	46	50	30	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	21
37	97-114	265754	343605	833	414	111	102	46	50	46	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	22
38	97-113	265728	343605	801	405	114	N101	46	50	7	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	23
39	97-112	245736	343605	803	406	114	S101	46	50	7	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	24
41	97-142	245620	313625	871		W113	99	46	50	10	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	25
46	97-141	245582	313625	839	410	113	S99	46	50	13	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	26
48	97-145	255558	343201	869	440	116	S101	46	54	7	54	LOW PIPE		FALSE	RIVER	LEFT	1275	Oliver	27
49	97-122	257004	343606	803		114	104	46	50	27	50	LOW PIPE/WEIR		FALSE	RIVER	LEFT	1275	Oliver	28
50	97-109	256913	343210	835	404	W116	106	54	64	64	64	LOW PIPE		FALSE	RIVER	LEFT	3000	Queen Mary Park	29
53	96-090	266055	343625			110 ST	N111 AVE	54	55					FALSE				Prince Rupert	30
60	97-129	272723	373220		401	W120	129	31	55	55	55	OVERFLOW		FALSE	RIVER	LEFT	2400	Calder	31
75	97-099	263753	343622		416	W87	114	56	56	56	13	OVERFLOW		FALSE				Parkdale	32
76	97-098	263758	343622		422	W86	114	56	56	56	13	OVERFLOW		FALSE				Parkdale	33
78	97-096	263708	343621		401	W83	114	56	56	56	13	OVERFLOW		FALSE				Parkdale	34
79	97-095	263716	343621		406	W82	114	56	56	56	13	OVERFLOW		FALSE				Parkdale	35
80	97-080	261662	343621		423	W80	113	56	56	56	13	OVERFLOW		FALSE				Cromdale	36
81	97-078	261672	343621		430	W79	113	56	56	56	13	OVERFLOW		FALSE				Cromdale	37
83	97-081	261660	343621		422	W80	114	56	56	56	13	OVERFLOW		FALSE				Edmonton Northland	38

IC Site#	Plan	IC MH#	CADAS-TRAL	SAN_MH	STRM_MH	STREET	AVENUE	OF_NUM	IC_AGE	SAN_AGE	STRM_AGE	ICTYPE	Delete date	COR-RECTED	OF_LOC1	OF_LOC2	OF_DIA	NHOOD	COUNT
94	96-008	227272	283606	803	412	110	57	22	52	46	52	LOW PIPE		FALSE	RIVER	RIGHT	1500	Pleasantview	39
95	96-010	227234	283615		420	111	S61	22	54	54	54	OVERFLOW		FALSE	RIVER	RIGHT	1500	Pleasantview	40
106		224867	283221		445	112	N76	22	54	47	54	OVERFLOW		FALSE	RIVER	RIGHT	1500	Parkallen	41
107	96-007	224927	283221	813	448	112	N75	22	86	48	54	LOW PIPE		FALSE	RIVER	RIGHT	1500	McKernan	42
110	97-021	242851	313212	009	471	SASK DR	89	23D	53	48	50	LOW PIPE/WEIR		FALSE	RIVER	RIGHT	375	Windsor Park	43
111	97-022	242711	313212	008	443	W120	89	23D	53	49	50	LOW PIPE		FALSE	RIVER	RIGHT	375	Windsor Park	44
113	97-029	228112	283625		429	109	73	22	54	14	54	OVERFLOW		FALSE	RIVER	RIGHT	1500	McKernan	45
114	96-018	227757	283616	842		109	67	22	51	46	51	OVERFLOW		FALSE	RIVER	RIGHT	1500	Parkallen	46
116	96-009	227604	283615		406	109	65	22	54	49	54	OVERFLOW		FALSE	RIVER	RIGHT	1500	Parkallen	47
119	96-013	227636	283615		431	109	62	22	54	49	54	OVERFLOW		FALSE	RIVER	RIGHT	1500	Parkallen	48
120	97-045	227702	283615	842		109	61	22	54	54	54	DUAL		FALSE	RIVER	RIGHT	1500	Pleasantview	49
134	97-195	229993	313601	861	473	89	S77	44	55	49	55	LOW PIPE		FALSE	RIVER	RIGHT	3800	King Edward Park	50
135	96-059	246571	313601	859	471	91	S77	44	55	28	55	LOW PIPE/WEIR		FALSE	RIVER	RIGHT	3800	King Edward Park	51
139	96-053	229990	313601	828	435	91	S80	44	55	28	55	LOW PIPE/WEIR		FALSE	RIVER	RIGHT	3800	King Edward Park	52
143	96-064	243161	313610	859		93	S83	116	55	39	55	OVERFLOW/WEIR		FALSE	CREEK	RIGHT	750	Bonnie Doon	53
147	96-066	243180	313610	867	437	87	S83	116	50	50	50	LOW PIPE/WEIR		FALSE	CREEK	RIGHT	750	Bonnie Doon	54
149	96-051	243858	313601	802	403	89	82	254	52	50	52	LOW PIPE		FALSE	CREEK	RIGHT	1050	Bonnie Doon	55
151	97-004	246539	313601	820		89	S81	44	55	46	55	LOW PIPE		FALSE	RIVER	RIGHT	3800	King Edward Park	56
153	97-003	246506	313601		460	89	S78	44	55	28	55	LOW PIPE		FALSE	RIVER	RIGHT	3800	King Edward Park	57
154	96-025	229777	283621	804	436	87	76	44	55	49	54	LOW PIPE/WEIR		FALSE	RIVER	RIGHT	3800	King Edward Park	58
155	96-060	246574	313601	864	477	87	S77	44	55	49	55	LOW PIPE/WEIR		FALSE	RIVER	RIGHT	3800	King Edward Park	59
156	96-058	246570	313601	857		87	77	44	55	49	55	LOW PIPE/WEIR		FALSE	RIVER	RIGHT	3800	King Edward Park	60
159	97-211	251618	314005		423	85	S80	44	55	55	49	OVERFLOW		FALSE				King Edward Park	61
161	97-210	251792	314005		432	85	S79	44	55	55	49	OVERFLOW		FALSE				King Edward Park	62
162	97-209	251797	314005		437	85	S78	44	55	55	49	OVERFLOW		FALSE				King Edward Park	63
164	97-205	251779	314005	804	408	83	S82	44	55	49	55	OVERFLOW/WEIR		FALSE	RIVER	RIGHT	3800	King Edward Park	64
176	97-001	244348	313621	811	409	87	98	52	52	52	52	OVERFLOW		FALSE	RIVER	RIGHT	900	River Valley Rivers	65
177	97-218	244318	313621	809	406	88	98	52	52	52	52	HIGH PIPE		FALSE	RIVER	RIGHT	900	River Valley Rivers	66
178	97-217	244347	313621	804	401	92	98	256	52	52	52	OVERFLOW		FALSE	RIVER	RIGHT	500	Cloverdale	67
179	97-214	244406	313622	807	420	97	N97	50	69	68	69	OVERFLOW		FALSE	RIVER	RIGHT	1500	Cloverdale	68
180 (n/m)	97-161	244671	313617	808	418	103	97	46	50	5	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Rossdale	69
181	97-159	245429	313624	869	447	104	S98	46	41	7	41	LOW PIPE		FALSE	RIVER	LEFT	1275	Rossdale	70
182 (n/m)	97-158	245174	313617	807	416	104	97	46	50	5	50	LOW PIPE		FALSE	RIVER	LEFT	1275	Downtown	71
183 (n/m)	97-157	245040	313617	805		105	97	46	50					FALSE				Rossdale	72
184	97-156	245170	313617	806		106	97	46	70					FALSE				Rossdale	73
185	97-138	262096	343603	913	442	99	101	243	50	8		LOW PIPE		FALSE	RIVER	LEFT	1980	Downtown	74
191	97-002	246377	313613	813		100	SASK DR	188	52	12	52	CHAMBER		FALSE	RIVER	RIGHT	1200	Strathcona	75
193	97-014	246787	313608	848	405	102	85	37	79	13	79	HIGH PIPE		FALSE	RIVER	RIGHT	900	Strathcona	76
194	97-013	246808	313608	863	406	102	83	37	79	35	79	HIGH PIPE		FALSE	RIVER	RIGHT	900	Strathcona	77
195	97-012	246799	313608	876	407	102	84	37	79	35	79	HIGH PIPE		FALSE	RIVER	RIGHT	900	Strathcona	78

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198	97-152a	244681	313617	024	818	105	S96	47	52	23	52	DUAL		FALSE	RIVER	LEFT	1050	Rossdale	79
199	97-151	245068	313617	818	502	105	96	47	52	23	52	LOW PIPE		FALSE	RIVER	LEFT	1050	Rossdale	80
200	97-146	245204	313613	821	443	101	94	188	52	11	52	LOW PIPE		FALSE	RIVER	RIGHT	1200	Rossdale	81
201	97-148	245013	313613	802	416	101	S94	145	52	11	52	OVERFLOW/WEIR		FALSE	RIVER	LEFT	300	Rossdale	82
202	97-163	245209	313618	805		100A	97	46	50					FALSE				Rossdale	83
204	97-221	245216				E101	96	45	57					FALSE				Rossdale	84
220	96-006	242107	313201	807	438	113	L. N. 79	22	54	47	54	LOW PIPE		FALSE	RIVER	RIGHT	1500	Parkallen	85
221		227702	283615			109	61	22	54	54	54	OVERFLOW/WEIR		FALSE	RIVER	RIGHT		Pleasantview	86
224		243209				89	83	116	56			LOW PIPE		FALSE				Bonnie Doon	87
226		245511	313625	801		111	97	46	50	5	50	HIGH PIPE		FALSE	RIVER	LEFT	1275	Oliver	88
234		246738	313614			102 (Tommy Bank)	Saskatche	37	71					FALSE				Strathcona	89
235		262142	343603			100	S. Jasper	47	26					FALSE				Downtown	90
238		246111	313608			101		37	79					FALSE				Ritchie	91
240 (n/m)		255527				119	S102	46	71					FALSE				Oliver	92
244 (n/m)		263246				102	110	54	68					FALSE				Central McDougall	93
245 (n/m)		263247				102	110	54	68					FALSE				Central McDougall	94
249		242945	313218			Hawrelak Park		27	66					FALSE				Hawrelak Park	95
250 (03,n/m)		255647				W114	N101	46	88					FALSE				Oliver	96
254 (03,n/m)		245584				112	98	46	50					FALSE				Oliver	97
255 (03)		245344				104	98	46	50					FALSE				Downtown	98
258 (03)		247763	313614			103	Sask. Dr	37	71					FALSE				River Valley Walter	99
265 (06, n/m)		240896				137	82	21	65			DUAL		FALSE				Laurier Heights	100
266 (08)		244346	313621	814	401	92	S98	256	46	46	46	LOW PIPE		FALSE	RIVER	RIGHT	500	Cloverdale	101
267 (09)		243667				92	98	256						FALSE	RIVER	RIGHT		Cloverdale	102
268 (09)		244163				Mill Creek		44						FALSE				Mill Creek Ravine N	103
269 (13, n/m)		261579				78	111	203				LOW PIPE		FALSE				River Valley Kinnai	104
273		330340				122	39A	2				DUAL		FALSE	Whitemud	RIGHT		Aspen Gardens	105
274		258480				123	112	31				LOW PIPE		FALSE				Inglewood	106
275		282732				37	122	88				LOW PIPE		FALSE				Beacon Heights/Be	107
276 (19)		243786	9343602			96A	98	51				TRANSVERSE WEIR		FALSE				Cloverdale	108
277 (19)		231393				111A	50	2				Dual MH with WEIR		FALSE	Whitemud	RIGHT		Malmo Plains	109
278 (19)		287019				W71	130	74				LOW PIPE		FALSE	RIVER	LEFT		Balwin	110
279 (19)		287020				W70	130	74				LOW PIPE		FALSE	RIVER	LEFT		Balwin	111
280 (19)		287021				W69	130	74				LOW PIPE		FALSE	RIVER	LEFT		Balwin	112
281 (19)		286503				W70	129	74				LOW PIPE		FALSE	RIVER	LEFT		Balwin	113
282 (19)		286554				W69	129	74				LOW PIPE		FALSE	RIVER	LEFT		Balwin	114
283 (19)		286508				70	N127	74				LOW PIPE		FALSE	RIVER	LEFT		Balwin	115

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CLOSED INTERCONNECTIONS																			
			344416	809		E34	N102	71	66	66	66	COMMON		TRUE	RIVER	LEFT	1200	Rundle Heights	1
			344416	808		35	102	71	66	66	66	COMMON		TRUE	RIVER	LEFT	1200	Rundle Heights	2
			344416	807		36	102	71	66	66	66	COMMON	#####	TRUE	RIVER	LEFT	1200	Rundle Heights	3
			344020		411	37	103	71	66	66	66	COMMON	#####	TRUE	RIVER	LEFT	1200	Rundle Heights	4
			344416	803		E34	103	71	66	66	66	COMMON		TRUE	RIVER	LEFT	1200	Rundle Heights	5
			374011	011	420	W38	123	88	80	80	80	HIGH PIPE	#####	TRUE	CREEK	LEFT	1350	Bergman	6
			374414	PW		HOOKE RD	HERMITA	74	64	64	64	PUMPWELL		TRUE	RIVER	LEFT	7620	Canon Ridge	7
			344023	869		55	S ADA BL	62	65	65	65	OVERFLOW	#####	TRUE	RIVER	LEFT	1200	River Valley Highla	8
			343621		417	W81	114		56	56	13	OVERFLOW		TRUE					9
			343602	832		94	CAMERON	148	51	51	51	DUAL	#####	TRUE	RIVER	LEFT	450	Riverdale	10
			343602	831		W94	CAMERON	148	51	51	51	DUAL	#####	TRUE	RIVER	LEFT	450	Riverdale	11
			343602	830		E95	CAMERON	148	51	51	51	DUAL	#####	TRUE	RIVER	LEFT	450	Riverdale	12
			343602	829		E95	CAMERON	148	51	51	51	DUAL	#####	TRUE	RIVER	LEFT	450	Riverdale	13
			343610	804	404	88	102	53	52	50	52	LOW PIPE	#####	TRUE	RIVER	LEFT	675	Riverdale	14
			343610	810	405	87	102	53	67	52	67	LOW PIPE	#####	TRUE	RIVER	LEFT	675	Riverdale	15
			343609	868	411	89	ROWLAN	152	43	11	42	LOW PIPE	#####	TRUE	RIVER	LEFT	450	Riverdale	16
			343609	874		88	104	155B	24	10	24	LOW PIPE	#####	TRUE	RIVER	LEFT	600	Riverdale	17
			343609	873		88	104	155A	24	10	24	HIGH PIPE	#####	TRUE	RIVER	LEFT	600	Riverdale	18
			343602	858	435	94	ROWLAN	148	42	11	42	LOW PIPE	#####	TRUE	RIVER	LEFT	450	River Valley Kinnai	19
			373602	835	411	89	117	56	14	14	14	CHAMBER	#####	TRUE	RIVER	LEFT	1950	Parkdale	20
			373601		429	N RACE TRK	NORTHLA	56	64	64	64	OVERFLOW	#####	TRUE	RIVER	LEFT	1950	Edmonton Northlar	21
			373601		411	E80	S116	56	57	57	57	OVERFLOW CHA	#####	TRUE	RIVER	LEFT	1950	Edmonton Northlar	22
			373619	802		86	127	74	58	58	58	DROP MANHOLE	#####	TRUE	RIVER	LEFT	7620	Killarney	23
			373919	410		90	127	74	58	58	58	LOW PIPE TEE	#####	TRUE	RIVER	LEFT	7620		24
			373601	870	411	E80	116	56	57	57	57	CHAMBER	#####	TRUE	RIVER	LEFT	1950	Parkdale	25
			343617	835		105	KINGSWA	54	68	68			#####	TRUE	RIVER	LEFT	3000	Central McDougall	26
			343211		418	116	107	54	72	72	72	MEMBRANE HO	#####	TRUE	RIVER	LEFT	3000	Queen Mary Park	27
			343605	811		113	102	46	50	30	50	OVERFLOW	#####	TRUE	RIVER	LEFT	1275	Oliver	28
			343201	874	441	W115	102	46	50	8	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Oliver	29
			343605	001	T1	114	N103	46	64	64	50	LOW PIPE TEE	#####	TRUE	RIVER	LEFT	1275	Oliver	30
			343223	007		E133	S116	31	54	54	54	COMMON		TRUE	RIVER	LEFT	2400	Woodcroft	31
			373215	802		143	N YELLOW	30	61	61	61	COMMON		TRUE	RIVER	LEFT	1650	Brown Industrial	32
			373224	007		ST ALBERT	130	31	66	66	66	COMMON		TRUE	RIVER	LEFT	2400	Bonadventure Indu	33
			373215	801		149	SYELLOW	31	63	63	63	COMMON		TRUE	RIVER	LEFT	2400	Brown Industrial	34
			373219		427	W124	129	31	55	55	55	OVERFLOW	#####	TRUE	RIVER	LEFT	2400	Calder	35
			373219		417	W126	129	31	55	55	55	OVERFLOW	#####	TRUE	RIVER	LEFT	2400	Calder	36
			433202	PW		E DUNLUCE	161	75	78	78	78	PUMPWELL	#####	TRUE	RIVER	LEFT	2250	Calder	37
			343603	854	417	100	101	48	26	5	26	LOW PIPE	#####	TRUE	RIVER	LEFT	1500	Downtown	38
			343602	049		96	GRIERSON	49	62	62	62	OVERFLOW CHA	#####	TRUE	RIVER	LEFT	1200	Downtown	39

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			343603	862		100	101	48	70	66	50	OVERFLOW	#####	TRUE	RIVER	LEFT	1500	Downtown	40
			313613	PW		101	S94	145	52	11	52	PUMPWELL	#####	TRUE	RIVER	LEFT	300	Rosssdale	41
			313618	821	443	101	94	145	52	11	52	LOW PIPE	#####	TRUE	RIVER	LEFT	300	Rosssdale	42
			313618	836	OF	E100	95	241	57	57	57	OVERFLOW	#####	TRUE	RIVER	LEFT	375	Rosssdale	43
			313617	007	479	106	95	42	85	85	58	LOW PIPE	#####	TRUE	RIVER	LEFT	600	Downtown	44
			313617	504		103	96	47	52	33	52	OVERFLOW	#####	TRUE	RIVER	LEFT	1050	Rosssdale	45
			313616	803	402	110	97	46	50	15	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Oliver	46
			313617	805	414	106	97	46	50	5	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Downtown	47
			313617	806	415	105	97	46	50	5	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Downtown	48
			313624	905	417	BELLAMY H	N97	46	50	50	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Rosssdale	49
			313617	838	419	102	97	46	50	5	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Rosssdale	50
			313618	802	402	101	97	46	50	5	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Rosssdale	51
			313618	805	405	100A	97	46	50	5	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Rosssdale	52
			313618	806	OF	100	97	45	50	5	50	OVERFLOW/WE	#####	TRUE	RIVER	LEFT	600	Rosssdale	53
			313625	843		112	98	46	50	5	50	LOW PIPE TEE	#####	TRUE	RIVER	LEFT	1275	Downtown	54
			313623	827		W100	99	109	7	5	7	LOW PIPE TEE	#####	TRUE	RIVER	RIGHT	500	Rosssdale	55
			313623	828	511	100	99	109	7	5	7	LOW PIPE	#####	TRUE	RIVER	RIGHT	500	Rosssdale	56
			313623	828	511	100	99	109	7	7	7	LOW PIPE	#####	TRUE	RIVER	RIGHT	500	Rosssdale	57
			313623	831	OF	SW LOW LVL	BRIDGE	48	29	5	29	HOLE	#####	TRUE	RIVER	LEFT	1500	Rosssdale	58
			313617	873	417	BELLAMY RD	97	46	62	62	50	LOW PIPE	#####	TRUE	RIVER	LEFT	1275	Rosssdale	59
			313623	819	497	E100	MCDONALD	48	57	10	29	LOW PIPE	#####	TRUE	RIVER	LEFT	1500	Downtown	60
			343214	801		137	N108	31	53	53	53	DUAL	#####	TRUE	RIVER	LEFT	2400	North Glenora	61
			343213	4		133	N109A	31	52	52	52	HIGH PIPE	#####	TRUE					62
			343218	819		133	N110A	31	52	52	52	LOW PIPE	#####	TRUE					63
			343214	29		139	N107A	31	52	52	52	LOW PIPE	#####	TRUE					64
			343214	56		135	N107A	31	52	52	52	LOW PIPE	#####	TRUE					65
			343213	18		133	107A	31	52	52	52	LOW PIPE	#####	TRUE					66
			343208	826		E132	STONY PLAIN RD		48	48	15		#####	TRUE					67
			343202	17		125	SJASPER	46	34			PUMPWELL	#####	TRUE					68
			313224	811		W139	RAVINE D	30	61	55	61	OVERFLOW	#####	TRUE	RIVER	LEFT	1650	River Valley Capito	69
			313223	PW		ST GEORGE	VICTORIA	123	64	29	55	PUMPWELL	#####	TRUE	CREEK	LEFT	200	Glenora	70
			343203	SOF		W132	TWEEDSN	135	50	50	50	OUTFALL	#####	TRUE	CREEK	LEFT	100	Glenora	71
			343203	839		E132	S103	125	54	54		DUAL	#####	TRUE	CREEK	LEFT	200	Glenora	72
			343204	841		139	101		65	65	51		#####	TRUE					73
			342823	PW		163	116	18	75	74	75	PUMPWELL	#####	TRUE	RIVER	LEFT	2400	Norwester Industria	74
			372810	PW		154	123	18	80	80	80	PUMPWELL	#####	TRUE	RIVER	LEFT	2400	Mitchell Industrial	75
			342807	014		170	105	18	75	75	75	OVERFLOW	#####	TRUE	RIVER	LEFT	2400	McNamara Industri	76
			312820	PW		151	N94	29	58			PUMPWELL	#####	TRUE	RIVER	LEFT	1650	Sherwood	77
			282819	PW		WOLF WIL R	WOLF WIL	13	75	75	75	PUMPWELL	#####	TRUE	RIVER	LEFT	1950	Westridge	78
			252420	PW		E WEDGEWOOD	WEAVER	257	88			PUMPWELL	#####	TRUE	CREEK	LEFT	900	Wedgewood Heigh	79
			313204	075		BV RD	81	21	59	57	58	LOW PIPE TEE	#####	TRUE	RIVER	LEFT	1350	Laurier Heights	80
			313204	PW		BV RD	VAL VIEW	21	58	57	58	PUMPWELL	#####	TRUE	RIVER	LEFT	1350	Parkview	81

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			313204	803		N BV RD	VAL VIEW	21	60	60	60	COMMON	#####	TRUE	RIVER	LEFT	1350	Parkview	82
			313207	085		VAL VIEW C		21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	83
			313207	511		VAL VIEW C		21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	84
			313207	087		VAL VIEW C		21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	85
			313208	003		VAL VIEW C		21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	86
			313208	002		VAL VIEW C		21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	87
			313208	001		VAL VIEW C		21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	88
			313207	088		E136	VAL VIEW	21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	89
			313204	077		VAL VIEW C	86	21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	90
			313204	076		VAL VIEW C	86	21	60	60	60	COMMON		TRUE	RIVER	LEFT	1350	Parkview	91
			344018		414	W65A	109	65	57	56	57	FLOW SPLIT		TRUE	RIVER	RIGHT	900	Capilano	92
			344007	850		W FULTON D	106	58	59	59	59	DROP MANHOLE	#####	TRUE	RIVER	RIGHT	1350	Fulton Place	93
			344007	467		E CAPILANO	106	58	59	59	59	CHAMBER	#####	TRUE	RIVER	RIGHT	1350	Capilano	94
			313601	858			82	254	52	49	52		#####	TRUE	CREEK	RIGHT	1050	Bonnie Doon	95
			313622	819	408	96A	98	51	60	26	60	OVERFLOW/WE	#####	TRUE	RIVER	RIGHT	600	Cloverdale	96
			313621	802	401	92	98	256	59	46	59	LOW PIPE	#####	TRUE	RIVER	RIGHT	500	Cloverdale	97
			313602	848		W94	S81	254	83	58	83	DROP MANHOLE	#####	TRUE	CREEK	RIGHT	1050	Mill Creek Ravine	98
			283620		436	91	70	92B	54		61	OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	750	Mill Creek Ravine	99
			283620		457	90	70	192	54			OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	300	Mill Creek Ravine	100
			283621		415	91	72	191	54		54	OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	525	Mill Creek Ravine	101
		229761?	283621		450	W87	73	93	56		56	OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	675	Mill Creek Ravine	102
			283620		420	91	66	91	54	54	54	OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	750	Mill Creek Ravine	103
			283611		419	92	63	194	54	54		OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	750	Mill Creek Ravine	104
			283611		423	91	63	193	61		54	OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	300	Mill Creek Ravine	105
		229112?	283611		416	90	65	91B	54	54		OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	600	Mill Creek Ravine	106
		229130?	283611		433	90	65	91A	54	54	54	OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	900	Mill Creek Ravine	107
			283621		413	W93	67	195	54			OUTFALL - NEVER WAS		TRUE	CREEK	RIGHT	750	Mill Creek Ravine	108
			283610	004	403	92	60	90	68	68	68	LOW PIPE	#####	TRUE	CREEK	RIGHT	750	Coronet Industrial	109
			283610		403	92	60	90	68	68	68	LOW PIPE	#####	TRUE	CREEK	RIGHT	750	Coronet Industrial	110
			313609	867	TUN	92	84	116	55	30	55	OUTFALL	#####	TRUE	CREEK	RIGHT	750	Mill Creek Ravine	111
			313614	835	463	N QE RD		39	55	55	55	LOW PIPE	#####	TRUE	RIVER	RIGHT	600	River Valley Walter	112
			313614	PW		E104	N SASK D	37	56	56	51	PUMPWELL	#####	TRUE	RIVER	RIGHT	900	River Valley Walter	113
			313614	PW		E104	N SASK D	37	56	56	51	PUMPWELL	#####	TRUE	RIVER	RIGHT	900	River Valley Walter	114
			313614	003		102	SASK RIV	38	56	56	56	CHECK VALVE	#####	TRUE	RIVER	RIGHT	750	River Valley Walter	115
			313613	424		LAVIGNE RD	91	188	88	90			#####	TRUE	RIVER	RIGHT	1200	River Valley Walter	116
			313219	PW		118	SASK DR	32	53	53	53	PUMPWELL	#####	TRUE	RIVER	RIGHT	1200	Windsor Park	117
			313219		446	116	N SASK D	32	55	40	55	LOW PIPE TEE	#####	TRUE	RIVER	RIGHT	1200	Windsor Park	118
			283619	803	403	97	S71	92B	60	50	60	LOW PIPE	#####	TRUE	CREEK	RIGHT	750	Hazeldean	119
			283625	840	428	E111	73	22	54	48	54	LOW PIPE/WEIR	#####	TRUE	RIVER	RIGHT	1500	McKernan	120
			283221	818		112	74	22	54	49	54	OVERFLOW	#####	TRUE	RIVER	RIGHT	1500	McKernan	121
			283221	808		112	N76	22	47	47	47	OVERFLOW	#####	TRUE	RIVER	RIGHT	1500	McKernan	122
			283219	801		BELGRAVIA	N68	22	59	59	59	COMMON	#####	TRUE	RIVER	RIGHT	1500	Lendrum Place	123

IC Site#	Plan	IC MH#	CADAS-TRAL	SAN_MH	STRM_MH	STREET	AVENUE	OF_NUM	IC_AGE	SAN_AGE	STRM_AGE	ICTYPE	Delete date	COR-RECTED	OF_LOC1	OF_LOC2	OF_DIA	NHOOD	COUNT
			253221	038		113A	46	2	63	63	63	COMMON	#####	TRUE	CREEK	RIGHT	2100	Malmo Plains	124
			253221	502		112	46	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Malmo Plains	125
			253221	040		111A	46	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Malmo Plains	126
			253221	505		111A	N46	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Malmo Plains	127
			253221	022		111A	S48	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Malmo Plains	128
			253625		496	111A	N48	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Malmo Plains	129
			253221	806		W111A	48	2	63	63	63	COMMON	#####	TRUE	CREEK	RIGHT	2100	Malmo Plains	130
			253221	807		W111A	48	2	63	63	63	COMMON	#####	TRUE	CREEK	RIGHT	2100	Malmo Plains	131
			253221	808		W111A	48	2	63	63	63	COMMON	#####	TRUE	CREEK	RIGHT	2100	Malmo Plains	132
			253221	504		113A	46	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Malmo Plains	133
			253212	051		E121	FAIRWAY	2	66	66	66	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	134
			253212	489		E121	FAIRWAY	2	66	66	66	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	135
			253212	053		E121	FAIRWAY	2	66	66	66	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	136
			253219	808		ASPEN DR	40	2	63	63	63	COMMON	#####	TRUE	CREEK	RIGHT	2100	Aspen Gardens	137
			253219	055		ASPEN DR	N40	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	138
			253219	056		ASPEN DR	N40	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	139
			253219	054		ASPEN DR	S41A	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	140
			253219	053		ASPEN DR	S41A	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	141
			253219		480	ASPEN DR	41A	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	142
			253219	052		ASPEN DR	N41A	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	143
			253219	057		ASPEN DR	N41A	2	63	63	63	COMMON		TRUE	CREEK	RIGHT	2100	Aspen Gardens	144
			253202		466	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	145
			253202		465	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	146
			253202		468	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	147
			253202		464	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	148
			253202		467	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	149
			253203	018		WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	150
			253203		424	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	151
			253203	022		WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	152
			253203	021		WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	153
			253203	020		WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	154
			253203	019		WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	155
			253203		423	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	156
			253208	019		WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	157
			253208		417	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	158
			253208		416	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	159
			253208	016		WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	160
			253208	015		WESTBRK		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	161
			253208		413	WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	162
			253208	013		WESTBRK	FAIRWAY	1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	163
			253208	012		WESTBRK	W FAIRW	1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	164

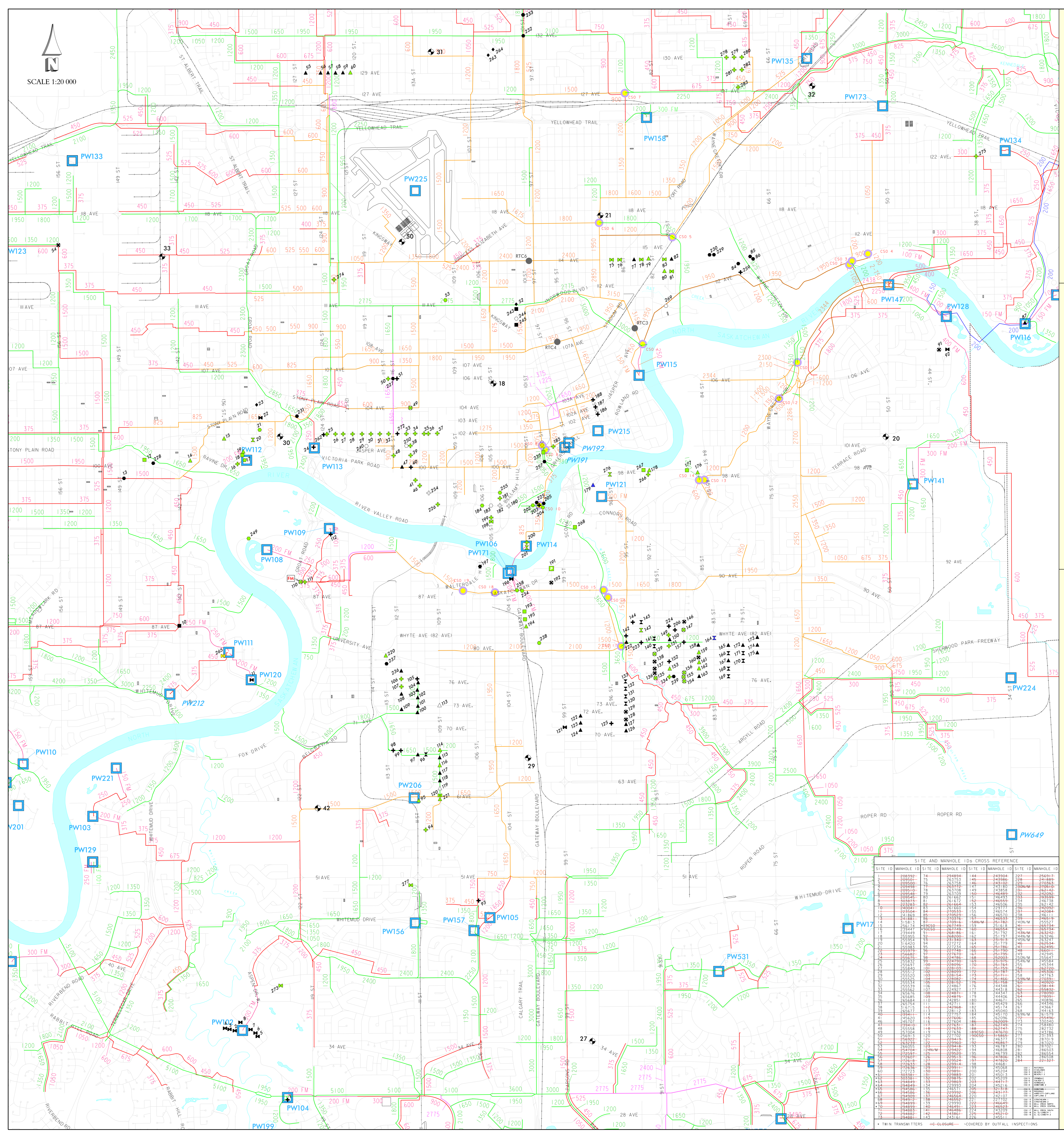
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			253208		410	WESTBRK	W FAIRW	1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	165
			253208	010		WESTBRK DR		1	62	62	62	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	166
			253208	001	401	WESTBRK	MARLBOR	1	64	64	61	HIGH PIPE	#####	TRUE	CREEK	RIGHT	900	Westbrook Estate	167
			253213		422	MARLBORO R		1	66	66	66	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	168
			253214	006		MARLBORO R		1	66	66	66	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	169
			253214	005		MARLBORO R		1	66	66	66	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	170
			253214	004		MARLBORO R		1	66	66	66	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	171
			253213	038		MARLBORO R		1	66	66	66	COMMON		TRUE	CREEK	RIGHT	900	Westbrook Estate	172
			282810	002	403	E WHITEMUD	58	12	74	71	72	HIGH PIPE	#####	TRUE	RIVER	RIGHT	750	River Valley White	173
			282811	011	405	FORT EDM		14	70	70	70	PUMPWELL	#####	TRUE	RIVER	RIGHT	1050	River Valley White	174
			252819	PW		RODNEY CR		101	80			PUMPWELL	#####	TRUE	RIVER	RIGHT	1500	Rhatigan Ridge	175
			253613	801		101	N39	9	75	75	66	COMMON	#####	TRUE	RIVER	RIGHT	5100	Strathcona Industri	176
			253618	801		101	S41	9	66	66	66	COMMON	#####	TRUE	RIVER	RIGHT	5100	Strathcona Industri	177
			253602	012		W97	30	9	75	75	75	MEMBRANE HOI	#####	TRUE	RIVER	RIGHT	5100	Parsons Industrial	178
			253602	013		97	30	9	75	75	75	MEMBRANE HOI	#####	TRUE	RIVER	RIGHT	5100	Parsons Industrial	179
			253602	014		E97	30	9	75	75	75	MEMBRANE HOI	#####	TRUE	RIVER	RIGHT	5100	Parsons Industrial	180
			253603		445		30	9	71			MEMBRANE HOI	#####	TRUE	RIVER	RIGHT	5100	Parsons Industrial	181
			253203		412	E125	29A	9	78	78	78		#####	TRUE	RIVER	RIGHT	5100	Blue Quill Estates	182
						E101	96		57				#####	TRUE					183
						100	90		52				#####	TRUE					184
							n. Borden Park		56					TRUE					185
146 (98)	97-207	243102	313610	856	438	87	S84	116	56	56	56	LOW PIPE/WEIR		TRUE	CREEK	RIGHT	750	Bonnie Doon	186
160 (98)	96-054	246554	313601	836	424	85	79	44	55	49	55	LOW PIPE/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	187
152 (98)	96-048	246559	313601	842	447	89	S79	44	55	53	55	LOW PIPE		TRUE	RIVER	RIGHT	3800	King Edward Park	188
222 (98)		246649	313602	876		94	81	254	55	22	55	OVERFLOW		TRUE	CREEK	RIGHT	1050	Mill Creek Ravine	189
137 (99)	96-056	246564	313601	850	457	91	S78	44	55	28	55	LOW PIPE/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	190
138 (99)	96-055	246552	313601	840	445	91	S79	44	55	53	55	LOW PIPE/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	191
145 (99)	96-063	243986	313610	852		93	S84	116	55	30	50	OVERFLOW/WEIR		TRUE	CREEK	RIGHT	750	Bonnie Doon	192
231 (99)		255784	343209			127	Villa Ave		88					TRUE					193
232 (99)		278099	403604			101	132		54					TRUE					194
233 (99)		293599	403604			101	134		54					TRUE					195
127 (00)	96-022	229524	283619	809		95	S71	92B	60	50	60	OVERFLOW		TRUE	CREEK	RIGHT	750	Hazeldean	196
126 (00)	96-024	229513	283619	817		95	S70	92B	60	50	60	OVERFLOW		TRUE	CREEK	RIGHT	750	Hazeldean	197
142 (00)	96-061	243861	313602	883	431	94	82	245	52	50	52	LOW PIPE		TRUE	RIVER	RIGHT	225	Mill Creek Ravine	198
23 (01)	96-089	256682	343208	826		132	S. Stony P	129	50	28	50	FLOW SPLIT		TRUE	CREEK	LEFT	250	Glenora	199
115 (01)	96-017	227606	283616		437	109	66	22	54	49	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	Parkallen	200
123 (01)	96-020	229418	283618	815		98	L. S. 71	92B	61	50	61	OVERFLOW		TRUE	CREEK	RIGHT	750	Hazeldean	201
129 (01)	96-031	229911	283621	856	448	95	72	191	54	50	54	LOW PIPE/WEIR		TRUE	CREEK	RIGHT	525	Hazeldean	202
197 (01)	97-020	247820		820	504	Walterdale Rd.	Queen Elizabeth Hill		52					TRUE				River Valley Walter	203
112 (02)	97-024	242968	313219	006		118	EDINBOR	32	53	53	53	LOW PIPE		TRUE	RIVER	RIGHT	1200	Windsor Park	204
237 (02)		242084	313201			113	N78		54					TRUE					205
2 (02)	97-051	209501	253208	801		WESTBRK DR		1	88	62	62	DUAL		TRUE	CREEK	RIGHT	900	Westbrook Estate	206

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3 (02)	97-052	209500	253207	802		WESTBRK DR		1	88	62	62	DUAL		TRUE	CREEK	RIGHT	900	Westbrook Estate	207
4 (02)	97-053	209498	253207	801		WESTBRK DR		1	88	62	62	DUAL		TRUE	CREEK	RIGHT	900	Westbrook Estate	208
5 (02)	97-055	209510	253208	804		MARLBORO R		1	88	66	66	DUAL		TRUE	CREEK	RIGHT	900	Westbrook Estate	209
6 (02)	97-056	209548	253208	803		MARLBORO R		1	88	66	66	DUAL		TRUE	CREEK	RIGHT	900	Westbrook Estate	210
7 (02)	97-057	209545	253208	802		MARLBORO R		1	88	66	66	DUAL		TRUE	CREEK	RIGHT	900	Westbrook Estate	211
8 (02)	97-058	303873	253213	801		MARLBORO R		1	88	66	66	DUAL		TRUE	CREEK	RIGHT	900	Westbrook Estate	212
133 (02)	96-026	229869	283622	806	409	95	76	100	55	14	55	OVERFLOW/WEIR		TRUE	CREEK	RIGHT	300	Ritchie	213
196 (02)	97-224	247806	313614	006		E104	N SASK D	38	56	56	51	DUAL		TRUE	RIVER	RIGHT	750	River Valley Walter	214
10 (03)	97-179	240041	313207	013		142	BUENA VI	24	58	57	58	HIGH PIPE		TRUE	RIVER	LEFT	1500	Parkview	215
22 (03)	96-087	255979	343203	836		E132	N103	130	54	54	54	DUAL		TRUE	CREEK	LEFT	300	Glenora	216
24 (03)	97-171	255675	343202	16		125	SJASPER	46	34			LOW PIPE		TRUE					217
55 (03)	97-136	272597	373219		421	W125	129	31	55	55	55	OVERFLOW		TRUE	RIVER	LEFT	2400	Calder	218
56 (03)	97-133	272607	373219		433	W123A	129	31	55	55	55	OVERFLOW		TRUE	RIVER	LEFT	2400	Calder	219
58 (03)	97-131	272633	373219		449	W122	129	31	55	55	55	OVERFLOW		TRUE	RIVER	LEFT	2400	Calder	220
77 (03)	97-097	263772	343622		433	W84	114		56	56	13	OVERFLOW		TRUE					221
82 (03)	97-079	261664	343621		429	W79	114		56	56	13	OVERFLOW		TRUE					222
91 (03)	97-194	268186	344011	801	412	43	106B	105	58	58	58	LOW PIPE/WEIR		TRUE	RIVER	RIGHT	1500	Gold Bar	223
92 (03)	97-193	268200	344011	802		E42	106B	105	58	58	58	DUAL		TRUE	RIVER	RIGHT	1500	Gold Bar	224
93 (03)	97-069	231340	253624	005	405	106	N47	2	63	61	63	LOW PIPE		TRUE	CREEK	RIGHT	2100	Empire Park	225
40 (03)	97-143	239392	313625	816	402	114	100	46	50	7	50	LOW PIPE		TRUE	RIVER	LEFT	1275	Oliver	226
229 (03)		270363	344005				n. Borden Park		56					TRUE					227
257 (03)		245306				100	McDonald		57					TRUE				Downtown	228
260 (03)		240920				Buena Vista Rd	81		58					TRUE					229
84 (05)	97-225	270533		207533		W72	113		57					TRUE					230
96 (05)	97-030	227748	283616		425	110	N66	22	54	50	54	OVERFLOW/WEIR		TRUE	RIVER	RIGHT	1500	Parkallen	231
97 (05)	96-015	227670	283616		415	111	L. S. 67	22	54	50	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	Parkallen	232
100 (05)	96-034	228096	283625		415	111	72	22	54	47	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	McKernan	233
101 (05)	96-036	228103	283625		421	111	73	22	54	48	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	McKernan	234
102 (05)	97-033	228099	283625		420	111	74	22	54	48	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	McKernan	235
103 (05)	97-034	228154	283625		407	111	75	22	54	48	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	McKernan	236
104 (05)	97-035	228082	283625		426	111	76	22	54	47	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	McKernan	237
261 (05)		238144				151	95		58					TRUE					238
130 (07)	96-029	229891	283622	829	470	95	73	100	55	47	55	OVERFLOW/WEIR		TRUE	CREEK	RIGHT	300	Ritchie	239
166 (07)	97-199	251790	314005	817	430	81	S80	44	55	49	55	OVERFLOW/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	240
105 (07)	96-038	228152	283625	802	401	111	N76	22	54	47	54	LOW PIPE		TRUE	RIVER	RIGHT	1500	McKernan	241
108 (07)	96-004	224871	283221		451	112	N73	22	54	47	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	McKernan	242
109 (07)	96-005	224875	283221		454	112	N72	22	54	49	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	McKernan	243
236 (07)		242092	313201			112	S78		86			OVERFLOW		TRUE				Parkallen	244
263 (07)		278090				105	130		59					TRUE				Lauderdale	245
121 (07)	96-019	229419	283618	816		99	70	92B	61	50	61	DUAL		TRUE	CREEK	RIGHT	750	Hazeldean	246
54 (07)	97-180	254704	342821	025	410	156	116	18	75	58	75	LOW PIPE/WEIR		TRUE	RIVER	LEFT	2400	Alberta Park Indust	247
264 (05, n/m)		278091				105	130		59					TRUE				Lauderdale	248
206 (09)	97-213	243177	313610	866		W87	S83		49			LOW PIPE		TRUE				Bonnie Doon	249
168 (03)	97-197	252003	314005	828	438	81	S78	44	55	49	55	OVERFLOW/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	250
174 (03)	97-203	251466	314004	816	412	77	S81	44	56	50	56	OVERFLOW		TRUE	RIVER	RIGHT	3800	King Edward Park	251
158 (10)	97-212	251782	314005		416	85	S81		55	55	49	OVERFLOW		TRUE					252
47 (10)	97-144	239410	313221	815		115	100	46	54	30	54	OVERFLOW		TRUE	RIVER	LEFT	1275	Oliver	253

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122 (10)	97-027	229960	283623	833		98	S72	92B	61	49	61	OVERFLOW		TRUE	CREEK	RIGHT	750	Hazeldean	254
125 (10)	96-023	229520	283619	806	402	96	S71	92B	60	50	60	LOW PIPE		TRUE	CREEK	RIGHT	750	Hazeldean	255
131 (10)	96-028	229883	283622	821	426	95	74	100	55	14	55	OVERFLOW/WEIR		TRUE	CREEK	RIGHT	300	Ritchie	256
132 (10)	96-027	229875	283622	812	420	95	75	100	55	14	55	OVERFLOW/WEIR		TRUE	CREEK	RIGHT	300	Ritchie	257
124 (n/m) (10)	97-028	229422	283618	819		98	S70	92B	61	50	61	OVERFLOW		TRUE	CREEK	RIGHT	750	Hazeldean	258
165 (11)	97-200	251786	314005	813	459	81	S81	44	55	50	55	OVERFLOW		TRUE	RIVER	RIGHT	3800	King Edward Park	259
171 (11)	96-075	251791	314005	818	431	79	S80	44	56	50	56	OVERFLOW/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	260
172 (11)	97-201	251787	314005	813	422	79	S81	44	56	50	56	OVERFLOW		TRUE	RIVER	RIGHT	3800	King Edward Park	261
230 (n/m) (12)		270510	344005				n. Borden Park		56					TRUE				Edmonton Northlar	262
243 (n/m) (12)		263242				102	111		68					TRUE				Central McDougall	263
167 (12)	97-198	251795	314005	824	435	81	S79	44	55	49	55	OVERFLOW		TRUE	RIVER	RIGHT	3800	King Edward Park	264
169 (12)	97-196	231975	314005	832	443	81	S77	44	55	52	55	OVERFLOW/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	265
170 (12)	96-078	251796	314005	826	436	79	S79	44	56	49	56	OVERFLOW/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	266
173 (12)	97-204	251711	314004	808	404	77	S82	44	56	50	56	OVERFLOW		TRUE	RIVER	RIGHT	3800	King Edward Park	267
175 (12)	97-202	251758	314004	826	415	77	S80	44	56	50	56	OVERFLOW		TRUE	RIVER	RIGHT	3800	King Edward Park	268
128 (13) OF 2010-103	96-030	229914	283622	855	457	95	71	92B	60	50	60	LOW PIPE/WEIR		TRUE	CREEK	RIGHT	750	Hazeldean	269
272 (14) RPN 0016		255496				W115	102							TRUE				Oliver	270
157	96-045	246533	313601	815	421	87	81	44	55	49	55	LOW PIPE		TRUE	RIVER	RIGHT	3800	King Edward Park	271
140 (16) OF 2011-23	96-046	246491	313601	818	425	91	S81	44	55	22	55	OVERFLOW/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	272
262 (05, closed '16)		255832				W123	102	46	47					TRUE				Oliver	273
259 (03, closed '16)		270391				73	N112	56	56					TRUE				Virginia Park	274
57 (18)	97-132	272618	373219		440	W123	129	31	55	55	55	OVERFLOW		TRUE	RIVER	LEFT	2400	Calder	275
59 (18)	97-130	272636	373219		452	W121	129	31	55	55	55	OVERFLOW		TRUE	RIVER	LEFT	2400	Calder	276
136 (18)	96-057	229992	313601	856	464	91	77	44	55	28	55	LOW PIPE/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	277
141 (18)	97-005	246486	313601	806	415	91	S82	44	55	31	55	OVERFLOW/WEIR		TRUE	RIVER	RIGHT	3800	King Edward Park	278
150 (18)	96-044	246489	313601	809		89	S82	44	55	46	55	LOW PIPE		TRUE	RIVER	RIGHT	3800	King Edward Park	279
98 (19)	96-002	224786	283220	807	418	112A	67	22	54	54	54	LOW PIPE		TRUE	RIVER	RIGHT	1500	Parkallen	280
99 (19)	96-001	224790	283220	811	421	112	67	22	51	51	51	LOW PIPE		TRUE	RIVER	RIGHT	1500	Parkallen	281
117 (19)	96-011	227631	283615		428	109	64	22	54	50	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	Parkallen	282
118 (19)	96-012	227633	283615		429	109	63	22	54	49	54	OVERFLOW		TRUE	RIVER	RIGHT	1500	Parkallen	283
144 (19)	96-062	243904	313609	869	870	W93	L. S. 84	116	55	30	55	LOW PIPE		TRUE	CREEK	RIGHT	750	Bonnie Doon	284
163 (19)	97-208	231913	314005		442	85	S77	44	55	55	49	OVERFLOW		TRUE				King Edward Park	285
223		246523	313601	814		93	81	22	55			LOW PIPE		TRUE				Bonnie Doon	286
52 (22)	97-107	263239	343617	857		102	111	54	68	14	68	FLOW SPLIT		TRUE	RIVER	LEFT	3000	Spruce Avenue	287
51 (22)	97-108	256922	343210	846	412	W115	106	54	83	64	83	LOW PIPE		TRUE	RIVER	LEFT	3000	Queen Mary Park	288
284 (22)		221327				172A	76							TRUE				Callingwood	289

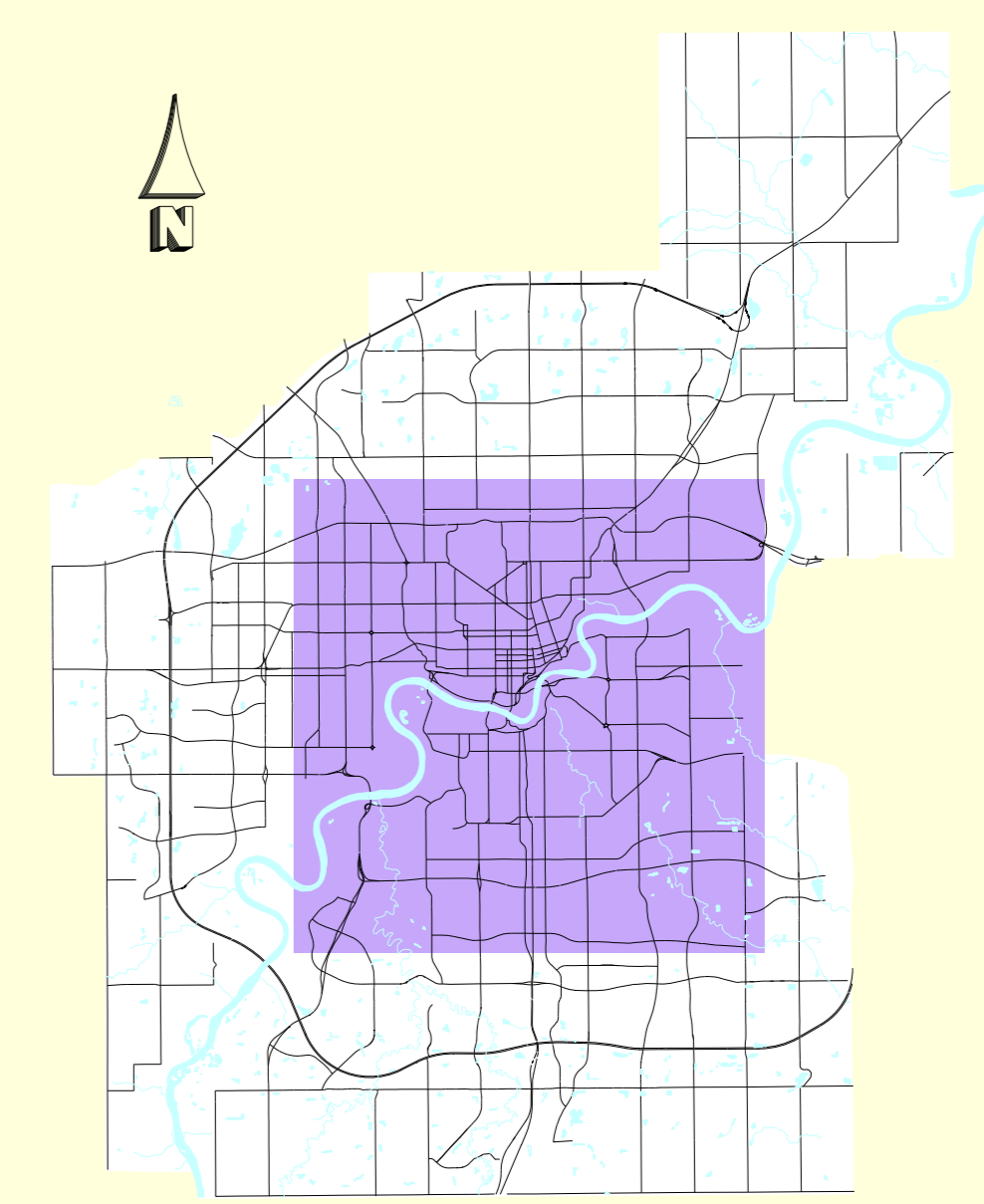
IC Site#	Plan	IC MH#	CADAS-TRAL	SAN_MH	STRM_MH	STREET	AVENUE	OF_NUM	IC_AGE	SAN_AGE	STRM_AGE	ICTYPE	Delete date	COR-RECTED	OF_LOC1	OF_LOC2	OF_DIA	NHOOD	COUNT
Removed from database (emergency pump overflow)																			
1 (02)	97-070	208392	253203	007	412	125	29A	1	76			LOW PIPE			CREEK	RIGHT	900	Blue Quill Estates	
9 (02)	97-059	223283	282810	PW	403	E WHITEMUD	58	12	72	70	72	PUMPWELL			RIVER	RIGHT	750	River Valley Whitemud	
11 (02)	97-187	223504	283223	006		S133	BV RD	21	58	59	58	DUAL			RIVER	LEFT	1350	Laurier Heights	
87 (02)	97-072	270916	344416	053	469	29	102	71	66	66	66	OVERFLOW			RIVER	LEFT	1200	Rundle Heights	
Removed from database (does not exist)																			
227 (03)		256917	343211		407	116	106	54	72	72	72	DROP MANHOLE STRUCTURE			RIVER	LEFT	3000	Queen Mary Park	
228 (03)		241889	343205		436	145	SUMMIT	30	50						RIVER	LEFT	1650	Crestwood	
239 (03)		246519				89	S77												
241 (03)		265734				113	102												
242 (03)		265734				113	102												
85 (04)	97-226	270523		270523		E71	113		51										
86 (04)	97-227	270376		270376		E71	113		51										
203 (04)	97-170	244717	313618	806	407	100	97	45	50	5	50	LOW PIPE			RIVER	LEFT	600	Rossdale	
205 (04)	97-220	321318				E101	96		85										
225 (n/m) (04)		245210	313623			100	97		50										
248 (n/m) (04)		266011				W109	111		68										
256 (03,n/m) (04)		262720				96	103		49										
Removed from database (discharge back to combined system)																			
186 (04)	97-082	262009	343609	815	814	95	101	152	49	7	49	LOW PIPE			RIVER	LEFT	450	Boyle Street	
187 (04)	97-083	262749	343609	810	402	95	102A	152	49	7	49	LOW PIPE			RIVER	LEFT	450	Boyle Street	
188 (04)	97-084	262747	343609	809	401	95	103	152	49	7	49	LOW PIPE			RIVER	LEFT	450	Boyle Street	
246 (n/m) (04)		262534				W105	106		69										
247 (n/m) (04)		262495				W106	106		69										
192 (n/m) (10)	97-015	246867	313613	843	412	100	89	188	53	53	53	LOW PIPE/WEIR			RIVER	RIGHT	1200	River Valley Walterdale	
270 (13)		270548				60E	112											Highlands	
271 (13)		284287				57E	112											Highlands	

Notes:
(n/m) = not monitored
(xx) indicates the year of discovery or closure of the I/C (if known)



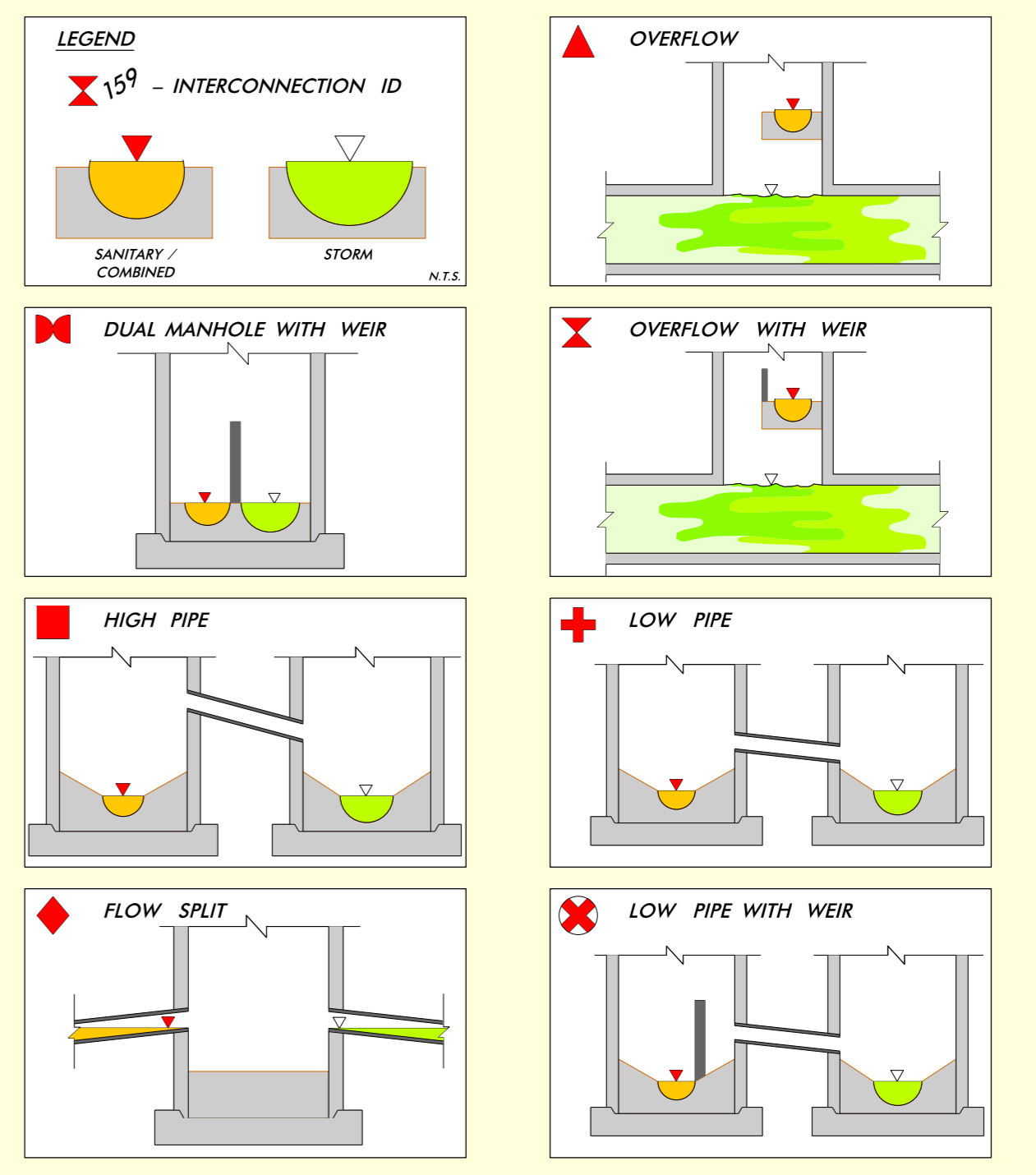
INTERCONNECTION CONTROL STRATEGY

2022 STATUS & DWO LOCATIONS



LOCATION PLAN
(NOT TO SCALE)

INTERCONNECTION (I/C) TYPES



- OTHER TYPES**
- P CHAMBER
 - PUMPWELL / CHAMBER
 - CSO
 - NON-DEFINED OPEN
 - RAINGAUGE
 - FM FLOW MONITOR
 - RTC - REAL TIME CONTROL STRUCTURE
 - PIPE SIZE AND FLOW DIRECTION
 - NON-DEFINED CLOSED

- INTERCONNECTION ACTIVITY CLASSIFICATION**
- DRY WEATHER OVERFLOW (DWO)
 - MONITORED CELLULAR INTERCONNECTION
 - PLANNED LOGGER UPDATE
 - IC CLOSURE
 - IC COVERED BY OTHER INSPECTIONS
 - IC AFFECTED BY LRT CONSTRUCTION

SITE AND MANHOLE IDS CROSS REFERENCE

SITE ID	MANHOLE ID	SITE ID	MANHOLE ID	SITE ID	MANHOLE ID	SITE ID	MANHOLE ID
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Storm and CSO Volumes and Loadings

This section is submitted in compliance with Section 4.4.10 and 6.3.3 of the Approval No. 639-03-06 for the one year period ending December 31, 2022. The monthly volumes discharged to the North Saskatchewan River (NSR) are indicated in Figures 1 and 2 for the following locations:

- 30 Avenue Storm Outfall
- Groat Road Storm Outfall
- Quesnell Storm Outfall
- Kennedale Storm Outfall
- Rat Creek CSO
- Highlands CSO
- Capilano CSO
- Cromdale CSO
- Strathearn CSO

Estimated and measured storms volumes are indicated on Figure 3. Total monitored CSO volumes are indicated on Figure 4. A tabular summary of the flow volumes and estimations of total monthly volumes discharged is also included (Table 2). Of the sites reported, the storm and combined system contribute 99.8% and 0.2% of the volume, respectively.

The total (measured and estimated) flow volume discharged from the storm sewer system to the NSR in 2022 was 126.0 million m³ - an 31.3% increase compared to the 2021 volume of 96.0 million m³. This large increase is the result of a particularly dry year in 2021. The 2022 flow volumes from the 30th Avenue, Groat Road, Quesnell, and Kennedale storm outfalls were 6.0, 3.8, 13.7, and 14.9 million m³, respectively. The volume of flows from Mill Creek originating inside the City limits was 13.3 million m³.

For the combined sewer system, the total CSO flow volume discharged to the NSR in 2022 was 247,514 m³ - a 353.7% increase compared to the 2021 volume of 54,560 m³. Again, this large increase is the result of a particularly dry year in 2021. The 2022 flow volumes from the Rat Creek, Highlands, Capilano, Cromdale, and Strathearn CSOs, were 187,754; 56,147; 2,251; 1,362; and 0 m³, respectively.

Water quality samples were obtained for the majority of the significant discharge events during the year. As well, a total of 66 dry-weather (baseflow) water quality samples were obtained from the storm sewer system. Table 3 provides a tabular summary of calculated flow-weighted mean monthly and annual concentrations for different constituents and the number of events sampled for water quality analysis.

In accordance with our Approval requirements, total monthly loadings to the North Saskatchewan River have been calculated for the above sites. Summaries of measured loads and estimated total loads for the City of Edmonton's storm and combined sewer system are included in Table 4. The reported loads were calculated using daily constituent concentrations, including storm sewer baseflow data, and the measured or estimated flow volumes. The combined storm and CSO total loading to the NSR consists of about 12,886 tonnes of total suspended solids (TSS), 1,264 tonnes of biochemical oxygen demand (BOD), 43 tonnes of total phosphorous (TP), 148 tonnes of nitrite and nitrate (NO₂ + NO₃), 73 tonnes of ammonia (NH₃), and 259 tonnes of total Kjeldahl nitrogen (TKN). Summaries of the Rat Creek CSO concentration statistics are shown in Table 5.

2022 Annual Wastewater Collection System Report

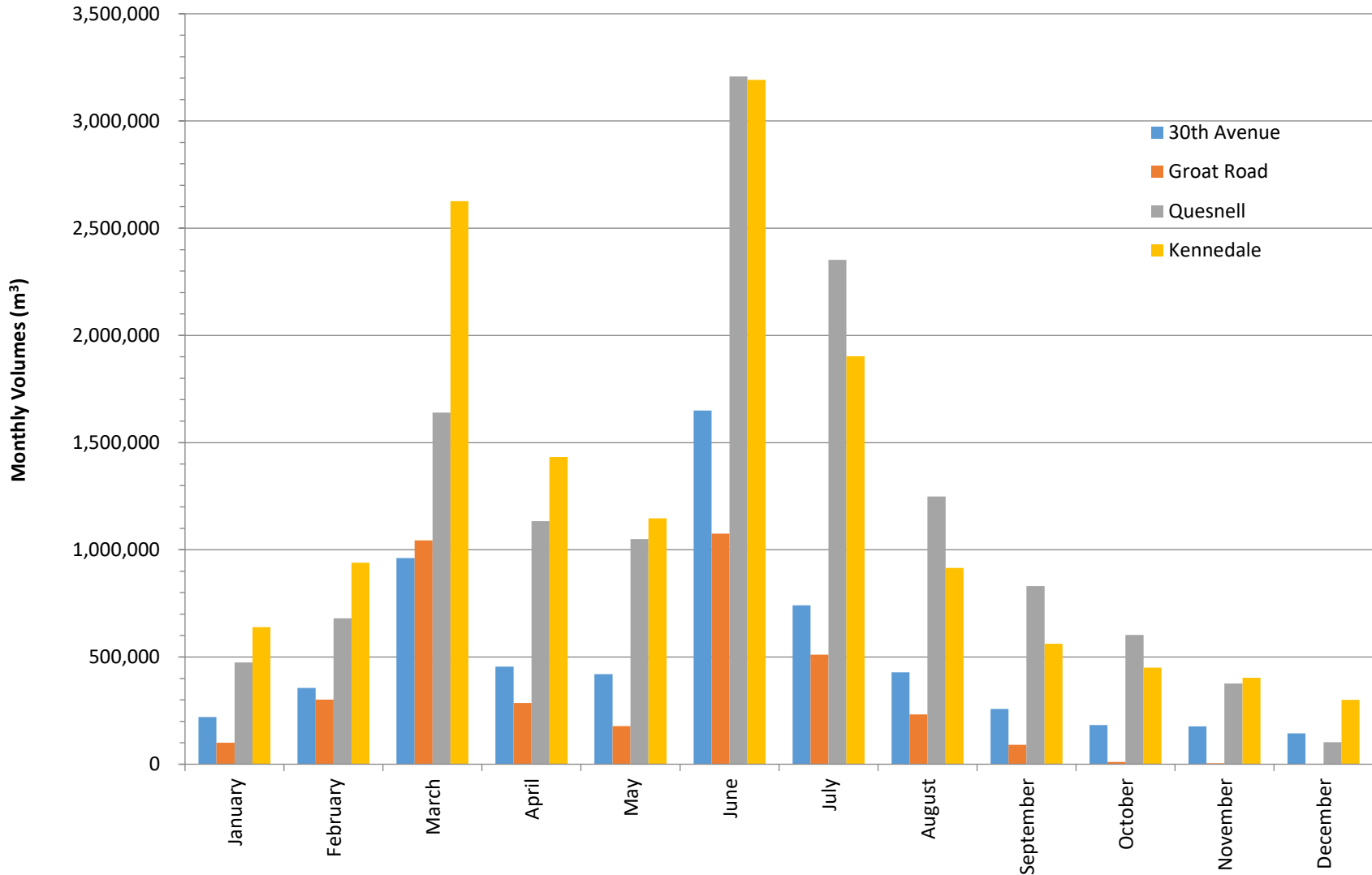


Figure 1: Total (Measured + Estimated) Storm Volume in 2022

2022 Annual Wastewater Collection System Report

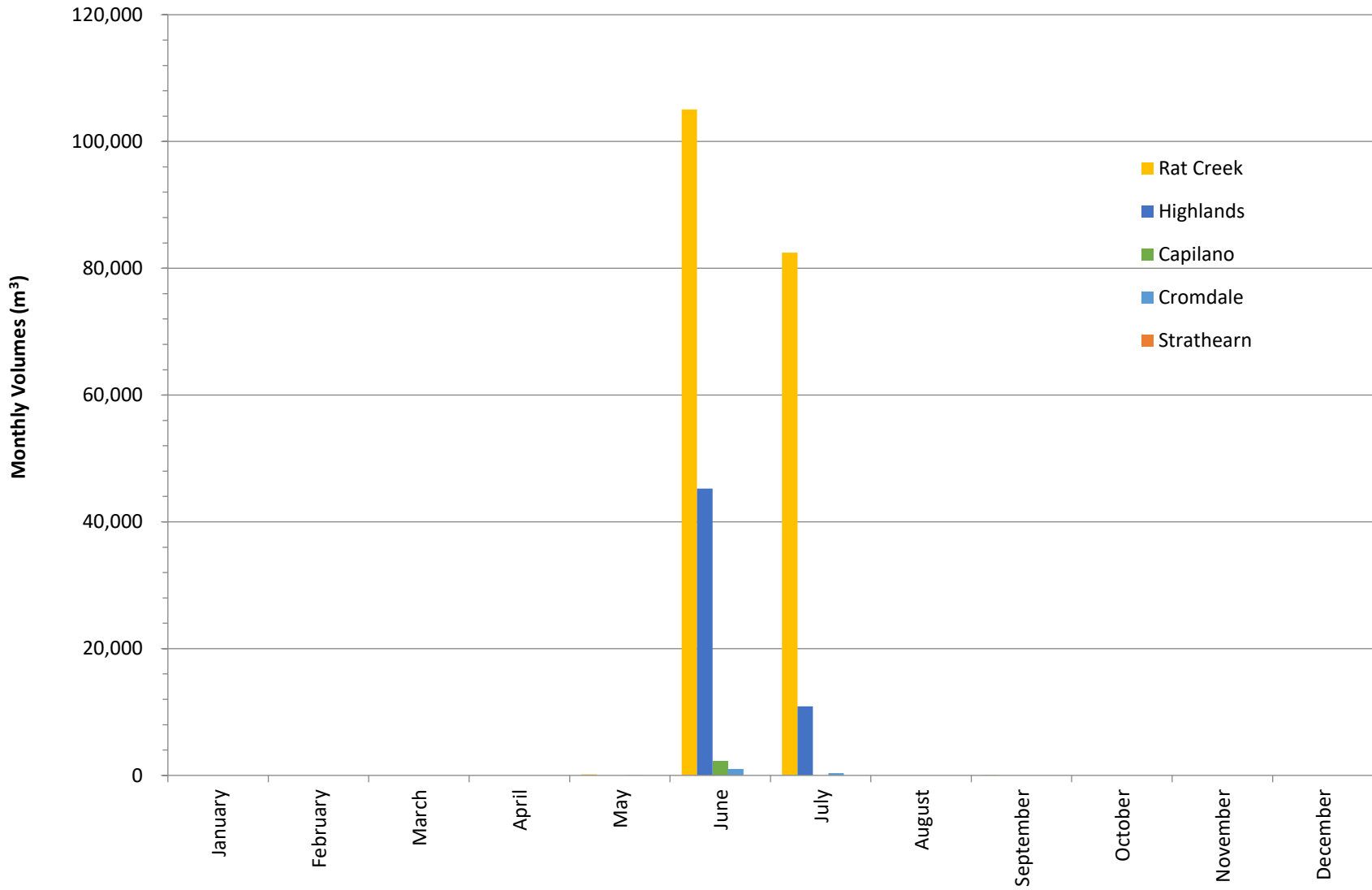


Figure 2: Total (Measured + Estimated) CSO Volumes in 2022

2022 Annual Wastewater Collection System Report

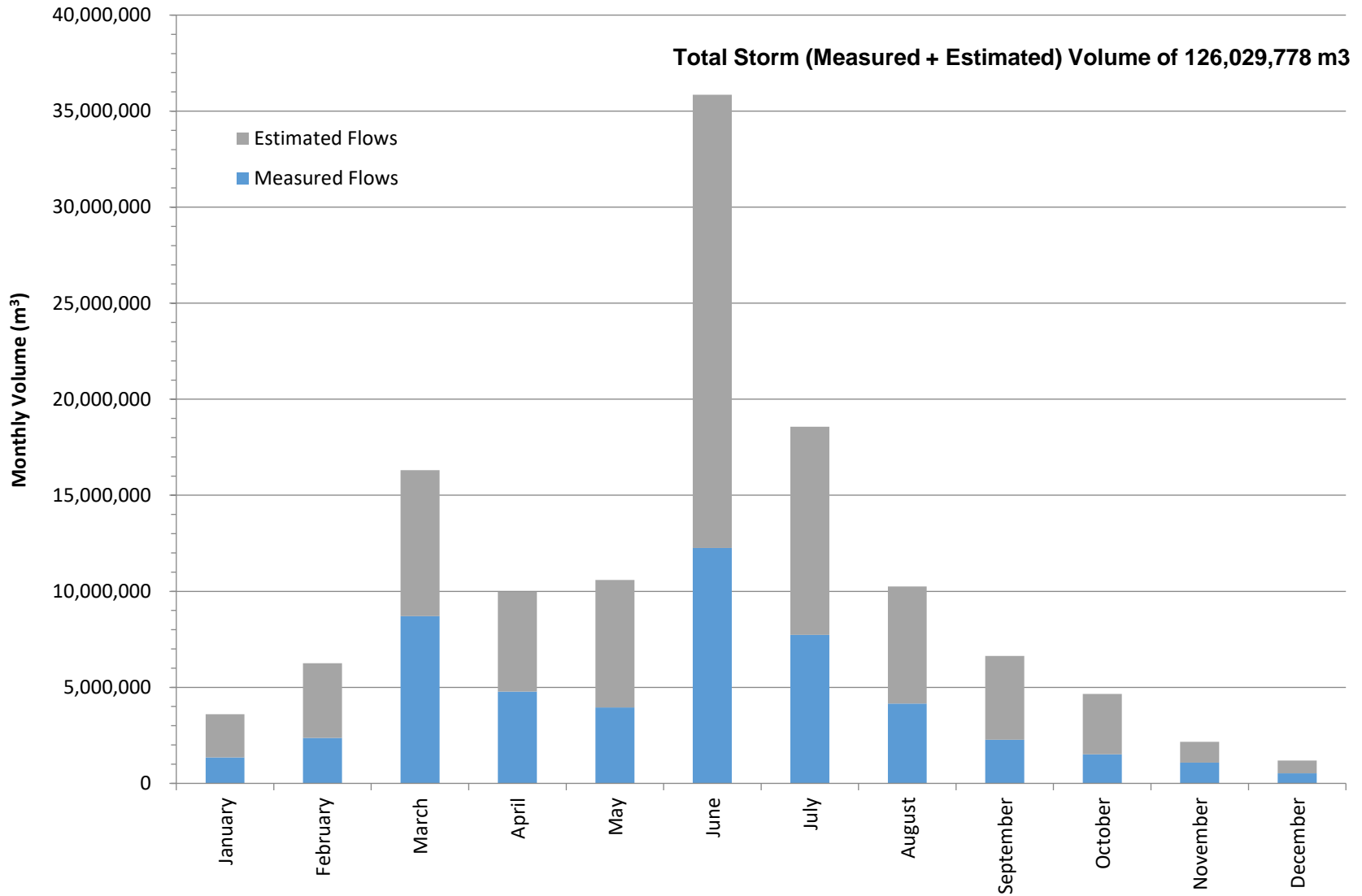


Figure 3: Total Storm (Measured + Unmonitored) Volumes in 2022 (All Storm Outfalls and Creeks)

2022 Annual Wastewater Collection System Report

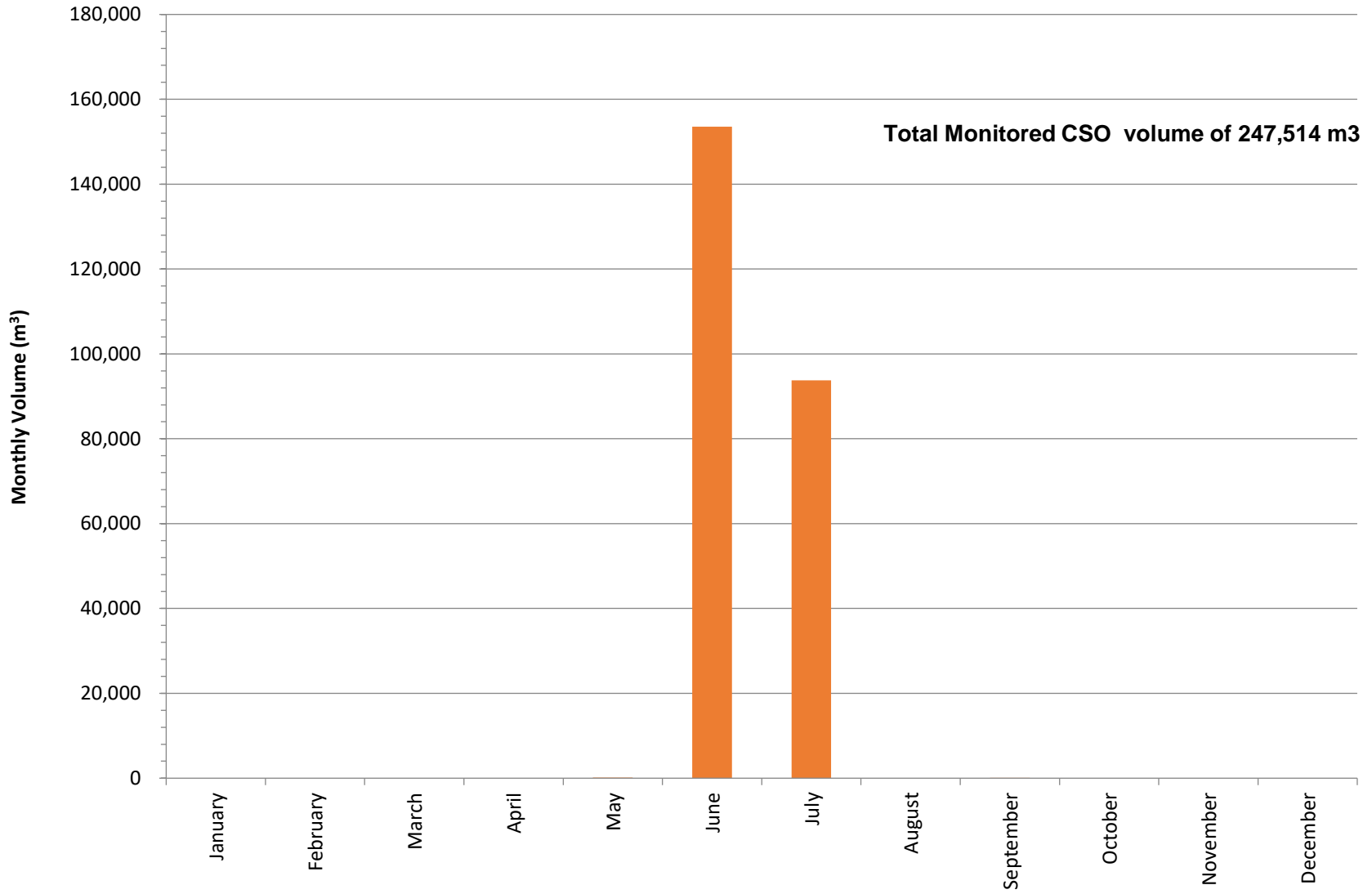


Figure 4: Total Monitored CSO Volume in 2022

2022 Annual Wastewater Collection System Report

Table 2: 2022 Annual Discharge Volumes (in Cubic Meters)

Month	Storm Outfalls				CSO Outfalls				
	30th Avenue	Groat Road	Quesnell	Kennedale	Rat Creek	Highlands	Capilano	Cromdale	Strathearn
January	220,565	99,967	475,176	638,959	0	0	0	0	0
February	355,540	301,930	680,092	939,221	0	0	0	0	0
March	961,526	1,044,028	1,640,443	2,625,681	0	0	0	0	0
April	455,327	286,145	1,133,796	1,432,288	0	0	0	0	0
May	420,360	177,915	1,050,497	1,147,006	136	0	0	9	0
June	1,649,396	1,075,313	3,207,881	3,191,706	105,069	45,258	2,251	994	0
July	741,057	510,757	2,352,657	1,903,409	82,487	10,889	0	360	0
August	428,099	232,653	1,248,621	915,910	0	0	0	0	0
September	258,033	90,870	830,600	561,588	62	0	0	0	0
October	182,791	10,147	602,905	450,883	0	0	0	0	0
November	176,421	5,029	377,049	403,291	0	0	0	0	0
December	143,398	2,551	102,570	299,732	0	0	0	0	0
Total	5,992,513	3,837,304	13,702,287	14,509,674	187,754	56,147	2,251	1,362	0

Month	Measured Flows		³ Unmonitored Flows		Total Flow	
	¹ Storm Outfalls	² CSO Outfalls	Storm Outfalls	CSO Outfalls	Storm Outfalls	CSO Outfalls
January	1,358,150	0	2,237,512	0	3,595,661	0
February	2,363,898	0	3,889,244	0	6,253,142	0
March	8,710,295	0	7,600,938	0	16,311,233	0
April	4,776,219	0	5,198,557	0	9,974,776	0
May	3,948,523	145	6,634,637	0	10,583,159	145
June	12,261,753	153,573	23,589,151	0	35,850,905	153,573
July	7,725,010	93,735	10,842,598	0	18,567,609	93,735
August	4,150,320	0	6,100,017	0	10,250,338	0
September	2,266,039	62	4,366,906	0	6,632,945	62
October	1,510,730	0	3,140,447	0	4,651,177	0
November	1,078,043	0	1,087,831	0	2,165,874	0
December	520,285	0	672,675	0	1,192,960	0
Total	50,669,265	247,514	75,360,513	0	126,029,778	247,514

Note: ¹Measured Storm flows are actual flow volumes measured from Storm outfalls: 30th Ave, Quesnell, Groat Road, Kennedale Storm/STS/Wetland, Belgravia, Mill Creek (factored).

²Measured CSO flows are actual flow volumes measured from CSOs: Rat Creek, Capilano, Highlands, Cromdale, and Strathearn.

³Unmonitored flow volumes include estimates from monitored sites when measurements not available in addition to other remaining sites.

2022 Annual Wastewater Collection System Report

Table 3: Calculated Flow-Weighted Mean Monthly and Annual Constituent Concentrations for 2022

Total Suspended Solids (mg/L)									
Month	Storm Outfalls				CSO Outfalls			No. of Samples	
	30th Avenue	Groat Road	Quesnell	Kennedale	Rat Creek	Highlands	Capilano	Storm	CSO
January	59	195	63	9	-	-	-	7	0
February	116	269	123	27	-	-	-	10	0
March	98	221	133	69	-	-	-	54	0
April	42	289	56	29	-	-	-	24	0
May	220	500	200	49	1,334	-	-	21	2
June	102	217	81	49	742	550	370	64	4
July	44	270	72	28	734	381	-	36	4
August	107	434	111	36	-	-	-	25	0
September	116	214	138	61	2,110	-	-	19	1
October	36	11	44	26	-	-	-	12	0
November	24	40	51	7	-	-	-	11	0
December	21	26	2	4	-	-	-	7	0
Mean Annual FWC =	92	259	97	41	740	517	370	290	11

Mean Annual FWC for all Storm = **91** Mean Annual FWC for all CSO = **686**

Biochemical Oxygen Demand (mg/L)									
Month	Storm Outfalls				CSO Outfalls			No. of Samples	
	30th Avenue	Groat Road	Quesnell	Kennedale	Rat Creek	Highlands	Capilano	Storm	CSO
January	8	14	8	4	-	-	-	7	0
February	14	24	12	6	-	-	-	10	0
March	12	17	9	10	-	-	-	54	0
April	5	14	5	7	-	-	-	23	0
May	16	24	12	9	290	-	-	21	2
June	6	15	6	6	104	99	92	63	3
July	6	16	4	5	103	87	-	35	2
August	11	59	7	7	-	-	-	24	0
September	19	23	8	14	139	-	-	19	0
October	14	5	8	11	-	-	-	12	0
November	13	17	9	5	-	-	-	10	0
December	11	10	3	3	-	-	-	7	0
Mean Annual FWC =	10	20	7	7	104	97	92	285	7

Mean Annual FWC for all Storm = **9** Mean Annual FWC for all CSO = **102**

2022 Annual Wastewater Collection System Report

Table 3: Calculated Flow-Weighted Mean Monthly and Annual Constituent Concentrations for 2022 (Cont.)

Total Phosphorus (mg/L)									
Month	Storm Outfalls				CSO Outfalls			No. of Samples	
	30th Ave	Groat Road	Quesnell	Kennedale	Rat Creek	Highlands	Capilano	Storm	CSO
January	1.0	0.5	0.3	0.3	-	-	-	7	0
February	1.7	0.7	0.5	0.4	-	-	-	10	0
March	0.1	0.8	0.6	0.6	-	-	-	54	0
April	0.5	0.6	0.2	0.3	-	-	-	25	0
May	1.0	0.8	0.4	0.2	5.8	-	-	22	3
June	0.1	0.4	0.2	0.2	2.1	1.9	1.6	64	1
July	0.2	0.4	0.2	0.1	3.2	2.5	-	40	2
August	0.3	0.3	0.3	0.2	-	-	-	26	1
September	0.2	0.5	0.4	0.4	9.6	-	-	19	1
October	0.3	0.1	0.3	0.3	-	-	-	13	0
November	0.3	0.3	0.3	0.2	-	-	-	11	0
December	15.5	0.3	0.3	0.2	-	-	-	7	0
Mean Annual FWC =	0.4	0.6	0.3	0.3	2.6	2.0	1.6	298	8

Mean Annual FWC for all Storm = **0.3** Mean Annual FWC for all CSO = **2.4**

Nitrite + Nitrate (mg/L)									
Month	Storm Outfalls				CSO Outfalls			No. of Samples	
	30th Ave	Groat Road	Quesnell	Kennedale	Rat Creek	Highlands	Capilano	Storm	CSO
January	2.1	0.9	1.2	2.1	-	-	-	7	0
February	1.4	0.7	0.8	1.3	-	-	-	10	0
March	0.9	0.7	0.6	0.7	-	-	-	54	0
April	1.8	1.1	0.9	1.3	-	-	-	25	0
May	2.4	1.0	1.2	1.3	0.3	-	-	22	3
June	1.2	1.1	0.8	0.8	0.8	1.0	0.8	64	1
July	1.6	0.7	0.8	1.4	0.3	0.4	-	40	2
August	1.7	0.7	0.9	1.0	-	-	-	26	1
September	2.1	0.7	1.0	0.5	0.4	-	-	19	1
October	2.2	0.4	0.9	1.0	-	-	-	13	0
November	1.9	1.0	1.5	1.5	-	-	-	11	0
December	2.1	1.2	1.6	2.2	-	-	-	7	0
Mean Annual FWC =	1.5	0.8	0.9	1.1	0.6	0.9	0.8	298	8

Mean Annual FWC for all Storm = **1.1** Mean Annual FWC for all CSO = **0.7**

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Table 3: Calculated Flow-Weighted Mean Monthly and Annual Constituent Concentrations for 2022 (Cont.)

Ammonia Nitrogen (mg/L)									
Month	Storm Outfalls				CSO Outfalls			No. of Samples	
	30th Ave	Groat Road	Quesnell	Kennedale	Rat Creek	Highlands	Capilano	Storm	CSO
January	1.9	1.1	1.4	1.1	-	-	-	7	0
February	2.7	1.2	2.5	1.3	-	-	-	10	0
March	1.7	1.0	1.4	0.8	-	-	-	54	0
April	0.6	0.7	0.6	0.7	-	-	-	25	0
May	0.7	0.6	0.6	0.1	18.9	-	-	22	3
June	0.2	0.2	0.2	0.1	3.8	4.1	2.9	64	1
July	0.3	0.2	0.1	0.1	5.5	3.8	-	40	2
August	0.5	0.2	0.3	0.2	-	-	-	26	1
September	0.5	0.6	0.6	0.3	18.8	-	-	19	1
October	0.5	0.7	0.7	0.5	-	-	-	13	0
November	0.5	0.7	0.7	0.8	-	-	-	11	0
December	0.9	0.7	0.8	0.7	-	-	-	7	0
Mean Annual FWC =	0.8	0.6	0.6	0.5	4.6	4.0	2.9	298	8

Mean Annual FWC for all Storm = 0.6 Mean Annual FWC for all CSO = 4.4

Total Kjeldahl Nitrogen (mg/L)									
Month	Storm Outfalls				CSO Outfalls			No. of Samples	
	30th Ave	Groat Road	Quesnell	Kennedale	Rat Creek	Highlands	Capilano	Storm	CSO
January	2.4	3.5	1.9	2.3	-	-	-	7	0
February	3.4	3.8	2.7	3.0	-	-	-	10	0
March	2.9	3.4	2.6	3.0	-	-	-	54	0
April	1.5	3.9	1.8	1.9	-	-	-	25	0
May	3.2	4.5	2.5	1.7	39.9	-	-	22	3
June	1.4	2.1	1.3	1.3	13.0	12.5	10.2	64	1
July	1.6	2.0	1.2	1.3	17.3	14.5	-	40	2
August	2.0	1.8	1.6	1.7	-	-	-	26	1
September	2.5	4.7	2.3	3.3	55.3	-	-	19	1
October	1.9	1.5	2.0	3.3	-	-	-	13	0
November	2.1	2.2	2.5	2.5	-	-	-	11	0
December	2.2	2.4	1.8	1.8	-	-	-	7	0
Mean Annual FWC =	2.1	2.9	1.8	2.1	14.9	12.9	10.2	298	8

Mean Annual FWC for all Storm = 2.1 Mean Annual FWC for all CSO = 14.4

Water quality monitoring sites include: 30th Ave, Quesnell, Groat Road and Kennedale Storm outfalls; and Rat Creek and Capilano CSOs.

FWC (mg/L) = Flow weighted concentration = 1000 x Constituent load (kg) / Volume (m3) per site for a monthly or annual period

Concentrations for unsampled flows were estimated or interpolated

No. of samples includes wet-weather and baseflow sampling. QA/QC samples not included in totals.

'-' - Concentration could not be calculated due to no flow present.

Table 4: Constituent Loads for 2022

Total Suspended Solids (kg)

Month	Storm Outfalls							Creeks				CSO Outfalls						
	30th Ave Storm	Groat Rd. Storm	Quesnell Storm	Kennedale Storm	Monitored Storm Sub-Total	Remaining Storm	Total Storm	Mill Creek	Whitemud Creek	Horsehills Creek	Wedgewood Creek	Total Creek	Rat Creek CSO	Highlands CSO	Capilano CSO	AEP CSO Sub-Total	Remaining CSO	Total CSO
January	12,930	19,455	29,724	6,008	68,116	77,334	226,986	20,997	42,088	14,367	9,291	81,536	0	0	0	0	0	0
February	41,348	81,246	83,889	25,387	231,870	271,081	804,706	86,082	151,732	51,795	33,494	301,755	0	0	0	0	0	0
March	94,575	230,380	218,487	180,058	723,500	760,036	2,011,213	432,066	129,380	44,493	28,890	527,677	0	0	0	0	0	0
April	19,282	82,656	63,140	41,721	206,799	206,201	677,389	92,945	124,508	42,502	27,485	264,389	0	0	0	0	0	0
May	92,677	88,921	209,955	55,941	447,494	821,424	2,177,247	285,832	456,386	174,366	62,631	908,329	182	0	0	182	2	183
June	167,783	232,904	259,012	156,011	815,710	1,299,482	3,480,615	406,877	704,855	207,247	147,351	1,365,424	77,982	24,893	833	103,707	3,111	106,818
July	32,530	137,676	169,862	53,081	393,149	413,636	1,285,177	200,670	211,356	68,450	47,683	478,393	60,582	4,147	0	64,729	647	65,376
August	45,830	100,890	138,252	33,298	318,270	292,967	1,147,810	213,292	238,725	97,133	40,318	536,573	0	0	0	0	0	0
September	29,874	19,468	114,284	34,028	197,655	169,301	654,990	65,504	173,289	36,643	28,843	288,034	131	0	0	131	1	132
October	6,545	115	26,774	11,684	45,118	43,169	159,090	13,617	39,093	10,781	10,690	70,803	0	0	0	0	0	0
November	4,239	199	19,085	2,927	26,450	23,750	75,183	6,428	12,898	4,403	2,847	24,983	0	0	0	0	0	0
December	3,056	67	229	1,161	4,514	4,836	13,147	295	2,289	781	505	3,797	0	0	0	0	0	0
Total	550,670	993,977	1,332,693	601,307	3,478,646	4,383,215	12,713,553	1,824,606	2,286,598	752,962	440,028	4,851,693	138,876	29,040	833	168,749	3,762	172,510

Total Load From Storm and CSO = 12,886,064

Biochemical Oxygen Demand (kg)

Month	Storm Outfalls							Creeks				CSO Outfalls						
	30th Ave Storm	Groat Rd. Storm	Quesnell Storm	Kennedale Storm	Monitored Storm Sub-Total	Remaining Storm	Total Storm	Mill Creek	Whitemud Creek	Horsehills Creek	Wedgewood Creek	Total Creek	Rat Creek CSO	Highlands CSO	Capilano CSO	AEP CSO Sub-Total	Remaining CSO	Total CSO
January	1,763	1,420	3,623	2,838	9,643	8,518	27,367	2,491	4,694	1,602	1,036	9,206	0	0	0	0	0	0
February	5,044	7,120	7,898	5,690	25,753	26,946	82,609	8,490	15,060	5,141	3,324	29,910	0	0	0	0	0	0
March	11,240	17,356	15,568	27,335	71,499	65,992	182,170	35,967	11,251	3,869	2,512	44,680	0	0	0	0	0	0
April	2,103	4,030	6,191	9,371	21,695	16,386	62,999	10,461	10,916	3,726	2,410	24,919	0	0	0	0	0	0
May	6,678	4,353	13,056	10,014	34,101	51,415	143,205	18,839	28,392	10,785	4,347	57,690	39	0	0	39	0	40
June	10,233	16,570	19,381	19,664	65,848	96,026	263,861	29,381	53,284	15,585	11,023	101,987	10,960	4,498	207	15,665	470	16,135
July	4,782	8,270	9,063	8,839	30,953	41,534	122,620	22,370	22,475	6,345	4,491	50,133	8,472	948	0	9,420	94	9,515
August	4,742	13,760	8,331	6,235	33,068	44,935	150,890	28,286	32,643	12,581	6,393	72,888	0	0	0	0	0	0
September	4,842	2,087	6,888	7,660	21,477	43,484	120,125	13,833	30,436	8,495	5,830	55,164	9	0	0	9	0	9
October	2,635	52	4,628	5,111	12,426	19,277	54,940	5,123	12,547	3,689	3,148	23,236	0	0	0	0	0	0
November	2,348	84	3,366	1,996	7,794	6,038	20,120	1,584	3,263	1,114	720	6,288	0	0	0	0	0	0
December	1,617	26	296	769	2,707	2,801	7,713	175	1,327	453	293	2,205	0	0	0	0	0	0
Total	58,028	75,126	98,288	105,521	336,962	423,352	1,238,620	176,998	226,288	73,386	45,529	478,305	19,480	5,447	207	25,134	565	25,698

Total Load From Storm and CSO = 1,264,318

Total Phosphorus (kg)

Month	Storm Outfalls							Creeks				CSO Outfalls						
	30th Ave Storm	Groat Rd. Storm	Quesnell Storm	Kennedale Storm	Monitored Storm Sub-Total	Remaining Storm	Total Storm	Mill Creek	Whitemud Creek	Horsehills Creek	Wedgewood Creek	Total Creek	Rat Creek CSO	Highlands CSO	Capilano CSO	AEP CSO Sub-Total	Remaining CSO	Total CSO
January	105	54	163	166	488	411	1,342	120	226	77	50	443	0	0	0	0	0	0
February	223	198	363	337	1,121	1,088	3,421	347	609	208	135	1,213	0	0	0	0	0	0
March	603	846	943	1,686	4,078	3,693	10,222	1,994	607	209	136	2,451	0	0	0	0	0	0
April	123	169	248	430	970	728	2,803	463	484	165	107	1,105	0	0	0	0	0	0
May	213	151	436	243	1,042	1,673	4,645	637	965	347	139	1,930	1	0	0	1	0	1
June	410	476	656	538	2,081	3,117	8,503	950	1,726	508	358	3,306	216	86	4	306	9	315
July	148	211	504	242	1,106	1,241	3,875	653	674	213	151	1,529	266	27	0	293	3	296
August	131	66	426	197	820	952	2,981	473	540	201	112	1,208	0	0	0	0	0	0
September	115	45	326	229	716	835	2,601	264	590	151	111	1,051	1	0	0	1	0	1
October	45	1	176	135	357	367	1,171	88	243	77	62	448	0	0	0	0	0	0
November	56	1	130	75	262	194	659	52	105	36	23	203	0	0	0	0	0	0
December	50	1	27	54	132	112	332	7	53	18	12	88	0	0	0	0	0	0
Total	2,222	2,219	4,398	4,333	13,173	14,410	42,557	6,046	6,823	2,209	1,395	14,973	483	114	4	600	12	612

Total Load From Storm and CSO = 43,169

Table 4: Constituent Loads for 2022 (Cont.)

Nitrite + Nitrate (kg)

Month	Storm Outfalls							Creeks				CSO Outfalls						
	30th Ave Storm	Groat Rd. Storm	Quesnell Storm	Kennedale Storm	Monitored Storm Sub-Total	Remaining Storm	Total Storm	Mill Creek	Whitemud Creek	Horsehills Creek	Vedgewood Creek	Total Creek	Rat Creek CSO	Highlands CSO	Capilano CSO	AEP CSO Sub-Total	Remaining CSO	Total CSO
January	453	94	578	1,355	2,479	1,496	5,632	469	834	285	184	1,656	0	0	0	0	0	0
February	497	204	545	1,200	2,447	1,790	6,217	559	998	341	220	1,980	0	0	0	0	0	0
March	901	700	1,050	1,795	4,445	3,940	12,535	2,547	1,426	490	318	4,150	0	0	0	0	0	0
April	798	316	1,051	1,866	4,031	2,799	11,968	2,480	2,095	715	462	5,138	0	0	0	0	0	0
May	1,018	176	1,250	1,436	3,880	5,105	15,206	2,263	3,037	988	494	6,221	0	0	0	0	0	0
June	1,970	1,193	2,441	2,638	8,242	11,088	31,506	3,702	6,257	1,890	1,245	12,176	85	44	2	131	4	135
July	1,173	340	1,912	2,616	6,041	7,240	22,755	4,264	4,027	1,309	932	9,474	25	4	0	29	0	30
August	730	157	1,110	918	2,915	6,799	17,348	3,280	3,312	1,232	623	7,634	0	0	0	0	0	0
September	544	59	792	263	1,659	5,488	12,388	1,461	2,657	891	594	5,242	0	0	0	0	0	0
October	404	4	562	450	1,420	2,687	6,882	610	1,491	480	345	2,775	0	0	0	0	0	0
November	332	5	582	608	1,527	966	3,493	249	520	178	115	1,000	0	0	0	0	0	0
December	307	3	162	657	1,129	692	2,368	45	328	112	72	547	0	0	0	0	0	0
Total	9,129	3,251	12,034	15,803	40,216	50,088	148,297	21,929	26,984	8,911	5,607	57,993	110	48	2	160	4	165

Total Load From Storm and CSO = 148,462

Ammonia Nitrogen (kg)

Month	Storm Outfalls							Creeks				CSO Outfalls						
	30th Ave Storm	Groat Rd. Storm	Quesnell Storm	Kennedale Storm	Monitored Storm Sub-Total	Remaining Storm	Total Storm	Mill Creek	Whitemud Creek	Horsehills Creek	Wedgewood Creek	Total Creek	Rat Creek CSO	Highlands CSO	Capilano CSO	AEP CSO Sub-Total	Remaining CSO	Total CSO
January	420	107	673	685	1,885	1,514	5,045	451	837	286	185	1,646	0	0	0	0	0	0
February	962	351	1,669	1,205	4,187	3,874	12,426	1,272	2,182	745	482	4,365	0	0	0	0	0	0
March	1,619	1,011	2,256	2,064	6,951	6,503	19,059	3,827	1,741	599	389	5,606	0	0	0	0	0	0
April	273	193	666	1,033	2,166	1,479	6,370	1,319	1,110	379	245	2,725	0	0	0	0	0	0
May	297	112	649	148	1,207	2,157	5,954	932	1,257	424	207	2,590	3	0	0	3	0	3
June	281	204	497	382	1,364	2,115	5,778	697	1,180	360	235	2,299	396	185	7	587	18	605
July	223	98	308	271	900	1,273	3,836	769	710	220	154	1,662	455	41	0	496	5	501
August	204	36	418	170	827	1,964	4,968	887	972	337	201	2,178	0	0	0	0	0	0
September	130	55	488	152	825	879	2,949	324	697	172	132	1,245	1	0	0	1	0	1
October	99	7	409	216	732	1,001	2,807	213	581	191	142	1,074	0	0	0	0	0	0
November	82	4	254	333	672	367	1,419	94	198	67	44	380	0	0	0	0	0	0
December	135	2	79	198	414	310	968	20	147	50	32	245	0	0	0	0	0	0
Total	4,727	2,181	8,366	6,855	22,129	23,435	71,578	10,805	11,612	3,830	2,448	26,015	855	226	7	1,087	23	1,110

Total Load From Storm and CSO = 72,688

Total Kjeldahl Nitrogen (kg)

Month	Storm Outfalls							Creeks				CSO Outfalls						
	30th Ave Storm	Groat Rd. Storm	Quesnell Storm	Kennedale Storm	Monitored Storm Sub-Total	Remaining Storm	Total Storm	Mill Creek	Whitemud Creek	Horsehills Creek	Wedgewood Creek	Total Creek	Rat Creek CSO	Highlands CSO	Capilano CSO	AEP CSO Sub-Total	Remaining CSO	Total CSO
January	529	353	894	1,466	3,243	2,286	8,008	676	1,262	431	279	2,479	0	0	0	0	0	0
February	1,195	1,134	1,812	2,831	6,972	5,775	19,177	1,835	3,233	1,104	714	6,430	0	0	0	0	0	0
March	2,783	3,595	4,226	7,970	18,574	16,548	47,301	9,264	3,326	1,144	743	12,179	0	0	0	0	0	0
April	701	1,118	2,016	2,790	6,624	4,943	19,627	3,583	3,435	1,173	758	8,060	0	0	0	0	0	0
May	1,344	807	2,650	1,985	6,786	9,939	28,321	3,916	5,723	2,058	869	11,596	5	0	0	5	0	5
June	2,348	2,290	4,168	4,192	12,998	18,522	51,397	5,853	10,301	3,067	2,108	19,877	1,363	566	23	1,952	59	2,011
July	1,200	1,018	2,762	2,514	7,495	8,752	27,212	4,756	4,770	1,531	1,088	10,965	1,429	158	0	1,587	16	1,603
August	853	430	2,052	1,582	4,918	7,109	20,328	3,303	3,698	1,365	755	8,301	0	0	0	0	0	0
September	650	424	1,894	1,864	4,832	5,302	17,073	1,709	3,871	1,050	733	6,939	3	0	0	3	0	3
October	354	15	1,200	1,501	3,070	3,046	9,568	697	1,866	596	466	3,452	0	0	0	0	0	0
November	364	11	936	1,003	2,314	1,380	5,136	366	747	255	165	1,442	0	0	0	0	0	0
December	309	6	184	550	1,049	718	2,334	46	341	116	75	567	0	0	0	0	0	0
Total	12,632	11,200	24,795	30,248	78,875	84,319	255,481	36,004	42,572	13,888	8,753	92,288	2,801	724	23	3,548	75	3,623

Total Load From Storm and CSO = 259,104

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Table 5: 2022 Rat Creek CSO Concentration Statistics

Month	CSO Events	TSS			BOD			TP			<i>E. coli</i>
		Mean (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Mean (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Mean (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Geometric Mean (MPN/100 mL)
January	0	-	-	-	-	-	-	-	-	-	-
February	0	-	-	-	-	-	-	-	-	-	-
March	0	-	-	-	-	-	-	-	-	-	-
April	0	-	-	-	-	-	-	-	-	-	-
May	2	1365.0	1430.0	1300.0	312.0	358.0	266.0	6.6	8.1	5.0	3,766,364
June	6	864.3	2340.0	370.0	108.5	152.0	92.0	2.8	5.2	1.6	1,788,250
July	4	718.0	1330.0	282.0	94.4	139.0	77.0	3.4	3.9	2.3	2,623,013
August	0	-	-	-	-	-	-	-	-	-	-
September	1	2110.0	2110.0	2110.0	139.0	139.0	139.0	9.6	9.6	9.6	3,970,000
October	0	-	-	-	-	-	-	-	-	-	-
November	0	-	-	-	-	-	-	-	-	-	-
December	0	-	-	-	-	-	-	-	-	-	-

Month	CSO Events	NH ₃			NO ₃ +NO ₂			TKN		
		Mean (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Mean (mg/L)	Maximum (mg/L)	Minimum (mg/L)	Mean (mg/L)	Maximum (mg/L)	Minimum (mg/L)
January	0	-	-	-	-	-	-	-	-	-
February	0	-	-	-	-	-	-	-	-	-
March	0	-	-	-	-	-	-	-	-	-
April	0	-	-	-	-	-	-	-	-	-
May	2	18.4	19.4	17.3	0.2	0.3	0.2	43.3	50.2	36.3
June	6	6.2	15.2	2.9	0.8	1.5	0.3	18.4	36.7	10.2
July	4	6.5	9.1	3.1	0.3	0.4	0.1	20.0	26.4	13.6
August	0	-	-	-	-	-	-	-	-	-
September	1	18.8	18.8	18.8	0.4	0.4	0.4	55.3	55.3	55.3
October	0	-	-	-	-	-	-	-	-	-
November	0	-	-	-	-	-	-	-	-	-
December	0	-	-	-	-	-	-	-	-	-

Note: Number of samples might not equal to number of CSO events due to sampler malfunction and extended sampling event.

TABLE 6: List of Certified Wastewater Collection System Operators

Certified Wastewater Collection System Operators per Level of WWC Certification:

- (1) Operators Level IV WWC Certified
- (6) Operators Level III WWC Certified
- (51) Operators Level II WWC Certified
- (27) Operators Level I WWC Certified

Name	Title	WWC Certification Level
Fechner, Frank	Senior Manager, Operational Strategies	IV
Bertin, Wendy	Engineering Technologist	III
Gunderson, John	Engineering Technologist	III
L'Heureux, Robin	Engineering Technologist	III
Lukenbill, Durward (Dylan)	Tradesman (Millwright 2)	III
McConnell, Peter	Drainage System MTV Operator	III
Powell, Ryan	Tradesman (Millwright 2)	III
Acker, Timothy	Drainage System MTV Operator	II
Ambrosio, Jeffrey	Sewer Substructure Inspector	II
Aniskou, Evgeni	Engineering Technologist	II
Benson, Leon	Drainage System Combo Operator	II
Bishop, Shawn	Drainage System Combo Operator	II
Branicki, Roman	Labour Foreman 1	II
Bronca, Robert	Labour Foreman 3	II
Brownoff, Nicholas	Tradesman (Millwright)	II
Charrupi, Carlos	Maintenance Repairman I	II
Coburn, Arthur	Labourer 3	II
Cuglietta, Carmine	Labour Foreman 1	II
Dowds, Alexander	Drainage System Combo Operator	II
Ewing, Nicole	Engineering Technologist	II
Ferenac, Nikola	Labour Foreman 3	II
Forrest, Scott	Water System Technical Support / Special	II
Fraser, Gordon	Labourer 2	II
Gawreletz, Kevin	Labour Foreman 1	II
Goodine, John	Tradesman (Millwright 2)	II
Goonewardane, Anton	Equipment Operator 3	II
Guidoccio, Natalino	Drainage System Serviceman	II
Guidoccio, Nicholas	Drainage System Serviceman	II
Hajar, Norm	Millwright Foreman	II
Hammond, Richard	Labourer 3	II
Hao, Yufu (Owen)	Industrial Wastewater Inspector	II

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Hillier, Denis	Foreman (Dual Trade)	II
Lawson, Linsey	Engineering Technologist	II
Ledl, Ryan	Industrial Wastewater Investigator	II
Lirazan, Warren	Labourer 3	II
Macrury, Robert	Labour Foreman 1	II
Manao, Manuel	Sewer Substructure Inspector	II
Marcoux-Mansbridge, Nikita	Tradesman (Millwright)	II
McKay, Brandy	Engineering Technologist	II
Miller, Wade	Tradesman (Millwright 2)	II
Montague, Thomas (Ian)	Labour Foreman 3	II
Murphy, Steven	Drainage System Combo Operator	II
Nelson, Tim	Environmental Specialist	II
Perron, Clayton	Tradesman (Millwright 2)	II
Persaud, Shawna	Equipment Operator 3	II
Rivard, Shaune	Drainage Network Specialist	II
Samarasinghe, Kalutota	Labourer 2	II
Schlacht, Shawn	Labour Foreman 3	II
Sedurante, Benjamin	Sewer Substructure Inspector	II
Sigstad, Lane	Tradesman (Millwright 2)	II
Slonetzky, Tyler	Sewer Substructure Inspector	II
Soni, Rohit	Planner (FCF Maintenance)	II
Sorenson, Melvin	Labour Foreman 1	II
Sorenson, Tim	Labour Foreman 3	II
Underhay, Dominic	Labourer 3	II
Ursuliak, Wes	Labour Foreman 3	II
Webster, Kenneth	Labour Foreman 3	II
Yang, Guang	Drainage System Combo Operator	II
Bellerose, Richard	Tradesman (Millwright 2)	I
Burns, Russel	Labourer 3	I
Byrne, Philip	Maintenance Repairman I	I
Campbell, Brent	Sewer Substructure Inspector	I
Casella, Carmen	Labourer 3	I
Clark, Daniel	Drainage Network Specialist	I
Dilts, Scott	Drainage System Combo Operator	I
Divino, Patrick	Drainage System Serviceman	I
Draghici, Courtney	Drainage System Combo Operator	I

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Fehr, Brittany	Engineering Technologist	
Handfield, Terrence	Drainage System Combo Operator	
Hill, James	Electrician 1	
Hogan, Alex	Industrial Wastewater Inspector	
Ledrew, Travis	Labour Foreman 1	
Liao, Leslie	Tradesman (Millwright)	
McHale, Ken	Drainage System Combo Operator	
McLellan, Christine	Drainage Network Specialist	
Nakpangi, Valene	Engineering Technologist	
Pinder, Cristan	Industrial Wastewater Investigator	
Rahal, Osman	Engineering Technologist	
Runco, Frank	Drainage System Combo Operator	
Sheppard, Cody	Tradesman (Millwright)	
Spila, Leanne	Drainage Network Specialist	
Swanson, Amy	Labour Foreman 3	
To, Alan	Drainage Network Specialist	
Trahan, Tessa	Industrial Wastewater Investigator	
Valentini, Marco	Maintenance Repairman 1	

TABLE 7: 2022 Annual Product Usage at Pump Stations

The Biomaxx Canada OXYN8 solution is used for odor control at sanitary pump stations.

Pump Station	Month	Product	Total Addition (L)
PW213 Trumpeter	June	Biomaxx Canada OXYN8	2,382
PW213 Trumpeter	July	Biomaxx Canada OXYN8	3,628
PW227 Chappelle Garden	July	Biomaxx Canada OXYN8	111
PW213 Trumpeter	August	Biomaxx Canada OXYN8	3,177
PW227 Chappelle Garden	August	Biomaxx Canada OXYN8	2,200
PW233 Edgemont II	August	Biomaxx Canada OXYN8	1,465
PW213 Trumpeter	September	Biomaxx Canada OXYN8	2,548
PW227 Chappelle Garden	September	Biomaxx Canada OXYN8	1,862
PW233 Edgemont II	September	Biomaxx Canada OXYN8	669
PW213 Trumpeter	October	Biomaxx Canada OXYN8	3,135
PW227 Chappelle Garden	October	Biomaxx Canada OXYN8	2,216
PW233 Edgemont II	October	Biomaxx Canada OXYN8	644
PW213 Trumpeter	November	Biomaxx Canada OXYN8	2,707
PW227 Chappelle Garden	November	Biomaxx Canada OXYN8	2,674
PW233 Edgemont II	November	Biomaxx Canada OXYN8	1,173
PW213 Trumpeter	December	Biomaxx Canada OXYN8	2,315
PW227 Chappelle Garden	December	Biomaxx Canada OXYN8	5,515
PW233 Edgemont II	December	Biomaxx Canada OXYN8	1,584

Total Usage (L): 40,005

TABLE 8: 2022 Annual Usage of Reward® Herbicide

Date of Application	Stormwater Management Facility	Quantity Used (L)
21-Jun-22	Ambleside #4 (3604-Allan Drive SW)	11
21-Jul-22	Uplands #2 (20220-27 Avenue NW)	8
26-Jul-22	Bearspaw Creek (1115-109 Street NW)	8
28-Jul-22	Paisley #1 (3040-Paisley Green SW)	23
08-Aug-22	Windermere #4 (5109-Woolsey Link NW)	2
23-Aug-22	Ambleside #4 (3604-Allan Drive SW)	11

Total Number of Applications: 6

Total Usage (L): 62

TABLE 9: 2022 Usage of Bright Dye

The use of Bright Dye in the **Field Operations** section is related to the identification of cross-connections in the collection system. The **Monitoring & Compliance** usage supports enforcement activities associated with Drainage By-law 19627 (EPCOR) and Drainage By-Law 18093 (City of Edmonton) and investigations of industrial and commercial customers.

Date Tested	Location of Test	Department / Section	Tests per Location	Bright Dye Usage (ml)
13-Jan-22	14715-116 Avenue NW	Monitoring & Compliance	3	75
13-Apr-22	6545-99 Street NW	Monitoring & Compliance	2	100
14-Apr-22	6545-99 Street NW	Monitoring & Compliance	1	25
30-May-22	122-Avenue & 47-Street NW	Field Operations	1	30
30-May-22	42-Avenue & 98-Street NW	Field Operations	1	30
7-June-22	146-Avenue & 50-Street NW	Field Operations	1	30
13-June-22	11305-164 Avenue NW	Field Operations	1	30
18-July-22	23-Avenue & 111-Street NW	Field Operations	2	60
19-July-22	10230-Jasper Avenue NW	Field Operations	1	30
19-July-22	7904-118 Avenue NW	Field Operations	1	30
27-July-22	6-Willow Way NW	Field Operations	1	90
23-Aug-22	14715-116 Avenue NW	Monitoring & Compliance	1	25
25-Aug-22	4160-97 Street NW	Monitoring & Compliance	8	200
25-Aug-22	9815-42 Avenue NW	Monitoring & Compliance	1	25
29-Nov-22	11208-48 Avenue NW	Monitoring & Compliance	1	25
29-Nov-22	11212-48 Avenue NW	Monitoring & Compliance	1	25
29-Nov-22	11220-48 Avenue NW	Monitoring & Compliance	1	25
29-Nov-22	11224-48 Avenue NW	Monitoring & Compliance	1	25
29-Nov-22	11228-48 Avenue NW	Monitoring & Compliance	1	25
29-Nov-22	11232-48 Avenue NW	Monitoring & Compliance	1	25
29-Nov-22	11234-48 Avenue NW	Monitoring & Compliance	1	25
30-Nov-22	11216-48 Avenue NW	Monitoring & Compliance	1	25
30-Nov-22	11204-48 Avenue NW	Monitoring & Compliance	1	25
30-Nov-22	11140-48 Avenue NW	Monitoring & Compliance	1	25
30-Nov-22	11136-48 Avenue NW	Monitoring & Compliance	1	25
30-Nov-22	11128-48 Avenue NW	Monitoring & Compliance	1	25
12-Dec-22	4160-97 Street NW	Monitoring & Compliance	2	50
29-Dec-22	7611A-150 Street NW	Monitoring & Compliance	1	25
29-Dec-22	7611A-150 Street NW	Monitoring & Compliance	1	25

Total Number of Tests: 41

Total Usage (mL): 1180

TABLE 10: 2022 Usage of De-Icing Product

Date	Outfall Number	Directly Affected Watercourse	Number of Applications	Total Amount of De-Icing Product Applied (Kg)
05-Jan-22	265	Whitemud Creek	1	60
05-Jan-22	277	Blackmud Creek	1	70
06-Jan-22	4	Whitemud Creek	1	40
06-Jan-22	3	Whitemud Creek	1	40
06-Jan-22	1	Whitemud Creek	1	40
07-Jan-22	23D	North Sask. River	1	40
07-Jan-22	23C	North Sask. River	1	50
11-Jan-22	120	North Sask. River	1	80
11-Jan-22	101	North Sask. River	1	110
11-Jan-22	52	North Sask. River	1	60
11-Jan-22	57	North Sask. River	1	130
12-Jan-22	25	North Sask. River	1	40
12-Jan-22	314	North Sask. River	1	70
12-Jan-22	274	Blackmud Creek	1	40
12-Jan-22	263	Blackmud Creek	1	70
12-Jan-22	65	North Sask. River	2	170
12-Jan-22	121	North Sask. River	1	20
13-Jan-22	65	North Sask. River	1	100
13-Jan-22	207	Blackmud Creek	1	50
13-Jan-22	264	Blackmud Creek	1	70
13-Jan-22	5	Whitemud Creek	1	80
14-Jan-22	109	North Sask. River	1	30
14-Jan-22	47	North Sask. River	1	50
14-Jan-22	108	North Sask. River	1	30
14-Jan-22	31	North Sask. River	2	70
14-Jan-22	298	North Sask. River	1	70
14-Jan-22	257	Wedgewood Creek	2	150
17-Jan-22	275	Blackmud Creek	1	50
17-Jan-22	119	Westridge Ravine	1	80
17-Jan-22	15	North Sask. River	1	80
18-Jan-22	118	Big Lake	1	20
18-Jan-22	29	North Sask. River	1	100
18-Jan-22	78	Goldbar Creek	1	50
19-Jan-22	77	Goldbar Creek	1	30
19-Jan-22	191	Mill Creek South	1	50

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19-Jan-22	92B	Mill Creek South	1	50
19-Jan-22	195	Mill Creek South	1	90
20-Jan-22	192	Mill Creek South	1	50
20-Jan-22	91	Big Lake	1	20
20-Jan-22	190	North Sask. River	1	30
20-Jan-22	65	North Sask. River	2	50
21-Jan-22	101	North Sask. River	2	100
21-Jan-22	298	North Sask. River	2	50
21-Jan-22	265	Whitemud Creek	1	70
24-Jan-22	183	North Sask. River	1	30
24-Jan-22	182	North Sask. River	1	30
24-Jan-22	136	Ramsay Ravine	1	40
24-Jan-22	125	Ramsay Ravine	1	40
24-Jan-22	139	Ramsay Ravine	1	40
24-Jan-22	126	Ramsay Ravine	1	20
24-Jan-22	124	Ramsay Ravine	1	20
24-Jan-22	123A	Ramsay Ravine	1	20
24-Jan-22	65	North Sask. River	1	70
24-Jan-22	87	Kennedale Ravine	1	40
24-Jan-22	88	North Sask. River	1	40
24-Jan-22	71	North Sask. River	1	40
25-Jan-22	123	Ramsay Ravine	1	10
25-Jan-22	24	North Sask. River	1	40
25-Jan-22	29	North Sask. River	1	40
25-Jan-22	57	North Sask. River	1	30
25-Jan-22	58	North Sask. River	1	30
26-Jan-22	268	North Sask. River	1	40
26-Jan-22	148	North Sask. River	1	60
26-Jan-22	108	North Sask. River	1	30
27-Jan-22	249	Mill Creek South	1	60
28-Jan-22	191	Mill Creek South	1	40
28-Jan-22	92B	Mill Creek South	1	30
28-Jan-22	195	Mill Creek South	1	30
28-Jan-22	192	Mill Creek South	1	30
31-Jan-22	4	Whitemud Creek	1	50
31-Jan-22	1	Whitemud Creek	1	40
31-Jan-22	274	Blackmud Creek	1	40
31-Jan-22	275	Blackmud Creek	1	40
31-Jan-22	263	Blackmud Creek	1	50
31-Jan-22	65	North Sask. River	1	40

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01-Feb-22	59	North Sask. River	1	40
01-Feb-22	268	North Sask. River	1	40
01-Feb-22	267	North Sask. River	1	40
01-Feb-22	65	North Sask. River	2	60
01-Feb-22	23D	North Sask. River	1	40
01-Feb-22	314	North Sask. River	1	40
01-Feb-22	120	North Sask. River	1	80
02-Feb-22	23C	North Sask. River	1	40
02-Feb-22	277	Blackmud Creek	1	70
02-Feb-22	101	North Sask. River	1	80
02-Feb-22	25	North Sask. River	1	30
03-Feb-22	265	North Sask. River	1	80
03-Feb-22	264	North Sask. River	1	80
04-Feb-22	257	Wedgewood Creek	1	100
04-Feb-22	15	North Sask. River	2	100
04-Feb-22	65	North Sask. River	1	40
04-Feb-22	N/A	Shallow Storm Main	1	40
07-Feb-22	65	North Sask. River	1	80
07-Feb-22	119	Westridge Ravine	1	40
08-Feb-22	52	North Sask. River	1	80
08-Feb-22	153	North Sask. River	1	30
08-Feb-22	156	North Sask. River	1	30
08-Feb-22	121	North Sask. River	1	60
09-Feb-22	78	Goldbar Creek	1	60
09-Feb-22	77	Goldbar Creek	1	40
09-Feb-22	47	North Sask. River	1	60
09-Feb-22	108	North Sask. River	1	40
09-Feb-22	57	North Sask. River	1	50
09-Feb-22	109	North Sask. River	1	30
09-Feb-22	46	North Sask. River	1	50
10-Feb-22	126	Ramsay Ravine	1	40
10-Feb-22	138	Ramsay Ravine	1	10
14-Feb-22	274	Blackmud Creek	1	80
14-Feb-22	207	Blackmud Creek	1	30
15-Feb-22	277	Blackmud Creek	1	50
15-Feb-22	123A	Ramsay Ravine	1	50
15-Feb-22	124	Ramsay Ravine	1	50
15-Feb-22	126	Ramsay Ravine	1	50
16-Feb-22	108	North Sask. River	1	30
16-Feb-22	47	North Sask. River	1	50

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16-Feb-22	109	North Sask. River	1	30
16-Feb-22	192	Mill Creek South	1	40
18-Feb-22	154	North Sask. River	1	40
22-Feb-22	267	North Sask. River	1	40
22-Feb-22	268	North Sask. River	1	40
22-Feb-22	59	North Sask. River	2	100
23-Feb-22	77	Goldbar Creek	1	20
23-Feb-22	N/A	Shallow Storm Main	1	20
28-Feb-22	118	Big Lake	1	30
01-Mar-22	217	Clover Bar Ravine	1	20
02-Mar-22	46	North Sask. River	1	10
02-Mar-22	128	Wellington Ravine	1	50
04-Mar-22	15	North Sask. River	1	70
07-Mar-22	119	Westridge Ravine	1	50
07-Mar-22	257	Wedgewood Creek	1	80
07-Mar-22	197	Mill Creek South	1	50
08-Mar-22	275	Blackmud Creek	1	50
08-Mar-22	274	Blackmud Creek	1	70
09-Mar-22	52	North Sask. River	1	80
09-Mar-22	274	Blackmud Creek	1	70
09-Mar-22	265	Whitemud Creek	1	60
09-Mar-22	277	Blackmud Creek	1	50
09-Mar-22	207	Blackmud Creek	1	40
10-Mar-22	274	Blackmud Creek	1	70
10-Mar-22	132	Ramsay Ravine	1	20
11-Mar-22	108	North Sask. River	1	30
11-Mar-22	109	North Sask. River	1	30
11-Mar-22	47	North Sask. River	1	80
15-Mar-22	126	Ramsay Ravine	1	50
15-Mar-22	136	Ramsay Ravine	1	40
15-Mar-22	124	Ramsay Ravine	1	40
15-Mar-22	101	North Sask. River	2	40
16-Mar-22	123	Ramsay Ravine	1	30
16-Mar-22	123A	Ramsay Ravine	1	50
16-Mar-22	256	North Sask. River	1	20
16-Mar-22	46	North Sask. River	1	20
18-Mar-22	121	North Sask. River	1	90
23-Mar-22	N/A	North Sask. River	1	10
25-Mar-22	125	Ramsay Ravine	1	90
28-Mar-22	125	Ramsay Ravine	1	100

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28-Mar-22	124	Ramsay Ravine	1	30
28-Mar-22	123A	Ramsay Ravine	1	30
28-Mar-22	154	North Sask. River	1	20
09-Nov-22	125	Ramsay Ravine	1	50
09-Nov-22	126	Ramsay Ravine	1	40
09-Nov-22	124	Ramsay Ravine	1	40
10-Nov-22	139	Ramsay Ravine	1	50
23-Nov-22	52	North Sask. River	1	70
23-Nov-22	301	Mill Creek South	1	40
25-Nov-22	192	Mill Creek South	1	40
29-Nov-22	119	Westridge Ravine	1	80
29-Nov-22	298	North Sask. River	1	80
29-Nov-22	101	North Sask. River	1	80
29-Nov-22	183	North Sask. River	1	30
29-Nov-22	125	Ramsay Ravine	1	40
30-Nov-22	139	Ramsay Ravine	1	30
30-Nov-22	136	Ramsay Ravine	1	30
30-Nov-22	274	Blackmud Creek	1	60
01-Dec-22	265	Whitemud Creek	1	70
01-Dec-22	277	Blackmud Creek	1	50
05-Dec-22	4	North Sask. River	1	20
05-Dec-22	126	Ramsay Ravine	1	50
06-Dec-22	123A	Ramsay Ravine	1	40
06-Dec-22	123	North Sask. River	1	30
06-Dec-22	124	Ramsay Ravine	1	40
06-Dec-22	118	Big Lake	1	20
06-Dec-22	15	North Sask. River	1	50
07-Dec-22	249	Mill Creek South	1	100
07-Dec-22	31	North Sask. River	1	40
15-Dec-22	119	Westridge Ravine	1	40
16-Dec-22	87	Kennedale Ravine	1	50
19-Dec-22	29	North Sask. River	1	70
19-Dec-22	71	North Sask. River	1	50
19-Dec-22	148	North Sask. River	1	40
19-Dec-22	108	North Sask. River	1	30
19-Dec-22	47	North Sask. River	1	60
20-Dec-22	109	North Sask. River	1	40
20-Dec-22	183	North Sask. River	1	30
21-Dec-22	46	North Sask. River	1	10
21-Dec-22	182	North Sask. River	1	30

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21-Dec-22	125	Ramsay Ravine	1	50
21-Dec-22	139	Ramsay Ravine	1	40
22-Dec-22	126	Ramsay Ravine	1	30
22-Dec-22	123A	Ramsay Ravine	1	30
22-Dec-22	124	Ramsay Ravine	1	30
22-Dec-22	31	North Sask. River	1	80
22-Dec-22	29	North Sask. River	1	40
23-Dec-22	24	North Sask. River	1	40
23-Dec-22	N/A	North Sask. River	1	20
23-Dec-22	65	North Sask. River	1	40
28-Dec-22	101	North Sask. River	1	100
29-Dec-22	31	North Sask. River	3	430
30-Dec-22	314	North Sask. River	1	70
30-Dec-22	120	North Sask. River	1	70
30-Dec-22	23C	North Sask. River	1	60
30-Dec-22	23D	North Sask. River	1	80

Total Number of Applications: 223

Total Usage (kg): 10,980

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TABLE 11: 2022 Operational Issues - Drainage Services

Date of Occurrence	Location	Incident Description	Type	AEPA Reference Number
11-Jan-22	10310-56 Street NW	During the investigation of an odour complaint at Outfall #57 (OF268556), EPCOR Drainage Investigators identified a plugged / damaged sanitary line (PIP9224) that was allowing untreated wastewater (unknown volume) to infiltrate into an adjacent storm line. EPCOR equipment removed the obstruction in the sanitary line stopping the release of untreated wastewater into the storm collection system. Condition assessments of the sanitary / storm lines were initiated and repairs to the sanitary line were completed on January 20, 2022. This release was reported to AEPA on January 13, 2022. A written report was issued to AEPA on January 20, 2022.	Reportable-Internal	387062
19-Jan-22	9626-96A Street NW	Propylene glycol (approx. 100L) was released into the combined collection system at the City of Edmonton – Muttart Conservatory. During repairs to the mechanical room at this facility a private contractor (Graham Construction & Engineering Inc.) released glycol into a floor drain. The City of Edmonton has addressed the issue of the improper disposal of the glycol with the private contractor. This release was reported to AEPA on January 19, 2022 by the City of Edmonton. A written report was issued to AEPA on January 19, 2022.	Reportable-3 rd Party Release	387223
20-Jan-22	Multiple Locations	During a technical review of condition assessments associated with the drill drop manhole (DDMH) rehabilitation program, EPCOR Utilities identified four DDHM where structural deficiencies in the corrugated metal pipe would have resulted in untreated wastewater being released to soil. Any release would be contained in the surrounding soil and would not have entered the storm collection system or the environment. EPCOR is currently evaluating rehabilitation and construction options for each of the four drill drop manholes; this includes evaluating access challenges, developing design and engineering drawings and construction schedules. EPCOR will continue to monitor the condition of the four drill drop manholes. This release was reported to AEPA on January 21, 2022. A written report was issued to AEPA on January 28, 2022.	Reportable-Internal	387302
08-Feb-22	100-Street & -104 Avenue NW	Ethylene glycol (approx. 3L) was released into a catch basin from a City of Edmonton bus. The catch basin (CB264506) at this location drains to the combined sewer system that is connected to the Gold Bar WWTP. A 3 rd party environmental company (Nor-Alta Environmental Services) was called to the spill site to remove contaminants from the impacted catch basin and surrounding area. This release was reported to AEPA on February 8, 2022 by the City of Edmonton. A written report was issued to AEPA on February 11, 2022.	Reportable-3 rd Party Release	387446
10-Feb-22	5618-54-Street NW	Diesel fuel (approx. 10L) was released from a damaged gravel truck located at Edmonton Truck Wash. Drainage investigators observed a trail of fuel leading down 54 th street towards a storm catch basin (CB233505). The truck had been leaking for 2-3 days and diesel fuel may have entered the storm collection system. A 3 rd party environmental company was called to the spill site to remove fuel residue near the gravel truck and along the roadway. A Notice to Comply was issued to Edmonton Truck Wash to immediately after becoming aware of a release to take all reasonable steps to: a) confine, remedy and repair the effects of the release and b) remove or dispose of the matter in a manner that minimizes any adverse effects. This release was reported to AEPA on February 10, 2022 by City of Edmonton – Fire Services. A written report was issued to AEPA on February 17, 2022.	Reportable-3 rd Party Release	387810
19-Feb-22	Multiple Locations	During a technical review of condition assessments associated with the drill drop manhole (DDMH) rehabilitation program, EPCOR Utilities identified three DDMH where structural deficiencies in the corrugated metal pipe would have resulted in untreated wastewater being released to soil. These releases would be contained in the surrounding soil and would not have entered the storm collection system or the environment. EPCOR is currently evaluating rehabilitation and construction options for 2022 for each of the three drill drop manholes; this includes evaluating access challenges, developing design and engineering drawings and construction schedules. EPCOR will continue to monitor the condition of the three drill drop manholes. This release was reported to AEPA on February 24, 2022. A written report was issued to AEPA on March 1, 2022.	Reportable-Internal	388125, 388126, 388127
22-Feb-22	15830-121A Avenue NW	Sample results of the stormwater discharge from Burnco Rock Products were received and reviewed by EPCOR Drainage - Monitoring & Compliance. The results of the sample exceeded Bylaw 18100 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for COD at 366 mg/L and pH at 9.87. The original sample from the company was collected on February 17, 2022 by Drainage Investigators. A Notice to Comply was issued to Burnco Rock Products to discontinue the release of restricted waste	Reportable-3 rd Party Release	388161

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		to the storm collection system and to report the release to AEPA. This release was reported to AEPA on February 23, 2022 by the company. A written report was issued to AEPA on March 3, 2022.		
08-Mar-22	102-Avenue & 179-Street NW	Potable water (approx. 8 cubic meters) was released into the storm collection system at an EPCOR Drainage worksite. During an excavation, a Drainage Construction crew struck a water line, which resulted in a potable (chlorinated) water release into a nearby storm catch basin (CB524320). An EPCOR Water crew was mobilized to the site to shut off the water main and repair the damaged line. This release was reported to AEPA on March 8, 2022. A written report was issued to AEPA on March 15, 2022.	Reportable-Internal	388491
08-Mar-22	8882- 170-Street NW	Sample results of the stormwater from a storm manhole (MH237162) located at the West Edmonton Mall shopping center were received and reviewed by EPCOR Drainage - Monitoring & Compliance. The results of the sample (E. coli = 200,000 CFU/100mL) indicated that untreated wastewater may have entered the storm collection system thru a cross-connection. Drainage investigators conducted an investigation into this incident to confirm if a cross-connection exists at this location. Further sampling and video inspections of the storm lines at this location confirmed a cross-connection. A Notice to Comply was issued to the shopping center to locate / repair the source of the cross-connection. This release was reported to AEPA on June 2, 2022 by the shopping center. A written report was issued to AEPA on June 6, 2022.	Reportable-3 rd Party Release	391232
22-Mar-22	56 Avenue & 107-Street NW	Hydraulic fluid (approx. 60L) was released into a catch basin (CB228325) from a damaged City of Edmonton truck. Drainage investigators determined that this catch basin is connected to the combined sewer system and there was no release of hydraulic fluid to the storm collection system. This release was reported to AEPA on March 22, 2022 by the City of Edmonton. A written report was issued to AEPA on March 28, 2022.	Reportable-3 rd Party Release	388864
22-Mar-22	1912-66 Avenue NW	Sample results of wastewater from the sanitary line (S-57862-SAN) located at Great Western Containers were received and reviewed by EPCOR Drainage - Monitoring & Compliance. The results of the sample exceeded Alberta Environment and Parks hazardous waste (Class 9.3 violation) limits for Ethylbenzene at 4.19 mg/L, Toluene at 26.2 mg/L and Total Xylenes at 30.1 mg/L. The original sample from the sanitary line was collected on March 15, 2022 by Drainage Investigators. A Notice to Comply was issued to Great Western Containers to discontinue the release of hazardous waste into the sewerage system. Activity will continue with this customer to discontinue the release of hazardous waste from this site. Enforcement and educational activities with the business are ongoing. This release was reported to AEPA on March 22, 2022. A written report was issued to AEPA on March 28, 2022.	Reportable-3 rd Party Release	388869
25-Mar-22	16110-116 Avenue NW	Motor oil (approx. 5L) was released along the roadway / snowbank near the Alberta Park Industrial neighborhood. Drainage investigators observed that the oil was likely spilled during the winter months and had recently been released into the storm collection system (CB567985) during the spring melt. A 3 rd party environmental company (GFL Environmental) was contacted to clean-up the impacted catch basin and surrounding area. This release was reported to AEPA on March 25, 2022. A written report was not required by AEPA.	Reportable-3 rd Party Release	388983
30-Mar-22	149-Street & Stony Plain Road NW	Potable water (approx. 165 cubic meters) was released into the storm collection system by a private company (Marigold Infrastructure Ltd). During excavation activity to install a piling, the company struck an EPCOR water line. The potable water at this location would have been released through the storm collection system at Outfall #30 (OF241827) located Southeast of 135-Street & Ravine Drive NW. The water line was shut off and repaired by an EPCOR Water crew. A Notice to Comply was issued to the company to discontinue the release of potable (chlorinated) water to the storm sewerage system. This event was reported to AEPA on March 30, 2022 by the company. A written report was issued to AEPA on April 6, 2022.	Reportable-3 rd Party Release	389120
30-Mar-22	9924-35 Avenue NW	Motor oil (approx. 10L) was released from a private company (Lube City). The release from an oil tank onto the surface of the rear parking area of the facility may have entered a nearby private storm catch basin. Drainage investigators used absorbent booms to contain and remove contaminants from the spill site. A 3 rd party environmental company (Clean Harbors) was contacted to clean-up the impacted storm catch basin and surrounding area. This event was reported to AEPA on March 30, 2022 by the company. A written report was issued to AEPA on April 1, 2022.	Reportable-3 rd Party Release	389116
08-Apr-22	14402-114 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NW district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for Chemical Oxygen Demand at 202 mg/L, Oil & Grease at 30 mg/L, Arsenic at 0.064 mg/L, Cadmium at 0.0103 mg/L, Chromium at 0,239 mg/L, Copper at 0.20 mg/L, Lead at 0.129 mg/L, Nickel at 0.189 mg/L and Zinc at 1.80 mg/L. The original sample from the NW district yard facility was collected on March 30, 2022 by COE Environmental Technologists. This release was reported to AEPA on April 8, 2022 by the City of Edmonton. A written report was issued to AEPA on April 15, 2022.	Reportable-3 rd Party Release	389427
08-Apr-22	13003-56 Street NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes	Reportable-3 rd Party	389426

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		Applicable to Storm Sewers and Watercourses" for Chemical Oxygen Demand at 662 mg/L, Oil & Grease at 35 mg/L, Cadmium at 0.0027 mg/L, Zinc at 0.40 mg/L and Total Chlorine at 0.07 mg/L. The original sample from the NE district yard facility was collected on March 30, 2022 by COE Environmental Technologists. This release was reported to AEPA on April 8, 2022 by the City of Edmonton. A written report was issued to AEPA on April 15, 2022.	Release	
08-Apr-22	5404- 59-Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) SE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for Chemical Oxygen Demand at 576 mg/L, Oil & Grease at 42 mg/L, Cadmium at 0.012 mg/L and Zinc at 0.76 mg/L. The original sample from the SE district yard facility was collected on March 30, 2022 by COE Environmental Technologists. This release was reported to AEPA on April 8, 2022 by the City of Edmonton. A written report was issued to AEPA on April 15, 2022.	Reportable-3 rd Party Release	389424
12-Apr-22	3191-141 Street SW	Untreated wastewater (unknown volume) was released into the storm collection system from the Chappelle business complex. EPCOR Drainage investigators observed that untreated wastewater was surcharging from a private sanitary manhole and was migrating into a nearby private storm catch basin. EPCOR equipment was mobilized to the site to release the blockage in the sanitary line and clean contaminants from the impacted storm collection system. Drainage investigators checked the storm line downstream to the Chappelle Facility #1 SWMF (SWM475564) and did not observe any evidence of sanitary wastewater in the facility pond. A Notice to Comply was issued to two restaurants in the business complex to clean and maintain their grease interceptors. A Notice to Comply was also issued to the owner of the business complex to discontinue the release of unpermitted waste into the storm sewerage system. This release was reported to AEPA on April 12, 2022. A written report was issued to AEPA on April 19, 2022.	Reportable-3 rd Party Release	389530
14-Apr-22	9351-105 Avenue NW	Potable water (unknown volume) was released into the combined collection system (MH262848) from a leaking fire hydrant near the City of Edmonton – Central District yard. The City of Edmonton contacted a 3 rd party vacuum truck to clean up the release site. There was no release of potable water to the storm collection system. This release was reported to AEPA on April 14, 2022 by the City of Edmonton. A written report was issued to AEPA on April 21, 2022.	Reportable-3 rd Party Release	389617
20-Apr-22	6545-99 Street NW	Sample results of the stormwater discharge from a business complex were received and reviewed by EPCOR Drainage Monitoring & Compliance. The results of the sample (E. coli = 9,700,000 CFU/100mL) collected on April 13 th confirmed that untreated wastewater was entering the storm collection system (MH478152) thru a cross-connection. EPCOR Drainage crews conducted dye tests and a CCTV inspection that identified that the cross-connection was located at a nearby food retail store (7-Eleven). The untreated wastewater from this cross-connection would have been released to Mill Creek Ravine South from Outfall 91A (OF229113). A Notice to Comply was issued to the property owner to identify and repair the cross-connection. This release was reported to AEPA on April 20, 2022. A written report was issued to AEPA on April 27, 2022.	Reportable-3 rd Party Release	389734
21-Apr-22	505-65 Avenue NW	Oil waste (unknown volume) was released from a private trucking company (Shan Construction Services Ltd). EPCOR Drainage investigators responded to a report from AEPA of used oil leaking from barrels onto the ground at this location. The investigators identified several barrels and totes of used oil on the property with black staining observed on the nearby ground and ditches. The company has cleaned up the contaminated soil as required. This area is not currently serviced by a storm / sanitary collection system. A Notice to Comply was issued to the company to discontinue the release of prohibited waste (used oil). The notice also requires the company to store prohibited waste in a manner that will ensure that no future releases will occur. The reference number (#389770) for this release was provided by AEPA. A written report was not required by AEPA.	Reportable-3 rd Party Release	389770
01-May-22	100-Creston Place NW	Untreated wastewater (approx. 200L) was released into the storm collection system by the Renew Carpet Care company. The company was using their vehicle to pump untreated wastewater from a collapsed sanitary line into a nearby storm catch basin (CB296983). EPCOR equipment was mobilized to the site and removed contaminants from the impacted catch basin. A Notice to Comply was issued to the company to discontinue the release of untreated wastewater into the storm collection system. This release was reported to AEPA on May 1, 2022 by the company. A written report was not required by AEPA.	Reportable-3 rd Party Release	390069
03-May-22	18711-106A Avenue NW	Potable water (approx. 2000L) was released into the storm collection system at the City of Edmonton – Fire Services Training Center. During training activities at their west end center, Fire Rescue Services had not dechlorinated the potable water used during their training exercises. A Notice to Comply was issued to the City of Edmonton to discontinue the release of other than permitted matter (chlorinated water) into the storm collection system. This release was reported to AEPA on May 3, 2022 by the City of Edmonton. A written report was issued to AEPA on May 10, 2022.	Reportable-3 rd Party Release	390158

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04-May-22	3428-99 Street NW	Untreated wastewater (unknown volume) was released into the storm collection system from a Parsons Place shopping center. Drainage investigators arrived on site and observed that a surcharging private sanitary manhole was releasing untreated wastewater into a nearby private storm catch basin. EPCOR equipment was mobilized to the site and released the blockage in the private sanitary line and removed contaminants from the impacted private catch basin and storm line. A Notice to Comply was issued to the property owner to discontinue the release of other than permitted matter (untreated wastewater) into the storm collection system. This release was reported to AEPA on May 4, 2022. A written report was issued to AEPA on May 11, 2022.	Reportable-3 rd Party Release	390218
09-May-22	14402-114 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NW district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for Total Chlorine at 0.16 mg/L. The original sample from the NW district yard facility was collected on April 28, 2022 by COE Environmental Technologists. This release was reported to AEPA on May 9, 2022 by the City of Edmonton. A written report was issued to AEPA on May 16, 2022.	Reportable-3 rd Party Release	390358
09-May-22	13003-56 Street NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for Chemical Oxygen Demand at 329 mg/L, Oil & Grease at 59 mg/L, Cadmium at 0.00086 mg/L, Zinc at 0.357 mg/L, Lead at 0.0304 mg/L, Total Phosphorous at 1.56 mg/L and Total Chlorine at 0.69 mg/L. The original sample from the NE district yard facility was collected on April 28, 2022 by COE Environmental Technologists. This release was reported to AEPA on May 9, 2022 by the City of Edmonton. A written report was issued to AEPA on May 16, 2022.	Reportable-3 rd Party Release	390357
09-May-22	5404-59 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) SE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for Chemical Oxygen Demand at 730 mg/L, Cadmium at 0.0063 mg/L and Total Phosphorous at 1.16 mg/L. The original sample from the SE district yard facility was collected on April 29, 2022 by COE Environmental Technologists. This release was reported to AEPA on May 9, 2022 by the City of Edmonton. A written report was issued to AEPA on May 16, 2022.	Reportable-3 rd Party Release	390356
10-May-22	112-Avenue & 120-Street NW	During an open-cut repair, a suspected hydrocarbon odor was detected by an EPCOR Contractor (Streamline Construction) at a Drainage worksite (PIP52005). A soil sample was collected and analyzed for hydrocarbon and BTEX contaminants. Laboratory results indicated that no contaminants were present in the excavated soil. This release was reported to AEPA on May 10, 2022 by the contractor. A written report was issued to AEPA on May 17, 2022.	Reportable-Internal	390406
11-May-22	11066-150 Street NW	Hydraulic fluid (approx. 10L) was released into a storm catch basin (CB254002) by a City of Edmonton contractor (Canadian Tree Care). The hydraulic fluid was contained within the catch basin sump and there was no release into the storm collection system. A 3 rd party vacuum truck (GFL Environmental) was called in to remove contaminants from the impacted catch basin. This release was reported to AEPA on May 11, 2022 by the City of Edmonton. A written report was issued to AEPA on May 16, 2022.	Reportable-3 rd Party Release	390435
18-May-22	14708-50 Street NW	A concrete slurry (approx. 5L) was released into a private storm catch basin by a 3 rd party contractor (E-Tech Contracting). The release was contained within the catch basin sump and a 3 rd party vacuum truck was called to the site to remove contaminants from the impacted catch basin. There was no release of concrete slurry to the storm / sanitary collection system. A Notice to Comply was issued to the contractor to discontinue the release of prohibited waste to the sewerage system. This release was reported to AEPA on May 18, 2022 by the contractor. A written report was issued to AEPA on May 20, 2022.	Reportable-3 rd Party Release	390709
19-May-22	111-Avenue & 97-Street NW	A fire retardant foam (approx. 5L) was released into a storm catch basin (CB265141) by a City of Edmonton – Fire Services truck. Rainfall released the foam into the downstream (combined sewer) drainage system. There was no release of firefighting foam to the storm collection system. This release was reported to AEPA on May 19, 2022 by the City of Edmonton. A written report was issued to AEPA on May 26, 2022.	Reportable-3 rd Party Release	390756
19-May-22	8745-165-Street NW	An emulsified oil (approx. 3L) was released into the storm collection system at the Meadowlark Village condo complex. EPCOR Drainage investigators observed that the oil had pooled in the parking lot of the complex and recent rainfall had released oil into a nearby private storm catch basin. A 3 rd party vacuum truck (GFL Environmental) was called in to remove contaminants from the parking lot and impacted catch basin. A Notice to Comply was issued to the property owner to discontinue the release of prohibited waste into the sewerage system. Investigators will conduct a follow-up investigation to determine the source of the release. This release was reported to AEPA on May 19, 2022. A written report was not required by AEPA.	Reportable-3 rd Party Release	390777

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19-May-22	4510-68 Avenue NW	Sample results of the stormwater discharge from a metal recycling company (Maple Leaf Metals) were received and reviewed by EPCOR Drainage Monitoring & Compliance. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for Chemical Oxygen Demand at 1630 mg/L, Cadmium at 0.00105 mg/L, Lead at 0.036 mg/L and Nickel at 0.123 mg/L. The original sample from the company was collected on May 11, 2022 by Drainage investigators. A Notice to Comply was issued to the company to discontinue the release of restricted waste into the storm sewer system. This release was reported to AEPA on May 20, 2022 by the company. A written report was issued to AEPA on April 27, 2022.	Reportable-3 rd Party Release	390790
26-May-22	Gateway Boulevard & Saskatchewan Drive NW	Untreated wastewater (approx. 17 cubic meters) was released from a combined sewer manhole (MH247804) surcharge. A portion of the flow from MH247804 travelled overland through Queen Elizabeth Park to the North Saskatchewan River (NSR). Upon confirming the release of untreated wastewater, additional EPCOR resources were mobilized to site. A shutdown of the pumps at the Walterdale Pump Station (PS171) was initiated. This shutdown stopped the flow of untreated wastewater to the downstream combined pipe and stopped the release of untreated wastewater from MH247804. Additional EPCOR equipment and personnel were also mobilized to the site and EPCOR has initiated/completed site remediation activities. This release was reported to AEPA on May 26, 2022. A written report was issued to AEPA on June 2, 2022.	Reportable-Internal	390975
26-May-22	14163-28 Avenue SW	Gasoline (approx. 50L) was released at a gas station (Co-Op). The gasoline had entered a nearby storm drain, but was contained within a private stormceptor. A 3 rd party vacuum truck (Nor-Alta Environmental Services) was called in to remove contaminants from the stormceptor and surrounding area. There was no release of gasoline to the storm / sanitary collection system. This release was reported to AEPA on May 26, 2022 by the gas station. A written report was not required by AEPA.	Reportable-3 rd Party Release	390950
27-May-22	Gateway Boulevard & Whitemud Drive NW	Hydraulic fluid (approx. 50L) was released into the storm collection system (MH314069) from a City of Edmonton contractor street sweeper. The hydraulic fluid was released into a storm catch basin and entered a downstream stormwater underground storage facility (SUT320936). A 3 rd party vacuum truck was called-in to remove contaminants from the roadway and impacted storm catch basin. EPCOR equipment was mobilized to the site to remove hydraulic fluid contaminants from the underground storage facility. This release was reported to AEPA May 27, 2022 by the City of Edmonton contractor. A written report was issued to AEPA on June 6, 2022.	Reportable-3 rd Party Release	390989
27-May-22	5945-168 Avenue NW	Antifreeze (approx. 1L) was released into a storm catch basin (CB461516) from a City of Edmonton garbage truck. The antifreeze was contained within the catch basin sump and was removed by an EPCOR vacuum truck. There was no release of antifreeze to the storm / sanitary collection system. This release was reported to AEPA on May 27, 2022 by the City of Edmonton. A written report was not required by AEPA.	Reportable-3 rd Party Release	391012
01-Jun-22	7640-144 Avenue NW	Untreated wastewater (unknown volume) was released into the storm collection system from the Londondale Shopping Centre. During routine system maintenance an EPCOR Drainage crew observed that a surcharging private sanitary manhole was releasing untreated wastewater into a nearby storm catch basin (CB295296). EPCOR equipment was used to release the blockage in the private sanitary line and removed contaminants from the impacted catch basin and storm line. A Notice to Comply was issued to the property management company to discontinue the release of prohibited waste into the sewerage system. This release was reported to AEPA on June 1, 2022. A written report was issued to AEPA on June 8, 2022.	Reportable-3 rd Party Release	391221
03-Jun-22	10030-115 Street NW	Potable water (approx. 102 cubic meters) was released into the combined sewer system at a Drainage Construction worksite. During an excavation at the worksite, the Construction crew struck a potable water line that was not accurately marked in the EPCOR mapping database (Geofit). Dechlorination pucks were put down to remove residual chlorine from the water. EPCOR Water responded to the utility strike, shut off the water and completed repairs to the damaged water line. This release was reported to AEPA on June 3, 2022 by EPCOR Water Services. A written report was issued to AEPA on June 6, 2022.	Reportable-Internal	391301
08-Jun-22	14402-114 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NW district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B Restricted Wastes Applicable to Storm Sewers and Watercourses for Total Chlorine at 0.23 mg/L and Cadmium at 0.0037 mg/L. The original sample from the NW district yard facility was collected on May 30, 2022 by COE Environmental Technologists. This release was reported to AEPA on June 8, 2022 by the City of Edmonton. A written report was issued to AEPA on June 15, 2022.	Reportable-3 rd Party Release	391426
08-Jun-22	13003-56 Street NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B Restricted Wastes Applicable to Storm Sewers and Watercourses for Cadmium at 0.0103 mg/L. The original sample from the NE district yard facility was collected on May 30, 2022 by COE Environmental Technologists. This release was reported to AEPA on June 8, 2022 by the City of Edmonton. A written report was issued to AEPA on June 15, 2022.	Reportable-3 rd Party Release	391425

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08-Jun-22	5404-59 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) SE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B Restricted Wastes Applicable to Storm Sewers and Watercourses for Chemical Oxygen Demand at 723 mg/L and Cadmium at 0.0078 mg/L. The original sample from the SE district yard facility was collected on May 30, 2022 by COE Environmental Technologists. This release was reported to AEPA on June 8, 2022 by the City of Edmonton. A written report was issued to AEPA on June 15, 2022.	Reportable-3 rd Party Release	391424
16-Jun-22	565-Griesbach Parade NW	Groundwater (approx. 5000L) was released into the storm collection system by a private contractor (Deveraux Developments). The contractor had requested a permit from EPCOR to discharge ground water / surface run-off from their worksite into the sanitary sewer system. A water sample that the contractor had submitted to EPCOR Drainage investigators had exceeded the Drainage Bylaw 19627 Appendix C guidelines for BOD at 550 mg/L, COD at 199 mg/L, Oil and Grease at 41 mg/L and Total Phosphorus at 1.06 mg/L. Based on these lab results, this water could not be released into the storm collection system. During an inspection of the contractor worksite, Drainage investigators observed that the contractor was pumping ground water into the storm collection system (MH419992). A Notice to Comply was issued to the contractor to ensure approval is obtained from EPCOR Drainage Operations prior to all future releases to the storm sewerage system. This release was reported to AEPA on June 16, 2022 by the contractor. A written report was issued to AEPA on June 16, 2022.	Reportable-3 rd Party Release	400332
22-Jun-22	86-Street & Jasper Avenue NW	Stormwater / untreated wastewater (approx. 429 cubic meters) was released into the North Saskatchewan River (NSR) from Outfall #54 (OF377189). The City of Edmonton experienced significant precipitation on June 22, 2022. A level sensor at the Real-Time Control #3 did not close a downstream gate (PW537) as expected. The resulting combined sewer flow exceeded the North Highland Interceptor capacity and resulted in combined sewer wastewater being released to the NSR. On June 23, 2022, EPCOR identified the issue with the gate at PW537 and restored the gate to regular operation. A repair of the gate at PW537 is expected to prevent this issue from reoccurring. The level sensing instruments, alarms and gate control operations are undergoing further evaluation. This release was reported to AEPA on June 23, 2022 by the Drainage Environmental Manager. A written report was issued to AEPA on June 30, 2022.	Reportable-Internal	400597
24-Jun-22	9253-48 Street NW	Untreated wastewater (unknown volume) was released into the storm collection system from The Citadel Center. EPCOR Drainage investigators observed that untreated wastewater was surcharging from a private sanitary manhole and was migrating into a nearby storm catch basin (CB249665). EPCOR equipment was mobilized to the site to release the blockage in the private sanitary line and clean contaminants from the impacted storm collection system. This release was reported to AEPA on June 25, 2022 by the property owner. A written report was issued to AEPA on August 2, 2022.	Reportable-3 rd Party Release	400647
26-Jun-22	519-89 Street SW	Paint / drywall wastewater (approx. 15L) was released into the storm collection system (CB393085) from a private residence. EPCOR Drainage investigators contacted a 3 rd party environmental company (GFL Environmental) to clean contaminants from the roadway and the impacted storm collection system. This release was reported to AEPA on June 27, 2022. A written report was not required by AEPA.	Reportable-3 rd Party Release	400706
27-Jun-22	519-89 Street SW	Paint wastewater (approx. 490L) was released into the storm collection system (CB393085) from a private residence. EPCOR Drainage investigators responded to a second report of a paint release at this location and observed a milky residue along the roadway and inside the storm catch basin. The homeowner contacted a 3 rd party environmental company (Hydrodig) to clean contaminants from the roadway and the impacted storm collection system. This clean-up was performed under the supervision of the Drainage investigators. A verbal notice was issued to the homeowner to discontinue the release of prohibited waste into the storm collection system. This release was reported to AEPA on June 27, 2022. A written report was not required by AEPA.	Reportable-3 rd Party Release	400734
29-Jun-22	13810-64 Street NW	Hydraulic fluid (approx. 200L) was released from a City of Edmonton – Waste Management truck. EPCOR Drainage investigators arrived on site and observed that hydraulic fluid had been released onto a nearby roadway and parking lot. The spill site was cleaned-up by the City of Edmonton. There was no release of hydraulic fluid to the storm collection system. This release was reported to AEPA on June 29, 2022 by the City of Edmonton. An email update was issued to AEPA by EPCOR Drainage on July 11, 2022.	Reportable-3 rd Party Release	400794
30-Jun-22	11319-163 Street NW	Diesel fuel (approx. 2L) was released into the storm collection system from a private tow truck (Rescue Towing Ltd). EPCOR Drainage investigators arrived on site and observed that diesel fuel had been released onto the roadway and had migrated into a nearby storm catch basin (CB255429). The towing company called in a 3 rd party vacuum truck to clean-up contaminants from the roadway and impacted catch basin. This release was reported to AEPA on June 30, 2022 by the towing company. A written report was not required by AEPA.	Reportable-3 rd Party Release	400861
04-Jul-22	100-Street & McDougall Hill NW	Untreated wastewater (approx. 17 cubic meters) was released to the ground from a combined sewer manhole (MH245306) surcharge. EPCOR equipment was mobilized to the site to release the blockage, flush the sewer line and restore the pipe to regular service. No untreated wastewater left the vicinity of the surcharge to enter the storm collection system and/or the North Saskatchewan River. This release was reported to AEPA on July 4, 2022. A written report was issued to AEPA on July 7, 2022.	Reportable-Internal	400961

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04-Jul-22	6809-36A Avenue NW	A concrete slurry (approx. 50L) was released onto a roadway by a cement company (Lafarge Canada). The company called in a 3 rd party street sweeper and vacuum truck to remove the concrete slurry from along the roadway. There was no release of concrete slurry to the storm / sanitary collection system. This release was reported to AEPA on July 4, 2022 by the cement company. A written report was issued to AEPA on July 6, 2022.	Reportable-3 rd Party Release	400962
04-Jul-22	11622-127 Avenue NW	Tac oil (approx. 50L) was released by a City of Edmonton contractor (Standard General Inc.). EPCOR Drainage investigators observed that most of the tac oil had adhered to the road surface and only a small amount (sheen) would have entered a nearby catch basin (CB273750). A 3 rd party vacuum truck was called in to remove any contaminants that may have entered nearby catch basins. The catch basins in this area are connected to the combined sewer system. There was no release of tac oil to the storm collection system. This release was reported to AEPA on July 4, 2022 by the City of Edmonton. A written report was not required by AEPA.	Reportable-3 rd Party Release	400965
09-Jul-22	3532-33 Avenue NW	A concrete slurry (approx. 5L) was released into the storm collection system (CB331329) by a private contractor (Ribbon Contracting). EPCOR Drainage investigators called in a 3 rd party vacuum truck (GFL Environmental) to remove contaminants from the impacted catch basin and nearby roadway. A Notice to Comply was issued to the contractor to discontinue the release of restricted wastes into the sewerage system. This release was reported to AEPA on July 9, 2022 by the City of Edmonton. A written report was issued to AEPA on July 15, 2022.	Reportable-3 rd Party Release	401162
12-Jul-22	16707-14 Street NE	Untreated wastewater (189 cubic meters) was released into the North Saskatchewan River (NSR) at the Regional Tunnel. The Regional Tunnel connects the City of Edmonton with the Alberta Capital Region Wastewater (ACRWC) plant and runs under the North Saskatchewan River (NSR). Currently, the south 750mm pipe in the tunnel conveys wastewater from North East Edmonton to the Alberta Capital Region Water Commission. The north pipe 750mm provides redundancy in case of a failure to the south pipe. The tunnels are designed to remove groundwater from infiltration by discharging that groundwater from a sump pump in the tunnels into the NSR. On July 8, 2022 due to a ROGER'S network outage, two level sensors that communicate to control the flow of untreated wastewater through the two 750mm pipes inside the Regional Tunnel (Station 901 & 902) went in to a standby state to store untreated wastewater in the tunnel and regulate downstream flow. Work is ongoing to review the control philosophy, control system and resulting hydraulic conditions related to determine any other adjustments that could potentially be made to optimize flow in the event of a ROGER'S network outage. EPCOR has completed an assessment of the Regional Tunnel and is completing an engineering assessment of the condition and operation of the north pipe to prevent future occurrences. This release was reported to AEPA on July 12, 2022 by the Drainage Environmental Manager. A written report was issued to AEPA on July 19, 2022.	Reportable-Internal	401267
12-Jul-22	5404-59 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) SE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B Restricted Wastes Applicable to Storm Sewers and Watercourses for Chemical Oxygen Demand at 358 mg/L & Cadmium at 0.0095 mg/L. The original sample from the SE district yard facility was collected on June 24, 2022 by COE Environmental Technologists. This release was reported to AEPA on July 12, 2022 by the City of Edmonton. A written report was issued to AEPA on July 18, 2022.	Reportable-3 rd Party Release	401208
12-Jul-22	13003-56 Street NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B Restricted Wastes Applicable to Storm Sewers and Watercourses for Cadmium at 0.0311 mg/L and E.coli at 17,000 CFU/100 mL. The original sample from the NE district yard facility was collected on June 24, 2022 by COE Environmental Technologists. This release was reported to AEPA on July 12, 2022 by the City of Edmonton. A written report was issued to AEPA on July 18, 2022.	Reportable-3 rd Party Release	401209
12-Jul-22	14402-114 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NW district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B Restricted Wastes Applicable to Storm Sewers and Watercourses for Chemical Oxygen Demand at 143 mg/L, E.coli at 310 CFU/100mL and Oil and grease at 18 mg/L. The original sample from the NW district yard facility was collected on June 24, 2022 by COE Environmental Technologists. This release was reported to AEPA on July 12, 2022 by the City of Edmonton. A written report was issued to AEPA on July 18, 2022.	Reportable-3 rd Party Release	401211
19-Jul-22	9815-42 Avenue NW	Sample results of the stormwater from a storm manhole (MH212492) were received and reviewed by EPCOR Drainage Monitoring & Compliance. The results of the sample (E. coli = 8,800,000 CFU/100mL) collected on June 19 th confirmed that untreated wastewater was entering the storm collection system thru a cross-connection. The untreated wastewater from this cross-connection would release to the North Saskatchewan River at Outfall# 9 (OF207873). EPCOR Drainage investigators will conduct an investigation to determine the source of the cross-connection by sampling upstream at 5 key locations to narrow down the particular sections of storm line in the service area.	Reportable-Internal	401580

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		Based on the analytical results, EPCOR will continue to investigate until the source of the cross-connection is identified. This release was reported to AEPA on July 19, 2022. A written report was issued to AEPA on July 25, 2022.		
22-Jul-22	22049-95B Avenue NW	Paint waste (approx. 20L) was released into the storm collection system (CB460734) from a residential property. EPCOR Drainage investigators called in a 3 rd party vacuum truck (GFL Environmental) to remove contaminants from the impacted storm collection system. A Notice to Comply was issued to the tenant of the property to discontinue the release of prohibited waste into the sewerage system. This release was reported to AEPA on July 22, 2022. A written report was issued to AEPA on July 27, 2022.	Reportable-3 rd Party Release	401761
22-Jul-22	1485-Welbourn Drive NW	A concrete slurry (approx. 5-50L) was released into the storm collection system (CB308015) by a cement company (Finished First Concrete Ltd). EPCOR Drainage investigators arrived on site and observed concrete residue along the roadway and in a nearby catch basin. The company called in a 3 rd party vacuum truck (Strathcona Excavating Ltd) to remove contaminants from the impacted catch basin and nearby roadway. A Notice to Comply was issued to the company to discontinue the release of prohibited waste into the sewerage system. This release was reported to AEPA on July 22, 2022 by the company. A written report was not required by AEPA.	Reportable-3 rd Party Release	401750
23-Jul-22	38-Avenue & 66-Street NW	Untreated wastewater (unknown volume) was released into the storm collection system from an EPCOR sanitary manhole surcharge. EPCOR Drainage investigators responded to the site and observed that a sanitary manhole (MH216795) was releasing untreated wastewater into a nearby storm catch basin (CB216868). EPCOR equipment was mobilized to the site and released the blockage (fats, oil and grease) in the sanitary line, removed contaminants from the impacted storm collection system and cleaned untreated wastewater from the nearby roadway. The untreated wastewater from this release would have entered the North Saskatchewan River at Outfall# 9 (OF207873). This release was reported to AEPA on July 23, 2022. A written report was issued to AEPA on July 28, 2022.	Reportable-Internal	401784
25-Jul-22	1636C-Kerr Road NW	Sample results of the stormwater from a storm manhole (MH416955) were received and reviewed by EPCOR Drainage Monitoring & Compliance. The results of the sample (E. coli = 1,100,000 CFU/100mL) collected on July 19 th confirmed that untreated wastewater was entering the storm collection system thru a cross-connection. A Notice to Comply was issued to the property management company for this location to identify and repair the cross-connection. This release was reported to AEPA on July 25, 2022. A written report was issued to AEPA on July 27, 2022.	Reportable-3 rd Party Release	401859
27-Jul-22	9625-58 Avenue NW	A chromic acid solution (approx. 700L) was released into the sanitary collection system (MH230852) by a metal plating company (Western Hard Chrome Plating Ltd). Due to age deterioration of a steel holding tank, a leak of chromic acid was released into a nearby floor drain. EPCOR Drainage investigators observed a heavy flow thru the EPCOR sanitary sewer lines at this location and the chromic acid solution would likely have reached the Gold Bar WWTP soon after the initial release. The company cleaned up the spill site within their facility and will be replacing the primary and secondary liner on the steel tank. The company will also have new flooring installed with advanced sealing technological material and have it sloped towards a self-contained sump. This release was reported to AEPA on July 27, 2022 by the company. A written report was issued to AEPA on July 28, 2022.	Reportable-3 rd Party Release	401927
04-Aug-22	10542-95 Street NW	Hydraulic fluid (approx. 1L) was released into a catch basin (CB264481) by a City of Edmonton vehicle. EPCOR Drainage investigators arrived on site and confirmed that hydraulic fluid had been released from the catch basin into the combined sewer system. The spill site was cleaned-up by the City of Edmonton using absorbent pads and sand. There was no release of hydraulic fluid to the storm collection system. This release was reported to AEPA on August 4, 2022 by the City of Edmonton. A written report was not required by AEPA.	Reportable-3 rd Party Release	402262
15-Aug-22	5404-59 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) SE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for Chemical Oxygen Demand at 382 mg/L, E.coli at 1200 CFU/100 mL and Cadmium at 0.0096 mg/L. The original sample from the SE district yard facility was collected on August 3, 2022 by COE Environmental Technologists. This release was reported to AEPA on August 15, 2022 by the City of Edmonton. A written report was issued to AEPA on August 22, 2022.	Reportable-3 rd Party Release	402707
16-Aug-22	3004-Grandville Drive NW	Tack oil (approx. 1L) was released into the storm collection system (CB561818) by a private contractor located at the Lewis Farms LRT project. EPCOR Drainage investigators arrived on site and observed that tack oil had migrated downstream to a storm manhole (MH561792). The contractor (Standard General Inc.) called in a 3 rd party vacuum truck to remove contaminants from the impacted storm collection system. A verbal Notice to Comply was issued to the contractor to discontinue the release of prohibited waste into the sewerage system. This release was reported to AEPA on August 16, 2022 by the contractor. A written report was not required by AEPA.	Reportable-3 rd Party Release	402766
17-Aug-22	13003-56 Street NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for Cadmium at 0.00257 mg/L and E.coli at 3300 CFU/100 mL. The original sample from	Reportable-3 rd Party Release	402828

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		the NE district yard facility was collected on August 5, 2022 by COE Environmental Technologists. This release was reported to AEPA on August 17, 2022 by the City of Edmonton. A written report was issued to AEPA on August 22, 2022.		
17-Aug-22	14402-114 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NW district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B "Restricted Wastes Applicable to Storm Sewers and Watercourses" for E.coli at 2700 CFU/100mL. The original sample from the NW district yard facility was collected on August 5, 2022 by COE Environmental Technologists. This release was reported to AEPA on August 17, 2022 by the City of Edmonton. A written report was issued to AEPA on August 22, 2022.	Reportable-3 rd Party Release	402827
19-Aug-22	109A-Avenue & 129-Street NW	Motor oil (approx. 5L) was released into a storm catch basin (CB346379) from an unknown source. EPCOR Drainage investigators confirmed that the oil was contained within the catch basin sump and a 3 rd party environmental company (GFL Environmental) was called-in to clean contaminants from the impacted catch basin. This release was reported to AEPA on August 19, 2022 by the City of Edmonton – Fire Services. A written report was not required by AEPA.	Reportable-3 rd Party Release	402918
19-Aug-22	2763-119A Street SW	Untreated wastewater (unknown volume) was released into the storm collection system from the Heritage Valley Town Complex. EPCOR Drainage investigators observed that untreated wastewater was surcharging from a private sanitary manhole and was migrating into a nearby private storm catch basin. The property manager for this complex called-in a 3 rd party vacuum truck to release the blockage in the private sanitary line and clean contaminants from the impacted storm collection system. A Notice to Comply was issued to the property manager to discontinue the release of prohibited waste (untreated wastewater) into the storm sewerage system. This release was reported to AEPA on August 19, 2022 by the property manager. A written report was issued to AEPA on August 25, 2022.	Reportable-3 rd Party Release	402940
21-Aug-22	13008-205 Street NW	Power steering fluid (approx. 5-10L) was released into a storm catch basin (CB487125) from a private vehicle. EPCOR Drainage investigators confirmed that the fluid was contained within the catch basin sump and a 3 rd party environmental company (GFL Environmental) was called-in to clean contaminants from the impacted catch basin. This release was reported to AEPA on August 21, 2022 by the City of Edmonton – Fire Services. AEPA has not requested a written report.	Reportable-3 rd Party Release	402972
24-Aug-22	6410-28 Avenue NW	Diesel fuel (approx. 0.5L) was released into a storm catch basin (CB382668) by a City of Edmonton - ETS bus. EPCOR Drainage investigators arrived on site and confirmed that the fuel was contained within the catch basin sump. The investigators used absorbent pads to remove contaminants from the catch basin and nearby roadway. There was no release of diesel fuel to the storm collection system. This release was reported to AEPA on August 24, 2022 by the City of Edmonton. AEPA has not requested a written report.	Reportable-3 rd Party Release	403146
26-Aug-22	11424-55 Avenue NW	A concrete slurry (approx. 5L) was released into the storm collection system (CB225181) by a private residence. The resident had also opened a sanitary manhole (MH224092) and was releasing concrete slurry directly into the sanitary sewer line. EPCOR Drainage equipment was mobilized to the site to remove contaminants from the impacted storm / sanitary collection systems. A Notice to Comply was issued to the resident to discontinue the release of prohibited waste (concrete and cement based products) into the sewerage system. The Notice also requires the resident to discontinue the removal of any manhole covers owned by EPCOR Water Services Inc. This release was reported to AEPA on August 26, 2022. AEPA has not requested a written report.	Reportable-3 rd Party Release	403333
29-Aug-22	10119-45 Avenue NW	EPCOR Drainage was notified by Labatt's Brewery that an anhydrous ammonia solution (approx. 37L) had been released into the sanitary collection system. The actual release occurred on August 21, 2022 and was reported to the EPCOR Gold Bar WWTP control room by the company. This release was reported to AEPA by the company. A written report was issued to AEPA on August 26, 2022.	Reportable-3 rd Party Release	402971
30-Aug-22	3703-161 Avenue NW	Paint waste (approx. 5L) was released into the storm collection system (CB403599). This release was reported to EPCOR Drainage investigators by an EPCOR Drainage Operations crew and the source of the release has not been determined. The investigators called in a 3 rd party environmental company (GFL Environmental) to remove contaminants from the impacted storm collection system. This release was reported to AEPA on August 30, 2022. AEPA has not requested a written report.	Reportable-3 rd Party Release	403535
30-Aug-22	10155-102 Street NW	Ethylene glycol (approx. 18,000L) was released into the combined sewer system from an office building (Commerce Place). During maintenance work inside the building, a coolant line was accidentally damaged resulting in a large release of ethylene glycol that flowed out of the building, down the street and into a nearby catch basin (CM264344). This area is serviced by a combined sewer system and there was no release of glycol to the storm collection system. This release was reported to AEPA on August 30, 2022 by the property manager. A written report was issued to AEPA on September 7, 2022.	Reportable-3 rd Party Release	403529
01-Sep-22	122-Avenue & 121A Street NW	Firefighting foam (unknown volume) was released by City of Edmonton – Fire Services from a vehicle accident. EPCOR Drainage investigators confirmed that the foam and small amounts of blackened material from the fire had not entered the storm collection system. The investigators used absorbent pads to remove contaminants from two small puddles along the roadway. This release was reported to AEPA on September 1, 2022 by the City of Edmonton – Fire Services. AEPA has not requested a written report.	Reportable-3 rd Party Release	403741

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14-Sep-22	9529-106 Avenue NW	Hydraulic fluid (approx. 1L) was released into a private catch basin at the City of Edmonton – Huffman Yard facility. EPCOR Drainage investigators observed that the hydraulic fluid was contained within the catch basin sump. The City of Edmonton called-in a 3 rd party vacuum truck to remove contaminants from the impacted catch basin. This area is serviced by a combined sewer system and there was no release of hydraulic fluid to the storm collection system. This release was reported to AEPA on September 14, 2022 by the City of Edmonton. AEPA has not requested a written report.	Reportable-3 rd Party Release	404343
14-Sep-22	7665-91 Avenue NW	Chlorinated water (unknown volume) was released from a fire hydrant that was hit by a City of Edmonton vehicle. EPCOR water was called to the location to shut off the potable water to the area and repair the damaged fire hydrant. This area is serviced by a combined sewer system and there was no release of chlorinated water to the storm collection system. This release was reported to AEPA on September 14, 2022 by the City of Edmonton. A written report was issued to AEPA on September 19, 2022.	Reportable-3 rd Party Release	404409
20-Sep-22	2909-113 Avenue NW	Roofing primer (approx. 1L) was released into a storm catch basin (CB271221) at the City of Edmonton – A.C.T Center. A contractor (Graham Construction) was working at the facility and reported that after working hours, a pail of the primer had dropped off the roof of the building. EPCOR Drainage investigators observed that the primer had migrated into the catch basin sump, but had not been released into the storm collection system. The contractor called-in a 3 rd party vacuum truck (McRae’s Environmental Services) to remove contaminants from the impacted catch basin and surrounding area. This release was reported to AEPA on September 21, 2022 by the contractor. AEPA has not requested a written report.	Reportable-3 rd Party Release	404614
30-Sep-22	437-Parsons Road SW	Diesel fuel (approx. 1L) was released into a private storm catch basin located at a business complex. EPCOR Drainage investigators observed that diesel fuel from a leaking pickup truck had spilled onto a parking lot and entered a nearby catch basin. The fuel was contained within the catch basin sump and had not been released into the storm collection system. The property manager for the complex called-in a 3 rd party vacuum truck to remove contaminants from the impacted catch basin and surrounding area. This release was reported to AEPA on September 30, 2022 by the City of Edmonton – Fire Services. A written report was issued to AEPA on October 4, 2022.	Reportable-3 rd Party Release	405014
03-Oct-22	5404-59 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) SE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B “Restricted Wastes Applicable to Storm Sewers and Watercourses” for Chemical Oxygen Demand at 240 mg/L and Cadmium at 0.0037 mg/L. The original sample from the SE district yard facility was collected on September 19, 2022 by COE Environmental Technologists. This release was reported to AEPA on October 3, 2022 by the City of Edmonton. A written report was issued to AEPA on October 10, 2022.	Reportable-3 rd Party Release	405118
03-Oct-22	14402-114 Avenue NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NW district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B “Restricted Wastes Applicable to Storm Sewers and Watercourses” for Chemical Oxygen Demand at 185 mg/L, E.coli at 18,000 CFU/100mL and Cadmium at 0.00065 mg/L. The original sample from the NW district yard facility was collected on September 19, 2022 by COE Environmental Technologists. This release was reported to AEPA on October 3, 2022 by the City of Edmonton. A written report was issued to AEPA on October 10, 2022.	Reportable-3 rd Party Release	405120
03-Oct-22	13003-56 Street NW	Sample results of the stormwater discharge from the City of Edmonton (COE) NE district yard facility were received and reviewed by COE Engineering Services. The results of the sample exceeded Bylaw 19627 Appendix C and Bylaw 18093 Schedule B “Restricted Wastes Applicable to Storm Sewers and Watercourses” for Chemical Oxygen Demand at 218 mg/L, E.coli at 26,000 CFU/100 mL, Cadmium at 0.00208 mg/L and Oil & Grease at 16 mg/L. The original sample from the NE district yard facility was collected on September 19, 2022 by COE Environmental Technologists. This release was reported to AEPA on October 3, 2022 by the City of Edmonton. A written report was issued to AEPA on October 10, 2022.	Reportable-3 rd Party Release	405119
06-Oct-22	10204-127 Avenue NW	Fats, oil and grease (approx. 1L) were released into the storm collection system (MH277329) by the Root of Beirut restaurant. EPCOR Drainage investigators observed material in a private catch basin, which appeared to be waste from a grease interceptor. EPCOR equipment was mobilized to the site to clean contaminants from the impacted storm collection system. A Notice to Comply was issued to the restaurant to clean and maintain their grease interceptor on a regular basis. This release was reported to AEPA on October 06, 2022. A written report was issued to AEPA on October 17, 2022.	Reportable-3 rd Party Release	405308
14-Oct-22	10525-108 Street NW	During an excavation at a Drainage worksite by an EPCOR contractor (Norellco Contracting Ltd), a possible hydrocarbon odor was detected. The soil was stockpiled and a sample was collected for laboratory analysis. The lab results confirmed there was no exceedance of regulatory limits. The excavated soil was taken to Norstar Industries (12204-170 Street NW) for disposal. This release was reported to AEPA on October 24, 2022 by the contractor. A written report was issued to AEPA on October 31, 2022.	Reportable-Internal	406040

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20-Oct-22	105-Avenue & 184-Street NW	A concrete slurry (approx. 10L) was released into the storm collection system (CB464981) by a private contractor (DeFord Contracting Ltd.). A 3 rd party vacuum truck (Alta Vac Services Ltd.) was called-in to remove contaminants from the impacted catch basin and nearby roadway. This release was reported to AEPA on October 20, 2022 by the contractor. AEPA has not requested a written report.	Reportable-3 rd Party Release	405899
22-Oct-22	9325-84 Avenue NW	Untreated wastewater (approx. 4 cubic meters) was released to the ground from a combined sewer manhole (MH245306) surcharge located in the Mill Creek ravine. EPCOR equipment was mobilized to the site to release the blockage (leaves/sticks/rags), flush the sewer line and restore the pipe to regular service. No untreated wastewater left the vicinity of the surcharge to enter the storm collection system or Mill Creek. This release was reported to AEPA on October 22, 2022. A written report was issued to AEPA on October 28, 2022.	Reportable-Internal	405987
23-Oct-22	14402-114 Avenue NW	A calcium chloride solution (approx. 400L) was released into a private storm manhole located at the City of Edmonton – NW District Yard. The City of Edmonton called-in a 3 rd party vacuum truck (GFL Environmental) to remove contaminants from the impacted sewer system and surrounding areas. The storm lines in this area release (downstream) into the combined sewer system and there was no release of calcium chloride to the storm collection system. This release was reported to AEPA on October 23, 2022 by City of Edmonton. A written report was issued to AEPA on October 31, 2022.	Reportable-3 rd Party Release	405999
24-Oct-22	9310-211 Street NW	Sample results of the stormwater from private storm manholes located at the Lewis Estates Seniors Facility were received and reviewed by EPCOR Drainage Monitoring & Compliance. The results of the samples (E. coli = 90,000,000 & 120,000,000 CFU/100mL) collected on September 19 th confirmed that untreated wastewater was entering the storm collection system thru a cross-connection. The untreated wastewater from this cross-connection would release into the Webber Greens Storm Facility #1 (SWM466400). A Notice to Comply was issued to the senior's facility to discontinue the release of restricted waste into the storm sewerage system. The Notice also requires the facility to identify, locate and repair the cross-connection that is discharging untreated wastewater into the storm sewerage system. This release was reported to AEPA on October 24, 2022. A written report was issued to AEPA on November 3, 2022.	Reportable-3 rd Party Release	406146
25-Oct-22	North of Hooke Road NW	During rehabilitation work on storm Outfall #88 (OF288009), an EPCOR contractor's (Whitson Contracting) turbidity monitor observed a turbidity exceedance downstream of the work site. In-stream activities by the contractor were ceased until the next day after a sediment fence, filter cloth and sandbag berm were installed on the upstream and downstream limits of the work area. It was concluded that the high turbidity was caused by wildlife activity (muskrats) within the channel and work area. This release was reported to AEPA on October 25, 2022 by the contractor. A written report was issued to AEPA on October 31, 2022.	Reportable-Internal	406086
28-Oct-22	1310-Potters Green Drive NW	An Alberta Environment and Parks (AEPA) - Fish and Wildlife team investigated the Potter Greens #1 East (SWM309151) and Potter Greens #2 West (SWM306499) stormwater management facilities for the presence of invasive species. Their investigation involved setting three nets on October 27, 2022 for an overnight catch. The AEPA team came back on the morning of October 28th and pulled out the nets and confirmed the presence of invasive species (goldfish) at both stormwater management facilities. EPCOR Drainage Services has contacted AEPA to discuss follow-up actions.	Reportable-Internal	N/A
07-Nov-22	13003-56 Street NW	A release of hydraulic fluid (approx. 5-50L) from a City of Edmonton sanding truck was reported to EPCOR Drainage. The original release occurred on November 3, 2022 when a sanding truck began leaking hydraulic oil at the City of Edmonton - Northeast Yard. This leak was not noticed until the truck reached the intersection of 167-Avenue NW and 18-Street NW. The City of Edmonton cleaned the hydraulic fluid release from the roadway. Due to recent snowfall, EPCOR Drainage investigators were not able to observe if any hydraulic fluid was released into nearby roadway ditches or the storm collection system. This release was reported to AEPA on November 3, 2022 by the City of Edmonton. A written report was issued to AEPA on November 10, 2022.	Reportable-3 rd Party Release	406442
15-Nov-22	North of Hooke Road NW	During rehabilitation work on storm Outfall #88 (OF288009), an EPCOR contractor (Whitson Contracting) observed turbid water coming from a sediment bag at the end of a discharge hose. Pumping activity at this site was temporarily stopped while the sediment bag was secured back onto the discharge hose. This release was reported to AEPA on November 15, 2022 by the contractor. A written report was issued to AEPA on November 18, 2022.	Reportable-Internal	406778
15-Nov-22	11204-48 Avenue NW	Results of a stormwater sample collected on November 10 th from a storm manhole (MH210778) were received by EPCOR Drainage investigators. The analytical results of the sample (E. coli at 22,000,000 CFU/100ml) indicated a sanitary cross-connection into the storm collection system. Further investigations are ongoing to determine the source of the cross-connections. Investigators will dye test suspected residences in the area to confirm which ones have a sanitary / storm cross connection. Residences that have a confirmed cross-connection will be issued a Notice to Comply to correct any untreated wastewater discharge to the storm collection system. This release was reported to AEPA on November 15, 2022. A written report was issued to AEPA on November 23, 2022.	Reportable-3 rd Party Release	406815
17-Nov-22	13880-110A Avenue NW	Results of stormwater samples collected on November 15 th from storm manholes located in the North Glenora neighborhood were received by EPCOR Drainage investigators. The E. coli results of the samples (MH257970 at 2,100,000 CFU/100 mL & MH257972 at 39,000 CFU/100	Reportable-3 rd Party	406859

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		mL) indicated a possible sanitary cross-connection into the storm collection system. Further investigations are ongoing to determine the source of any cross-connections. Investigators will dye test suspected residences in the area to confirm if any have a sanitary / storm cross connection. Residences that have a confirmed cross-connection will be issued a Notice to Comply to correct any untreated wastewater discharge to the storm collection system. This release was reported to AEPA on November 17, 2022. A written report was issued to AEPA on November 24, 2022.	Release	
21-Nov-22	68-Marlboro Road NW	Results of a stormwater sample collected on November 15 th from a storm manhole (MH209510) located in the Westbrook Estates neighborhood were received by EPCOR Drainage investigators. The analytical results of the sample (E. coli at 5,900,000 CFU/100 mL) indicated a sanitary cross-connection into the storm collection system. Further investigation of the storm sewer lines in the area has determined that there is potentially one residence at 132 Fairway Drive NW that has their sanitary wastewater cross connected into the storm sewer on the private side of the connection to EPCOR's system. Investigators will dye test the suspected residence to confirm a sanitary / storm cross connection. Once the cross-connection has been confirmed, a Notice to Comply will be issued to correct the untreated wastewater discharge to the storm collection system. This release was reported to AEPA on November 21, 2022. A written report was issued to AEPA on November 28, 2022.	Reportable-3 rd Party Release	406962
22-Nov-22	2304-24 Street NW	Results of a stormwater sample collected on November 14 th from a private storm manhole located at the Market at the Meadows business complex were received by EPCOR Drainage investigators. The analytical results of the sample (E. coli at 10,000,000 CFU/100 mL) indicated a sanitary cross-connection into the storm collection system. A sample was also taken from the receiving EPCOR storm manhole (MH412498) on November 18 th (E.coli at 24,000,000 CFU/100mL). EPCOR Monitoring & Compliance staff were instructed to sample the Silver Berry # 2 SWMF (SWM401009). No sample was obtained as the SWMF was frozen over, therefore sampling will occur once the ice thaw. Once the cross-connection at the business complex has been confirmed, a Notice to Comply will be issued to the property owner to correct the untreated wastewater discharge to the storm collection system. This release was reported to AEPA on November 22, 2022. A written report was issued to AEPA on November 29, 2022.	Reportable-3 rd Party Release	406991
24-Nov-22	North of Hooke Road NW	During rehabilitation work on storm Outfall #88 (OF288009), an EPCOR contractor (Whitson Contracting) observed turbid water coming from a sediment bag at the end of a discharge hose. Pumping activity at this site was temporarily stopped while the cause of the turbidity was investigated. The turbidity may be due to a very fine clay subgrade layer that the sediment bags are not able to capture. The contractor has initiated procedures to control the turbidity at the worksite, including frequent replacement of sediment bags, erecting silt fences and discharging onto a vegetated area. This release was reported to AEPA on November 24, 2022 by the contractor. A written report was issued to AEPA on November 29, 2022.	Reportable-Internal	407066
30-Nov-22	88B-Avenue & 159-Street NW	Results of a stormwater sample collected on November 28 th from a storm manhole (MH237320) located in the Meadowlark Park neighborhood were received by EPCOR Drainage investigators. The analytical results of the sample (E.coli at 1,800,000 CFU/100mL) indicated a sanitary cross-connection into the storm collection system. Further investigations are ongoing to determine the source of any cross-connections. Investigators will dye test suspected residences in the area to confirm if any have a sanitary / storm cross connection. Residences that have a confirmed cross-connection will be issued a Notice to Comply to correct any untreated wastewater discharge to the storm collection system. This release was reported to AEPA on November 30, 2022. A written report was issued to AEPA on December 7, 2022.	Reportable-3 rd Party Release	407259
01-Dec-22	8750-53 Avenue NW	Ethylene glycol (approx. 500L) was released into a private storm catch basin at Di-Corp. The spill occurred when a stack of totes at the site toppled over and released the glycol. EPCOR Drainage investigators observed that the glycol was contained within private catch basins at the facility and there was no release of glycol into the EPCOR storm collection system. A 3 rd party environmental company was mobilized to the site to remove contaminants from the impacted catch basins and surrounding area. This release was reported to AEPA on December 1, 2022 by the company. A written report was issued to AEPA on December 2, 2022.	Reportable-3 rd Party Release	407320
06-Dec-22	12326-111 Avenue NW	Gasoline (approx. 40L) was released into a private storm catch basin at a Petro-Canada service station. The release occurred during the refueling of a Southland Transportation bus. EPCOR Drainage investigators confirmed that the gasoline was contained within a private catch basin at the station and there was no release of gasoline into the EPCOR storm collection system. A 3 rd party vacuum truck was called to the site to remove contaminants from the impacted catch basin and surrounding areas. A Notice to Comply was issued to the transportation company to discontinue the release of prohibited waste into the sewerage system. This release was reported to AEPA on December 6, 2022 by the transportation company. A written report was issued to AEPA on December 9, 2022.	Reportable-3 rd Party Release	407425
13-Dec-22	173-Avenue & 105-Street NW	Sample results of the stormwater from a storm manhole (MH302615) located at the Baturyn neighborhood were received and reviewed by EPCOR Drainage Monitoring & Compliance. The results of the sample (E. coli = 1,700,000 CFU/100mL) collected on December 8 th	Reportable-3 rd Party	407711

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		confirmed that untreated wastewater was entering the storm collection system thru a cross-connection. The untreated wastewater from this cross-connection would release into the Beaumaris Storm Facility (SWM378188). A cross-connection at a private residence (17335-105 Street NW) was identified by EPCOR Drainage Investigators. EPCOR is in the process of scheduling additional testing at the residence to further confirm the location of the cross connection. If an issue with this private service is confirmed, EPCOR will issue a Notice to Comply with those private customers who must then make repairs to their plumbing to stop the release of untreated wastewater. This release was reported to AEPA on December 14, 2022. A written report was issued to AEPA on December 21, 2022.	Release	
15-Dec-22	76-Avenue & 150-Street NW	Sample results of the stormwater from a storm manhole (MH222587) located at the Rio Terrace neighborhood were received and reviewed by EPCOR Drainage Monitoring & Compliance. The results of the sample (E. coli = 13,000,000 CFU/100mL) collected on December 8 th confirmed that untreated wastewater was entering the storm collection system thru a cross-connection. The untreated wastewater from this cross-connection would release thru Outfall #15 (OF223494). EPCOR televised both the storm and sanitary collection systems in the area of concern. Visual evidence was observed of possible customer cross connections at 3 private residences located at 7611A-150 Street NW, 7611B-150 Street NW and 15006-77 Avenue NW. EPCOR is in the process of scheduling additional testing at these residences to further confirm the location of the cross connection(s). If an issue with these private services is confirmed, EPCOR will issue a Notice to Comply with those private customers who must then make repairs to their plumbing to stop the release of untreated wastewater. During televising, it was also discovered that a sanitary service line from a private residence at 15002-77 Avenue NW had caused damage to an EPCOR's storm line (PIP70054). This sanitary service may be leaking untreated wastewater into the storm line at this location. An emergency spot repair was initiated by EPCOR on December 20 th . This release was reported to AEPA on December 15, 2022. A written report was issued to AEPA on December 22, 2022.	Reportable-3 rd Party Release	407774
24-Dec-22	North end of 231 Street NW	Untreated wastewater (unknown volume) was released into the storm collection system from an Alberta Capital Region sanitary line (PIP467008). A mechanical failure in the sanitary forcemain coming from the Parkland Private Pump Station #10 (PS467009) released the untreated wastewater into Big Lake thru Outfall #118 (OF417466). EPCOR vacuum trucks were temporarily used to divert the untreated wastewater from the Alberta Capital Region sanitary line into an EPCOR sanitary manhole (MH497161). The use of EPCOR vacuum trucks remained in place until a bypass was set-up by a 3 rd party company (Rocor Services) on December 28 th . This release was reported to AEPA on December 24, 2022 by the Alberta Capital Region Wastewater Commission. A written report was issued to AEPA on December 31, 2022.	Reportable-3 rd Party Release	408027

Table 11 Summary - 2022 Operational Issues by Month

(Total annual = 104)

