



EDWARDSBURGH CARDINAL

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Cardinal WWTP Annual Report 2019

Prepared By: Environmental Services

Township of Edwardsburgh Cardinal

Date: February 18th, 2020

Executive

Summary

The operation and maintenance of this facility was within the design and effluent criteria set forth in ECA

Approval #

3-0341-94-957

The facility is normally staffed with a licensed operator Monday thru Friday, with walkthrough inspections performed twice daily, by the rotational on-call operator, during

weekends and holidays. The facility is monitored 24/7 and security company dispatches on-call operator via pager to respond to alarms and residential concerns.



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Staffing and Licensing

The table below lists the licensed operational staff at the end of the 2019 calendar year.

NAME	POSITION	LICENCE #	TYPE	CLASS
Dave Grant	CAO	10410	WWT	III
		12743	WWC	II
Gord Shaw	Director of Operations	58944	WWT	III
		78208	WWC	II
Eric Wemerman	Chief Operator	64873	WWT	II
		80295	WWC	II
Aaron Campbell	Assistant Chief Operator	81927	WWT	II
		96033	WWC	II
Stephen Campbell	Operator	18529	WWT	II
		76515	WWC	II
Mark Simzer	Operator	93002	WWT	II
		104866	WWC	II
Wayne Lefebvre	Public Works Operator	17953	WWC	I

Tabulation of Monitoring Data

Effluent quality obtained leaving the facility met or was better than the effluent objectives set forth in Condition 6 of the Certificate of Approval. A summary of annual concentrations and loadings versus objectives and compliance can be found in Appendix A of this report.

There were no occurrences of non-compliance with respect to Condition 7, 8,9 or 10 of the Certificate of Approval as demonstrated in Appendix A, B and C of this report.

Summary of Maintenance

The majority of routine and scheduled maintenance was performed based on maintenance and lubrication schedules developed by the design consultants and reviewed and modified by operations staff as needed.

Other maintenance and projects included:

- UV Service/Maintenance Contract performed annually by H2Flow.
- Gal Power Service Agreement service and bi-annual maintenance of generators.
- Black & McDonald Service Agreement for quarterly boiler maintenance.
- Replaced SBR blower intake filters.
- Repaired Vessel 2 foam cutter.
- Replaced mechanical seal in Vessel 2 Discflow pump.
- Replaced check valves in ATAD Pipework.
- Repaired leak in ATAD Pipework.
- Replaced timer and solenoid switch on bar screen.
- Repaired roof leaks at the Cardinal Sewage Treatment Plant.
- Replaced Trojan 3000B UV bulbs.
- Replaced Biofilter effluent pump motor.
- Relined sewer main on Marjorie Street (Capital Project).
- Adelaide dry well project (Capital Project)
- Sewer main flushing.
- Installed sump pump in Adelaide St Dry well.
- Replaced level regulator (float) on decanter # 1.
- Falcon Security replaced transceiver in radio communication box.
- Repaired leak on 4 inch non potable water line in sewage plant.
- Repaired leak on boiler system.
- Replaced pressure relief valves on all boilers.
- Replaced temperature sensor in Air Handler Unit # 1.
- Replaced air handler vent hood on roof.
- Installed new starter on blower.
- Installed security camera system around perimeter of sewage plant.
- New pipework installed on biofilter effluent pump.
- Installed new pump and starter relay switch at Flett St. Pumping Station.
- Replaced variable speed drive on decanter # 1.

Operational Problems

Problem: Sewer Lateral Stoppages (6)

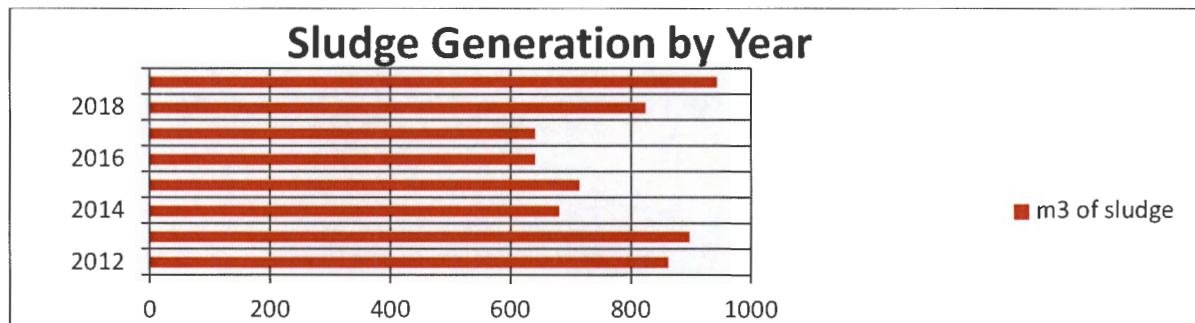
In 2019 the Township received complaints for 6 sewage lateral stoppages/back-ups. All stoppages were investigated, addressed and those originating from Township properties were remediated by Township staff or by utilizing a combination of methods and resources to clear the obstructions and restore service of the laterals.

Problem: Sink Hole (1)

June 26th, 2019- Sink hole developed by a new sewer manhole at the corner of Walker and County Rd 2 in Cardinal. Cornwall Gravel repaired.

Sludge Generation and Removal

The total amount of sludge generated and removed by 3rd High Farms in 2019 was 943 cubic meters. This represents a 14% increase compared to 2018. Based on short-term population growth projections, it is anticipated that sludge generation will remain relatively consistent from 2019 into 2020 depending on the rate of development the Village of Cardinal undergoes.



Currently, waste activated sludge is removed daily from the sequential batch reactors and placed into an un-thickened holding tank. A gravity belt thickener is utilized 2 to 3 times per week to thicken the sludge. The thickened sludge is processed into a holding tank. The sludge is then batch treated, (2 to 3 times per week), through the auto-thermophilic aerobic digesters, (ATADs), and placed into the land application holding tank. The digested sludge is hauled away by Third High Farms and applied to a licensed land application site under Provisional Certificate of Approval # H480300 and Approval of Amended NASM Plan – 23296 under regulation 267/03.

Calibration and Maintenance Procedures

The calibration and maintenance intervals utilized at this facility seem sufficient to maintain equipment and instrumentation in good working order.

Evaluation of Performance and Reliability

The facility is being operated and maintained in efforts to produce the high-quality effluent that is demonstrated by the overall results achieved in 2019. Extraneous flows are an issue and will continue to be for the foreseeable future. These flows are being addressed through a sanitary sewer relining projects and through sewage utility replacement such as the Walker St. rehabilitation project. In 2019, approximately 260 meters of 250mm main on Marjorie Street in Cardinal was relined. Regular assessment and striving for improvement will endeavor to ensure continued high performance, efficiency and reliability of this facility.

Appendices

Appendix A – Annual Monitoring & Performance Report

Appendix B – Monthly Average Effluent Concentrations and Loadings

Appendix C – Sludge Processing Performance Summary

Appendix D – Monthly Average Effluent Loadings

Appendix E - ATAD Performance Summary

Appendix A

CARDINAL WASTEWATER TREATMENT FACILITY

ANNUAL MONITORING & PERFORMANCE REPORT

Period Covered : from 1-Jan to 31-Dec 2019

Average Daily Flow for Period = 914 m³/d

Annual Average Effluent Concentrations & Loadings

"Annual average concentration" means the arithmetic mean of the monthly average concentrations of a contaminant in the effluent calculated for a particular calendar year.

"Annual average loading" means the value obtained by multiplying the annual average concentration of a contaminant by the average daily flow over the same calendar year.

ANNUAL AVERAGE EFFLUENT CONCENTRATIONS

<u>Parameters</u>	<u>Units</u>	<u>Objectives</u>	<u>Compliance</u>	<u>Actual</u>
BOD ₅	mg/L	15.0	25.0	3.02
Suspended Solids	mg/L	15.0	25.0	3.28
Total Phosphorus	mg/L	<1.0	1.0	0.09
Am & Am Nitrogen	mg/L	4.0		0.19
E. Coli		<200/100 ml		4.33
CBOD	mg/L	15.0		3.00

ANNUAL AVERAGE EFFLUENT LOADING

CBOD	kg/d	36		2.7
BOD ₅	kg/d	36	61	2.8
Suspended Solids	kg/d	36	61	3.0
Total Phosphorus	kg/d	<2.4	2.4	0.1
Am & Am Nitrogen	kg/d	9.8		0.2

CARDINAL WASTEWATER TREATMENT FACILITY

Municipality: Cardinal				Year: 2019				Receiving Water: St. Lawrence River				Design Capacity: Peak Hourly Flow = 8900 m ³ /day				Descriptor: Sequential Batch Reactor with Autoheated Thermophilic Aerobic Digestion				Annual Average Daily Flow = 2438 m ³ /day			
MONTH	FLOWS			BIOCHEMICAL O ₂ DEMAND			SUSPENDED SOLIDS			PHOSPHORUS			AMMONIA			CBOD							
	TOTAL FLOWS	AVG DAY FLOWS	MAX DAY FLOWS	AVE RAW BOD	AVE EFF BOD	PERCENT REMOVAL	AVG RAW SS	AVG EFF SS	PERCENT REMOVAL	AVG RAW PHOS.	AVG EFF PHOS.	PERCENT REMOVAL	AVG RAW AMM.	AVG EFF AMM.	PERCENT REMOVAL	AVG RAW CBOD	AVG EFF CBOD	PERCENT REMOVAL					
	m ³	m ³	m ³	(mg/L)	(mg/L)	%	(mg/L)	(mg/L)	%	(mg/L)	(mg/L)	%	(mg/L)	(mg/L)	%	(mg/L)	(mg/L)	%					
JAN	19009	613	1173	76	3.2	96%	77	4.2	95%	2.27	0.05	98%	14.29	0.08	99%	61.40	3.00	95%					
FEB	14443	516	869	86	3.00	97%	101	3.0	97%	3.06	0.07	98%	19.03	0.17	99%	69.50	3.00	96%					
MAR	38451	1240	3396	48	3.00	94%	51	3.5	93%	1.42	0.07	95%	12.05	0.13	99%	43.25	3.00	93%					
APR	63629	2121	4837	22	3.20	85%	62	3.4	95%	0.96	0.11	88%	9.49	0.76	92%	12.40	3.00	76%					
MAY	43610	1407	1801	23	3.00	87%	26	3.0	89%	2.60	0.06	98%	7.16	0.10	99%	17.00	3.00	82%					
JUN	29459	982	1587	37	3.00	92%	43	3.0	93%	1.66	0.08	95%	26.54	0.12	100%	31.25	3.00	90%					
JUL	20045	647	800	58	3.00	95%	68	4.0	94%	1.98	0.22	89%	17.24	0.17	99%	48.20	3.00	94%					
AUG	13630	440	624	98	3.00	97%	94	3.3	97%	2.90	0.06	99%	24.88	0.14	99%	89.25	3.00	97%					
SEP	13760	459	600	61	3.00	95%	89	3.0	97%	2.66	0.09	99%	22.62	0.14	99%	58.80	3.00	95%					
OCT	17814	575	1836	72	3.00	96%	80	3.0	96%	2.71	0.08	97%	20.16	0.26	99%	61.00	3.00	95%					
NOV	33348	1112	3168	33	3.00	91%	57	3.0	95%	1.35	0.08	94%	11.19	0.12	99%	32.00	3.00	91%					
DEC	26482	854	1374	49	3.00	94%	77	3.0	96%	1.65	0.08	95%	13.46	0.07	100%	37.40	3.00	92%					
TOTAL AVERAGE	333680	914	4837	55	3.0	93%	69	3.3	95%	2.10	0.09	95%	16.5	0.19	99%	46.8	3.00	91%					
MAXIMUM CRITERIA				97.75	3.2		101	4.2		3	0.22		26.5	0.76		89.3	3.00						
					25.0			25.0			1.00			15			15						

CARDINAL WASTEWATER TREATMENT FACILITY

SLUDGE PROCESSING PERFORMANCE SUMMARY										
YEAR: 2019										
MONTH	WASTE ACTIVATED SLUDGE	THICKENED WASTE ACTIVATED SLUDGE			DIGESTED SLUDGE			VOLATILE SOLIDS	REACTOR TEMP.	
	VOL. m ³	Vol. m ³	TS %	VS %	Vol. m ³	TS %	VS %	Reduction %	R1 °C	R2 °C
JAN	222.00	63.4	4.58	64.4	82.5	3.73	56.4	29%	29.1	51.8
FEB	183.38	52.6	4.32	67.6	70.4	3.59	56.6	30%	31.0	51.6
MAR	234.67	51.7	4.42	67.6	70.8	3.75	59.0	26%	33.0	52.8
APR	184.90	51.5	4.72	66.9	71.0	3.70	58.3	32%	33.3	51.7
MAY	102.34	32.5	4.81	62.3	42.4	3.56	55.7	34%	42.4	47.7
JUN	84.10	28.4	4.84	64.4	36.6	3.00	52.3	50%	53.8	46.8
JULY	99.41	40.4	4.63	57.2	50.5	3.20	49.7	40%	54.7	53.5
AUG	167.87	51.3	3.90	61.3	64.3	3.45	51.7	25%	46.8	58.3
SEP	281.87	74.7	4.25	59.0	99.6	3.41	52.9	28%	40.2	61.0
OCT	171.47	42.8	4.43	64.5	46.2	3.49	55.0	33%	40.2	56.5
NOV	174.77	46.6	4.06	63.6	47.2	3.84	51.7	23%	37.5	47.5
DEC	215.20	50.9	4.06	63.6	60.0	3.92	52.0	21%	33.9	47.6
Total	2121.98	586.7			741.5					
Avg.	176.83	48.89	4.42	63.54	61.79	3.55	54.29	31%	39.66	52.24

Appendix D

CARDINAL WASTEWATER TREATMENT FACILITY

Year: 2019

MONTHLY AVERAGE CONCENTRATIONS

		MONTHLY		MONTHLY		MONTHLY
	BOD5	COMPLIANCE	SS	COMPLIANCE	TOT. PHOS	COMPLIANCE
MONTH	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
JANUARY	3	35	4.2	35	0.05	1
FEBUARY	3	35	3	35	0.07	1
MARCH	3	35	3.5	35	0.07	1
APRIL	3	35	3.4	35	0.11	1
MAY	3	35	3	35	0.06	1
JUNE	3	35	3	35	0.08	1
JULY	3	35	4	35	0.22	1
AUGUST	3	35	3.25	35	0.06	1
SEPTEMBER	3	35	3	35	0.09	1
OCTOBER	3	35	3	35	0.08	1
NOVEMBER	3	35	3	35	0.08	1
DECEMBER	3	35	3	35	0.08	1

MONTHLY AVERAGE LOADINGS

		MONTHLY		MONTHLY		MONTHLY
	BOD5	COMPLIANCE	SS	COMPLIANCE	TOT. PHOS	COMPLIANCE
MONTH	kg/d	kg/d	kg/d	kg/d	kg/d	kg/d
JANUARY	1.96	85.3	2.58	85.3	0.03	2.4
FEBUARY	1.55	85.3	1.55	85.3	0.03	2.4
MARCH	3.72	85.3	4.34	85.3	0.1	2.4
APRIL	6.36	85.3	7.21	85.3	0.2	2.4
MAY	4.22	85.3	4.22	85.3	0.1	2.4
JUNE	2.95	85.3	2.95	85.3	0.1	2.4
JULY	1.94	85.3	2.59	85.3	0.1	2.4
AUGUST	1.32	85.3	1.43	85.3	0.03	2.4
SEPTEMBER	1.36	85.3	1.36	85.3	0.04	2.4
OCTOBER	1.72	85.3	1.72	85.3	0.05	2.4
NOVEMBER	3.33	85.3	3.33	85.3	0.1	2.4
DECEMBER	2.56	85.3	2.56	85.3	0.1	2.4

Appendix E

CARDINAL WASTEWATER TREATMENT FACILITY

2019

ATAD PERFORMANCE SUMMARY

Month	Thickened WAS		Temperature	
	% TS	% VS	R1 - °C	R2 - °C
Jan	4.58	64.4	29.1	51.8
Feb	4.32	67.6	31.0	51.6
Mar	4.42	67.6	33.0	52.8
Apr	4.72	66.9	33.3	51.7
May	4.81	62.3	42.4	47.7
Jun	4.84	64.4	53.8	46.8
Jul	4.63	57.2	54.7	53.5
Aug	3.90	61.3	46.8	58.3
Sep	4.25	59.0	40.2	61.0
Oct	4.43	64.5	40.2	56.5
Nov	4.06	63.6	37.5	47.5
Dec	4.06	63.6	33.9	47.6