STRATHROY WASTEWATER TREATMENT FACILITY

2023 ANNUAL REPORT

as per ECA # 5933-C37KWJ Section 11.(4)
Works # 12000827

STRATHROY-CARADOC
URBAN OPPORTUNITY – RURAL HOSPITALITY

1. Influent Monitoring and Compliance Summary (Certificate of Approval 11. 4. (a))

The annual influent laboratory results for carbonaceous biochemical oxygen demand, total suspended solids, total phosphorus and total kjeldahl nitrogen can be found in Appendix A.

The incoming sewage characteristics are similar to the previous year.

2. Effluent Monitoring and Compliance Summary (Certificate of Approval 11. 4. (b))

The Strathroy WWTF has a design rated capacity of 10,000 m^3/day, with a peak flow rate of 23,280 m^3/day. During 2023, the annual average daily flow was 5,009 m^3/day, which is 50% of the design rated capacity for the treatment facility. The maximum daily flow was recorded at 12,468 m^3/day, which is 54% of the peak flow rate. Flow rates are similar to the previous year.

The summary of the annual effluent laboratory results for carbonaceous biochemical oxygen demand, total suspended solids, total phosphorus, nitrogen, DO and pH is found in Appendix A. The comparison of these results to the compliance criteria can be found in Table 1 and Table 2 below. All parameters met effluent limits in 2023.

Table 1
Strathroy WWTF – Effluent Quality Summary

Description	Range of Monthly Averages mg/L	Effluent Limits mg/L	# Months Limits Achieved/ # Months
CBOD5 (non-freezing period April - Oct)	2.0 – 2.4	10	7/7
CBOD5 (freezing period Nov-Mar)	2.0 – 3.3	15	5/5
Suspended Solids (non-freezing period April - Oct)	2.3 - 4.3	10	7/7
Suspended Solids (freezing period Nov-Mar)	2.75-4.50	15	5/5
Total Phosphorus (non-freezing period April - Oct)	0.11 - 0.27	0.5	7/7
Total Phosphorus (freezing period Nov-Mar)	0.09 - 0.15	1	5/5

Total Ammonia Nitrogen (non-freezing period April - Oct)	0.10 - 0.70	2	7/7
Total Ammonia Nitrogen (freezing period Nov-Mar)	0.10-2.18	5	5/5
E.Coli (counts/100mL)	0.14-4.23	200 (geometric mean)	12/12
pH	6.30-7.80	6.0 - 9.5	12/12
DO (min)	4.3	>4.0	12/12

Table 2
Strathroy WWTF – Effluent Loading Summary

Description	Annual Average Loading kg/d	Effluent Loading Limits kg/d	Achieved Yes/No
CBOD5	11.39	103.4	Yes
Suspended Solids	16.94	103.4	Yes
Total Phosphorus	1.62	6.1	Yes
Total Ammonia Nitrogen	2.54	27.8	Yes

3. Operating Issues and Corrective Actions (Certificate of Approval 11. 4. (c))

During the year, there were no exceedances in 2023.

The second phase of the upgrades at the Strathroy WWTF, are currently being designed and a second ECA application has been submitted for approval by the MECP.

4. Maintenance Summary (Certificate of Approval 11. 4. (d))

The operators performed the routine maintenance throughout the year. In addition to the routine maintenance which includes greasing, oiling and changing air filters a detailed list is included in Appendix B.

5. Quality Assurance/Quality Control (Certificate of Approval 11. 4. (e))

On a monthly basis, the operator collected and submitted influent samples to SGS Canada Inc for total suspended solids, biochemical oxygen demand, TKN and total phosphorus analysis.

On a weekly basis, the operator collected effluent samples for analysis by SGS Canada Inc for total suspended solids, carbonaceous biochemical oxygen demand, total phosphorus, ammonia and E. Coli analyses. The operator performed analysis for pH, DO and temperature in-house.

In-house laboratory testing also included monitoring of MLSS, reactive phosphorus, total suspended solids, and ammonia in the effluent.

6. Calibration/Maintenance Summary (Certificate of Approval 11. 4. (f))

Flow meter calibrations were carried out by SCG in February 2023. The laboratory, SGS Canada Inc was used for all the required analytical chemical and biological testing of influent and effluent from the wastewater treatment facility.

7. Effluent Objectives (Certificate of Approval 11. 4. (g))

Strathroy-Caradoc attempted to meet the objectives in the Environmental Compliance Approval (ECA) through regular testing and monitoring of the treatment system. The installation of new filters in 2022 helped improve the WWTF treatment process.

In the table below, monitoring data and analytical results are compared to the Effluent Objectives as listed in the ECA.

Table 3

Strathroy WWTF – Effluent Objective Summary

Description	Range of Monthly Averages mg/L	Effluent Objectives mg/L	# Months Objectives Achieved/# Months
CBOD5 (non-freezing period April - Oct)	2.0 – 2.4	5	7/7
CBOD5 (freezing period Nov-Mar)	2.0 – 3.3	10	5/5
Suspended Solids (non-freezing period April - Oct)	2.3 - 4.3	5	7/7
Suspended Solids (freezing period Nov-Mar)	2.75-4.50	10	5/5
Total Phosphorus (non-freezing period April - Oct)	0.11 - 0.27	0.3	7/7
Total Phosphorus (freezing period Nov-Mar)	0.09 - 0.15	0.5	5/5

Total Ammonia Nitrogen (non-freezing period April - Oct)	0.10 - 0.70	1	7/7
Total Ammonia Nitrogen (freezing period Nov-Mar)	0.10-2.18	3	5/5
E.Coli (counts/100mL)	0.14-4.23	150 (geometric mean)	12/12
pH	6.30-7.80	6.5 - 8.5	11/12

7. Sludge Management (Certificate of Approval 11. 4. (h))

Supernatant from this lagoon is transferred to the aeration section of the sewage treatment plant for treatment as needed. Staff monitor the lagoon levels to ensure adequate reserve capacity is in place to accommodate waste activated sludge along with precipitation events and will implement supernatant pumping as required.

In 2023, the Municipality hired a contractor that removed 224 dry tones of sludge from the storage lagoon. The sludge production and sludge handling methods for 2024 is expected to be similar to 2023.

8. Complaints Summary (Certificate of Approval 11. 4. (i))

There were no complaints related to the Strathroy WWTP in 2023.

9. Summary of By-pass, Spill or Abnormal Events (Certificate of Approval 11. 4. (j))

There were no by-pass, spill or abnormal events to report.

10. Notice, Modifications/Summary of Alterations (Certificate of Approval 11. 4. (k & l))

There were no modifications to the Sewage Works completed under the Limited Operational Flexibility provisions in the ECA.

The following list details alterations, extensions or replacements that were implemented or in process in 2023

- Strathroy WWTF Process Upgrades - $538,055
- Albert St Pumping Station - $587,563
- Lagoon Sludge Handling- $7,038
- Sanitary Masterplan and PPCP (Strathroy/Mt Brydges) - $60,430

For 2024, the 2023 projects are continuing. Also the following are proposed and are awaiting Council approval that will provide a benefit to the operation of the Strathroy WWTF.

- PLC Upgrades Budget - $750,000
- Queen St Reconstruction Phase 2 (includes sanitary sewers) - $1,600,000

11. Changes/Updates in Schedule (Certificate of Approval 11. 4. (m))

The projects are continuing to proceed as mentioned above

12. Summary of Monitoring Schedule (Certificate of Approval 11. 4. (n))

Routine weekly effluent sampling was conducted on Mondays for 2023. The sampling will be complete on Thursdays for 2024.

APPENDIX A

Strathroy WWTF

Year: 2023

		January	February	March	April	May	June	July	August	September	October	November	December	Average	Total
Flows, Average Daily Flow 10,000 m3/day															
Effluent Total	m^3	120,791	113,920	142,272	215,968	150,203	130,180	181,566	163,061	155,212	153,385	150,842	151,888	152,441	1,829,288
Effluent Average	m^3/day	3,896	4,069	4,589	7,199	4,845	4,339	5,857	5,260	5,174	4,948	5,028	4,900	5,009	
Effluent Max	m^3/day	4,653	5,629	6,540	12,468	5,557	5,827	9,444	7,386	6,208	5,447	5,672	5,668	6,708	
cBOD, Monthly Average Concentration Limits Apr 1 - Oct 31 10mg/L, Nov 1 - Mar 31 15mg/L															
Raw Average BOD	mg/L	280	430	261	101.0	292	552	312	423	302	424	822	609	400.7	
Effluent Average cBOD	mg/L	3.2	3.3	2.8	2.0	2.0	2.0	2.0	2.0	2.0	2.4	2.3	2.0	2.32	
Effluent cBOD Loading	kg/D	12.47	13.22	12.62	14.4	9.69	8.68	11.71	10.52	10.35	11.87	11.31	9.80	11.39	
Suspended Solids, Monthly Average Concentration Limits Apr 1 - Oct 31 10 mg/L, Nov 1 - Mar 31 15mg/L															
Raw Average	mg/L	55	314	46	80.0	85	502	280	596	419	511	543	545	331.3	
Effluent Average	mg/L	4.2	3.0	4.5	4.3	3.4	3.8	2.6	2.3	2.5	3.2	4.3	2.8	3.39	
SS Loading	kg/D	16.37	12.21	20.65	30.6	16.47	16.27	15.23	11.84	12.93	15.83	21.37	13.47	16.94	
Total Phosphorus, Monthly Average Concentration Limits Apr 1 - Oct 31 0.5mg/L, Nov 1 - Mar 31 1 mg/L															
Raw Average	mg/L	5.4	5.0	5.2	3.2	5.2	11.2	8.2	9.8	12.5	10.9	7.3	8.4	7.69	
Effluent Average	mg/L	0.12	0.09	0.11	0.11	0.14	0.20	0.27	0.16	0.24	0.16	0.15	0.09	0.15	
Phosphorus Loading	kg/D	0.48	0.36	0.50	0.76	0.68	0.87	1.56	0.83	1.24	0.78	0.73	0.43	0.77	
Nitrogen, Monthly Average Concentration Limits Apr 1 - Oct 31 2mg/L, Nov 1 - Mar 31 5mg/L															
Raw Average TKN	mg/L	49.60	50.50	42.50	31.1	41.70	68.30	39.10	67.70	61.10	54.30	38.00	49.20	49.43	
Effluent Average Total N	mg/L	1.20	1.28	2.18	0.70	0.22	0.13	0.16	0.10	0.13	0.10	0.10	0.18	0.54	
Nitrogen Loading	kg/D	4.68	5.19	9.98	5.0	1.07	0.54	0.94	0.53	0.65	0.49	0.50	0.86	2.54	
Effluent TKN	mg/L	1.96	2.53	2.98	1.8	1.22	1.03	1.02	1.20	0.80	1.28	1.50	1.33	1.55	
Nitrate as Nitrogen	mg/L	21.89	21.78	15.05	12.6	16.90	9.30	6.37	10.52	7.57	8.86	6.53	11.81	12.43	
Nitrite as Nitrogen	mg/L	3.07	0.24	0.17	0.2	0.21	0.05	0.08	0.05	0.04	0.03	0.07	0.19	0.36	
Unionized Ammonia Avg	mg/L	0.0010	0.0018	0.0080	0.0028	0.0012	0.0015	0.0014	0.0010	0.0015	0.0010	0.0010	0.0013	0.0019	
Unionized Ammonia Min	mg/L	0.0010	0.0010	0.0030	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0012	
Unionized Ammonia Max	mg/L	0.0010	0.0020	0.0180	0.0050	0.0020	0.0030	0.0020	0.0010	0.0030	0.0010	0.0010	0.0020	0.0034	
E. Coli, Monthly Geometric Average 200 Counts/mL															
Geo Mean	CFU/ 100mL	0.69	2.00	0.14	4.23	0.24	2.38	0.24	2.99	2.00	1.10	0.95	2.00	1.58	
pH 6.0 -9.5, DO > 4.0															
pH Min	SU	6.3	6.7	6.7	7.1	6.8	7.0	7.2	7.0	7.2	7.1	7.0	6.9	6.92	
pH Max	SU	7.0	7.2	7.3	7.5	7.3	7.4	7.6	7.8	7.6	7.8	7.8	7.7	7.50	
pH Average	SU	6.5	6.9	7.0	7.3	7.1	7.2	7.4	7.3	7.4	7.4	7.3	7.3	7.18	
Temperature MIN	^oC	8.3	6.1	7.5	9.0	11.9	17.0	20.1	19.4	19.2	15.2	10.0	10.3	12.8	
Temperature MAX	^oC	12.0	10.3	10.9	14.5	18.8	21.0	22.6	22.0	23.0	21.2	15.6	13.5	17.1	
DO Min	mg/L	4.7	4.3	7.4	6.5	6.3	6.1	6.0	6.0	5.8	4.8	6.7	6.5	5.9	
Non-Freezing (N) Freezing (F)		F	F	F	N	N	N	N	N	N	N	F	F		

APPENDIX B

2023 Annual Maintenance Summary for STRATHROY WWTF

January
- Replaced relay on ventilation system in blower room
- Replaced broken chain in screen room
- Diffusers being fixed on aeration pond
- Run generators

February
- Routine maintenance
- Run generators

March
- Repaired water heater
- Install of iron filter and water softener
- Service on filter 2 backwash pump 1
- UV bank 1 sensor changed
- Run generators

April
- Weir plate being added to filter 1
- Rebuild pump 1 on filter 1
- Weir plate added to filter 2
- SCADA upgrades, work being completed on filters
- Run generators

May
- Annual generator maintenance
- Replace UV bulbs
- Receptacle replacement near alum pumps
- Pump on filter 1 being fixed
- Drive belt on ceiling fan in blower room replaced
- Run generators

June
- Replace seal on gear box clarifier 2
- Run generators

July
- Updated programming of new filters
- Run generators

August
- Routine maintenance
- Run generators

September
- Replace vacuum pump in Lab
- Run generators

October
- Routine maintenance
- Run generators

November
- Cracked header line on aeration pond repaired
- Repair of aerators
- Sludge being removed from pond 4
- Run generators

December
- New coupler installed on blower 2
- Run generators
- Membrane in aeration cell repaired