Feb 14, 2025

Ministry of the Environment
Southwestern Region
733 Exeter Road
London, Ontario
N6E 1L3

Attn.: Mr. Pierre Adrien

Re: Listowel Wastewater Treatment Facility
2024 Annual Report

Please find enclosed the 2024 Annual Report for the Municipality of North Perth – Listowel Wastewater Treatment Facility. In accordance with Amended Environmental Compliance Approval # 2436-D2GKXP, this report outlines;

1. Summary and interpretation of all monitoring data and comparison to compliance limits.
2. Description of any operating problems and corrective actions taken.
3. Summary of the maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works.
4. Summary of effluent quality assurance or control measures.
5. Summary of the calibration and maintenance on all effluent monitoring equipment.
6. Description of efforts made, and results achieved in meeting the Design Objectives.
7. Tabulation of the volume of sludge generated and an outline of the anticipated volumes to be generated in the next reporting period and a summary of the locations of where the sludge was disposed.
8. Summary of complaints received, and the steps taken to address the complaints.
9. Summary of all By-pass, spill or abnormal discharge events
10. Summary of quantity and quality of different types of imported wastewater co-treated at the Works and an overview of the success of the co-treatment.
11. Tabulation of the quantities and characteristics of the sewage from all different sources in the reporting period on a monthly basis and an outline of any changes in the anticipated quantities and characteristics of the sewage from all different sources in the next reporting period.
12. A copy of all Notice of Modifications submitted to the Water Supervisor as a result of Schedule B, Section 1, with a status report of the implementation of each modification.

13. A report summarizing all modifications completed as a result of Schedule A, Section 3; and
14. Any other information the Water Supervisor requires from time to time.

Regards,

Mark Hackett
Manager of Environmental Services, Municipality of North Perth

1. MONITORING DATA AND ANALYTICAL RESULTS

The utility monitoring reports for the year are attached in accordance with the Environmental Compliance Approval guidelines for the period January to December 2024.

The total influent flow in 2024 was 2639.156 ML. The annualized average daily flow was 7.211 MLD. The design capacity for the treatment facility is 9.030 MLD. The maximum influent daily flow for the year was 20.072 MLD, which was recorded in the month of January. The total influent flow includes the Atwood Wastewater System, which added 97.245 ML and the Septage Receiving Station, which added an additional 55.213 ML.

The total effluent flow for the year was 2585.914 ML and the annualized average effluent daily flow for the year was 7.065 MLD. The maximum effluent daily flow for the year was 14.800 MLD, which was recorded in the month of April.

The annualized influent concentrations and loadings for Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Suspended Solids, Total Phosphorus and Total Kjeldahl Nitrogen are summarized in table 1 below. The concentrations and loadings were calculated using the annualized averages of the monthly averages.

Table 1.

Influent Quality Parameter	Average Concentration (mg/L)	Average Loading (kg/d)
$CBOD_5$	363	2537.2
Suspended Solids	387	2709.5
Total Phosphorus	6.90	45.9
Total Kjeldahl Nitrogen	50.1	348.5

The annualized effluent concentrations of various parameters are summarized in table 2 below. The concentrations were calculated using the annualized averages of the monthly averages.

Table 2.

Effluent Quality Parameter	Annual Monthly Average Concentration mg/L	Annual Minimum and Maximum Result mg/L	Concentration Criteria mg/L December 1 - March 32	Concentration Criteria mg/L April 1 – November 30	Compliance
$CBOD_5$	3.6	2.0 - 11.0	< 15	< 10	Monthly
Suspended Solids	4.49	1.30 – 8.60	< 15	< 10	Monthly
Total Phosphorus	0.19	0.07 – 0.33	< 0.73	< 0.36	Monthly
Ammonia + Ammonium	0.32	0.03 – 2.54	< 3.62	< 2.2	Monthly
Total Kjeldahl Nitrogen	2.7	1.19 – 4.73	N/A	N/A	
E. Coli	26.3	0 - 650	200 counts/100 mL	200 counts/100 mL	Monthly
pH	7.01-7.84	6.19 – 8.51	6.0 – 9.5	6.0 – 9.5	Inclusive
Temperature	17.5	10.1 – 25.7			
Dissolved Oxygen	7.14	4.01 – 9.07	> 5	> 5	Monthly

All the effluent monthly concentration criteria as per the Environmental Compliance Approval were achieved for the reporting period.

The annualized effluent loadings for various parameters have been calculated based on the monthly average effluent daily flows and monthly effluent monthly concentrations. They are summarized in table 3 below.

Table 3.

Effluent Parameter	Average Loading Kg/day	Monthly Min – Max Loading Kg/day	Monthly Average Loading (kg/d) @ period B Temp.< 5	Average Monthly Loading (kg/d) @ period A Temp. >5
$CBOD_5$	26.8	9.9 – 51.4	135.6	90.4
Suspended Solids	33.4	11.1– 72.9	135.6	90.4
Total Phosphorus	1.4	0.6 – 2.2	6.56	3.28
Ammonia + Ammonium	3.8	0.5 – 19.9	32.8	20.0
Total Kjeldahl Nitrogen	19.5	9.1 – 33.9		

Table 4 below evaluates the performance of the wastewater treatment process. The efficiency is expressed as % removal and was calculated using the annualized influent and effluent concentrations and annualized influent and effluent loadings for each parameter.

Table 4.

Parameter	Concentration % Removal	Loading % Removal
$CBOD_5$	99.0 %	98.9%
Suspended Solids	98.8 %	98.8%
Total Phosphorus	97.2%	96.9%
Total Kjeldahl Nitrogen	94.6 %	94.4%

TABLES 5 – 8 BELOW SUMMARIZE MONTHLY FLOWS AND ANALYTICAL COMPLIANCE DATA

Wastewater Treatment Plant Incoming Flows

Table 5.

	Raw Sewage - Total Flow			Final Effluent			Septage Receiving Station			Atwood Flow		
	Total Flow	ADF	MDF	Total Flow	ADF	MDF	Total Flow	ADF	MDF	Total Flow	ADF	MDF
	ML	MLD	MLD	ML	MLD	MLD	ML	MLD	MLD	ML	MLD	MLD
January	298.941	9.643	20.072	259.140	8.359	13.000	7.143	0.230	0.646	11.960	0.386	1.010
February	254.411	8.773	11.462	275.950	9.516	13.790	6.157	0.212	0.523	8.929	0.308	0.429
March	295.342	9.527	12.862	323.920	10.449	13.460	6.874	0.222	0.544	10.719	0.346	0.604
April	299.953	9.998	15.234	307.430	10.248	14.800	8.751	0.292	0.570	10.672	0.356	0.644
May	263.083	8.487	11.094	275.880	8.899	11.370	8.106	0.261	0.440	8.246	0.266	0.384
June	192.500	6.417	8.270	168.010	5.600	7.160	3.946	0.132	0.403	6.397	0.213	0.289
July	202.098	6.519	15.481	165.490	5.338	8.110	0.000	0.000	0.000	8.032	0.259	1.043
August	162.779	5.251	6.754	181.960	5.870	7.930	0.000	0.000	0.000	5.938	0.192	0.303
September	148.291	4.943	6.216	123.534	4.118	5.900	0.166	0.006	0.166	5.524	0.184	0.277
October	156.856	5.060	6.018	176.220	5.685	7.230	4.388	0.142	0.337	5.962	0.192	0.261
November	155.792	5.193	6.595	142.750	4.758	6.560	5.285	0.176	0.340	5.848	0.195	0.250
December	209.110	6.745	12.841	185.630	5.988	12.130	4.397	0.142	0.382	9.018	0.291	0.706
Total	2639.156			2585.914			55.213			97.245		
Monthly Avg	219.930	7.211	11.075	215.493	7.065	10.120	4.601	0.151	0.363	8.104	0.266	0.517
Monthly Max	299.953	9.998	20.072	323.920	10.449	14.800	8.751	0.292	0.646	11.960	0.386	1.043

ML= megalitres

MLD= megalitres/day

ADF= average daily flow

MDF= maximum daily flow

MAC= monthly average concentration

MAL= monthly average loading

Monthly Raw BOD5 & Final Effluent CBOD5

TABLE 6.

	Biochemical 0_2 Demand			
	Raw Sewage (BOD5)		Final Effluent (CBOD5)	
	MAC	MAL	MAC	MAL
	mg/L	Kg/day	mg/L	Kg/day
January	226	2183.2	3.3	27.6
February	261	2289.8	5.4	51.4
March	252	2402.7	3.9	40.8
April	422	4221.2	4.3	44.1
May	381	3233.5	5.5	48.9
June	350	2247.9	2.5	14.0
July	398	2595.9	2.8	14.9
August	378	1984.9	2.7	15.8
September	318	1573.9	2.4	9.9
October	502	2540.1	3.7	21.0
November	451	2343.6	3.5	16.7
December	420	2829.5	2.8	16.8
Average	363	2537.2	3.6	26.8
Minimum	226	1573.9	2.4	9.9
Maximum	502	4221.2	5.5	51.4
ECA Compliance Limit Period A April 1 - November 30			10.0	90.4
ECA Compliance Limit Period B December 1 - March 31			15.0	135.6

MAC = monthly average concentrations

MAL = monthly average loading

Yellow Highlights = Meets ECA Effluent Design Objectives

Monthly Total Suspended Solids & Total Phosphorus

Table 7.

	Suspended Solids				Total Phosphorus			
	Raw Sewage		Final Effluent		Raw Sewage		Final Effluent	
	MAC	MAL	MAC	MAL	MAC	MAL	MAC	MAL
	mg/L	Kg/day	mg/L	Kg/day	mg/L	Kg/day	mg/L	Kg/day
January	233	2250.7	3.40	28.4	3.55	34.2	0.11	0.9
February	228	1995.9	5.18	49.3	3.97	34.8	0.20	1.9
March	277	2641.8	6.98	72.9	3.98	37.9	0.21	2.2
April	425	4248.2	5.58	57.2	5.56	55.6	0.21	2.2
May	495	4201.1	4.53	40.3	5.36	45.5	0.24	2.1
June	441	2831.2	3.43	19.2	10.26	65.8	0.21	1.2
July	430	2805.8	4.96	26.5	6.80	44.3	0.26	1.4
August	462	2423.3	4.65	27.3	11.15	58.5	0.21	1.2
September	259	1280.2	2.70	11.1	8.26	40.8	0.15	0.6
October	507	2665.4	3.80	21.6	9.10	46.0	0.21	1.2
November	481	2498.9	4.08	19.4	8.16	42.4	0.16	0.8
December	411	2771.5	4.58	27.4	6.65	44.9	0.13	0.8
Average	387	2709.5	4.49	33.4	6.9	45.9	0.19	1.4
Minimum	228	1280.2	2.70	11.1	3.55	34.2	0.11	0.6
Maximum	507	4248.2	6.98	72.9	11.15	65.8	0.26	2.2
ECA Compliance Limit Period A April 1 - November 30			10.0	90.4			0.36	3.3
ECA Compliance Limit Period B December 1 - March 31			15.0	135.6			0.73	6.6

MAC = monthly average concentrations

MAL = monthly average loading

Yellow Highlights = Meets ECA Effluent Design Objectives

Monthly Total Kjeldahl Nitrogen (TKN), Ammonia, & Other Effluent Parameters

Table 8.

	Total Kjeldahl Nitrogen (TKN)				Other Final Effluent Parameters					
	Raw Sewage		Final Effluent		Ammonia + Ammonium		Temp.	pH Range Low - High	Dissolved Oxygen	E. Coli
	MAC	MAL	MAC	MAL	MAC	MAL	°C		(mg/L)	counts per 100 ml
	mg/L	Kg/day	mg/L	Kg/day	mg/L	Kg/day				
January	34.3	330.8	1.9	16.1	0.39	3.3	12.5	6.19 - 7.59	8.63	0.0
February	31.2	273.7	2.7	25.5	0.42	4.0	11.7	6.39 - 7.14	8.59	1.0
March	30.6	291.5	3.2	33.9	0.94	9.8	12.0	6.61 - 7.36	8.08	8.0
April	42.0	419.9	3.2	32.3	0.73	19.9	14.3	6.86 - 7.46	7.34	1.0
May	76.7	651.0	3.4	30.3	0.40	3.6	18.0	7.04 - 8.23	6.25	47.0
June	70.3	451.0	2.7	15.2	0.15	0.8	20.4	7.66 - 8.04	7.23	11.0
July	42.8	279.0	2.2	11.9	0.10	0.5	21.5	6.85 - 7.91	5.77	1.0
August	45.1	236.8	2.7	15.8	0.17	1.0	23.3	7.33 - 8.43	6.59	142.0
September	53.6	265.1	2.2	9.1	0.11	0.5	21.4	7.40 - 7.93	6.57	5.0
October	66.2	335.0	3.2	18.3	0.16	0.9	19.9	7.15 - 7.41	6.76	95.0
November	55.3	286.9	2.8	13.1	0.12	0.6	18.2	7.48 - 8.07	6.84	4.0
December	53.6	361.5	2.1	12.7	0.15	0.9	16.4	7.12 - 8.51	7.03	0.0
Average	50.1	348.5	2.7	19.5	0.32	3.8	17.5		7.14	26.3
Minimum	30.6	236.8	1.9	9.1	0.10	0.5	11.7	6.19	6.25	0.0
Maximum	76.7	651.0	3.4	33.9	0.94	19.9	23.3	8.51	8.63	142.0
ECA Compliance Limit Period A April 1 - November 30					2.2	20		6.00 - 9.50	> 5.0	< 200
ECA Compliance Limit Period B December 1 - March 31					3.62	32.8		6.00 - 9.50	> 5.0	< 200

MAC = monthly average concentrations

MAL = monthly average loading

Yellow Highlights = Meets ECA Effluent Design Objectives

2. OPERATIONAL UPSETS

There were no operational upsets during the reporting period.

3. MAINTENANCE ACTIVITIES

- All blowers inspected and vibration analysis completed by contractor.
- UV bulbs cleaned and replaced as required.
- All on-line Dissolved Oxygen and Suspended Solids sensors inspected and calibrated.
- Both Filters chemical treatment to sand and porous plates
- Septage Receiving Station upgrades including tank relining, addition of grit tank.
- Refurbishment of Biofilter Unit at Septage Receiving Station.
- Both Secondary Clarifiers full refurbishment and new equipment installed including new scum removal system.
- Purchased a new spare mixer for the aeration tank due to a mixer failure.
- New spare mixer was purchased due to a mixer failure.
- Highway 23 Pumping Station Pump Maintenance completed.
- Sanitary flushing completed.

4. QUALITY ASSURANCE OR CONTROL MEASURES

A 24hr composite sampler, model American Sigma, located at the inlet head works of the treatment plant obtains the influent sample. The sample is drawn from the screen effluent channel prior to grit removal. A 100 mL sample is taken every 30 minutes.

A 24hr composite sampler, model American Sigma, located at the effluent UV channel obtains the effluent sample. A 100 mL sample is taken every 30 minutes.

A sampler for the Septage Receiving Station was installed in 2016 to take samples automatically from loads received.

The influent and effluent samples as well as Septage Receiving Station samples are sent to ALS Labs in Waterloo for independent analysis. A portion of the same sample is analyzed in-house for suspended solids, pH, dissolved oxygen, nitrates, ammonia, phosphorus and temperature. All laboratory instruments used in-house are regularly calibrated as per manufacturer's recommendations and the methodology follows "Standard Methods for the Examination of Water and Wastewater".

5. MONITORING EQUIPMENT CALIBRATION & MAINTENANCE

The Spectrophotometer and other associated equipment used in the WWTP lab was calibrated. The various flow meters in use were calibrated and a copy of their reports is attached.

6. MEETING DESIGN OBJECTIVES

Through the best efforts of the operators, the treatment plant achieved most of the effluent parameter design objectives for the reporting period. The objectives were met as follows:

- $CBOD_5$ – achieved 11 out of 12 months
- TSS – achieved 10 out of 12 months
- TP – achieved 11 out of 12 months
- Ammonia – achieved 12 out of 12 months

7. SLUDGE GENERATED AND ANTICIPATED VOLUMES AND LOCATIONS

The aerobic digesters and sludge storage facility were utilized for the entire year.

- 136,042 m^3 of waste activated sludge was processed in the digesters
- 82,785 m^3 decanted to headworks
- 52,296 m^3 transferred to sludge holding cell
- 43,818 m^3 of digested sludge was hauled from the sludge holding cell. See 2024 Sludge Haulage Summary in Table 9 below

In 2025, similar volumes of sludge generation are expected.

The waste activated sludge generated at the wastewater treatment plant is aerobically stabilized in the aerated digester. Supernatant is decanted to the headworks. Processed sludge is then transferred into the sludge storage cell on site until it can be removed and hauled to approved agricultural sites for land application. A copy of the sludge analysis is attached.

2024 Sludge Haulage Summary

Table 9.

Date	Site #	Volume (m^3)
June 3 - 5	24269	6362
August 13	24824	1632
August 14 & 15	24827	3883
August 16	24270	5033
August 22	24830	4504
October 2	61811	4044
October 21	61792	2952
October 23	24270	2856
November 4	61812	3778
November 7	24827	6014
November 14	24269	2760
	Total	**43,818**

8. SUMMARY OF COMPLAINTS RECEIVED

There was no odor complaints received during the reporting period in 2024.

9. BY-PASS, SPILLS AND ABNORMAL DISCHARGE EVENTS.

There were no bypasses, spills or abnormal discharge events during the reporting period of 2024.

10. IMPORTED WASTEWATER SUMMARY

The Septage Receiving Station was out of service from June 13th to October 7th for planned maintenance and upgrades to the station. This work included holding tank relining, addition of a grit separation tank ahead of the holding tank, refurbishment of the biofilter, and converting the existing mixing pump to a jet aeration pump. The rest of the year the Septage Receiving Station was in operation. The controlled pumping of the storage tank contents through the WWTF force main eliminated the effects of shock loading. This enabled the plant to successfully treat the imported waste on a consistent basis. The daily totals of imported wastewater received, and its various parameters are reflected in table 10 below. An odor control system was installed in 2010 and refurbished in 2024 and is working well to eliminate odors from the Septage Receiving Station.

Table 10.

Imported Wastewater	Average Flow (Cubic meters/day)	Average Loading (Kilograms/day)	
		BOD_5	TKN
Septage	35.0	90.8	23.9
ARI	45.5	213.6	55.7
Perth Enviro. – New Process	50.1	219.5	10.9

11. Summary of Influent quantities and Characteristics

The quantities and characteristics of sewage from all sources on a monthly basis are summarized in the above tables in this report. No changes are anticipated in the quantities and characteristics of sewage from the different sources in the next reporting period.

12. Notice of Modifications

There was no Notice of Modification to Sewage Works submitted to the Water Supervisor as a result of Schedule B, Section 1 in 2024.

13. Summary of Schedule A, Section 3

There were no modifications completed in 2024 as a result of Schedule A, Section 3.

14. Information provided to water supervisor

There was not any additional information required or requested to be submitted to the Water Supervisor in 2024.