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Town of Arnprior 2024 – Water Pollution Control Centre Summary Report

January 29, 2025

Please find below a discussion of the operational undertakings of the Town of Arnprior's Water Pollution Control Centre (WPCC) for the 2024 calendar year. This report also includes a summary of all relevant sampling collected during 2024. This report is provided to meet the Town's requirements to report annually on the operation of the WPCC, as per Environmental Compliance Approval Number A-500-6176111914 Version: 1.0 Issue Date: July 18, 2023 and to provide residents of the Town of Arnprior with information on an important piece of the Town's municipal infrastructure.

1.0 **Preliminary Treatment**

1.1 Screen Units

There are three screening units, two automatic mechanical screen and a standby manual screen. All screens have openings of 13 mm between bars and are enclosed with an odour enclosure where the air is discharged to the exterior atmosphere through a carbon filter.

The screenings are then transferred onto a conveyer that empties into a container for disposal at the Arnprior landfill.

1.2 Grit Removal

Grit removal is achieved by a pair of rectangular aerated spiral roll 90 m³ tanks. Each tank has a grit screw conveyer which pushes settled grit into the grit hoppers. Grit is then pumped into a grit dewatering classifier unit where dense grit particles are separated from light organic solids.

2.0 Primary Treatment

2.1 Primary Sedimentation

There are four rectangular primary clarifiers at the WPCC: two with a surface overflow area of 142 m² and two with an overflow area of 154 m². All units are equipped with chain and flight sludge collection and manual scum removal.

Raw sludge is pumped from the primary clarifiers to Anaerobic Digesters using plunger type positive displacement pumps.

3.0 Secondary Treatment

3.1 Activated Sludge Treatment

The activated sludge treatment process includes two rectangular aeration tank and three separate rectangular secondary clarifiers, each made up of two units in parallel.

The aeration tank volumes are 1,303 m³ each, and are equipped with four inlet gates and one outlet slide plate for isolation. The secondary clarifiers have a surface area of 310 m² each. They are equipped with longitudinal and cross chain and flight collector mechanisms which collect the activated sludge into a sump where it is returned to the aeration tank.

3.2 Phosphorous Removal

The phosphorous control system consists of two 12,100 L indoor ferric chloride chemical storage tanks and two chemical feed pumps complete with calibration cylinders. The ferric chloride is added to either the aeration tank or preliminary discharge depending on operational requirements.

3.3 Chlorination System

Disinfection of the plant discharge is done through the addition of Sodium Hypochlorite (NaOCI). The NaOCI is stored in a pair of 12,100 L tanks, and a bank of three variable speed metering pumps are used to deliver the chlorine to the chlorine contact chamber.

3.4 De-chlorination System

The chlorinated water must be de-chlorinated before discharge into the Ottawa River. This is achieved through the addition of sodium bisulphite. The sodium bisulphite system is made up of one 1,336 L storage tank and a pair of feed pumps.

3.5 Sludge Dewatering

A Centrifuge capable of processing 7 L/s of sludge is used for dewatering anaerobically digested sludge. The sludge from this unit is loaded onto a dump truck and delivered to the Arnprior landfill.

3.6 Auxiliary Power

The Arnprior WPCC is equipped with a 400 Kw diesel generator and automatic transfer switch. This generator will automatically start when a power outage occurs, and can supply power to run the entire plant.

4.0 Plant Performance Summary

Environmental Compliance Approval Number A-500-6176111914 Version: 1.0 Issue Date: July 18, 2023, section 11.4 requires the Owner shall prepare performance reports on a calendar year basis and submit to the District Manager by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:

11.4.a. a summary and interpretation of all Influent, Imported Sewage and Processed Organic Waste monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;



Figures 1 and 2 show historical trends for the influent characteristics from 2024.

Figure 1. 2024 Influent Averages of pH level and Flow (×1000 m³)

Figure 1 shows the pH and the influent flow rate. Flow rate increased in March and April due to the spring freshet.



Figure 2. 2024 Influent Averages of BOD and TSS

Figure 2 shows a drop in total suspended solids (TSS) in March due to the spring freshet where plant flows experienced increased surface water runoff from combined sewers.

11.4.b. a summary and interpretation of all Final Effluent monitoring data, including

concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;

4.1 Effluent Flows and Loading

Table 4-1 below indicates the effluent criteria for average monthly flows, CBOD, Total Suspended Solids, Phosphorus and their respective loadings of the WPCC. All monthly concentrations and loadings meet the effluent objectives and limits.

	Daily Total (m³/Day)	CBOD₅ (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	CBOD₅ Loading (kg/Day)	Total Suspended Solids Loading (kg/Day)	Total Phosphorus Loading (kg/Day)
Objective	N/A	15.0	15.0	0.75	142.5	142.5	9.5
Limit	9700	25.0	25.0	1.0	243.0	243.0	9.7
Compliance Assessment Basis	Annual Average	Monthly Average	Monthly Average	Monthly Average	Monthly Average	Monthly Average	Monthly Average
January	4500	3.2	6.5	0.16	14.4	29.3	0.72
February	4635	3.0	4.8	0.15	13.9	22.0	0.68
March	5739	3.5	4.9	0.13	20.1	28.1	0.76
April	6206	5.8	9.2	0.30	36.0	57.1	1.85
Мау	4851	3.0	8.5	0.21	14.6	41.4	0.99
June	5893	3.3	8.0	0.16	19.2	46.9	0.94
July	5447	3.0	4.2	0.12	16.3	22.9	0.63
August	4581	3.0	11.0	0.19	13.7	50.4	0.87
September	3948	3.0	9.0	0.28	11.8	35.5	1.12
October	3907	6.0	9.4	0.53	23.4	36.7	2.07
November	4103	3.2	7.1	0.41	12.3	29.1	1.66
December	5044	3.2	5.2	0.21	16.1	26.4	1.06
Annual Average	4904	3.6	7.3	0.24	17.7	35.5	1.11

Table 4-1 - Summary of WPCC 2024 Final Effluent Flows and Loading

- 4.2 Monitoring Data Interpretation
 - **4.2.1** Five day Carbonaceous Biological Oxygen Demand (CBOD5) is sampled once per week from a composite sample. The effluent reporting criteria is 25 mg/L and the plant objective is 15 mg/L. The monthly average high was 6.0 mg/L in October. The CBOD5 objective loading rate is 142.5 kg/d, and in 2024 the plant maximum monthly average loading was 36.0 kg/d in April.
 - **4.2.2** The Total Suspended Solids (TSS) in the raw and effluent wastewater is usually measured monthly from a composite sample. The effluent reporting criteria is 25 mg/L and the plant objective is 15 mg/L. The maximum monthly average in 2024 was 11.0 mg/L in August. The objective with respect to plant effluent loading of TSS is 142.5 kg/d. The WPCC had a maximum monthly average effluent loading of 57.1 kg/d in April.
 - **4.2.3** The Total Phosphorous (TP) in the raw and effluent wastewater is sampled and tested each week from composite samples. The reporting criteria is 1.0 mg/L and the plant objective is 0.75 mg/L. The maximum monthly average of TP levels in 2024 was 0.53 mg/L in October. The Total Phosphorous objective loading rate is 9.5 kg/d and in 2024 the maximum monthly average TP loading rate was 2.07 kg/d in October.

5.0 Effluent Objectives and Effluent Quality Assurance

11.4.e. a summary of any effluent quality assurance or control measures undertaken;

11.4.g a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:

a) when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality; b) when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;

11.4.m.a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;

5.1 Effluent Monitoring

Table 5-1 below lists the objectives, limits and results of the final effluent monitoring parameters.

Table 5-1 - 2024 Final Effluent Sampling Results

	Total Ammonia Nitrogen (mg/L)	Total Residual Chlorine (mg/L)	E.Coli (CFU/100ml)	рН	Temperature (°C)	Un-Ionized Ammonia (Note #2)	Lethality Test
Objective	10.0 (May- Oct) 15.0 (Nov- Apr)	Non- Detect	100	6.5 - 8.5	N/A	N/A	Note #1
Limit	Note #1	N/A	200	6.0 - 9.5	N/A	N/A	Pass/ Fail
Compliance Assessment Basis	Monthly Average	Min/Max	Monthly Geometric Mean Density	Min/Max	Monthly Average	Monthly Average	Single Sample
January	12.7	0.02/0.04	2.6	6.8/7.1	12	0.0386	Pass
February	13.7	0.01/0.03	2.4	6.9/7.3	12	0.0460	Pass
March	11.0	0.00/0.04	5.6	6.9/7.2	14	0.0430	Pass
April	12.5	0.02/0.05	6.7	6.7/7.4	14	0.0553	Pass
Мау	2.8	0.00/0.02	66.3	6.2/6.8	19	0.0045	Pass
June	9.2	0.00/0.03	21.8	6.4/7.0	20	0.0445	Pass
July	1.4	0.00/0.04	21.2	6.5/7.0	22	0.0072	Pass
August	2.2	0.00/0.03	74.3	6.1/6.9	23	0.0034	Pass
September	1.3	0.00/0.04	85.7	6.0/6.5	23	0.0013	Pass
October	1.0	0.00/0.02	77.4	6.0/7.1	20	0.0121	Pass
November	9.6	0.00/0.03	6.1	6.1/7.0	18	0.0220	Pass
December	10.8	0.00/0.03	2.0	6.6/7.0	13	0.0116	Pass
Note #1- Non- Acutely Lethal to Rainbow Trout and Daphnia Magna							
Note #2- Un-Ionized Ammonia calculated using pH and temperature at time of sampling for Total Ammonia Nitrogen							

- **5.1.1** Total Ammonia Nitrogen has an objective of 10.0 mg/L throughout the months of May to October and 15.0 mg/L throughout the months of November to April. The effluent limit is to be non-acutely lethal to rainbow trout and daphnia magna year-round on a monthly test. The maximum monthly concentration was 12.5 mg/L in the month of April. All lethality tests throughout the year passed.
- **5.1.2** Total Residual Chlorine objective is to be non-detectable. A residual was detected in all months but at no time in the year did the value exceed 0.05 mg/L.
- **5.1.3** E.coli is measured in the unit of CFU/100mL as a monthly geometric mean density and the objective is 100 CFU/100mL. This objective was met in all months with the highest monthly geometric mean being 86 CFU/100mL in September. The limit for E.coli is 200 CFU/100mL.
- **5.1.4** <u>pH</u> is the negative log of the concentration of hydrogen. The objective for pH is 6.5 8.5 at all times. Exceedances noted are based on daily sampling. Soda ash is dosed in the aeration effluent channels to raise the pH and at all times the effluent pH was within the limit of 6.0 9.5. The WPCC effluent pH is sometimes too low because the raw sewage does not contain sufficient alkalinity to fully nitrify the incoming nitrogen.

There were no deviations from the monitoring schedule for the current reporting year.

6.0 Bypass, Overflow and Spills Summary

11.4.j. a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;

11.4.I. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted;

- On February 6th and 17th digester gas spilled to the atmosphere due to equipment malfunction. There was 18m3 of gas spilled on the first occasion and 7.5 m3 during the second event.
- A total amount of 120.52 m3 overflowed to the Madawaska River on June 6/7 due to heavy rain.
- In the afternoon of June 7th, 125 m3 overflowed from the Albert St, manhole to the Madawaska River. Again, due to heavy rain.
- On July 9th, heavy precipitation caused an overflow at the Albert St manhole in the amount of 42 m3.
- An amount of 16.59m3 overflowed from pump stations #2 & #3 because of heavy rain on July 24th.
- Due to equipment failure, on October 6th a volume of 90 m3 spilt to the Madawaska River from pump station #1.

Required samples were collected for all events and lab results were received. All events were reported to the MECP and the local health unit.

The digester pressure relief valve was serviced to ensure digester gases flowed to the flare stack.

A failed pump, check valve and motor controllers were replaced at pump station #1.

2024 capital works included the Reconstruction of MacDonald Street Ph I which resulted in the block of existing combined sewer between William Street and McGonigal Street being separated into dedicated sanitary and storm sewers. The total cost of this project was \$4.2 million.

2025 planned capital works include the Reconstruction of MacDonald Street Ph II and Edey Street which will see the reconstruction of aging sanitary sewers on both streets which will result in tighter sewer systems with significantly less inflow and infiltration, thereby reducing sewage flows to the WPCC and reducing the likelihood of overflows to the natural environment. The budgeted cost of this project is \$4.6 million.

7.0 Operating Problems

11.4.c. a summary of all operating issues encountered and corrective actions taken;

11.4.k. a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Condition 10, including a report on status of implementation of all modification;

A proactive approach is being utilized, contracting licensed plumbers, electricians and millwrights to make improvements throughout the facilities. No significant operational problems to note.

8.0 Plant Maintenance

11.4.d. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;

Both a monthly and a weekly maintenance schedule are printed out and the maintenance personnel initial the schedule as tasks are completed. If any major repairs are required, the operator communicates these to the ORO supervisor who then contacts the appropriate licensed contractor.

A summary of major repairs or maintenance carried out in 2024 is as follows:

- Annual certification of laboratory instruments.
- Annual certification of backflow preventers.
- Annual certification of flow meters.
- Purchase of bisulphite dosing pump
- Various health and safety supplies purchased.
- Purchase of spare sludge pump packing.
- Refurbish Flygt grit pump.
- Fabrication and installation of safety guard rail.
- Purchase of HACH chemical reagents.
- Purchase and replacement of hypo pump head.
- Spare mixer refurbished, ready for service.
- Many ESA defects identified and corrected by licensed electricians.
- Purchase of desks for control room.
- Replacement of VFD and overload by contractor

9.0 Sludge Processing

11.4.h. a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed.

Combined primary and secondary waste activated sludge is collected from all four primary settling tanks and pumped into the anaerobic digesters. From the digesters, sludge is pumped into holding tanks, it is then conditioned and processed in the centrifuge. Sludge is dewatered to approximately 22% and loaded onto a truck and transferred to the Arnprior landfill.

A total of approximately 186,614 kg dry weight of sludge was transported to the Arnprior Waste Disposal Site. Sludge production in 2025 is expected to be higher than 2024. Table 9-1 below provides a summary of the 2024 centrifuge operation and sludge management totals.

Month	Sludge To Storage m ³	Sludge To Centrifuge m ³	% Solids Avg.	Dry Solids (kg)
January	641	841	2.24	18,827
February	283	627	2.35	14,739
March	705	919	1.35	12,409
April	587	1051	2.14	22,395
Мау	737	938	1.73	16,224
June	606	841	1.73	14,500
July	493	1,280	1.50	19,205
August	366	1,025	1.76	17,994
September	575	1,040	1.90	19,791
October	348	932	1.51	14,086
November	445	514	1.48	7,580
December	428	566	1.57	8,864
Avg	518	881	1.77	15,551
Max	737	1,280	2.35	22,395
Min	283	514	1.35	7,580
Total	6,212	10,574		186,614

Table 9-1 - Centrifuge Operation and Summary of Sludge Totals

10.0 Monitoring Equipment Calibration

11.4.f. a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;

All flow meters were calibrated by an outside contractor and all flow meters passed calibration. The benchtop analyzers are certified annually to ensure accuracy.

11.0 Complaints

11.4.i. a summary of any complaints received and any steps taken to address the complaints;

There was a complaint of a loud siren being audible at night on one occasion. This was due to an intrusion alarm set to activate a siren. The siren was disabled being that it was only put back into service when a new security provider updated the system.

12.0 Conclusion

The Arnprior WPCC met all MECP sewage effluent limits throughout the reporting period.

The objective for total chorine residual was not met but at no time did the value exceed 0.10 mg/l. Also to be noted, the sampling location is not representative of the point of discharge in the Ottawa River. The objective being, non-detectable for total chorine residual,

The objective for pH is between 6.5 and 8.5. Due to the nitrification process the effluent can be less than 6.5 at times but at no time below the limit of 6.0

For inquiries regarding this report, please contact Scott Matthews at 623-4231 Ext. 1834.

Completed by Scott Matthews Waterworks Supervisor Arnprior