



Report n° WW2024-003
Date: 17/04/2024
Submitted by: Philippe Cormier
Subject: Biosolids Lagoon 2023 Annual Report

Nature/Goal

The purpose of this report is to present to Council the annual report for the Clarence-Rockland Wastewater Treatment Plant's Biosolids Lagoons completed as required under the site's Environmental Compliance Approval (ECA).

Directive/Previous policy

N/A

Department's recommendation

WHEREAS there is a requirement to prepare and submit an annual report for the Wastewater Treatment Plant's biosolid lagoon operations to the Ministry of Environment Conservation and Parks;

BE IT RESOLVED THAT Council hereby acknowledges the receipt of the report entitled "Biosolids Lagoons 2023 Annual Groundwater Monitoring Report", as attached to Report No. WW2024-003.

ATTENDU QU'il y a une exigence de préparer et soumettre un rapport annuel au Ministère de l'environnement et de la protection de la nature et des parcs par rapport aux opérations des lagunes biosolides de l'usine des eaux usés;

QU'IL SOIT RÉSOLU QUE le conseil accuse réception du rapport intitulé "Biosolids Lagoons 2023 Annual Groundwater Monitoring Report", tel qu'annexé au rapport no. WW2024-003.

Background

In 1997, a new wastewater treatment plant was built in Rockland to replace the lagoon treatment system.

From 1997 to 2002, the excess biosolids produced during the treatment process were pumped 400m to the previous treatment lagoon site located at the end of Industrielle road.

In the fall of 2002, the new biosolids lagoons were constructed and operational by early 2003. The new lagoons consist of two (2) lagoons, each of 0.14 hectare in size and are located on land once formerly occupied by the aeration's lagoons - situated approximately 50 meters north of the wastewater treatment plant.

A requirement of the construction of the biosolids lagoons was to install monitoring wells around the perimeter in order to monitor their integrity (sealed containment) and ensure that they did not impact existing

groundwater. In addition to the groundwater monitoring plan an “emergency action plan” was established in order to address a groundwater impact by the lagoons.

Over the course of several years, additional monitoring wells were installed in response to the Ministry of the Environment Conservation and Parks (MECP) review of the City’s 2016 annual report.

Groundwater Monitoring Program:

WSP was retained by the Corporation of the City of Clarence Rockland (City) to undertake the annual groundwater monitoring and reporting pursuant to satisfying the conditions prescribed by the amended Certificate of Approval; number 3-0466-93-967, Notice 3. This Approval was originally issued on February 8, 1996.

This report [reference Attachment A] covers the activities at the site for the period of February 2023 to January 2024. Specifically, the scope of the monitoring program included:

- Record static water levels at the 12 on-site monitoring wells quarterly;
- Collect representative groundwater samples from each of the 12 monitoring wells four (4) times per year;
- Complete a semi-annual visual inspection of the lagoon berms for breakouts;
- Compare groundwater sample results to the established groundwater triggers, as well as Provincial Water Quality Objectives (PWQO) where appropriate; and,

Compile and interpret the data and prepare a report summarizing the findings.

Discussion

The results of the groundwater chemical analysis were tabulated and are summarized in Table 2 included in Appendix A. The results were used to undertake an assessment of the site’s threshold values, as well as, compare against the limits prescribed by the Ontario Drinking Water Quality Standards/Guidelines (ODWQS) and MECP publication Provincial Water Quality Objectives (PWQO). These actions were deemed necessary since there are groundwater uses on adjacent properties and groundwater discharges to nearby surface waters. The comparison to the ODWQS and PWQO is for information purposes only.

Replacement of the biosolid lagoons is scheduled for 2026 in the municipalities Development Charge (DC) report. Within the DC report, gross project costs have been estimated for the design, remediation of existing lagoons and

construction of new biosolid management system.

There is evidence that the ground water is showing elevated concentrations of some contaminants (outlined below). These levels are not critical or alarming, many of which do not exceed provincial standards. The administration has taken a proactive approach in starting the design review process. WSP engineering has been retained to conduct the preliminary project design framework. This process will present all biosolid treatment systems available to the municipality that will reinforce efficiencies in regard to the operations at the Waste Treatment Plant.

Monitoring well MW-3 and MW11-10 are upgradient of the lagoons at the facility; and therefore, are thought to be considered representative of the background conditions. After review of the monitoring well, it was decided that the water quality at the monitoring well MW11-10 may be more vulnerable to influence by the adjacent on-site and off-site activities than monitoring well MW-3. The analytical results are included in Appendix E of the report.

The following are specific noteworthy observations:

- Monitoring wells MW11-8 and BH03-4 had significantly elevated ammonia concentrations compared to the background well MW-3.
- Monitoring wells MW11-8, BH03-4 and MW11-9 exceeded the PWQO limit for iron(0.3mg/L) during the spring.
- Total phosphorus concentrations exceeded the PWQO limit of 0.02 mg/L at each monitoring well. These amounts have been consistent with the 2019 well testing.
- Monitoring well W-8 exceeds the PWQO Limit for aluminum during the May and November sampling events.
- Monitoring well MW-2 exceeds the limit prescribed by the ODWQS for nitrate of 10 mg/L during both sampling events. Although not exceeding provincial standards, monitoring wells MW17-01 and MW-5 and MW-11-7 had significantly higher nitrate concentrations than the background monitor MW-3.
- Monitoring wells MW11-6 MW11-7 and MW-5 had concentrations of chloride above the ODWQS limit and significantly elevated compared to other monitors.
- Monitoring wells MW-6, MW11-7 and MW-5 have concentrations of sodium and chloride above the prescribed ODWS/OG limits. This may be attributed to salt-impacted stormwater drainage from winter-maintained service road.

- MW11-8 and BH03-04 had significantly elevated TKN during both monitoring events compared to the background monitor MW-3.
- Monitoring wells MW11-8 and BH03-4 had significantly elevated ammonia concentrations compared to the background well MW-3.

Conclusions:

It is evident that there are groundwater impacts associated with the operation of the biosolids storage lagoons. There is evidence of groundwater mounding in the vicinity of the lagoons, and the elevated concentrations of some contaminants in the groundwater downgrade and in the immediate vicinity of the lagoons. This suggests that exfiltration from the lagoons may be occurring.

Remediation Recommendations:

Section 5 of the annual report [reference Appendix A] details the recommendations to address the issues identified above. They include:

- implement “plan of action” described in the C of A.
 - the first step of the plan of action is to conduct a preliminary design review. Council Report *INF2021-025* identifies and outlines the necessary steps and financing for the design review.
 - ***Next step: start the detailed design process of the chosen system to replace the Biosolid Lagoons and decommission the existing lagoons.***

In the immediate future staff will ensure the following;

- continue implementation of the current monitoring and reporting program
- Extension and repairs will be done to MW11-8, MW11-7, MW-4 and MW-5
- at the next opportunity when sludge removal takes place, conduct a detailed survey of the lagoons to confirm the as built condition of the works. This will serve to provide confidence in the separation of the overburden groundwater and the bottom extent of the works. The survey should include an intrusive examination of the construction of the lagoon to establish the level of hydraulics security
- Continue monitoring MW-3 to evaluate its suitability for use as an interim background monitoring.

- A project has been initiated with the goal of building a biosolid treatment facility to process the wastewater treatment by-product and to eliminate foul odors cause by the sludge treatment. This project is part of the DC report of future planned projects. Once the facility is built and operational, the existing lagoon will be decommissioned, and surrounding lands will be decontaminated.

Consultation

N/A

Recommendations or comments from committee/ other departments

N/A

Financial impact (expenses/material/etc.)

There is a requirement to fund the remediation measures identified above. Staff will assess the ability to fund these expenditures from within approved current operating budgets. If additional funding is required, this will be the subject of a future staff report to Council.

Legal implications

The ongoing monitoring of the lagoon operations is a critical process for the municipality. It ensures that the Department proactively initiates corrective measures to address deficiencies as they become known to staff. This minimizes the possibility of legal actions against the city and ensures compliance with the ECA.

Risk management

Refer to Section 9 above.

Strategic implications

The monitoring and annual reports for the biosolids lagoons are important initiatives to ensure that the municipality is providing services to respond to the continued health and well-being of its residents. As well, the commitment to implement measures as necessary demonstrates the need to maintain vital city infrastructure in an environmentally sensitive manner.

Supporting documents

Attachment A: Biosolids Lagoons 2023 Annual Groundwater Monitoring Report (Annexes A to G available upon request)