Conservation Council *of* New Brunswick
Conseil de conservation *du* Nouveau-Brunswick

Environmental impact assessment (EIA) for the Replacement of the Mactaquac Provincial Park Wastewater Treatment Lagoon, Mactaquac, NB.

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Introduction

Throughout its 54-year history, the Conservation Council of New Brunswick (CCNB) has strived to increase awareness of environmental issues and advocate for solutions by conducting research, educating the public, and implementing interventions. We at the CCNB are committed to promoting solutions that are socially, environmentally, and economically responsible.

This submission is informed by the provisions of the Clean Environment Act, Clean Water Act, and the Canadian Environmental Assessment Act. This submission is intended to offer observations regarding the scope of the Environmental Impact Assessment (EIA) about the

proposed installation of the Replacement of the Mactaquac Provincial Park Wastewater Treatment Lagoon at Mactaquac Provincial Park, Mactaquac, New Brunswick.

The proposed project involves the construction of a new two-cell aerated waste treatment lagoon with ultraviolet (UV) disinfection next to the existing lagoon which would be decommissioned once the new lagoon is in service. Decommissioning the existing lagoon would include pumping wastewater into the new lagoon for treatment, removing sludge, grading, and revegetating the site.

The Conservation Council of New Brunswick acknowledges the potential for enhancing the Wastewater Treatment Lagoon at Mactaquac Provincial Park. However, it's crucial for the proposed project to thoroughly consider and mitigate any risks that may arise during both the construction and operation phases.

Globally, wastewater discharge is 400 billion cubic meters/per year, and it pollutes about 5.5 trillion cubic meters of water every year. The type and quality of wastewater generated varies according to the region. [1]

Across Canada, a high proportion of the population is served by wastewater collection and treatment systems. The level of treatment ranges from no treatment to very sophisticated and thorough treatments. Wastewater effluents are released to a wide variety of receiving environments: lakes, ponds, streams, rivers, estuaries, and oceans. Effluents released from wastewater systems do contain pollutants of concern since even advanced treatment systems are unable to remove all pollutants and chemicals. The solid material (biosolids and sludges) collected during treatment is disposed of on land, incinerated, or sent to landfills. Treatment of wastewater also releases emissions into the air mostly in the form of carbon dioxide and methane. [2]

Wastewater entering reservoirs, regardless of their designated water use, must be free from substances harmful to aquatic life or posing risks to human health.

In the assessment conducted by the Conservation Council, the installation of a new Wastewater Treatment Lagoon may increase treatment efficiency but also can bring environmental and social risks.

The EIA study must assess the potential for environmental impacts from this project.

Wastewater

Wastewater is a mixture of many different substances, such as sand, debris, suspended solids, pathogens, organic waste, nutrients, and a mixture of approximately 200 known chemicals. The negative impacts of wastewater pollution affect the health of aquatic and terrestrial organisms, as well as human health and the economy.

Municipal wastewater contains nutrients such as nitrogen and phosphorus. Although these nutrients are beneficial to plant life, high concentrations can lead to negative effects. Excessive growth of plants, especially algae, leads to eutrophication of receiving surface water bodies. This state of overgrowth leads to the degradation of the aquatic ecosystem

When large algal blooms die and decompose in freshwater ecosystems, large amounts of dissolved oxygen are used up, putting fish and other aquatic organisms at risk. Excess plant material also suffocates the bottom, creating additional stress for benthic organisms. In addition, some algae produce toxins that pose a risk to the environment and human health.

Many lakes and rivers suffer from the effects of eutrophication due to excess nutrients in urban sewage. Coastal areas are also under stress. Fish kills occur periodically due to nutrient levels in untreated sewage.

Eutrophication leads to a decrease in the biodiversity of plants and aquatic organisms, which creates a burden on the ecosystem.

In addition to the eutrophication of water bodies, sewage also contributes to another process of deoxygenation. The biological (bacterial) breakdown of solid organic matter in wastewater also consumes dissolved oxygen - the biological oxygen demand (BOD). Furthermore, the decomposition of chemicals in wastewater removes oxygen from the water through chemical reactions - chemical oxygen demand (COD).[3]

Due to the presence of many toxic substances in wastewater effluents, and the uncertainty about how they affect living organisms separately and/or in combination with each other, it’s difficult to assess the true environmental costs associated with municipal discharges. Impacts may be acute and occur very quickly, or they may be cumulative and happen over a long period. One thing is known, however, municipal wastewater discharges represent a significant threat to aquatic and terrestrial life.[3]

Wastewater has a direct impact on the biological diversity of aquatic ecosystems and its inappropriate management is capable of disrupting the fundamental integrity of life support systems, on which a wide range of sectors, from urban development to food production and industry, depend. [4]

Releases to Water

Inadequate treatment of wastewater often leads to the formation of sludge, which has a detrimental effect on the life of reservoirs.

Wastewater discharges can alter physical characteristics in a receiving body of water, such as alterations in temperature, flow rates, and the amount of suspended solids. Temperature increases may result in changes in the kinds and numbers of species present, and may also cause increased algae growth.

Changing the flow rates of streams can cause bank erosion, flooding, and stream bed changes, which result in habitat alterations, changes in the food web, and species loss.

Releases to Air

The collection and treatment of wastewater results in the release of certain volatile chemicals into the air. The chemicals typically released in the largest volume include; methane, carbon dioxide, oxides of nitrogen, hydrogen sulfide, mercaptans, chlorine (if used in the treatment process), and various other chemicals that can be released to a smaller extent.

Releases to Land

The process of removing both inorganic and organic suspended solids from the wastewater results in large quantities of solid waste. In typical treatment facilities, the inorganic solids (grit, debris) and other non-biodegradable materials are sent to landfill.

Lagoons

Lagoons are typically cost-effective to construct, easy to operate, and can yield treated effluent that poses minimal harm to the environment when appropriately designed, operated, and maintained. Nevertheless, as communities expand and environmental standards tighten, there's often a necessity to enhance capacity or refine performance.[5]

Wastewater treatment plants (WWTP) are mainly designed to reduce wastewater and environmental pollution, but the raw materials, energy consumption, and emissions from the WWTP subsequently result in different environmental impacts.

The effects of municipal wastewater effluents on environmental and human health are significant. The prevention of these problems, or at least their reduction is crucial. However, even a plant operating at peak efficiency with the most up-to-date technology releases contaminants into the environment.

These comprehensive considerations are intended to cover various aspects and potential impacts associated with the proposed construction of a new two-cell aerated waste treatment lagoon project. They should be incorporated into the environmental assessment process to safeguard both human health and the environment.

Point for further consideration

In light of the above considerations and the imperative to safeguard both human and environmental interests, the following measures are proposed for inclusion in a comprehensive Environmental Impact Assessment (EIA) project content:

1. Early Environmental Consequences Assessment:
    - The report should encompass the environmental ramifications from the project's initial stages, such as the construction of a new lagoon and the decommissioning of the existing lagoon

2. Technical Details of Planned Activity:
    - Comprehensive specifications of the vehicles and equipment used at all stages of the project
    - Detailed descriptions of technological processes occurring during the project
    - Description of the steps and timeline of the proposed project
    - Description of the land area which will be involved in the construction of a new lagoon and the area of the lagoon itself

3. Waste Management:

    - Comprehensive analysis of waste generated by the Wastewater Treatment Lagoon unit, specifying waste types and quantities
    - How much sludge needs to be removed and disposed of with the existing lagoon
    - Description of the place and ways to remove and dispose of sludge with the existing lagoon
    - Calculation of the possible amount of sludge that can accumulate during annual operation in new lagoons and its impact on the environment
    - Description of the place and ways to remove and dispose of sludge with the new lagoon

4. Air Emissions:

    - Identification of emission sources during the construction and operation of a new lagoon and decommissioning of the existing lagoon
    - Calculation of airborne emissions during the construction and operation of a new lagoon and decommissioning of the existing lagoon

5. Microclimatic Conditions Impact:

    - Assessment of the effect on microclimatic conditions, including the formation of elevated temperature zones during facility operation

6. Groundwater Impact:

    - Represent geotechnical investigation to assess the area under the proposed project
    - Provide data on the smallest depth of groundwater under the new lagoon
    - Evaluation of impacts on groundwater

7. Water Impact:

- Assessment of chemical composition, qualitative, and quantitative characteristics of discharged water from the current lagoon
- Evaluation of impacts on nearby water bodies
- Assessment of potential changes in aquatic plant and animal populations
- Calculation of the volume of water that will be discharged from the new lagoon (annual and hourly), the place of its discharge, and the expected chemical composition during discharge
- Provide a calculation of turbidity from the discharge of wastewater into a water body

8. Impact on flora:

- Describe how many and what species of trees will need to be removed to construct the proposed project
- Describe further uses of the removed trees from the proposed area

9. Soil Impact:

- Describe further ways to use the excavated soil
- Describe the soils that are in the territory of the proposed project

10. Reclamation:

- Provide a comprehensive analysis of how disturbed land from the lagoon will be reclaimed

11. Public Health:

- Evaluation of dangers and potential health risks during facility operation

12. Emergency Response:

- Comparative assessment of environmental impacts under normal operation and during accidents, such as floods, uncontrolled discharge of water, emergency leaks
- Indicate the protection measures that will be applied when pumping wastewater from the current lagoon to the new lagoon
- Identification of possible emergency scenarios and preventive measures
- Calculation of region contamination in case of worst-case accident scenario
- Formulation of an Emergency Response Plan, delineating responsibilities and technical means

- Estimation of costs associated with compensating in case of accidents
- Describe measures to prevent and/or mitigate erosion of the territory
- Description of mitigation measures that will be applied to reduce or eliminate the negative impacts of the planned activity on the natural environment, including biodiversity

13. Environmental monitoring during operation:

- Formulate environmental monitoring programs, including waste management facilities, by monitoring soil, groundwater, surface water, air, and vegetation on a regular and ongoing basis. The results should be publicly available promptly.
- Detailed environmental monitoring program during facility operation

14. Research Methods and Data Sources:

- Inclusion of all research methods, investigations, and environmental impact assessment approaches
- Identification of information sources used in the report, supporting the data and conclusions

Conclusion

The discharge of untreated or insufficiently treated wastewater into reservoirs and watercourses, i.e., water discharged after its use in human domestic and industrial activities, is the main cause of natural water pollution and can have a serious impact on human health, quality of life, and the state of the ecosystem.

Research and monitoring of wastewater fate and effects, safety measures, and comprehensive oversight are important to ensure that decision-making is based on sound science.

Wastewater, formed as a result of drinking, household, and technical water use, is inevitably discharged into a natural body of water, from which, either directly or at the next stages of the water cycle, the water is returned to humans again. Therefore, the protection of natural reservoirs from pollution by wastewater ultimately ensures the reliability of the ecological safety of drinking and household water use.

The Conservation Council of New Brunswick recognizes the opportunity to improve the Wastewater Treatment Lagoon at Mactaquac Provincial Park. Nevertheless, it's essential for the proposed project to carefully assess and address any potential risks that could occur during both the construction and operation stages.

References

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