



# BUSINESS CASE

## Municipality in North America

### Project highlights

Municipality: Ascot Corner, 3,500 citizens  
 Total investment: CAN\$560,000

- Impact: 40% increase in processing capacity.
- 300 additional housing units can be built.
- Reduction in energy consumption and greenhouse gas (GHG) emissions

Products: 3 modules installed in aerated lagoons.  
 Economic benefits:

- 30% less expensive to acquire than the closest solution.
- 60% less expensive in maintenance costs over 5 years.

### Baseline



*Aerated lagoons of Ascot Corner*

The total population of Ascot Corner in 2015 was 3,500 citizens. Wastewater comes mainly from domestic sources with some shops and restaurants.

#### Wastewater treatment plant:

Parameters	Current	Short term	Long term
Flow (US gal)/min (m <sup>3</sup> /d)	40 (215)	69 (375)	92 (500)
Organic load lb/d (kg BOD <sub>5</sub> /d)	55 (25)	165 (75)	198 (90)

### Overview

In many parts of the world, wastewater treatment is carried out using aerated lagoons, a process also known as "ecological lagooning". Aerated lagoons are a reliable, efficient and inexpensive process. They can be found in all climates in about 50 countries, including the United States, Canada, Australia, New Zealand, India, Africa, and even in Alaska. More than 70% of municipalities across North America use aerated lagoons. These lagoons are composed of basins where the water typically stays for 12 to 20 days and undergoes a process of sanitation. Microorganisms in the water break down organic load and transform it into mineral elements. Aerators, located in the basins, allow for proper oxygenation of the water in this ecosystem. The sanitation process creates a sludge that settles at the bottom of the lagoons and must be removed every few years. The role of aerated lagoons is to receive all sanitary wastewater, to treat it biologically and to retain the sludge produced. It is the easiest and most economical way to operate wastewater treatment systems.

Lagoons face many challenges related to population growth and climate, which can be summarized as follows:

- A saturation of the lagoons' treatment capacity;
- A difficulty to maintain the performance of the sanitation process in the winter and during major hydraulic flows, such as heavy rainfall or the melting of snow;
- Tighter regulations on contaminant loads that may be released into the environment, such as ammoniacal nitrogen (NH<sub>4</sub><sup>+</sup>) and phosphorus.

In Canada, aerated lagoons are the most common wastewater treatment process. There are more than 3,200 municipal aerated lagoons and they face the challenges enumerated above.



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## Current problems and restrictions

The municipality's development plan includes several residential projects in addition to the expansion of its industrial park. However, for several years, development projects have been carried out individually. Each one requires extensive effort to be approved by the Ministry of the Environment since the wastewater treatment plant (aerated lagoons) has almost reached its full capacity. The projects are grouped into small blocks of 3, 5 or 10 dwellings, which hinders the municipality's development efforts. The entire economic and social vitality of the municipality is compromised by this situation.

Several studies have been carried out in recent years to determine the possibilities of modifying wastewater treatment infrastructures. This is to enable the infrastructures to become capable of supporting the municipality's development plan with a view of sustainable development.

## The traditional solution

One of the most widely used technologies to increase the treatment capacity of aerated lagoons is the Moving Bed Biofilm Reactor (MBBR). The MBBR is preferably implanted before the first lagoon. It allows the reduction of the largest quantity of organic load (measured by the biological oxygen demand - BOD<sub>5</sub>). The existing lagoons are then used for polishing and sludge storage.

MBBR technologies involve the construction of one or more concrete tanks for the biological reactor. The tanks are then filled with a fluidized media (moving in the water) to fix and concentrate the biomass. The construction of these infrastructures involves a considerable amount of work and equipment.

The maintenance of mechanical parts must be done regularly, resulting in the consumption of a significant amount of energy. The MBBR sludge management must be done on a yearly basis.

The MBBR is supplied with air using blowers (high flow rate, low pressure). In most cases, new blowers are needed because the current ones must keep supplying air to the existing lagoons.

## The ECOFIXE solution and its advantages

Each module is equipped with a fine-bubble aeration system placed under each module, which helps to oxygenate the biomass, while ensuring maximum oxygen transfer. As the aeration system is more efficient than the standard lagoon aeration, the ECOFIXE system reduces the installation's energy consumption.

The modules do not interfere with the sludge removal operations that are required in the lagoons, i.e. they may be carried out while keeping the system in place. Since the quantity of sludge generated by the system is marginal, the presence of the ECOFIXE system does not increase removal frequency.

Once installed, the ECOFIXE system is self-sufficient, and does not require an operator to be present.



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### ADVANTAGES OF THE ECOFIXE SYSTEM

- No additional land required;
- No chemicals;
- Fast and simple installation (within a week);
- Modular;
- Sturdy;
- Energy efficient;
- Low operating costs;
- Treats 100% of the flow;
- Stable and constant performance.

### IMPACT ON GREENHOUSE GAS EMISSIONS

Did you know that 30% of a municipality's GHG emissions come from wastewater treatment? The expansion of aerated lagoons therefore increases GHG emissions, which in turn contribute to climate change.

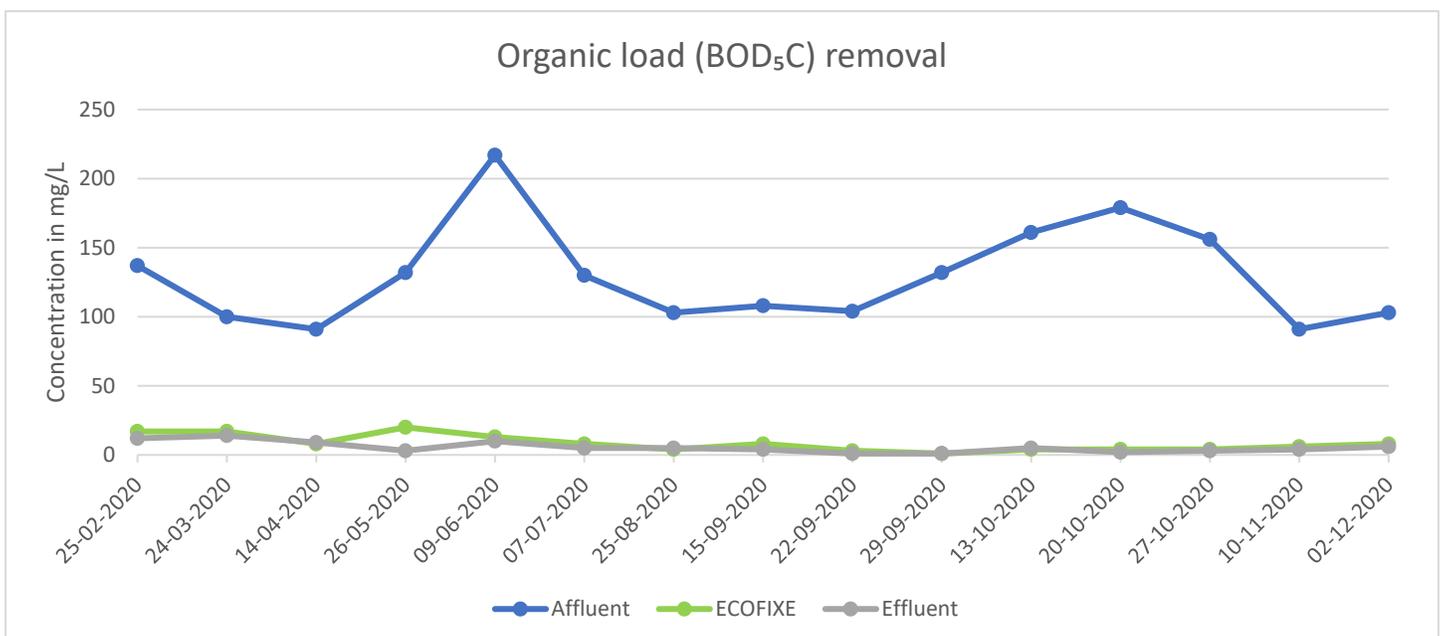
For Ascot Corner, an independent third party has demonstrated that the ECOFIXE system emits **80% less GHG than a comparable MBBR installation over its lifetime**. Another concrete step to protect the environment thanks to Technologies Ecofixe's solutions.

## Performance

To meet the municipality's short and long-term needs, the Technologies Ecofixe team determined that 3 ECOFIXE modules are required. The company's R&D has led to the development of a modelling tool that allows the team to design custom projects.

The model takes into account the customer's parameters (organic load, flow, etc.) as well as the customer's needs, in terms of additional treatment capacity.

The ECOFIXE system increases the treatment capacity of aerated lagoons from 20 to 40%. An abatement rate of 95% is observed when applied to the organic load.



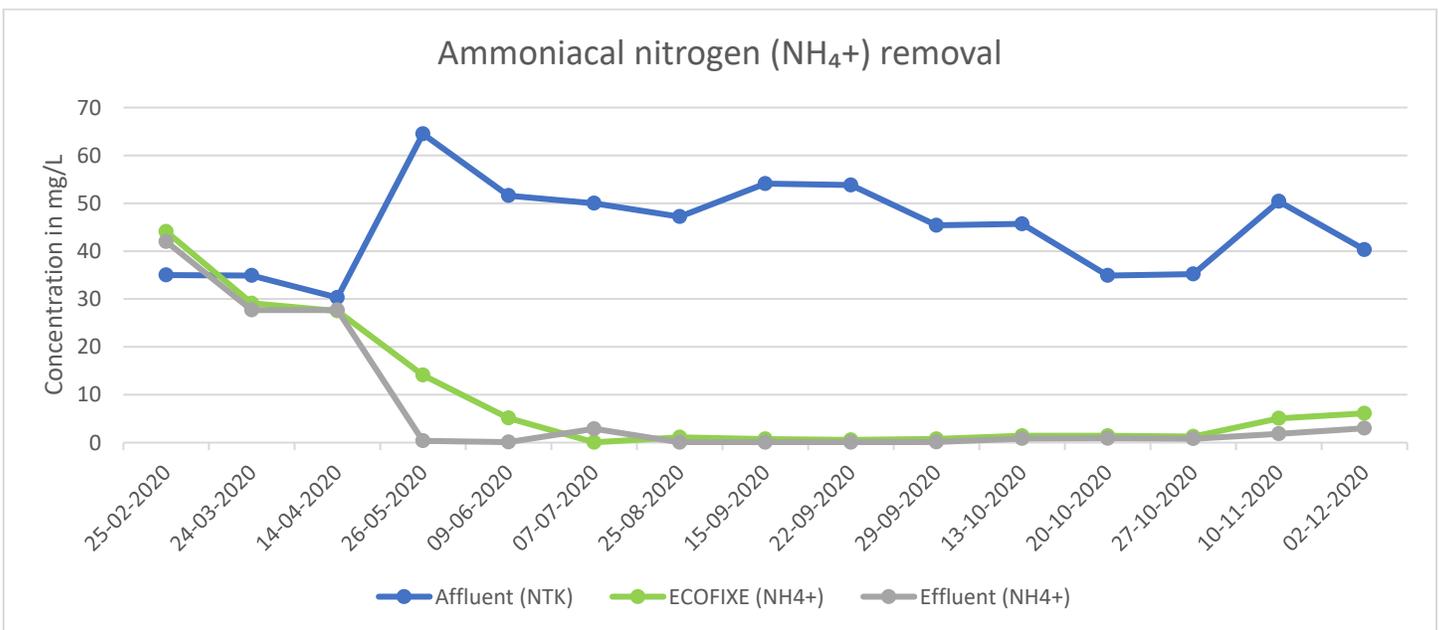
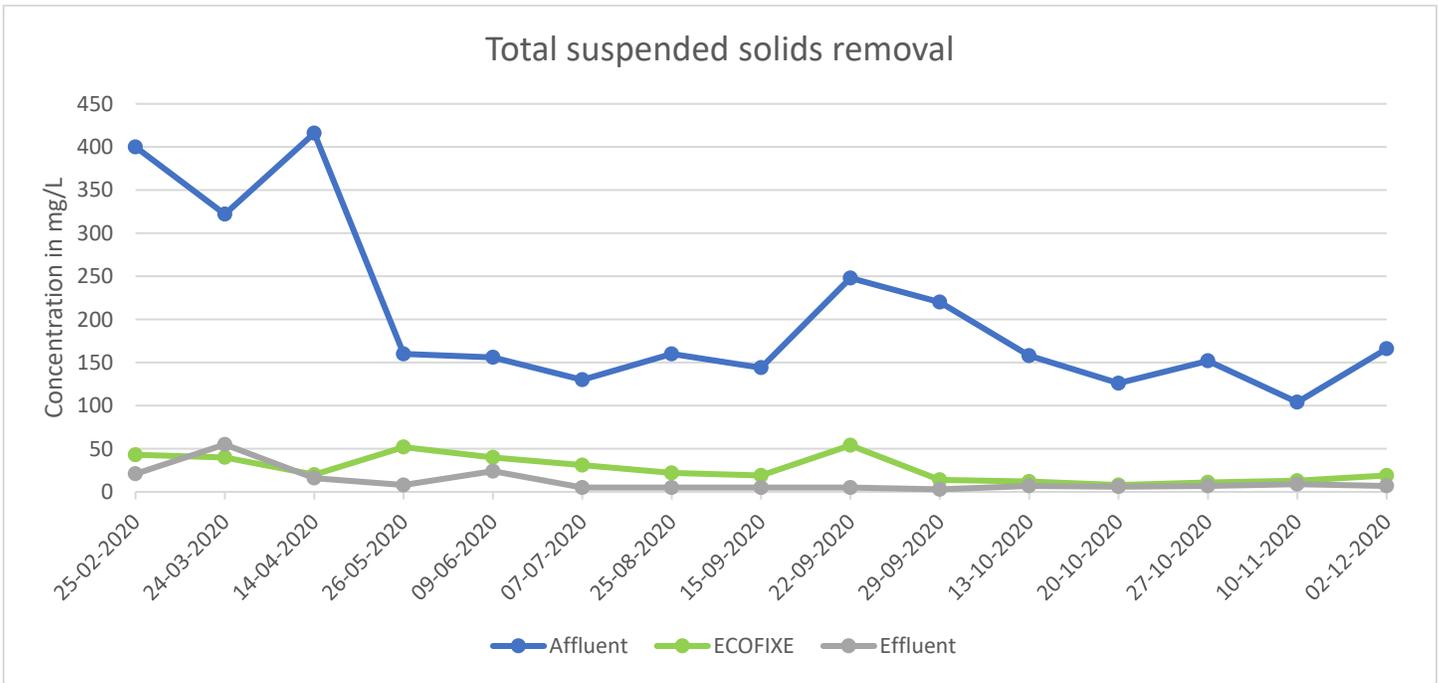


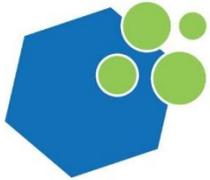
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Although the main objective of the ECOFIXE system is to optimize the organic load removal, practical application has shown us significant performance on the following parameters:

- Total suspended solids (TSS)
- Ammoniacal nitrogen (NH<sub>4</sub><sup>+</sup>)



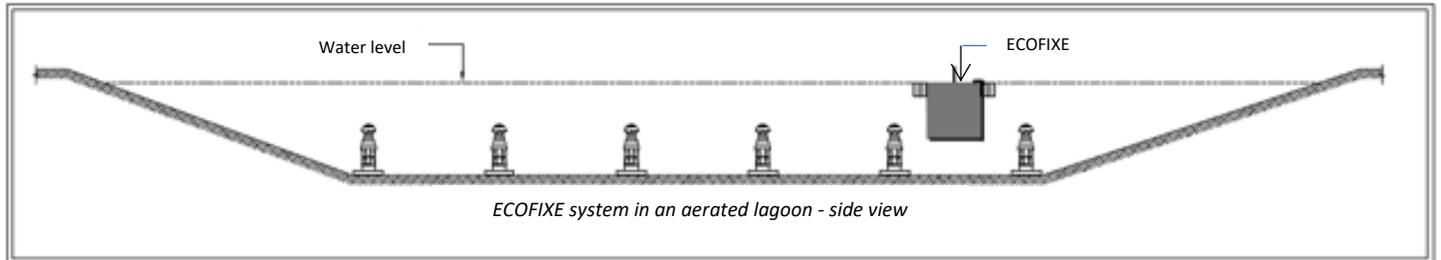


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**ECOFIXE**

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## Installation



The different components of the ECOFIXE system are entirely prefabricated in the factory. They are then transported to the site for assembly, beginning with the installation of the module suspension system.

Thereafter, the modules are hung on the suspension system and completely submerged into the aerated lagoon, requiring no additional footprint.

The installation is completed and fully functional in only 1 to 2 weeks. All the steps are carried out without interrupting the treatment process.



*Completed installation of ECOFIXE at Ascot Corner*