A Wide Range of Potential Reuse Applications

Pilot Testing

Test Results

BIOLOGICAL AERATED FILTER (BAF)

Typical Pressure Buildup Patterns

Summary of Performance After Optimization

Loading for 1st Stage BAF at Optimized Performance

Loading for 2nd Stage Nitrifying BAF at Optimized Performance

Typical Filter Runs

PERFORMANCE GOALS

CONCLUSIONS

Microfiltration membranes are used for physical separation of small particles from fluids. They are designed to operate in a pressure or vacuum mode. Microfiltration membranes can be designed as hollow fibers or plates depending on the manufacturer and application, and can be used for direct filtration of secondary effluent or as pre-treatment for reverse osmosis membranes.

In this biological fixed film process, the primary effluent flows upward through a bed of filter media with aerators to create an aeration environment. The biomass attached to the filter media removes soluble pollutants biologically, and inorganic pollutants are removed physicochemically by filtration.

Optimization of Biological Aerated Filter and Microfiltration Operation for Wastewater Reclamation

Project Background

At a minimum, baseline processes must meet Class A water quality standards for oxidation, filtration and disinfection. Additional treatment would be required to meet more stringent turbidity, metals, organic, and residual levels. Following an in-depth screening of the individual treatment processes, two aerobic biological treatment trains were selected for testing in a nine-month pilot test. One uses a Biological Aerated Filter (BAF) and the other a Membrane Bioreactor (MBR) for wastewater reclamation. Other emerging technologies investigated for their small footprints and enhanced performance include Fuzzy Filter and ballasted flocculation (Activated Sludge Design) for primary treatment, Fuzzy Filter and microfiltration (MF) for tertiary effluent filtration, and reverse osmosis for advanced treatment. This pilot tests the results of the BAF-MF testing.

Effluent turbidity <0.3 NTU, 90% percentile, to meet anticipated Class A requirements.
Effluent DOC <2 mg/L, 50th percentile, to meet anticipated direct groundwater recharge criteria.
System Recovery >90%.

The 7-stage BAF without MF cannot meet the Class A requirements. The 2-stage BAF provides level of treatment comparable to a stirred sludge, but with a much higher loading rate, hence less footprint.

The 2-stage BAF- MF process provides a consistently (±0.5 NTU) level flow to the MF units.

The MF and nitrate removal for direct groundwater recharge (nitrate).