

Membrane Bioreactors – Enviroquip MBR Systems (Retrofit)

Leoni Township, Michigan, USA

How we created value

- Replaced a failing lagoon system, significantly increasing treatment capacity/performance allowing for new development in service area
- Worked with the engineer, contractor and owner to deliver new plant under budget and ahead of schedule
- Provided a robust, simple MBR System equipped with energy management features and staffed by only three full-time employees



Brief

The Leoni Township's wastewater treatment plant (WWTP) serves thirteen communities across three counties including the Michigan Speedway complex. A moratorium on growth was put in place until capacity and treatment issues with an aging aerated lagoon system could be addressed. In June of this year, construction of a new membrane bioreactor (MBR) System was completed under budget and ahead of schedule. The new, higher capacity, plant will exceed current and future permit requirements allowing for new development in the service area, protecting both public health and the environment.

Solution

Peak hydraulic flows and periodic spikes in ammonia pollution from the Speedway during race weeks, makes Leoni's sanitation system one of the largest in Michigan. OMM Engineering, Inc. evaluated MBR technology and selected the Enviroquip MBR System as the best value option to reliably handle variations in both flow and pollutant loading while still meeting,

or exceeding, regulatory requirements. One of the primary drivers toward the MBR plant was the fact that the treatment plant discharges to one of the headwater tributaries to the Grand River, one of the largest watersheds in lower Michigan. The Michigan DNRE required that the effluent meet tight permit limits, including a 0.5 mg/l on ammonia, and a 0.33 mg/l on phosphorus.

The WWTP upgrade was designed to allow for phased installation keeping costs down and improving treatment efficiency over the life of the plant. In Phase 1, the plant will be rated to handle a nominal capacity of 3.0 MGD and short-term peaks up to 4.8 MGD. Accommodations were made for the installation of additional equipment, as needed, as flows increase over the life of the plant.

In addition to allowances for future expansion (if needed) special attention was paid to keeping the overall design simple, robust and easily maintained. For example, the membrane filtration process is primarily gravity calling

on pumps for temporary assistance as needed. The overall process is made up of four basic steps; influent wastewater is first screened to remove damaging debris, biological treatment happens next to remove dissolved pollutants such as nitrogen, the treated water is then filtered through a series of low-pressure membranes before final disinfection using ultraviolet (UV) light. As labor costs can often make up a substantial portion of an operating budget (25%-50%), the built in simplicity of the new System can translate into real savings.

Outcome

The new WWTP was recently commissioned and is staffed by three full-time operators. Effluent quality is better than permit requirements and efforts are underway to optimize operations.

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