

Orbal® Biological Nutrient Removal System Milan, MI WWTP

Biological Nutrient Removal Excellence

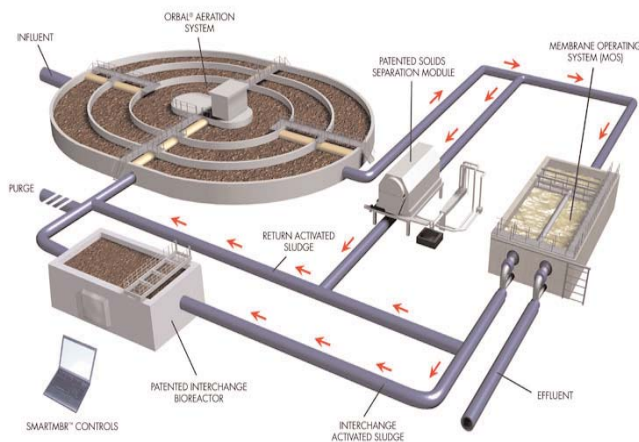
98% BOD removal
97% TSS removal
99% NH₃-N removal
80% TP removal

Design Criteria

Average Daily Flow: 1.4 MGD
BOD: 210 mg/l
TSS: 215 mg/l
NH₃-N: 11 mg/l

The city of Milan, MI Orbal®-based municipal wastewater treatment plant began operation in 2006. Since the State of Michigan water discharge ends up eventually into one of the great lakes, nutrient removal, phosphorus in particular, has long been a requirement for WWT Facilities. Milan was designed to handle biological phosphorus removal. The Orbal® BNR process was selected for this plant for its energy efficient biological nutrient removal capabilities.

The Orbal® design for this project consists of an anaerobic selector followed by three concentric Orbal® channels. The wastewater passes through the channels in series. Oxygen transfer rates in each channel are controlled by varying aerator speed and/or disc immersion. The absence of oxygen provided in the anaerobic selector facilitates biological phosphorus removal. The outer channel of the Orbal® is maintained in an oxygen deficit to provide simultaneous nitrification/denitrification conditions while the inner channel is maintained at aerobic conditions. The oxygen recovered by denitrification in the outer channel results in power savings. The City of Milan, MI Orbal® BNR system normally runs at higher sludge age in the winter to maintain nitrification.



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