

# MegaBubble™ – Anaerobic Mixing - Nutrient Removal

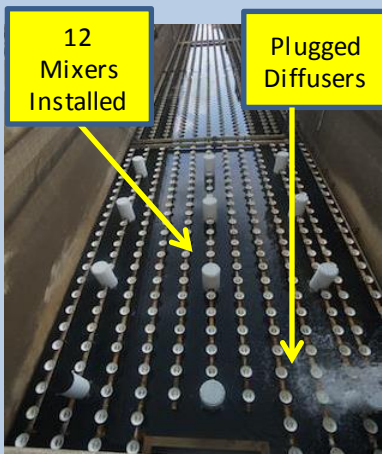
## South Shore WRF, 300 MGD, Milwaukee MSD (WI)

### Highlights

- **Low Maintenance:** No moving parts, no electricity below water
- **Simplicity:** MegaBubble mixers accumulate low pressure air and intermittently release 3' diameter megabubbles that rise at 20 ft/s for mixing
- **Truly Anaerobic:** MegaBubbles transfer insignificant oxygen into wastewater
- **Optimal BioP:** Very efficient P release and uptake was observed indicating truly anaerobic conditions
- **Energy Efficient:** Low energy: <1 Kw per basin
- A/O process anaerobic zone mixing

### About Pulsed Burst Systems (PBS)

Headquartered in Milwaukee, WI, PBS is a winner of the 2017 BREW competition and operates out of the Global Water Center. PBS designs and manufactures treatment systems to reduce energy and maintenance costs while helping facilities achieve nutrient removal limits. For additional information please visit [www.pulsedburst.com](http://www.pulsedburst.com).



South Shore WRF Installation



The Milwaukee Metropolitan Sewerage district owns the South Shore Water Reclamation Facility which can treat flows up to 300 MGD. This facility has historically used chemicals to remove phosphorus in order to achieve the 1 mg/L effluent permit limit for total phosphorus. MMSD has been investigating low cost options to implement biological phosphorus removal. A simple option is to turn the air off in the first aeration grid of each basin and add mixing, creating an anaerobic zone.

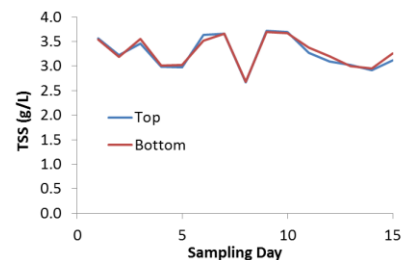
In 2015, MMSD initiated a mixing study to compare various technologies for mixing the 30'x45'x16' (0.16 MG) anaerobic zones. Air was turned off in the first aeration grid of basins 25 and 26. Basin 25 was retrofitted with twelve (12) MegaBubble mixers and basin 26 was retrofitted with a mechanical mixer. The Megabubble mixers utilized low pressure air already available at the bottom of the basin while a new electrical service was run for the mechanical mixer in basin 26.

### Demonstrated Results

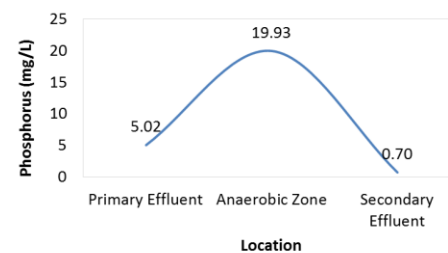
The MegaBubble mixers at South Shore provide energy-efficient anaerobic reactor mixing while minimizing maintenance and safety issues as MegaBubble has no submerged mechanical or electrical components, unlike the mechanical mixers.

During the testing period, the MegaBubble system consumed less than 1 Kw (1.4 hp) while maintaining uniform TSS in the anaerobic zone.

Basin 25 demonstrated very low ORP (-120mV average) and no dissolved oxygen, indicating truly anaerobic conditions which promoted substantial anaerobic P release and subsequent aerobic uptake.



Basin 25 TSS @ Top vs Bottom of Basin



Basin 25 Average P Release and Uptake (7/18/17 – 11/20/17)

This data validates the use of MegaBubble mixing in anaerobic/anoxic biological treatment zones as an energy efficient, low maintenance solution for biological nutrient removal.