

Innovative Mixing System Saves Energy, Reduces Maintenance and Improves Mixing Characteristics

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Green Bay MSD



*Cleaning Water Today for Tomorrow's Generations
Green Bay Metropolitan Sewerage District*

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INVENT Environmental Technologies, Inc.

Green Bay Metropolitan Sewerage District (GBMSD) Overview

- Wholesaler of wastewater conveyance and treatment services.
- 17 municipal customers (219,000 people) and 2 direct industrial customers.
- Service area of 285 square miles.
- Two Wastewater Treatment Plants (WWTP), seven miles apart, discharging to Fox River.
 - Green Bay Facility
 - De Pere Facility

Green Bay Facility

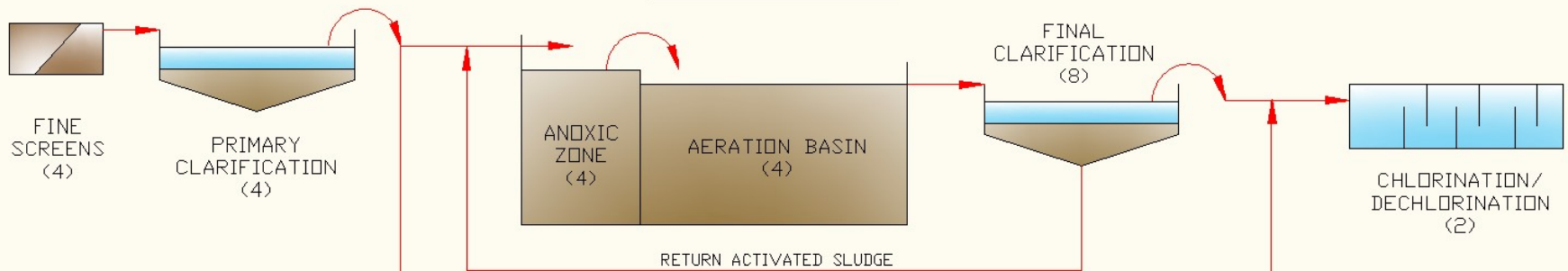
Enhanced BNR Activated Sludge Process
Average Loadings: 30 mgd 45,300 lb BOD/day
Permit: 25/30/ 1.0 (CBOD/TSS/Phos)



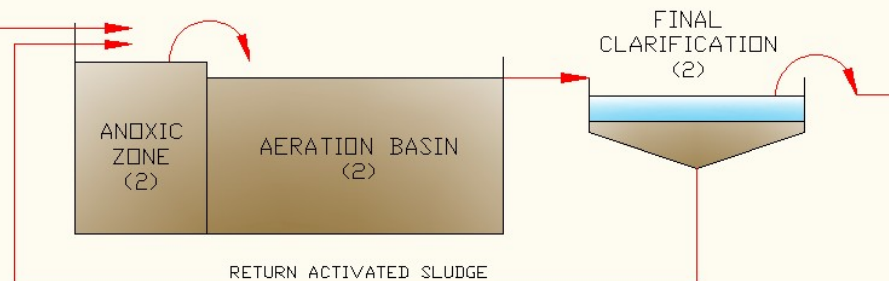
Green Bay Facility - Flow Schematic

GREEN BAY FACILITY

NORTH PLANT



SOUTH PLANT



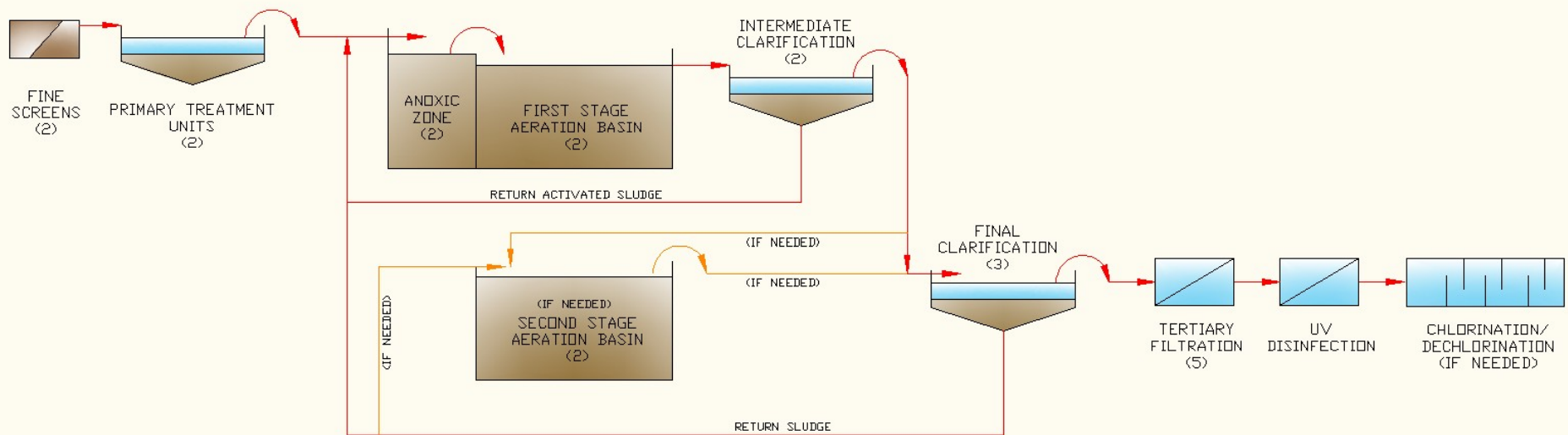
De Pere Facility

Enhanced BNR Activated Sludge Process
Average Loadings: 8 mgd 29,900 lb BOD/day
Permit: 9/10/ 1.0 (CBOD/TSS/Phos)



De Pere Facility - Flow Schematic

DE PERE FACILITY



Plant Upgrade Projects

- GBF – RAS/WAS System Improvements
 - North Plant – 16 @ 7.5 hp Submersible Mixers Replaced with 8 @ 7.5 hp Invent Mixers in the 4 Basins
 - South Plant – 4 @15 hp Submersible Mixers Replaced with 2 @ 7.5 hp Invent Mixers in the 2 Basins
- DPF – De Pere & Green Bay Facility Upgrades
 - 8 @ 50 hp Submersible Mixers Replaced with 8 @ 7.5 hp Invent Mixers in the 2 Basins

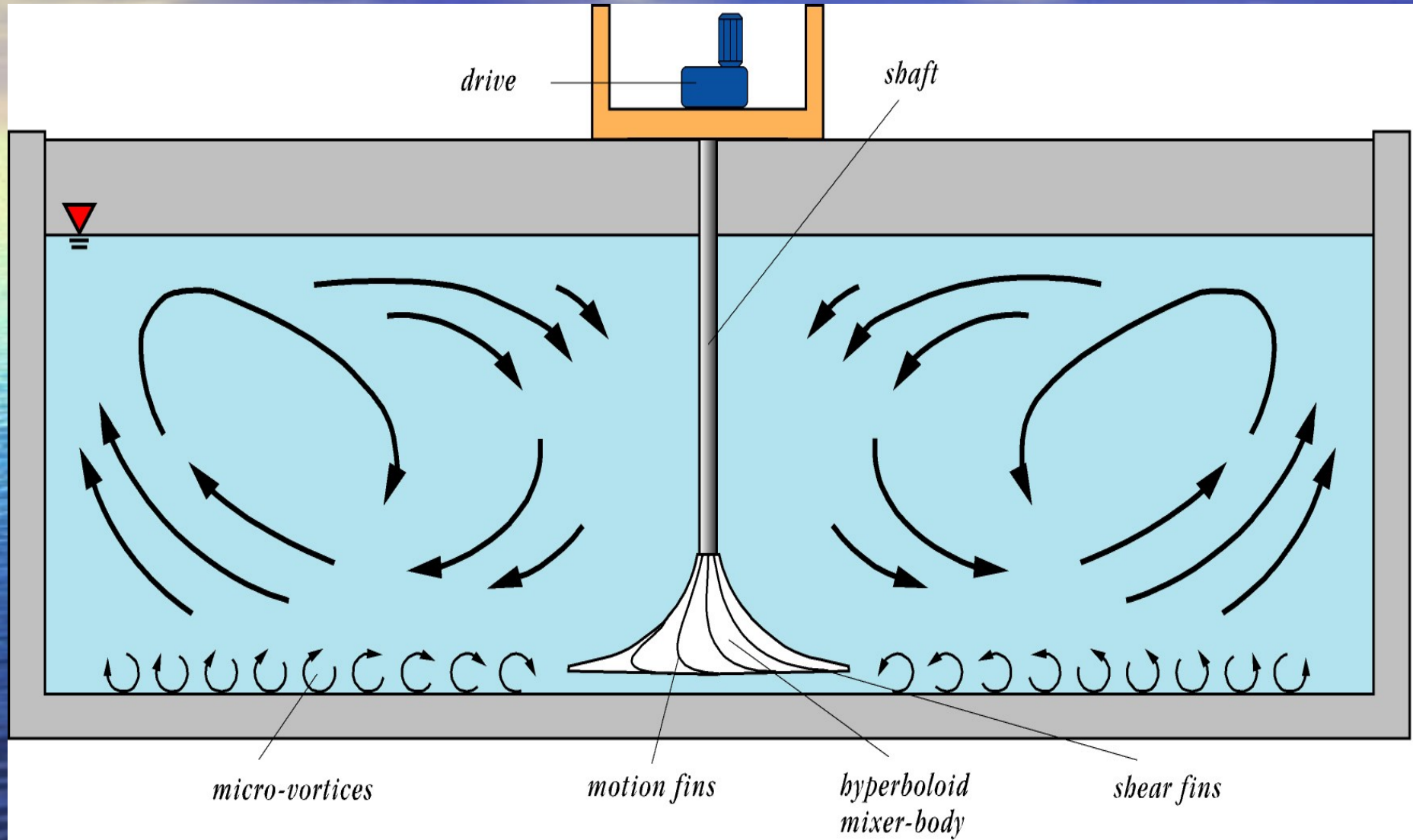
Plant Upgrade Projects

- Mixer Selection Considerations
 - Aging Existing Equipment
 - Energy Savings
 - Reduced Maintenance
 - Improved Mixing

What is the HyperClassic™ Mixer?

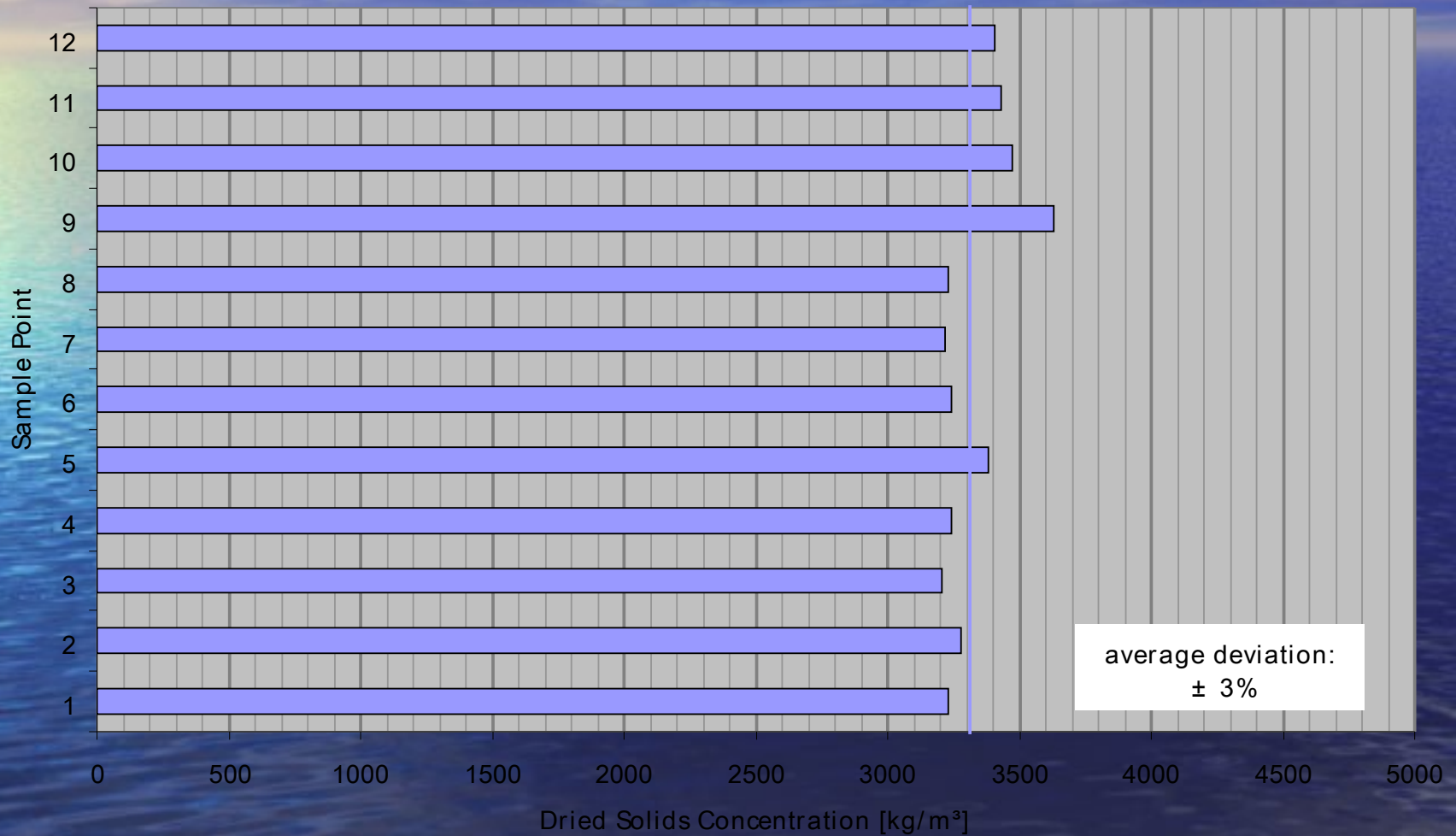
- Shaft Mounted Submerged Mixer
- Shaped like a Hyperboloid
- FRP Mixer body – Gel Coated
- FRP Shaft
- Dry Mounted Motor / Gear Box
- Slow Rotational Speed
- Minimal Maintenance
- Easy Installation

How the INVENT HyperClassic Mixer works



Uniform Mixing – typical test results

Stratford, CT - Dried Solids Concentration Profile



HyperClassic Mixer Installed Green Bay Facility – North Plant



HyperClassic Mixers installed Green Bay Facility – North Plant



Green Bay Facility – South Plant

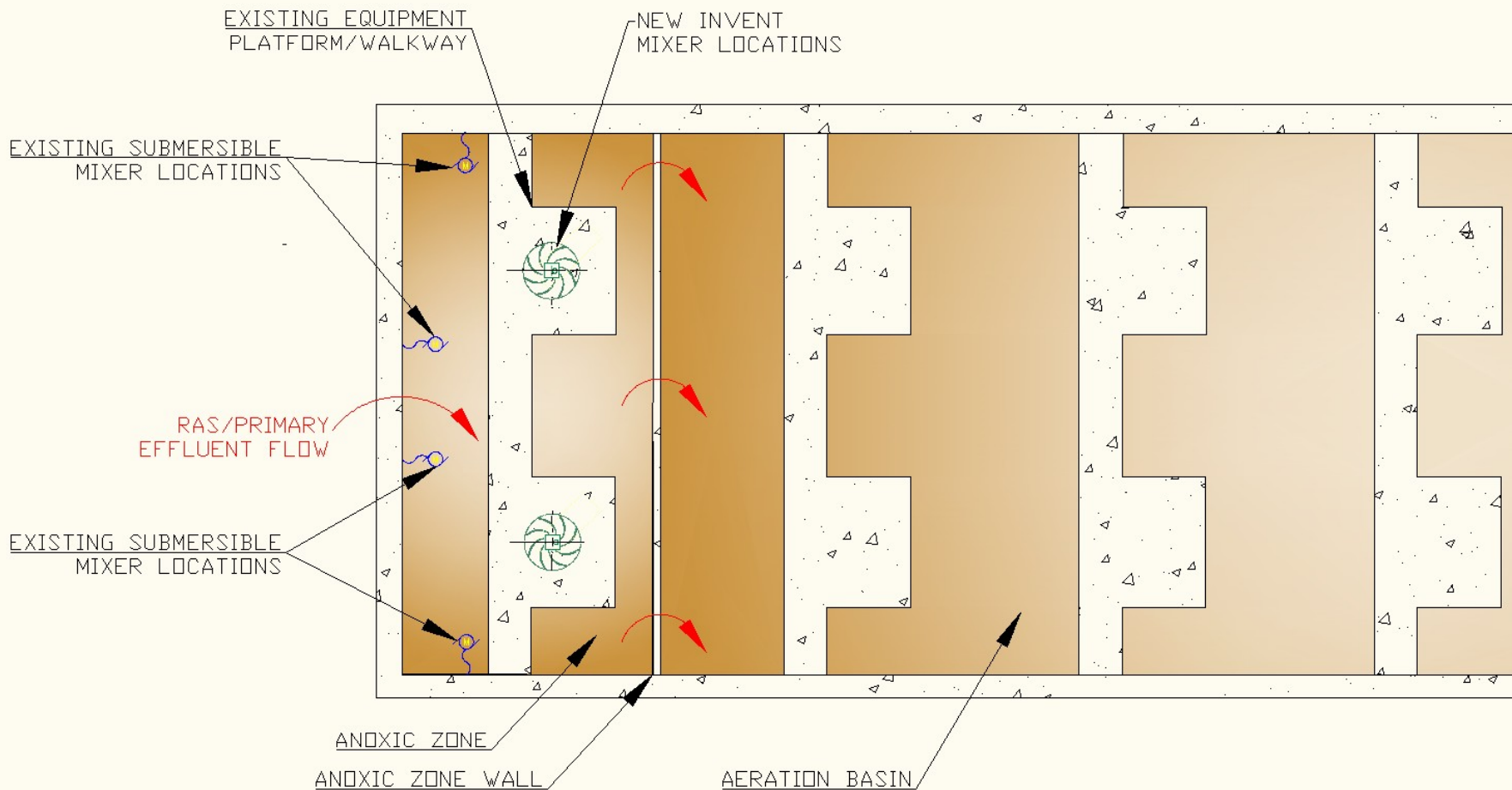
7.5 HP Mixers Replaced 15 HP Horizontal Mixers



Green Bay Facility – North Plant

Mixer Arrangement

Showing 1 of 4 Basins
Anoxic Zone
72.2' long x 34.3' wide x 19.6' swd
363,000 gallons



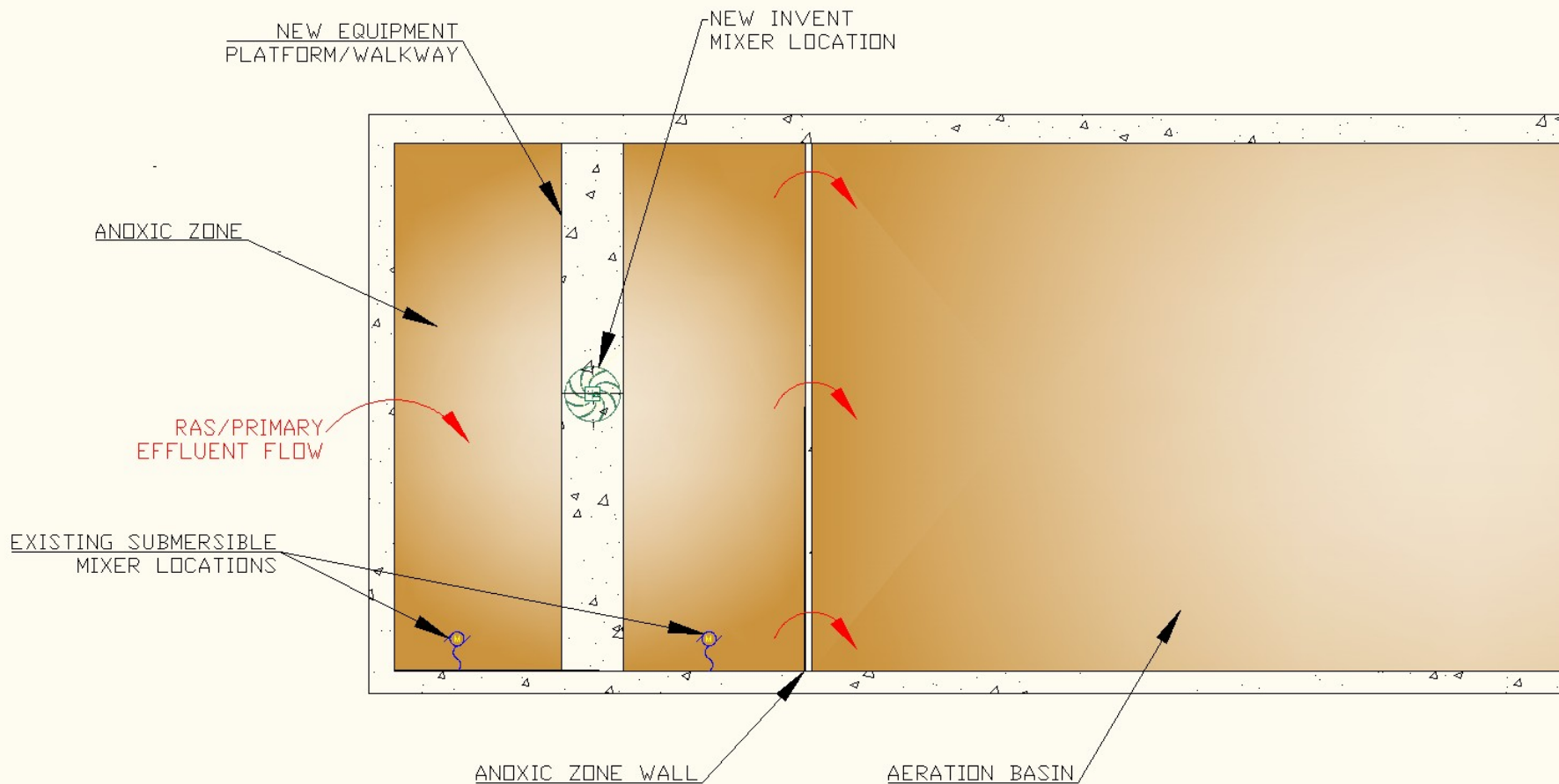
HyperClassic Mixer in service – GBF – North Plant



Green Bay Facility – South Plant

Mixer Arrangement

Showing 1 of 2 Basins
Anoxic Zone
45.0' long x 35' wide x 19.6' swd
231,000 gallons

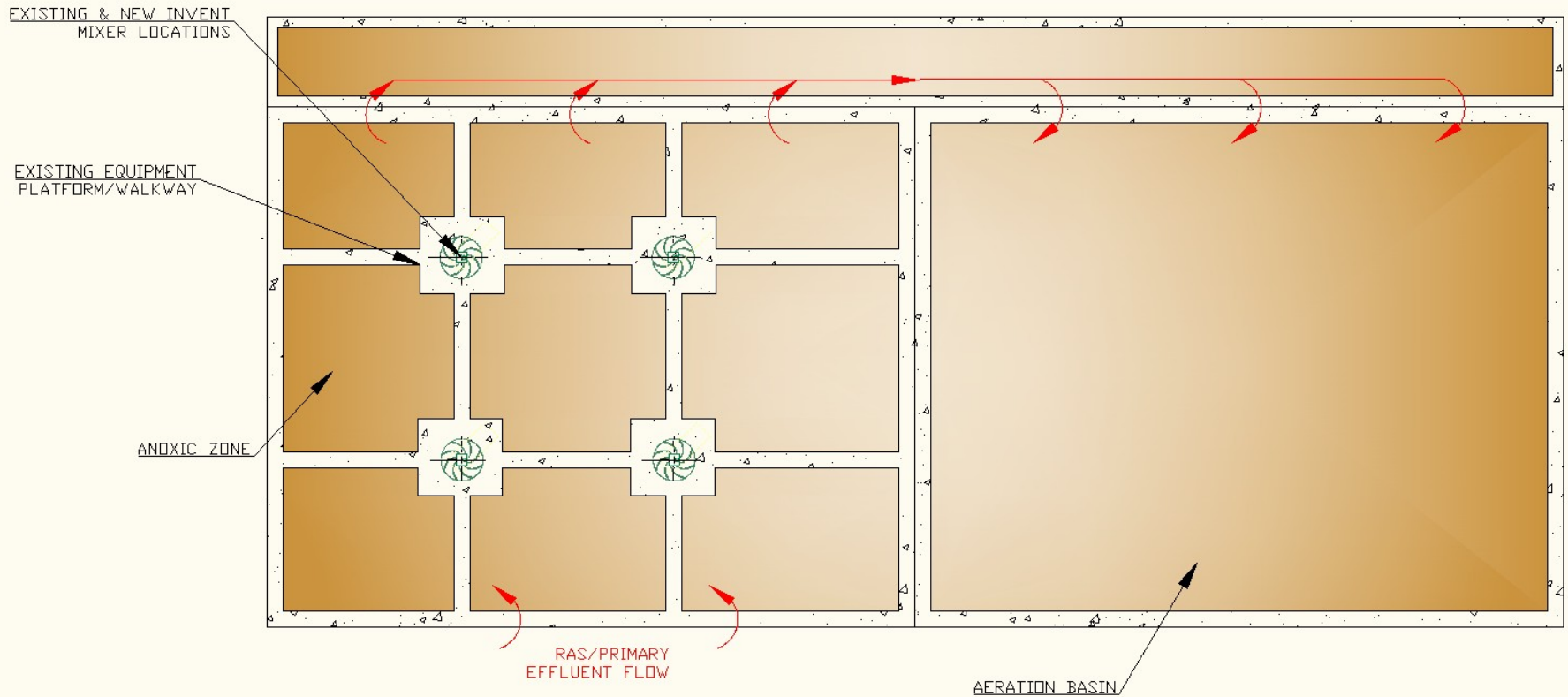


HyperClassic Mixer in service – GBF – South Plant



De Pere Facility – First Stage Aeration Mixer Arrangement

Showing 1 of 2 Basins
Anoxic Zone
70.0' long x 106' wide x 22' swd
1,343,000 gallons



De Pere Facility – 8 @ 50 HP units replaced with 7.5 HP HyperClassic Mixers



De Pere Facility - Filling Basin Four 2.5 M dia. / 7.5 HP Mixers



Operating Experience and Energy Savings

- Mixing Performance
 - Reduced Short-Circuiting in GBF North Plant Anoxic Zones
 - Uniform, Gentle Mixing
 - Good Floc Structure Apparent
 - Low Shear



Operating Experience and Energy Savings

- Idle Basins
- Minimum Operating Level
 - Bottom Guides for Low Water Level Performance in GBF South Plant
- Energy Savings
 - Green Bay Facility
 - North Plant - \$9,200 per year
 - South Plant - \$2,100 per year
 - Total Savings - \$11,300 per year
 - De Pere Facility
 - Total Savings - \$143,000 per year

Future Considerations

Hyper Pitch Assembly
Demonstration to determine
success in minimizing foam
and scum



Future Considerations

Bottom Guides for reduced minimum water level operation



Considerations for Your Facility

- Energy and Maintenance Savings
- Nutrient Removal / Improved Mixing and Future Regulations
- Existing Mixer Arrangement and Invent Mixer Structure Requirements
- Idle Basins
- Minimum Water Levels

Thank You
Questions & Answers



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