AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

Aqua-Aerobic® MBR

Membrane Bioreactor System

Why MBR?

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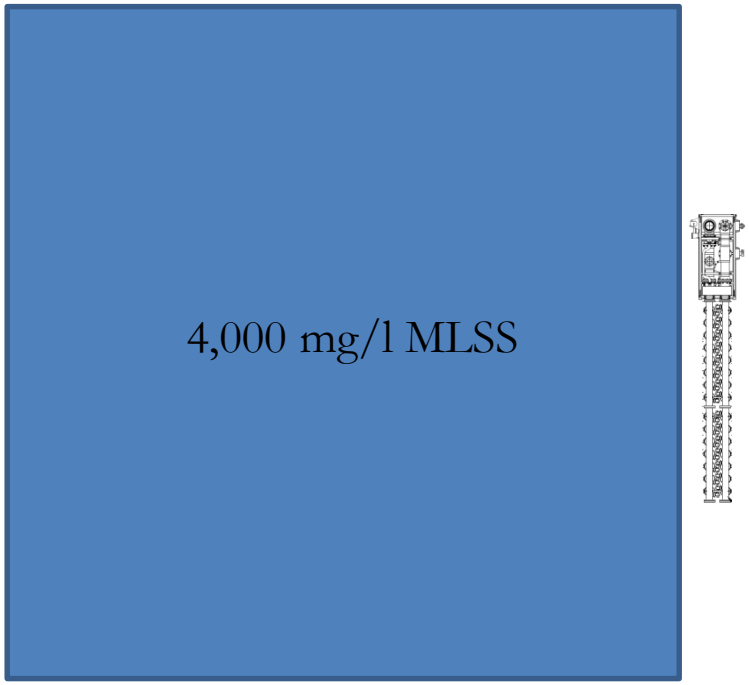
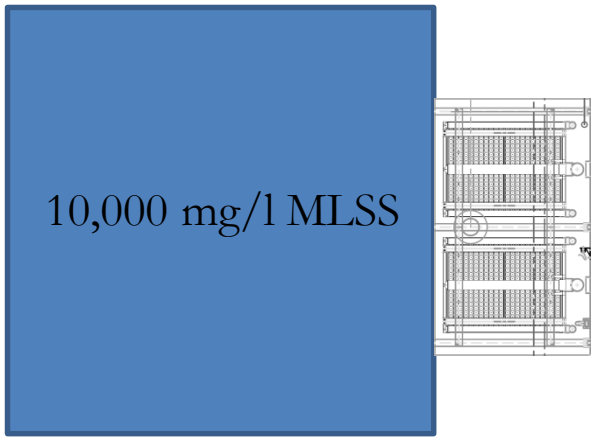
- Project requires membrane-quality effluent in a small footprint
  - Available space is limited
  - Flow can be increased up to 2.5x through existing system



1 MGD SBR Basin with UF Train



1 MGD Bioreactor with UF Train

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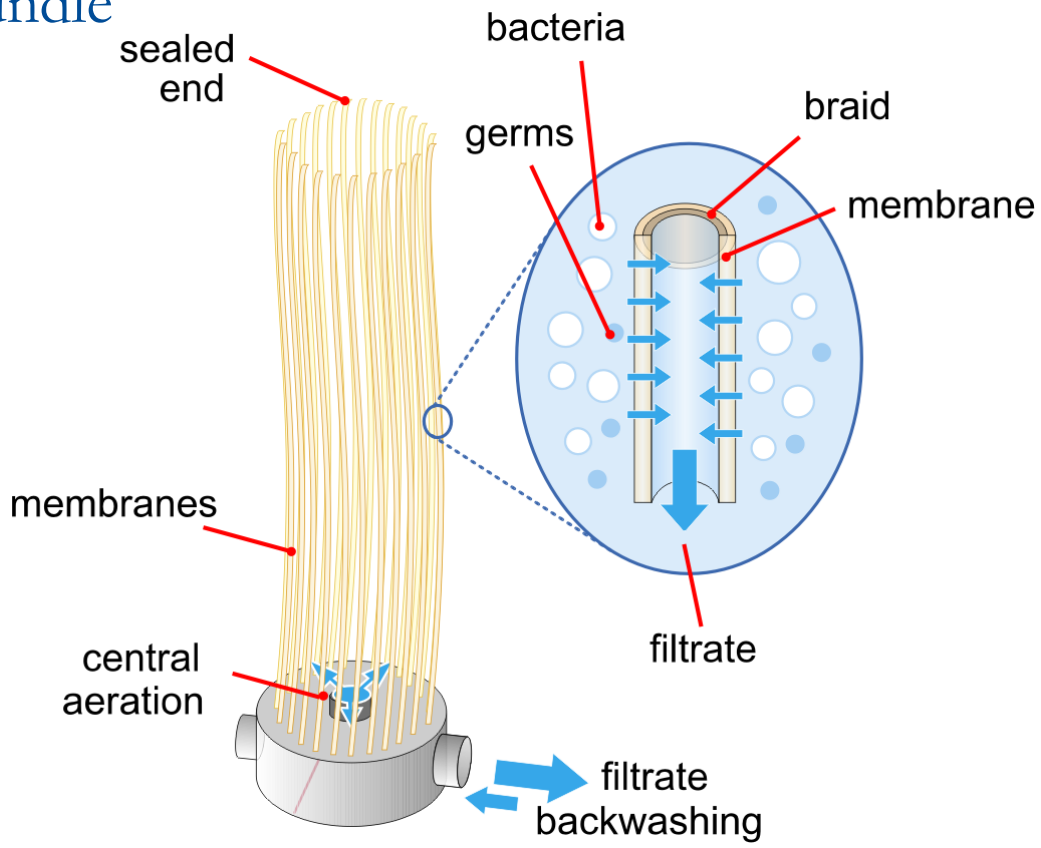
Membrane Bundle



- Support braid imbedded in membrane
- No top header for debris to collect
- Air scour integral to bottom header

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Membrane Features

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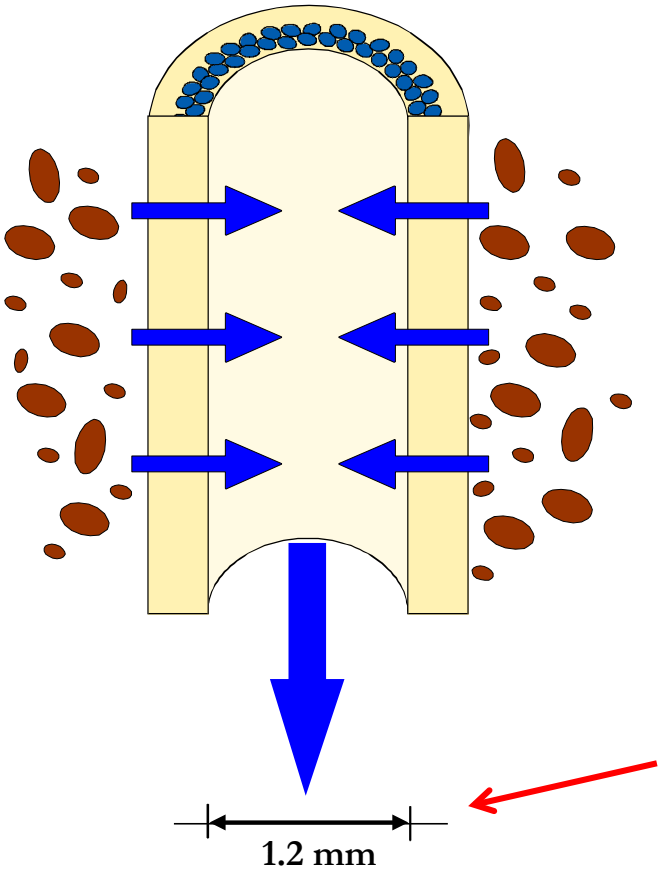

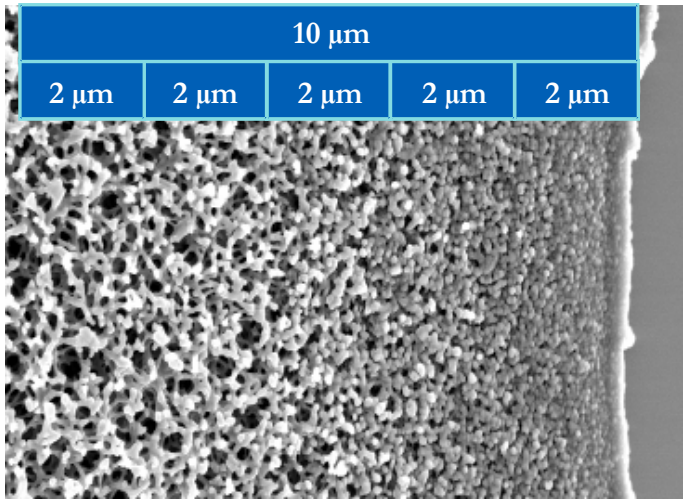

Enlargement: 10,000 x

- Thin filtration layer results in low TMP
- Large bore means lower pressure drop
- UF membrane has no minimum MLSS
  - Greater turn-down

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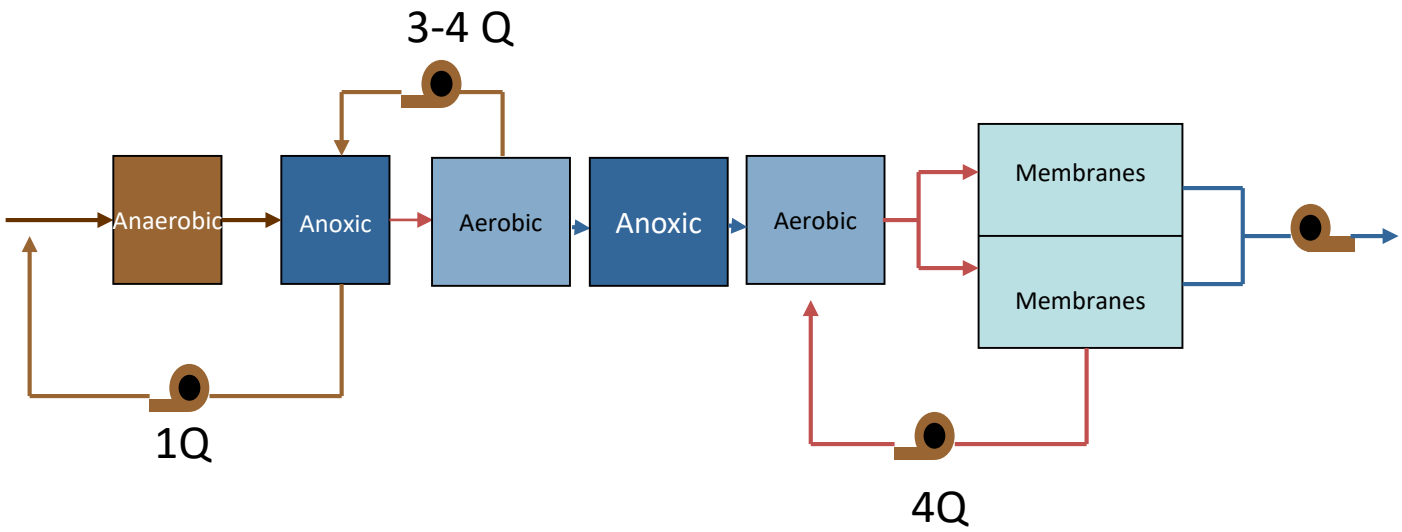
Fewer Basins and Pumps



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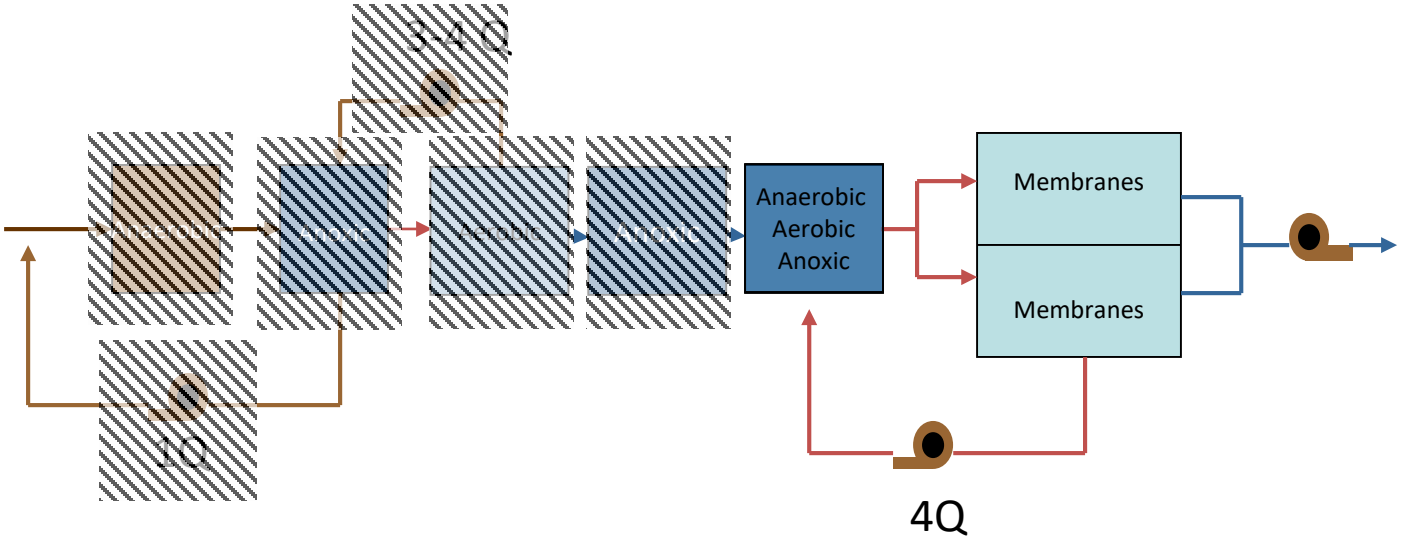
Fewer Basins and Pumps



- All treatment done in a single basin
- Internal recycle eliminates two pumps

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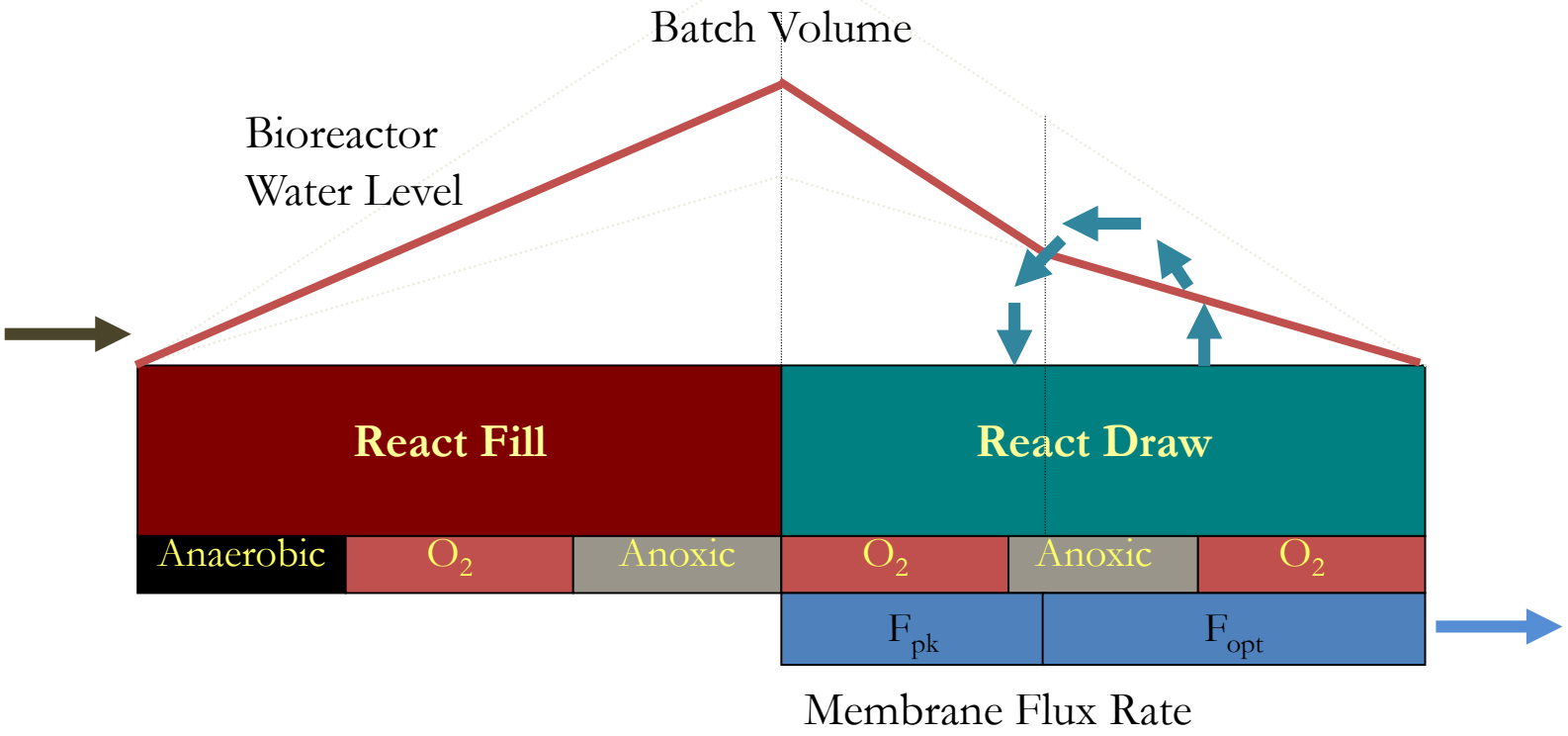
Less Power Usage at High Flows



- F_{opt} requires half the air as F_{pk}

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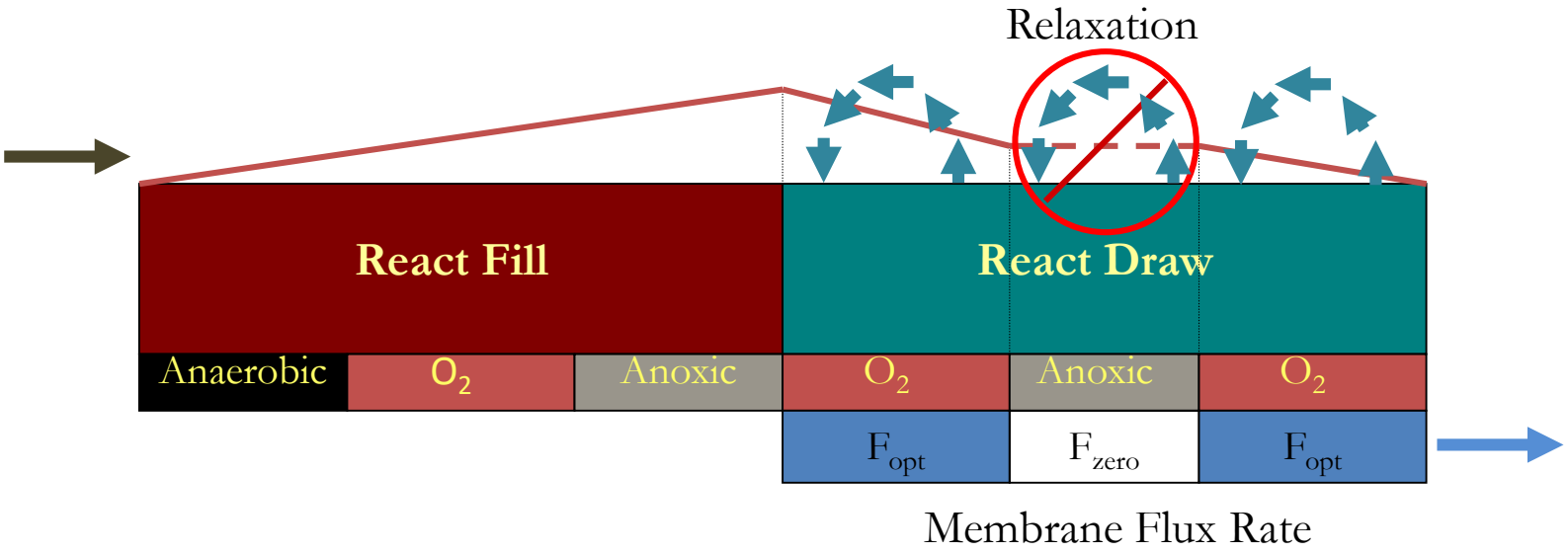
Much Less Power Usage at Low Flows



- The PLC synchronizes the membrane relaxation mode with the bioreactor anoxic mode
  - All pumps and blowers are off

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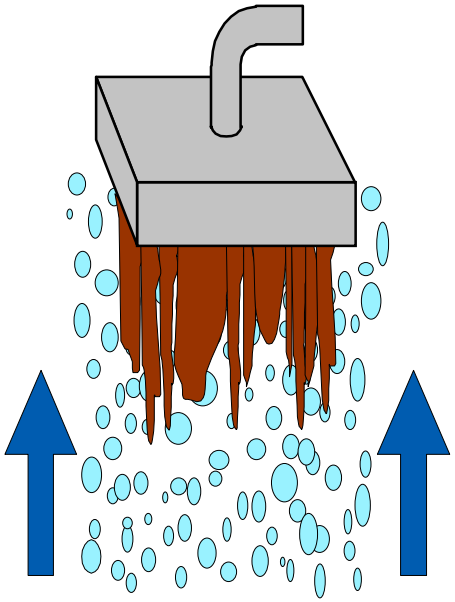
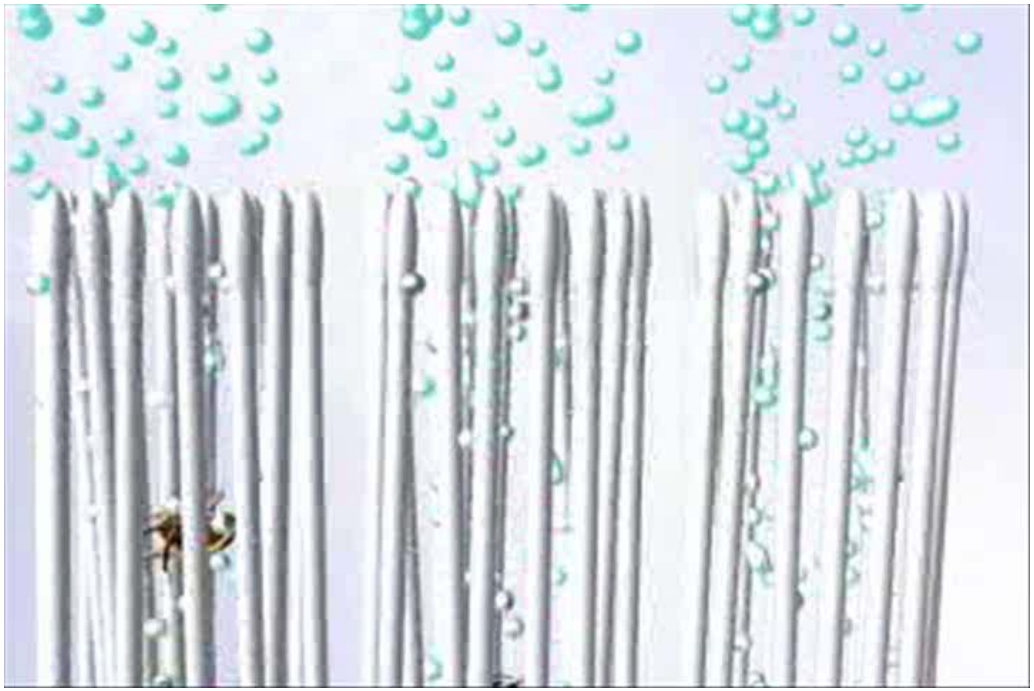
Less Sludging

Other Hollow Fiber Membranes



Aqua Membranes Have No Top Header



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Less Sludging

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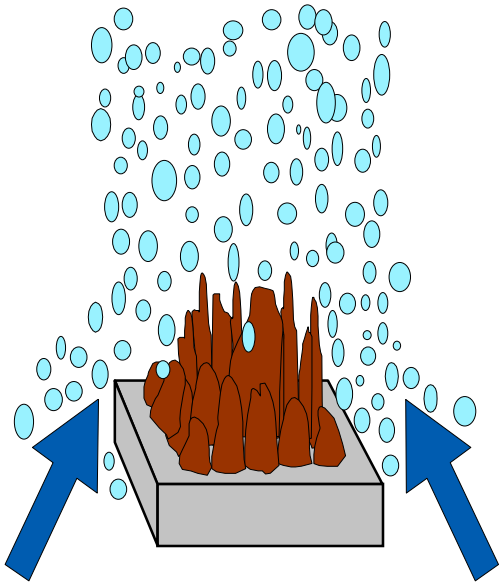
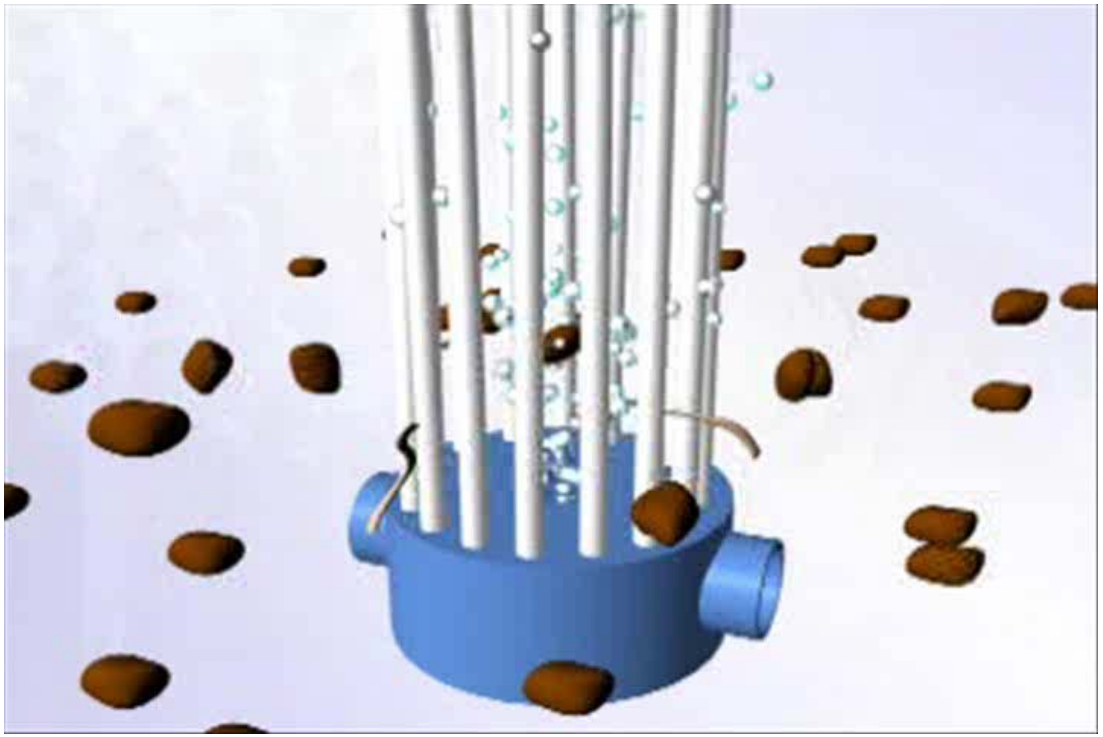
Other Hollow Fiber Membranes



Aqua Membranes Have Integral Air Scour



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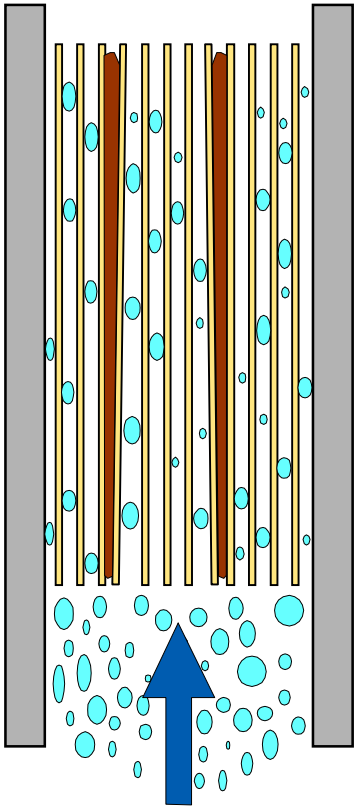
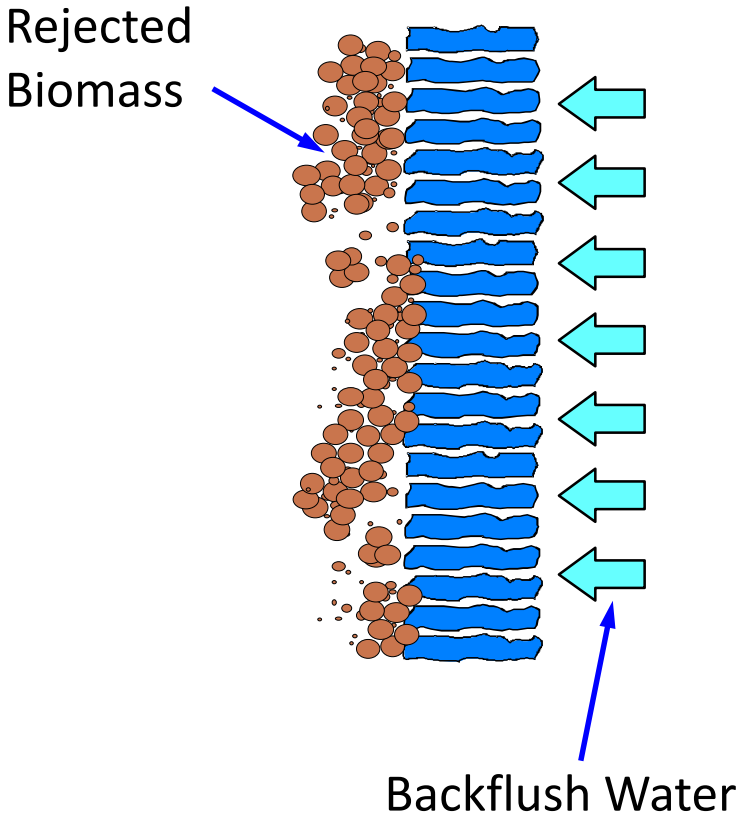
Less Sludging

Flat Sheet Membranes



Aqua Membranes Can Be Backflushed



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Installation at Riverhead, NY

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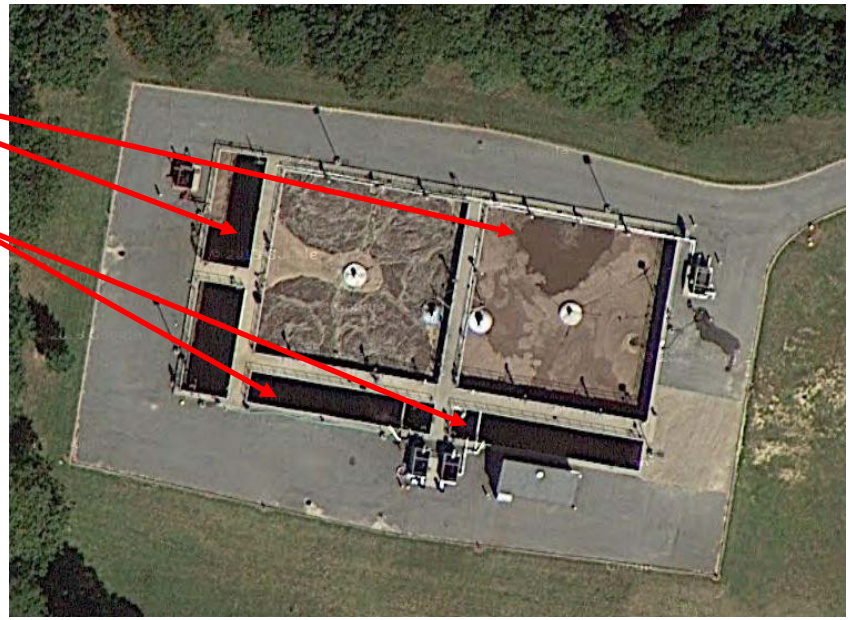
- Adapted existing system to BNR
  - Converted SBR basins to bioreactors
  - Converted equalization basins to membrane tanks
- 1.6 MGD equalized flow
- Lowers total nitrogen levels to less than 3 mg/l
- Phased approach allowed plant to meet flow/limits during transition



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