

# SAWEA Conference

## Design Competition



GE  
Water & Process Technologies



GE imagination at work

# What will we tell you

The problem

The Solution

The Design

Operational aspects

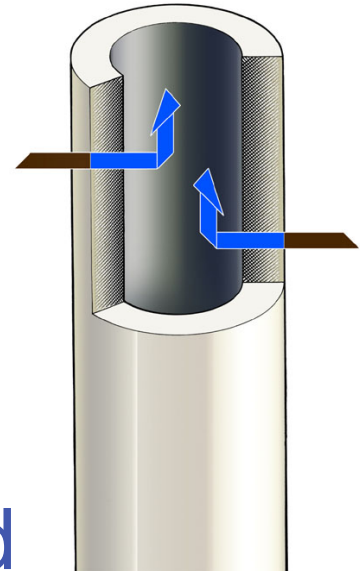
Advantages

Conclusions



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# The Problem

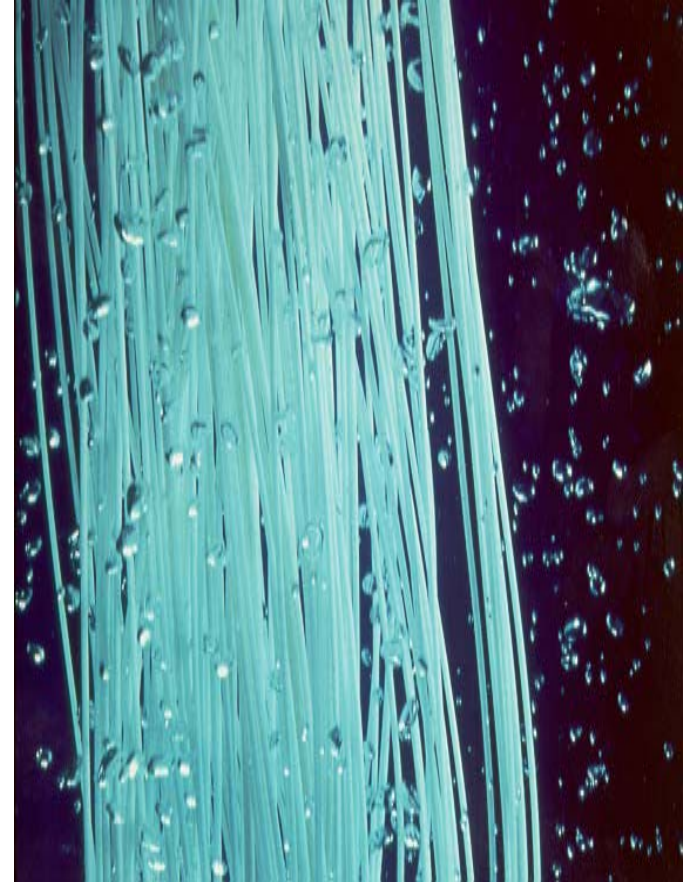


Municipal Wastewater to Unrestricted  
Water Re-Use

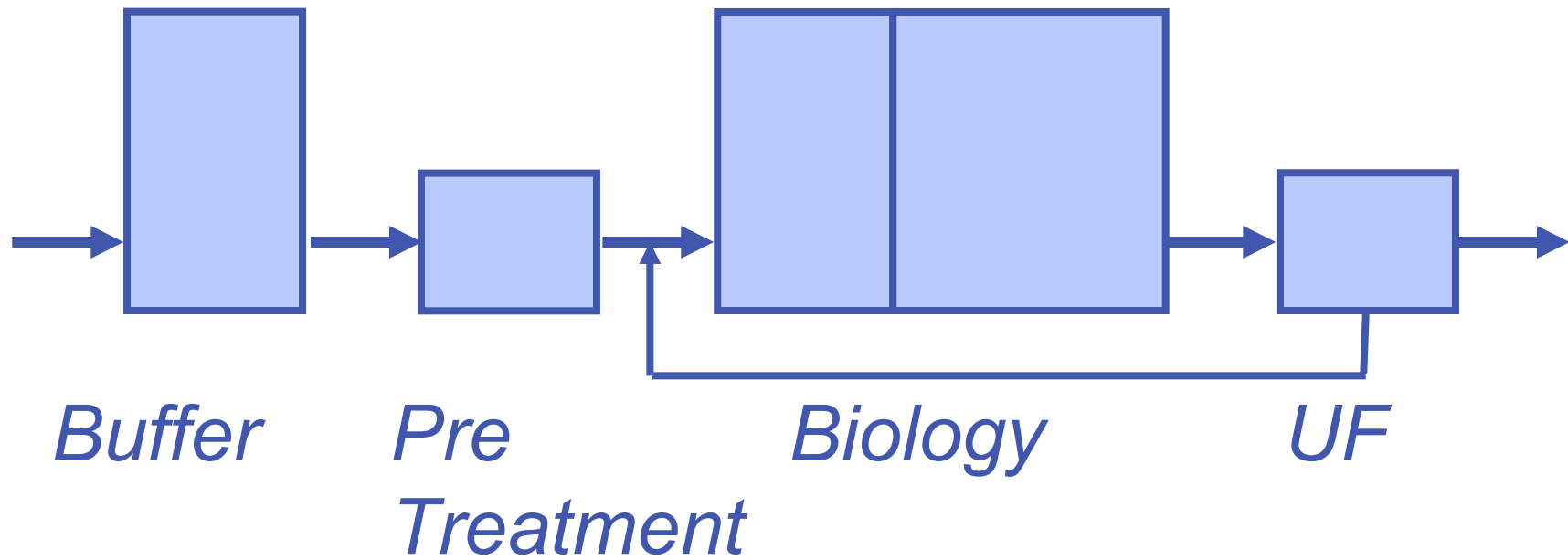
High peak flow during Rainweather

# The Solution

MBR = BAT = cost effective  
Peak shaving



# The Solution



# The Design

Buffer size HRT = 4 hrs

Rough screening (6mm)

Sand trap, oil&grease trap

Fine Screening (1mm)

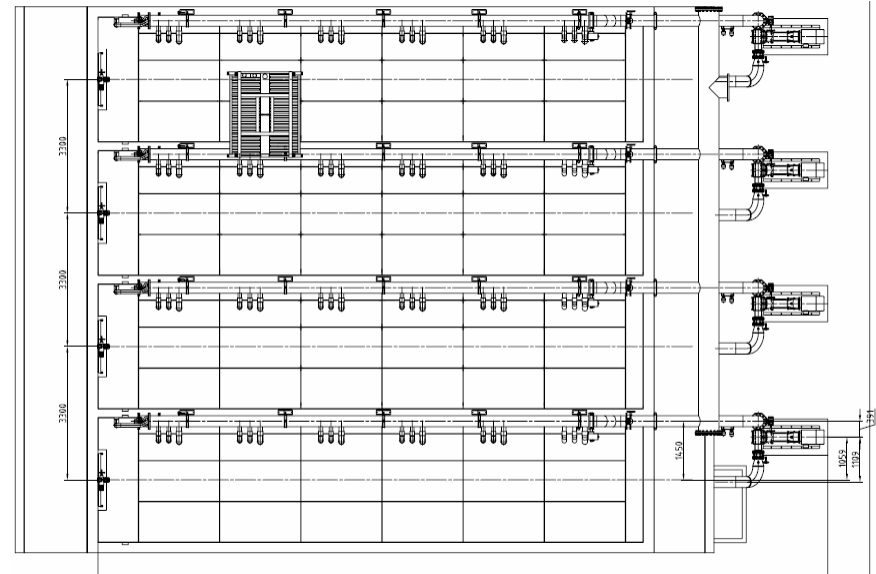
Anoxic tank (850 m<sup>3</sup>)

Aerobic tank (1500 m<sup>3</sup>)

Plate Aerators

Membrane tanks, 4 trains @ 5 cassettes

Cleans with Citric or Hypo



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# Design aspects

Screening 1 mm, 3\* 50%

Sludge load 0,13 kg BOD/kg MLVSS/d

MLSS (bio) = 8,5 kg/m<sup>3</sup>

Methanol dosing

N-1 design Membrane System

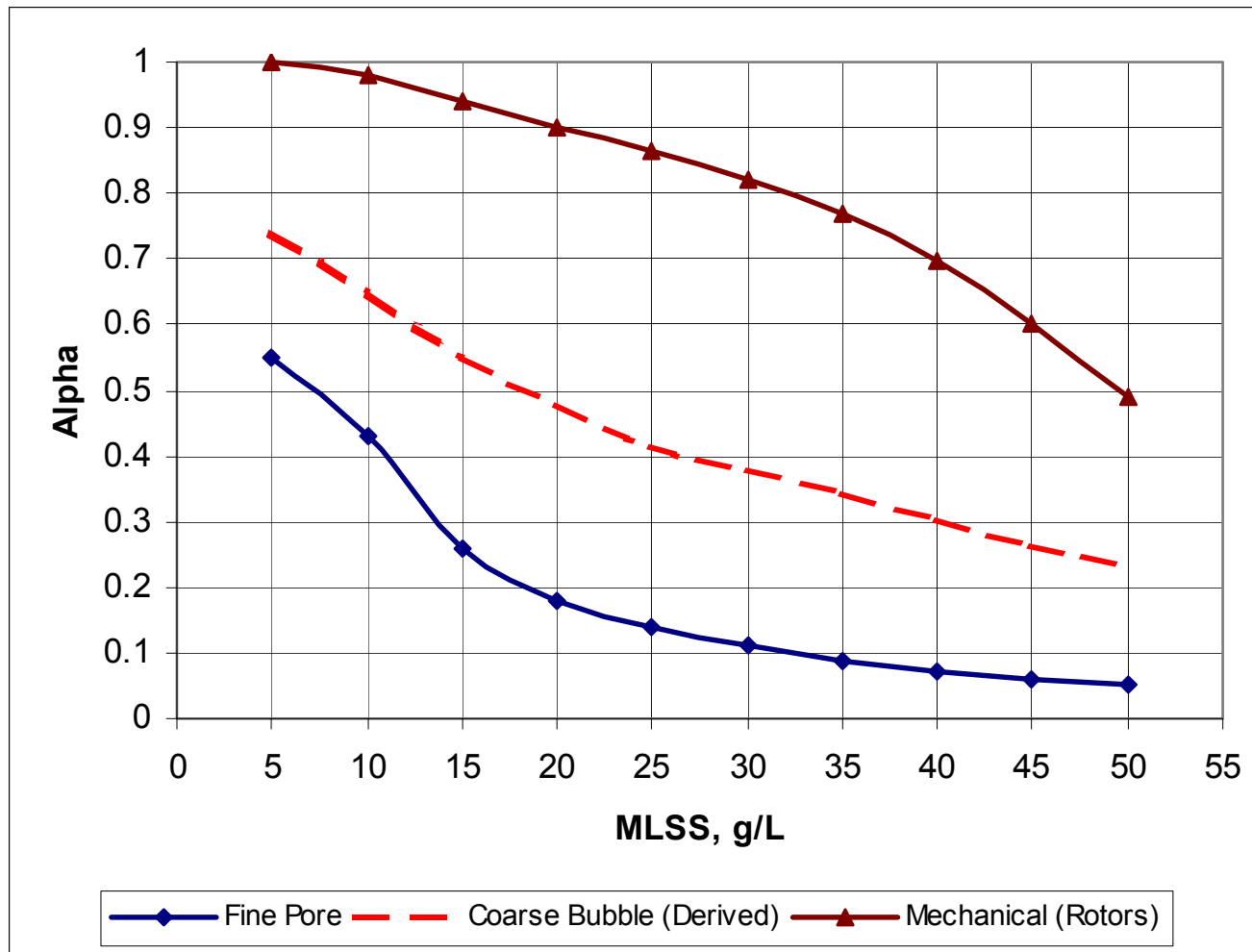
Submerged sludge pumps

Flux = 8 l/mh (ADF), 32 (MDF), 40 (N-1)

10/10 vs 10/30 aeration



# Effect of MLSS on Alpha Factor

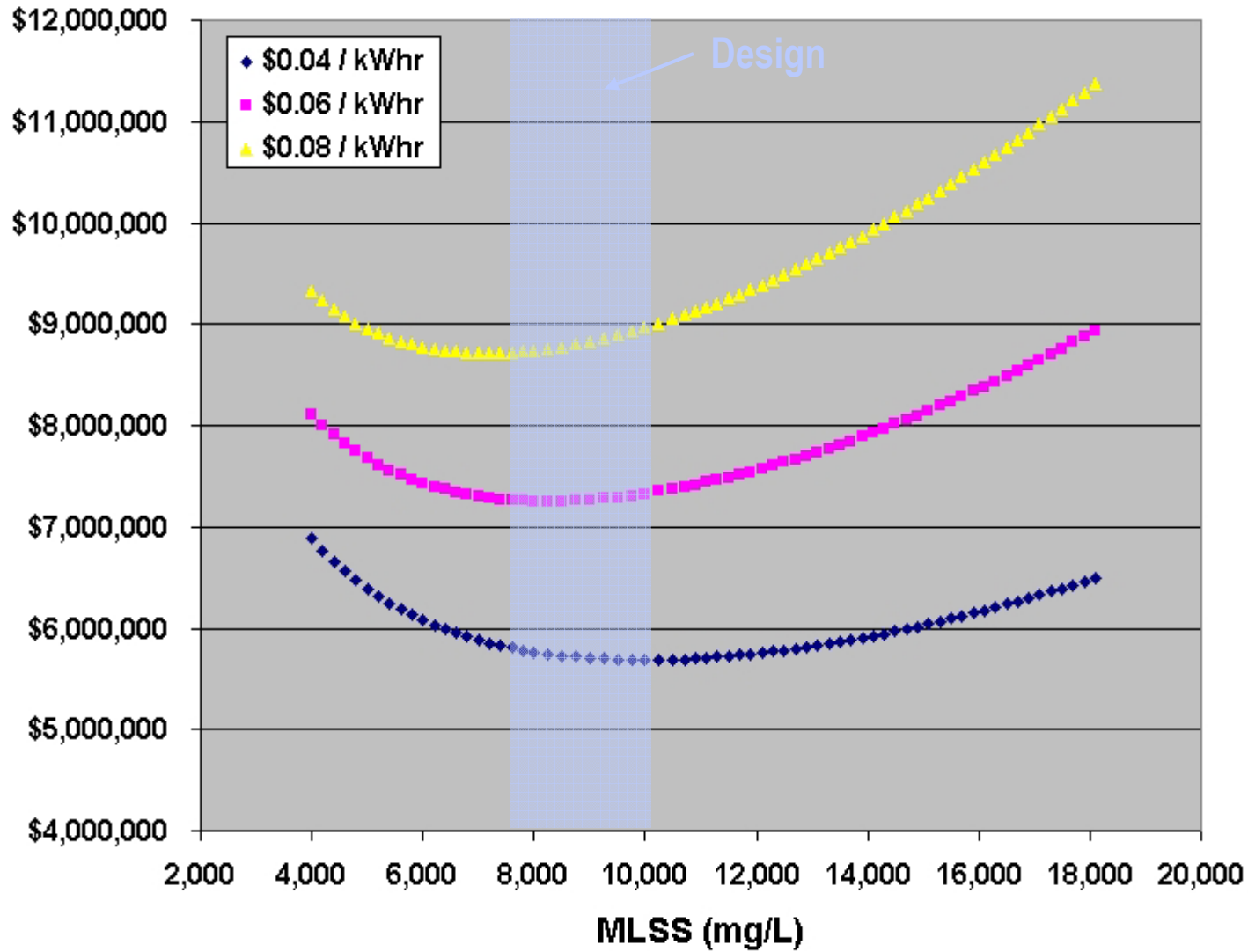


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Reference: **Bratby, John R. et al, *Merits of Alternative MBR Systems*, WEFTEC 2002.**



# Impact MLSS on NPV



# Operational Costs: Chemicals

Weekly MC with 200 ppm Hypo

2/yr RC with 1000 ppm hypo

2/yr RC with 2000 ppm citric

Consumption: 20 m<sup>3</sup>/yr Hypo

5,5 m<sup>3</sup>/yr Citric



# Operational Costs: Membranes

Low fluxes used

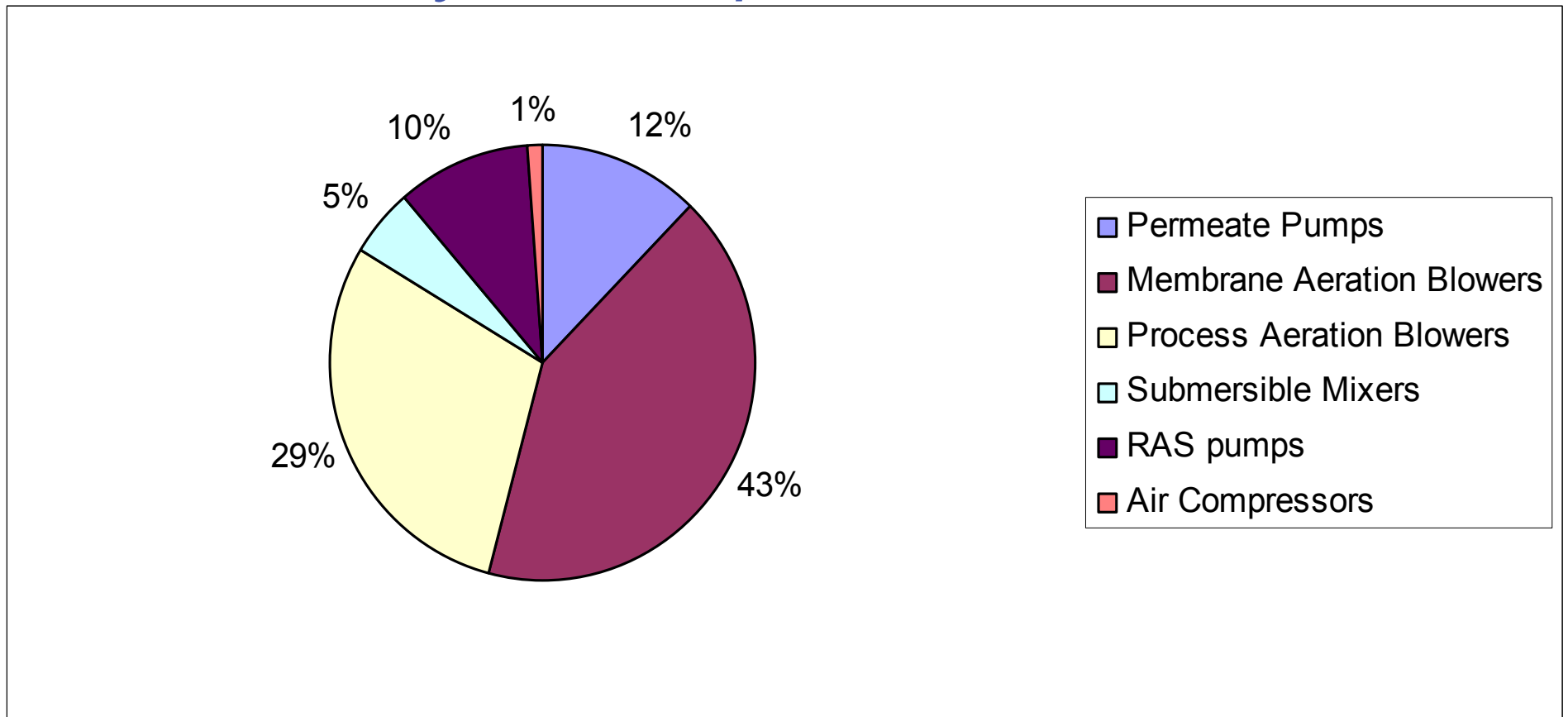
Low chemical consumption

PVDF matrix

Expected lifetime (Aquafin, DHV) >10 yrs

# Operational Costs: Energy

*Yearly consumption 620.000 kW\*h*



# Operational Aspects

Fully automatic cleans (weekly MC, 2/y RC)

TSS control system

Automatic change 10/10 to 10/30

Normal maintenance pumps, valves, blowers,  
instrumentation etc.

Zenotrac & Service visits



# The Conclusions

Robust system

Proven technology

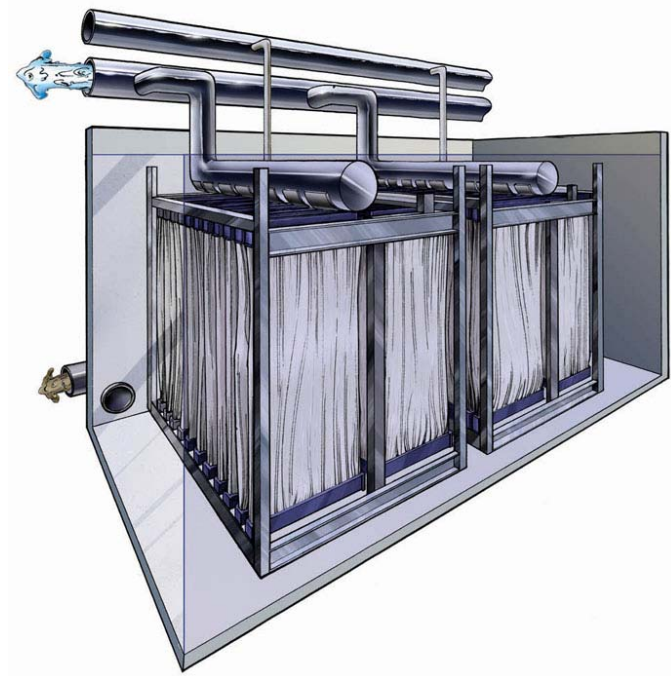
Always meet TSS limits

Designed for flexibility

Minimal operator attendance

Low operational costs

High after sales value



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# Sludge Recirculation



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# Membrane tank



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# Permeate Pump



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