



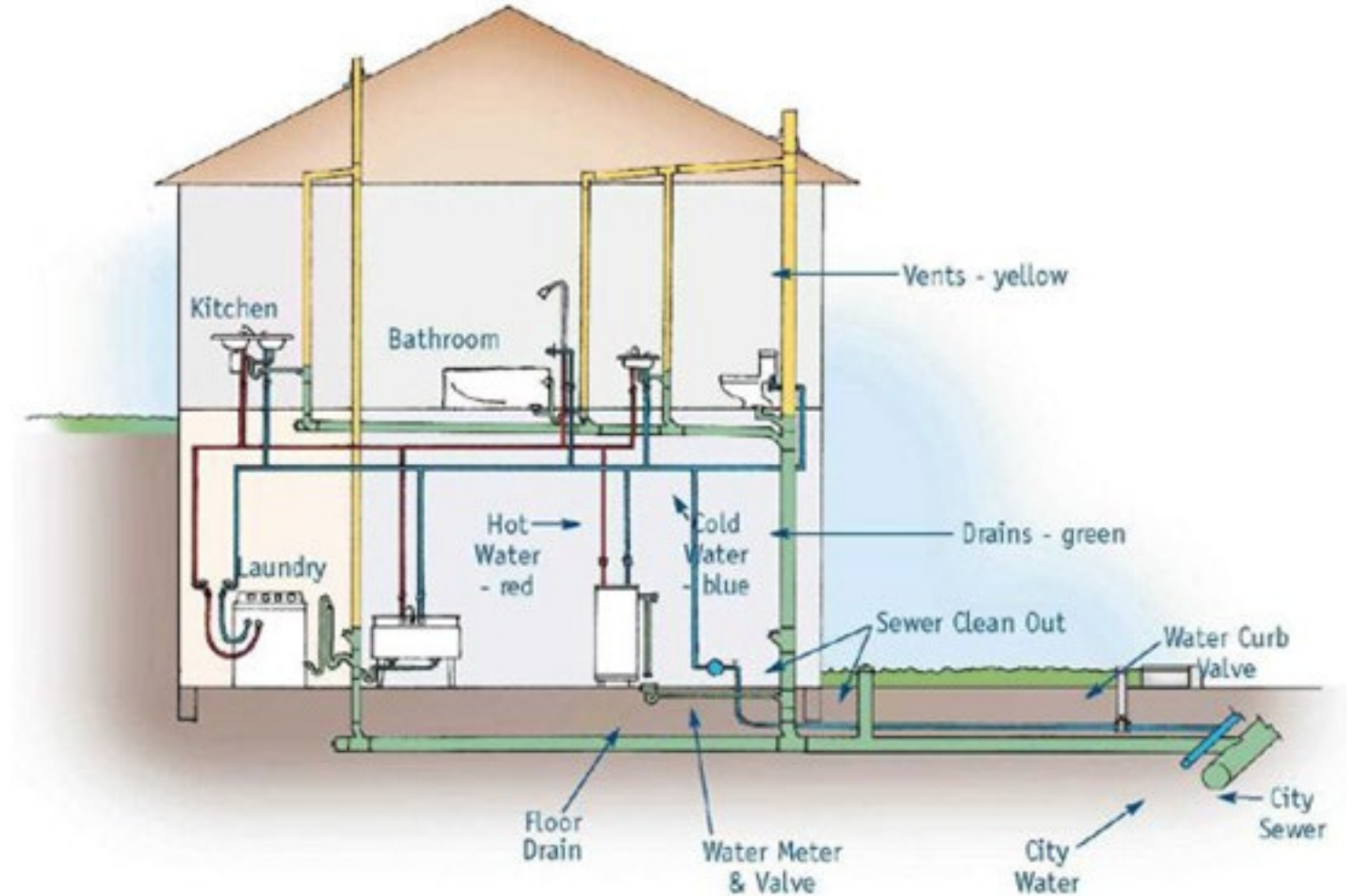
Comparison of Wastewater Treatment Technologies

Operator Workshop

September 2023

Wastewater Treatment

- Household sanitary
- Industrial
- Commercial
- Institutional



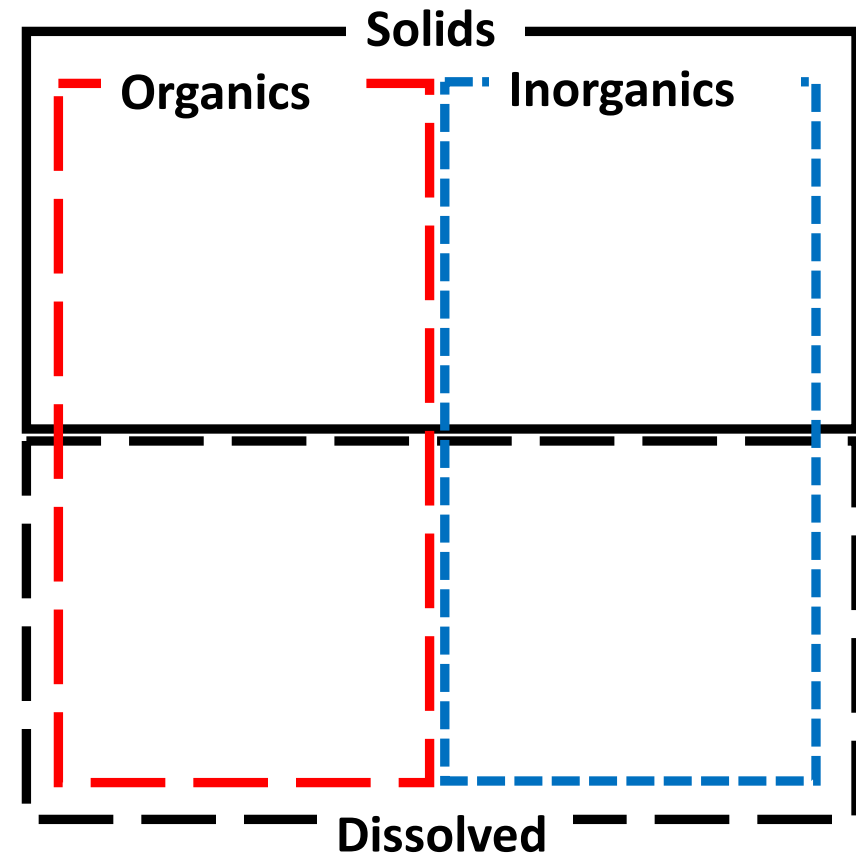
Wastewater Treatment

- Pollutants
 - Organics
 - Inorganics
 - Solids



Wastewater Treatment

- Pollutants (cont'd)
 - Nutrients
 - Fat / oil / grease
 - Pathogens
 - Metals



Wastewater Treatment

- Reduce negative impacts:
 - Receiving waters
 - Natural environment

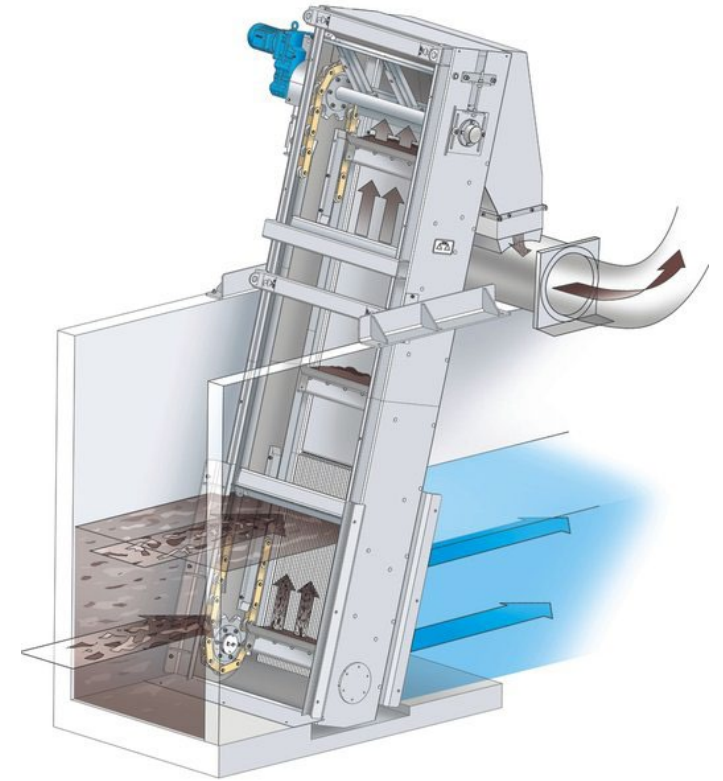
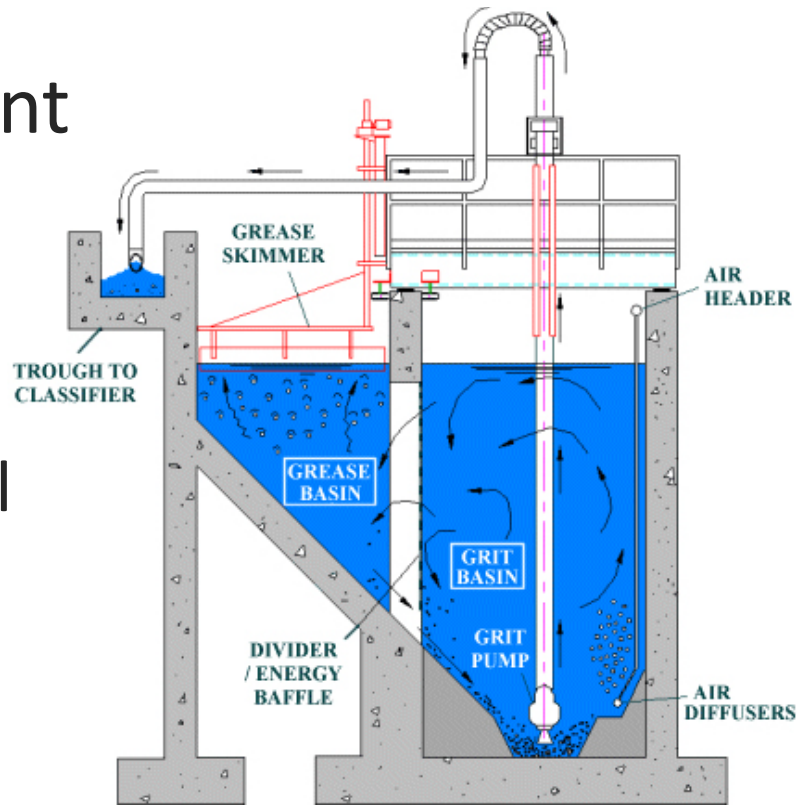


Wastewater Treatment

- Levels of Wastewater Treatment
 - Preliminary
 - Primary
 - Secondary
 - Tertiary

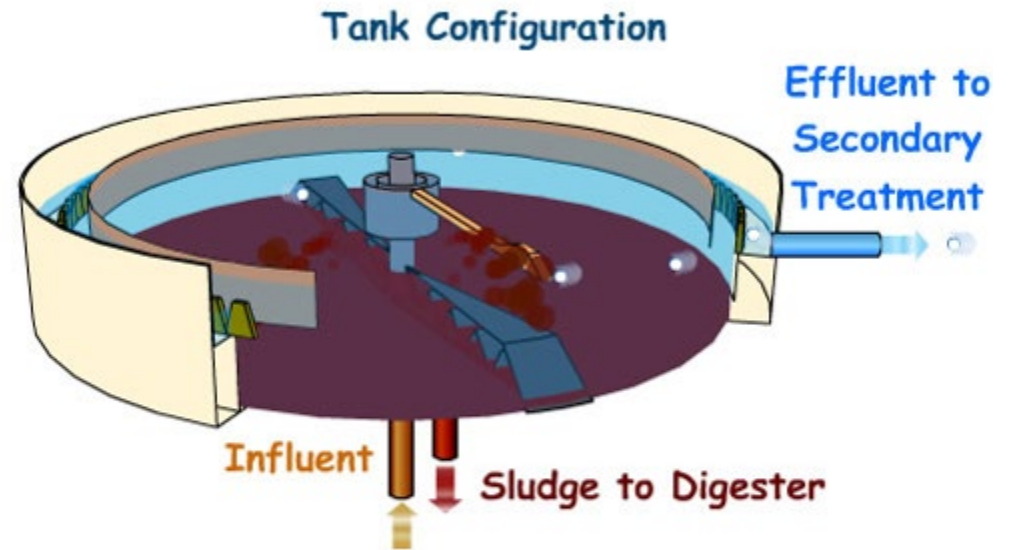
Wastewater Overview

- Preliminary Treatment
 - Screen
 - Comminution
 - Grit removal
 - Scum / FOG removal



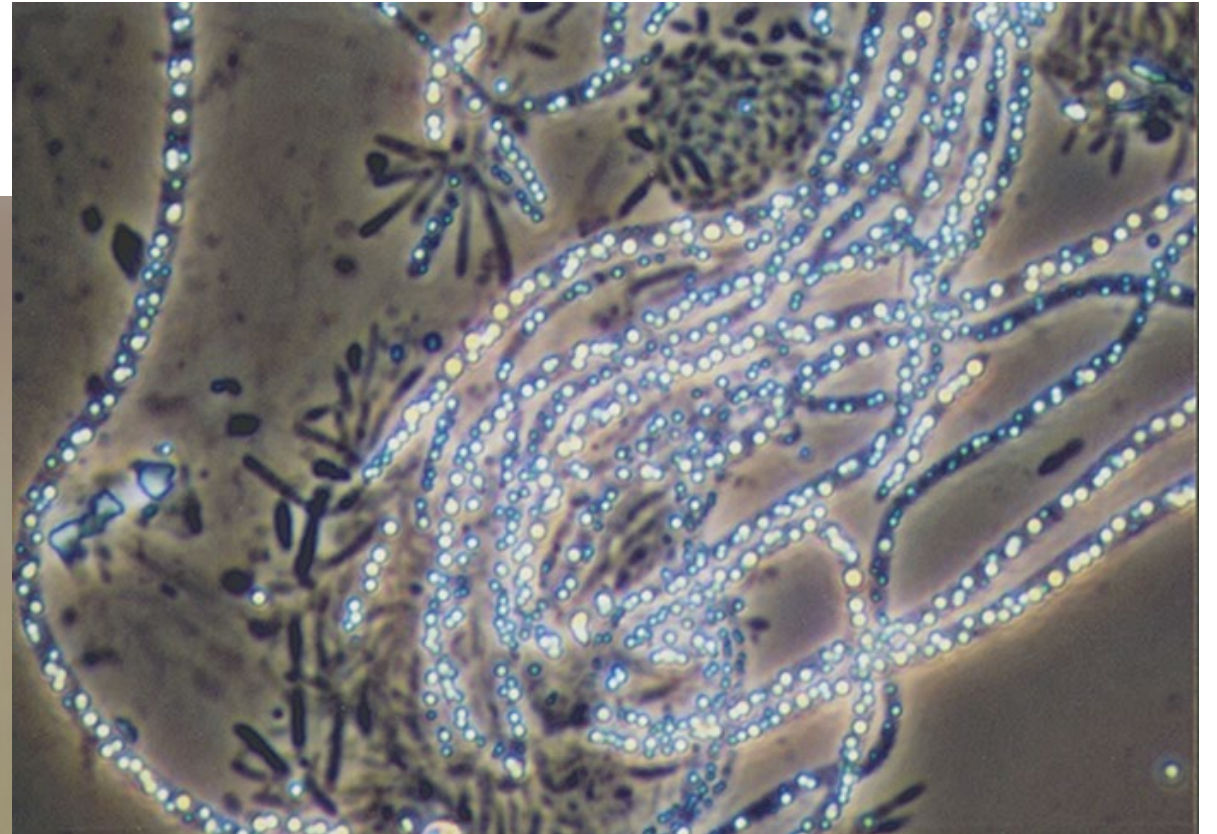
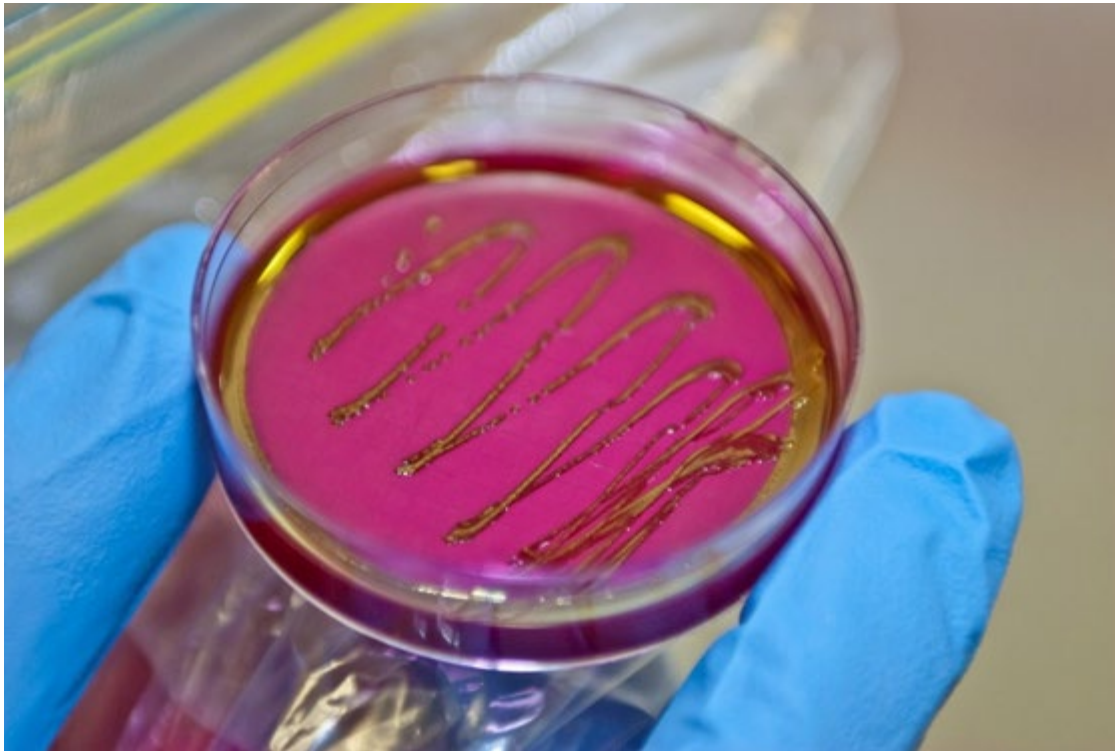
Wastewater Overview

- Primary Settling



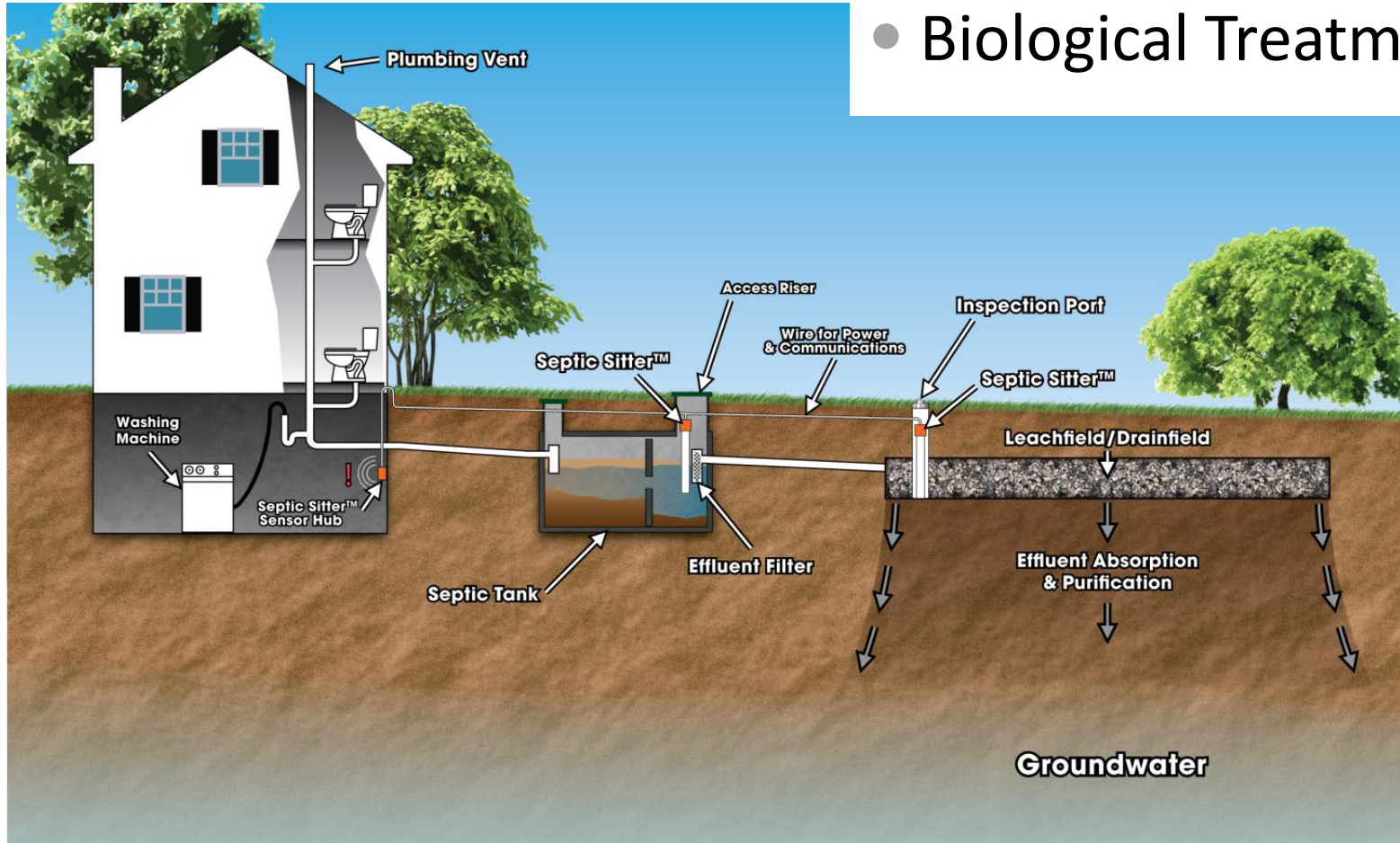
Wastewater Overview

- Biological Treatment



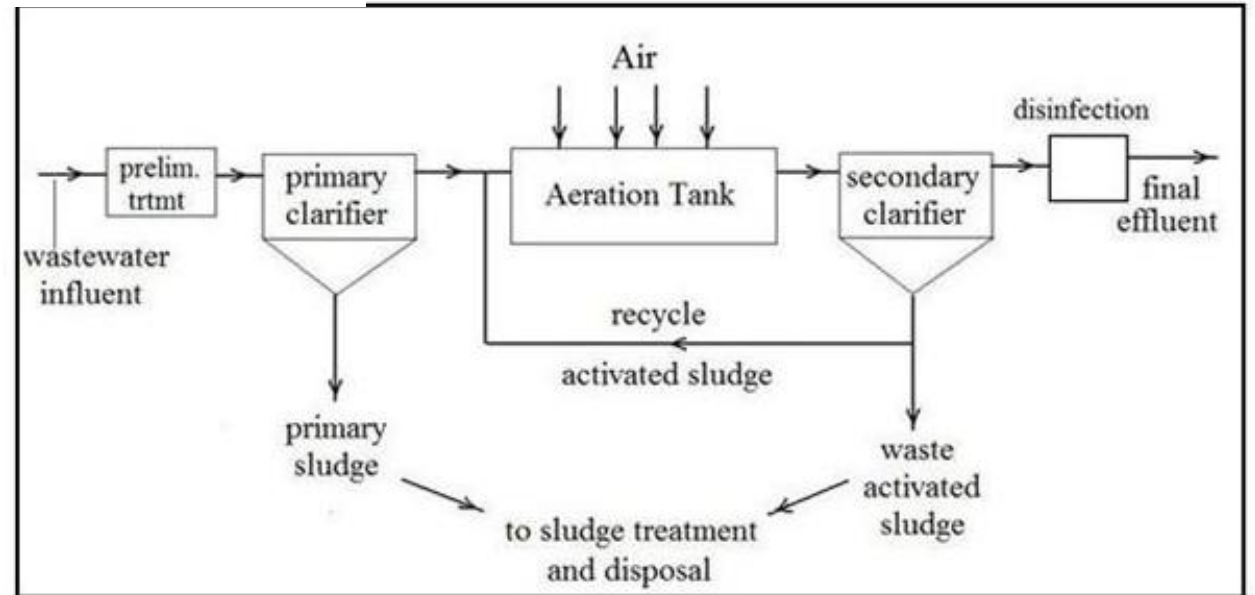
Wastewater Overview

- Biological Treatment – Septic System



Wastewater Overview

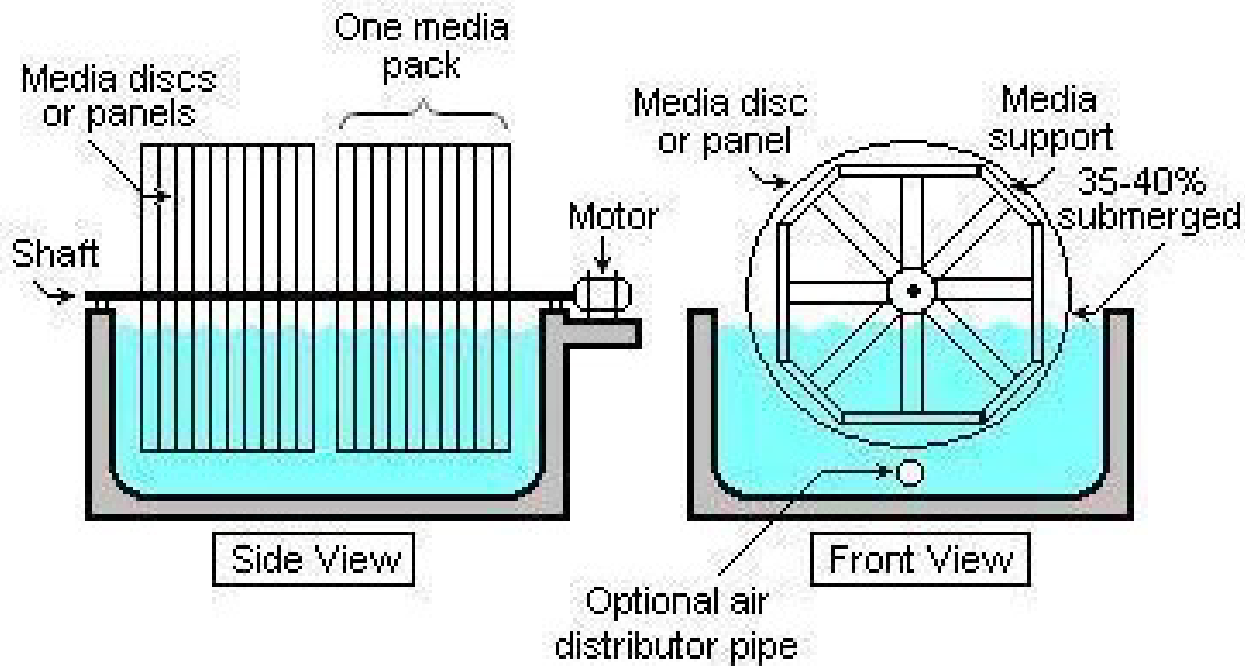
- Biological Treatment – Activated Sludge



Activated Sludge Wastewater Treatment Flow Diagram

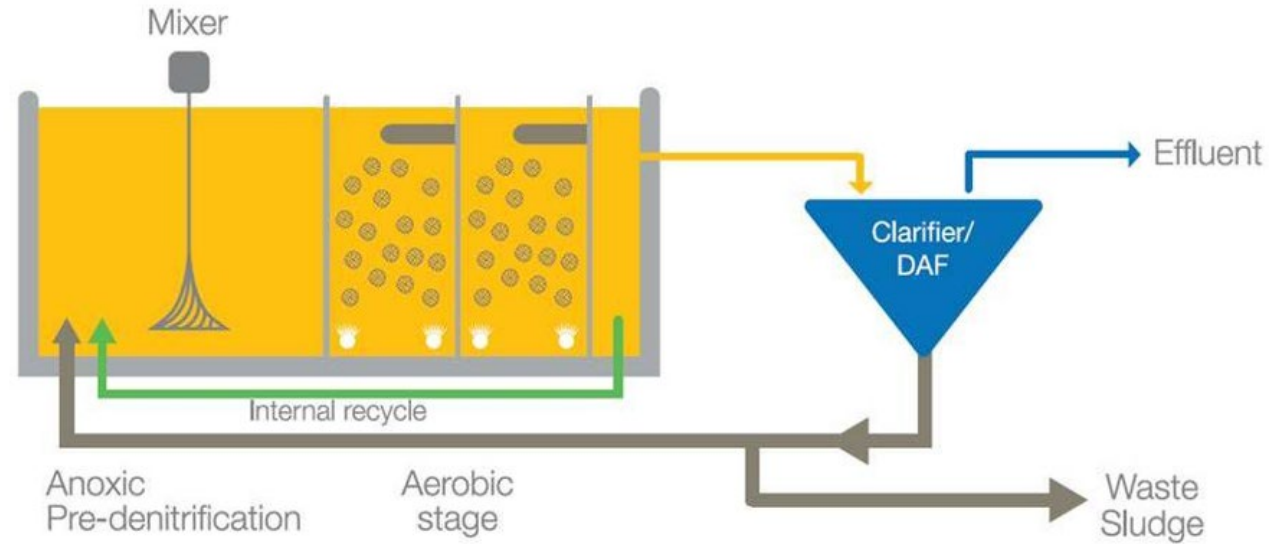
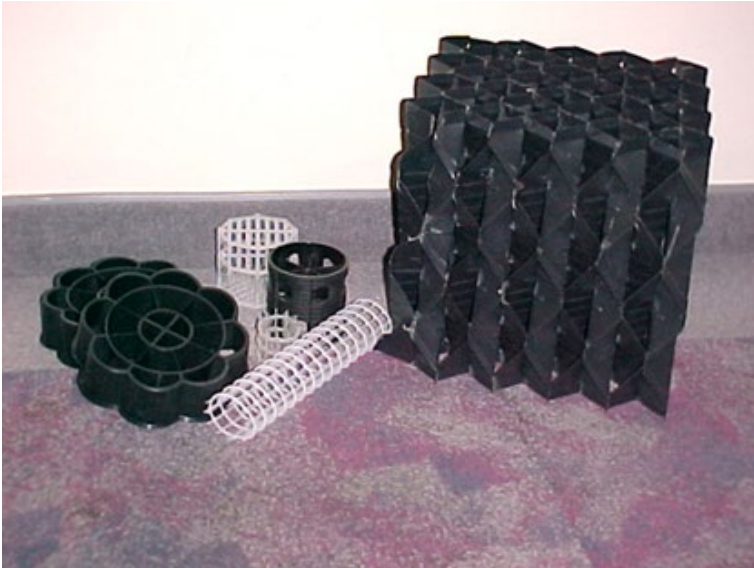
Wastewater Overview

- Biological Treatment – Rotating Biological Contactor



Wastewater Overview

- Biological Treatment – Fixed Film Reactor



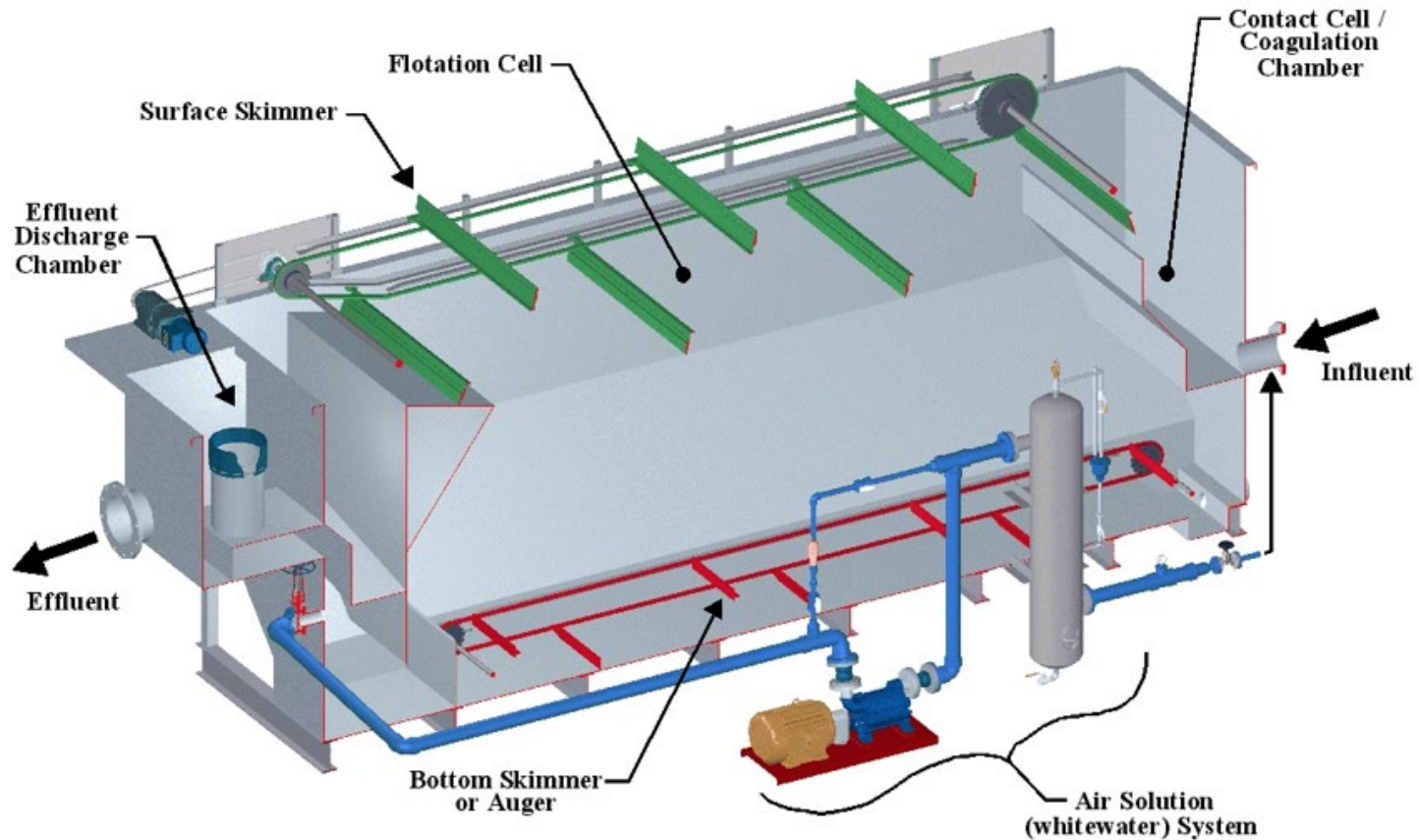
Wastewater Overview

- Biological Treatment – Secondary Clarification



Wastewater Overview

- Biological Treatment – DAF

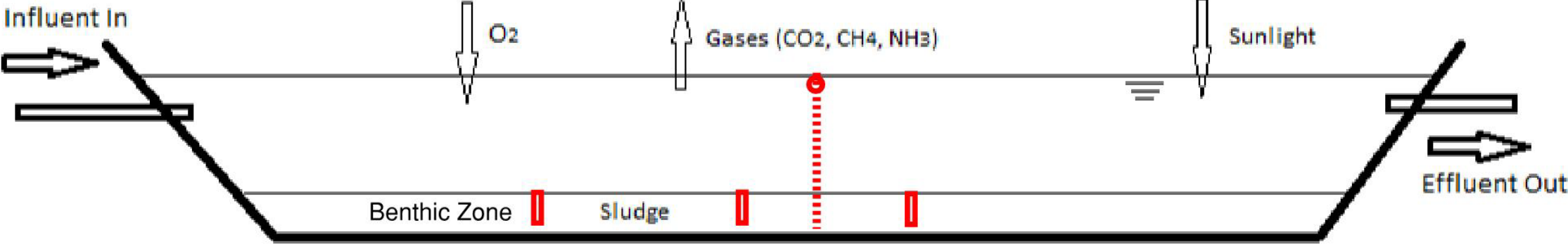


Wastewater Overview

- Biological Treatment – Lagoon



Wastewater Overview



Lagoon Section

Wastewater Overview



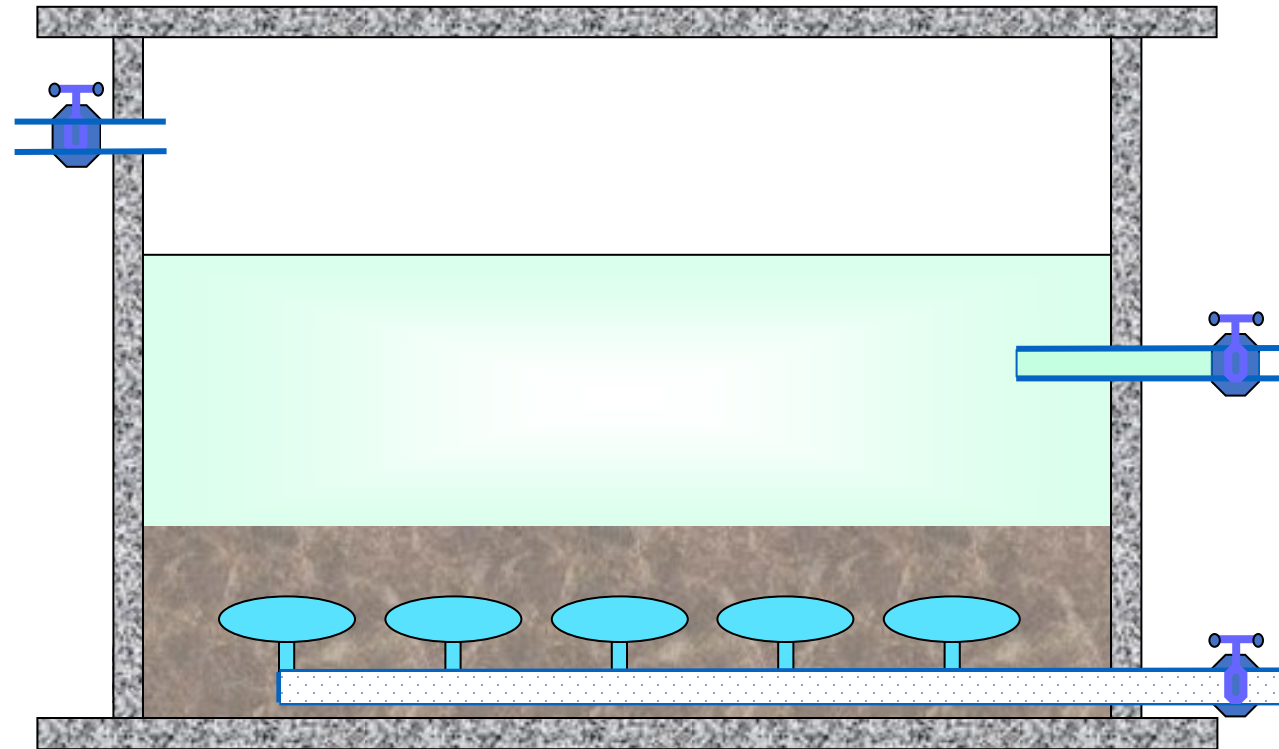
Wastewater Overview

- Activated Sludge vs Lagoon



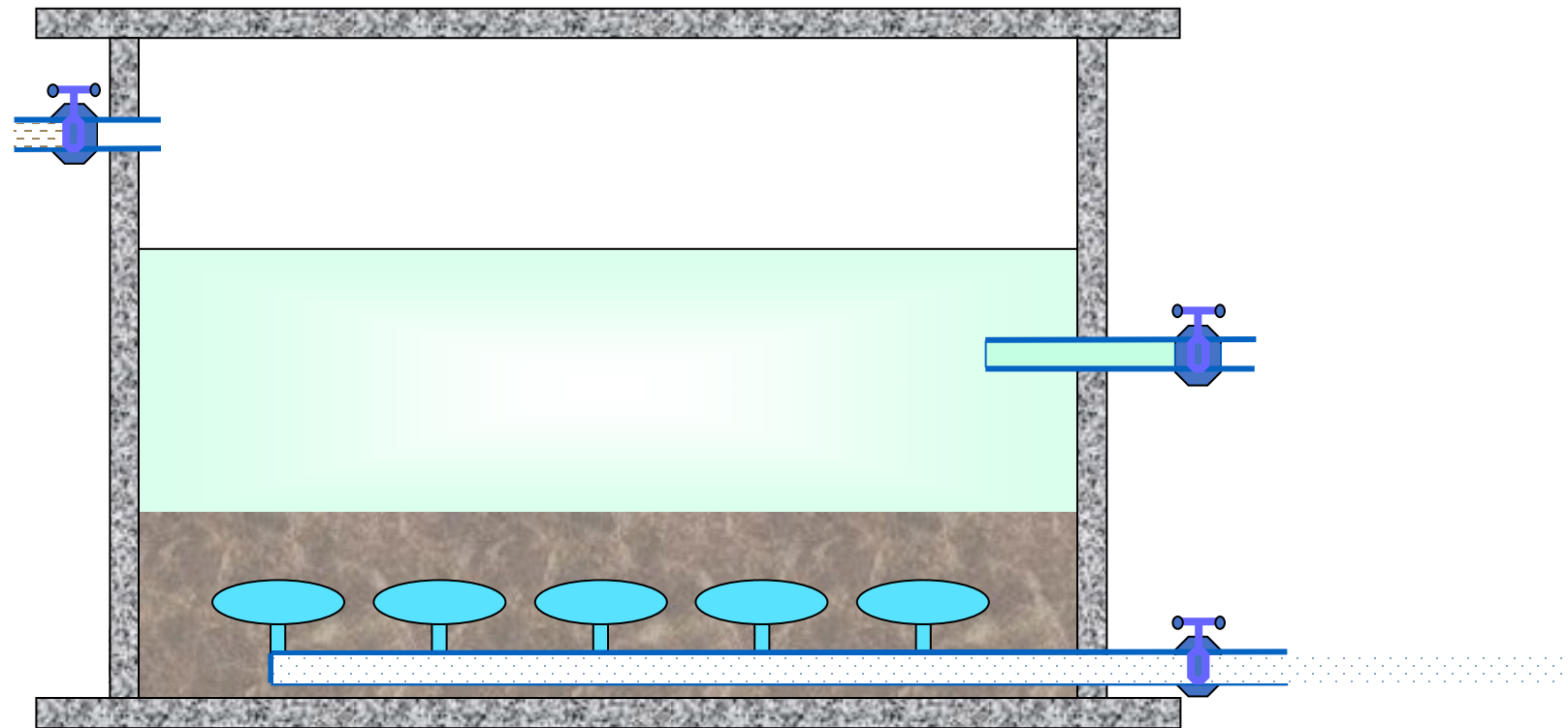
- Operating Sequence for SBR

Idle



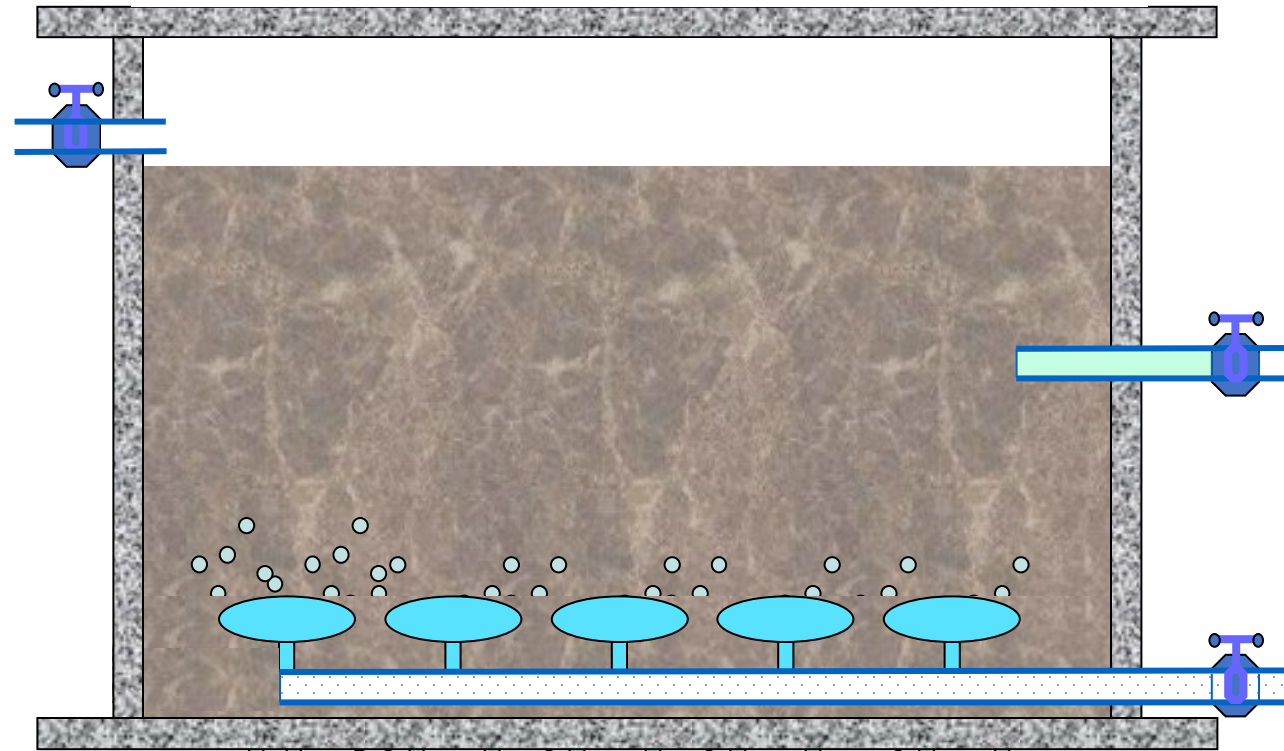
- Operating Sequence for SBR

Fill



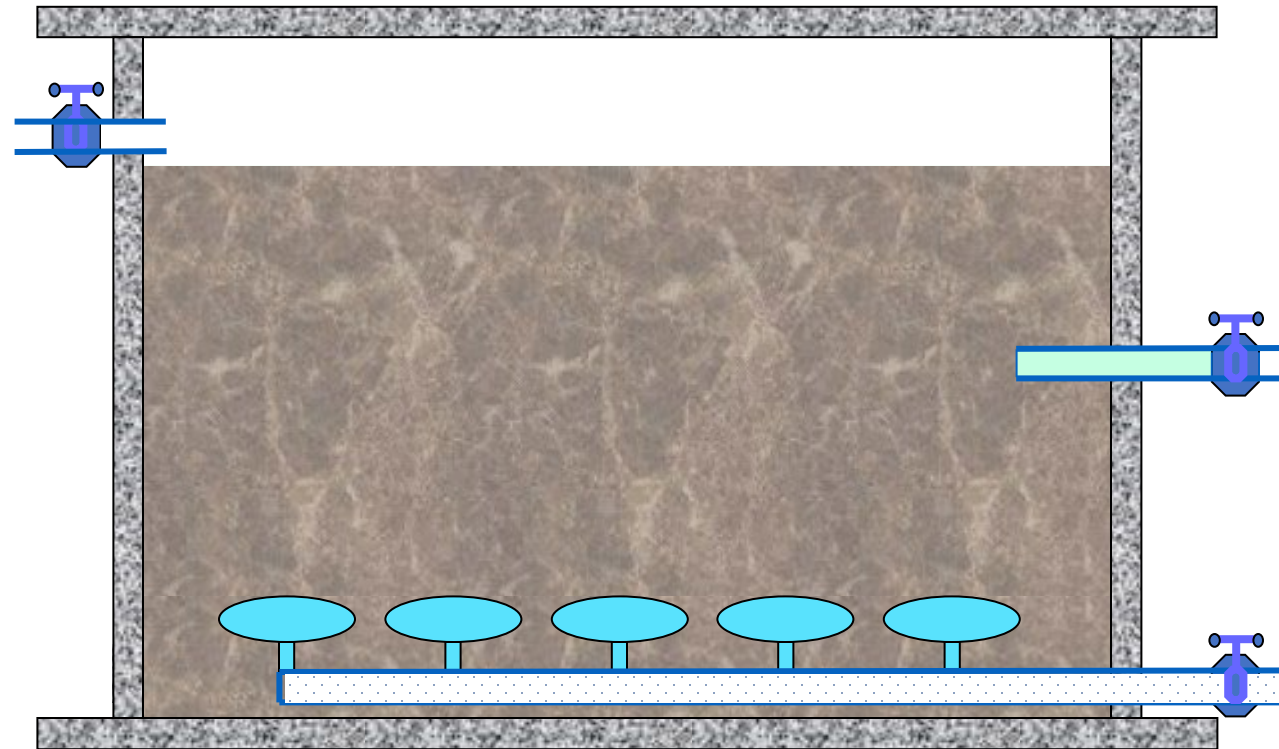
- Operating Sequence for SBR

React



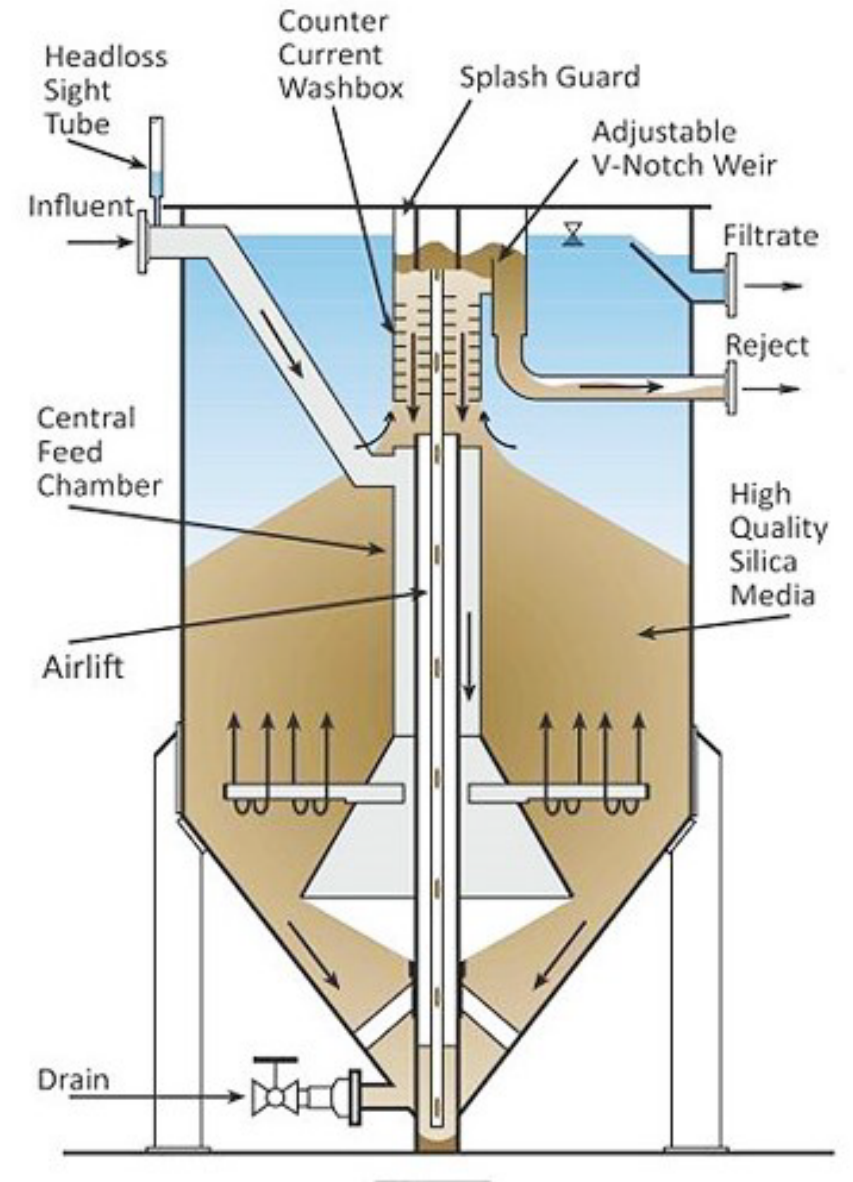
- Operating Sequence for SBR

Settle



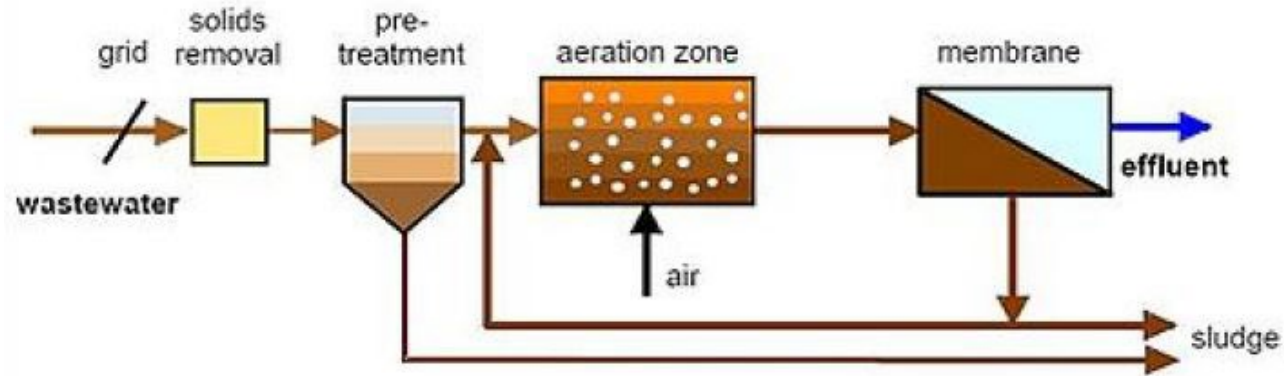
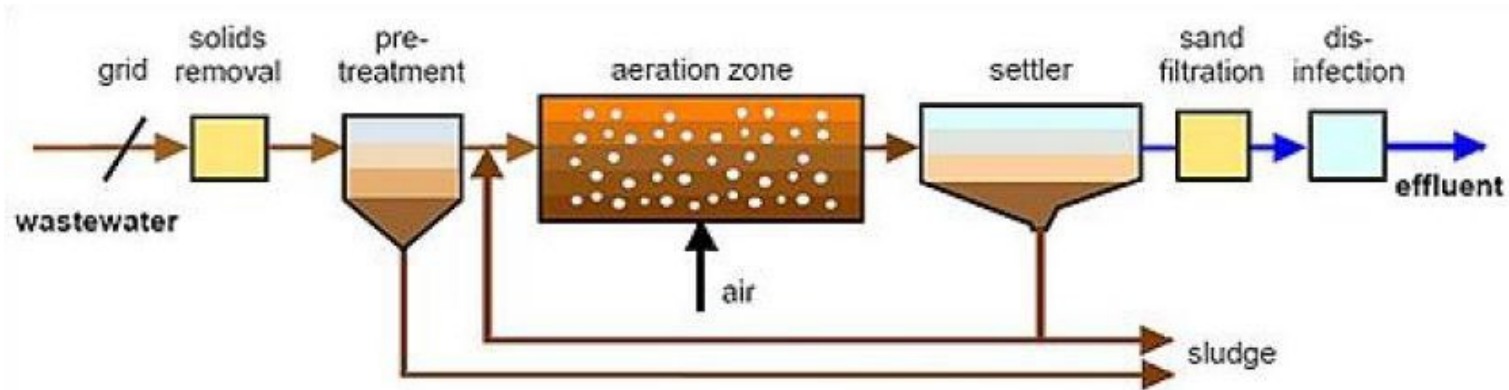
Wastewater Overview

- Tertiary Treatment
 - Reduction of nutrients
 - Reduction of suspended solids & organics



Wastewater Overview

- Membrane Bioreactor





Thank you