

The Activated Sludge Process

“Treatment Units”

Fall 2015



“The Units”

- Preliminary
 - Remove the big stuff.
 - Non-organic, inert stuff.
- Secondary
 - Biological breakdown of suspended and soluble stuff.
- Tertiary
 - Polishing
- Digestion

“The Units”

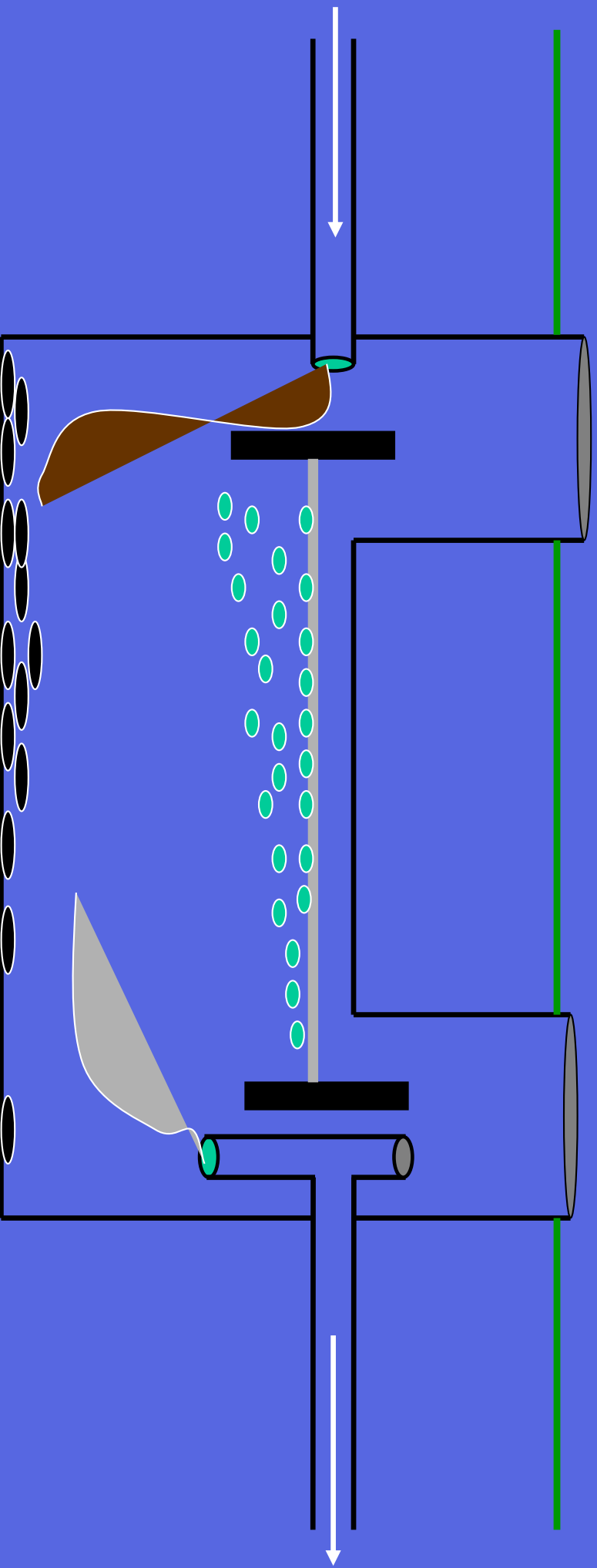
- Problems occur when:
 - A unit fails.
 - The load is passed to the next unit in line.
 - The next unit wasn't designed for its removal.
- Failures cause additional expense/labor to operators.

Trash Trap

Designed to:

1. Capture settleable solids such as grit, gravel, heavy organic solids...
2. Capture floatable solids such as grease, plastics, paper, organic scum...
3. Dissipate energy of influent flow by use of baffle walls and effluent tee piping

The Trash Trap















SWEET WATER

TENN.



Bar Screen

- Located immediately prior to aeration tank
- Designed to capture some rags, bricks, 2x4 lumber, and other large trash items
- Comes in 1 & 1/2" to 1/2" gaps
- Used as a substitute to trash traps



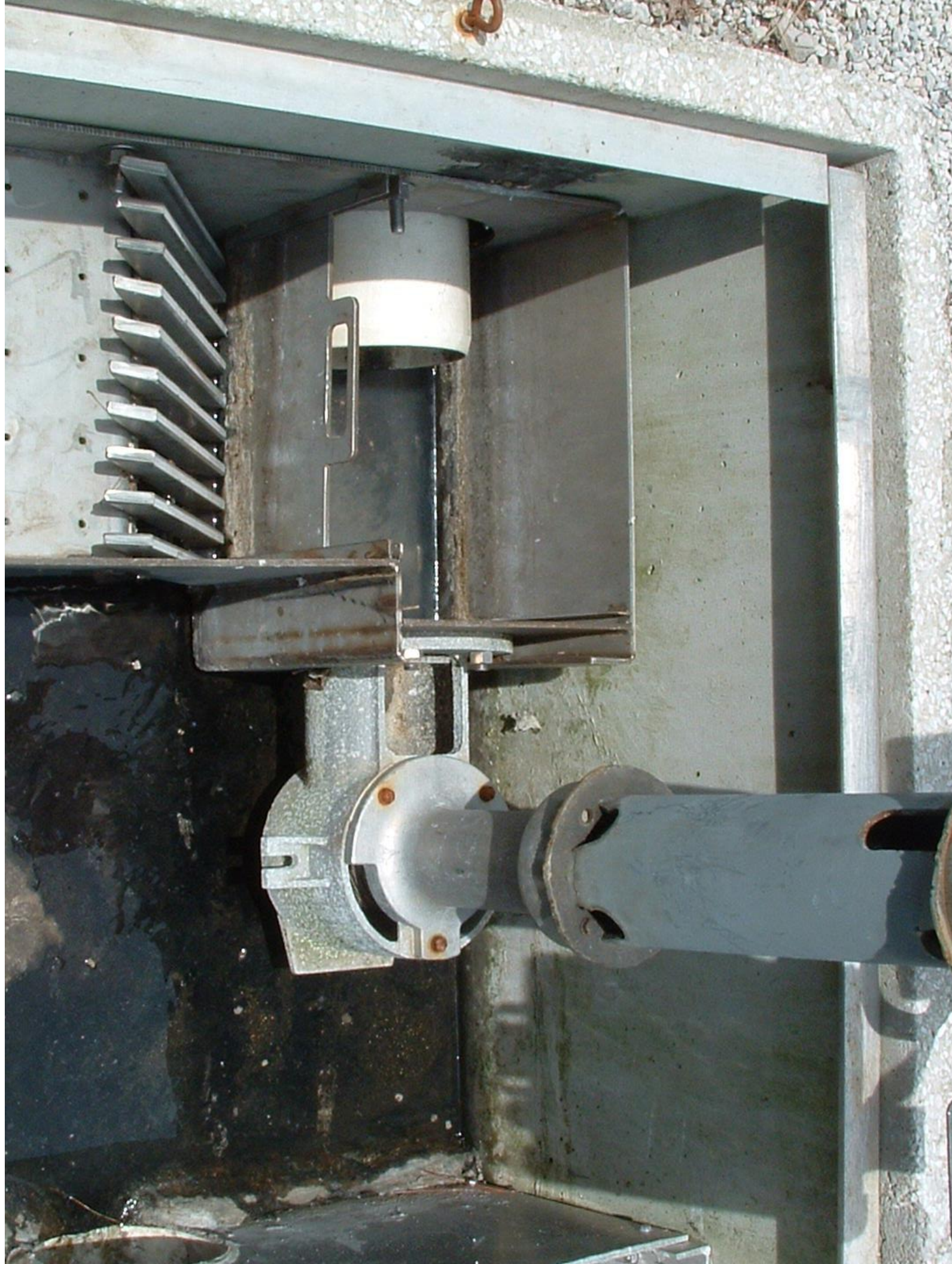






Comminuter

- Located after bar screen
- Designed to shred trash to prevent plugged pumps
- Can be found with automated auger screening systems





Flow Equalization Tank

- Located after trash trap or screen system
- Consists of a tank, 2 pumps, flow control box, electric control panel, float switches, and an emergency overflow pipe
- Designed to smooth out spike flows to the plant
 - Flow control box ensures design flows to the plant









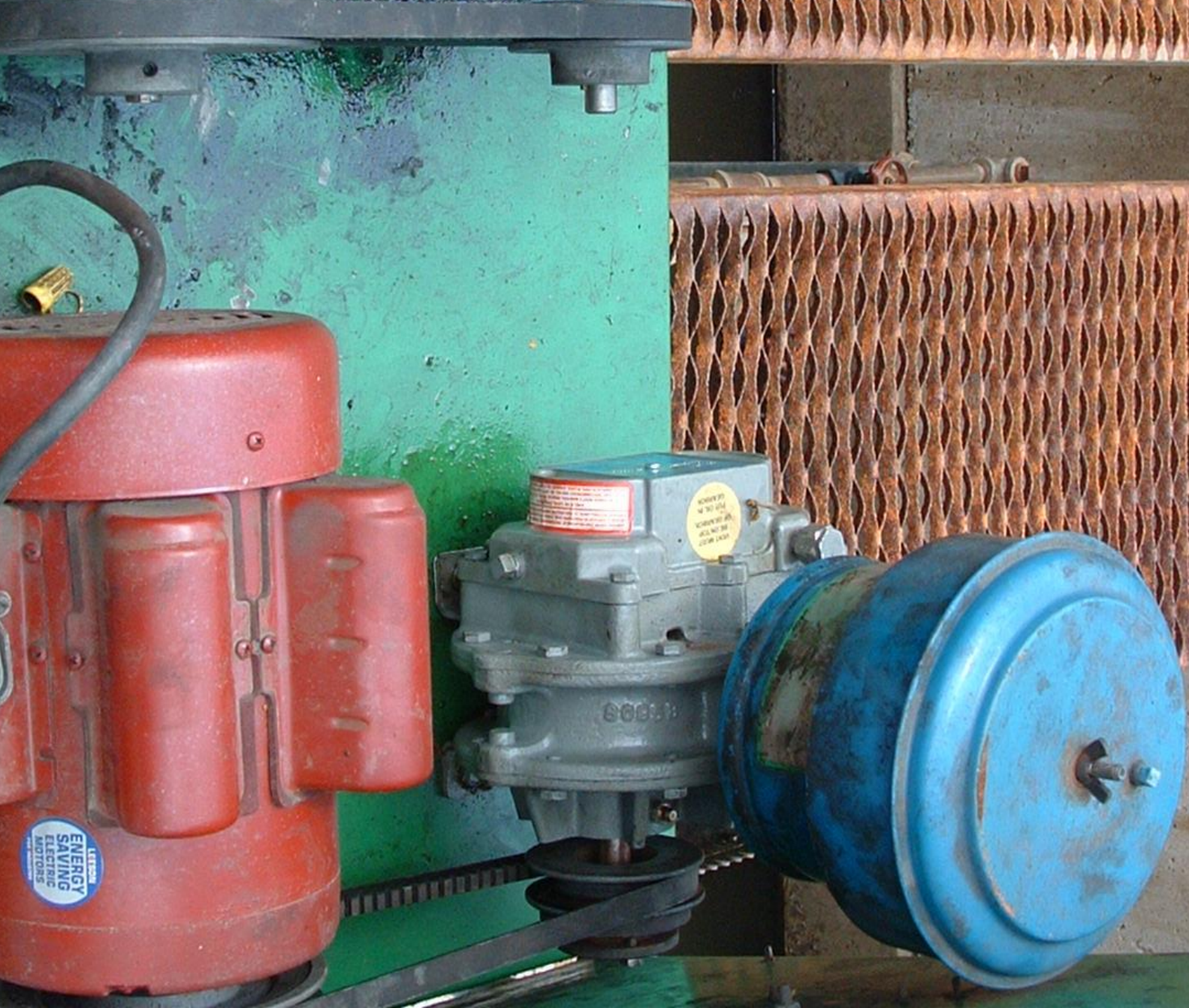
The Secondary Units

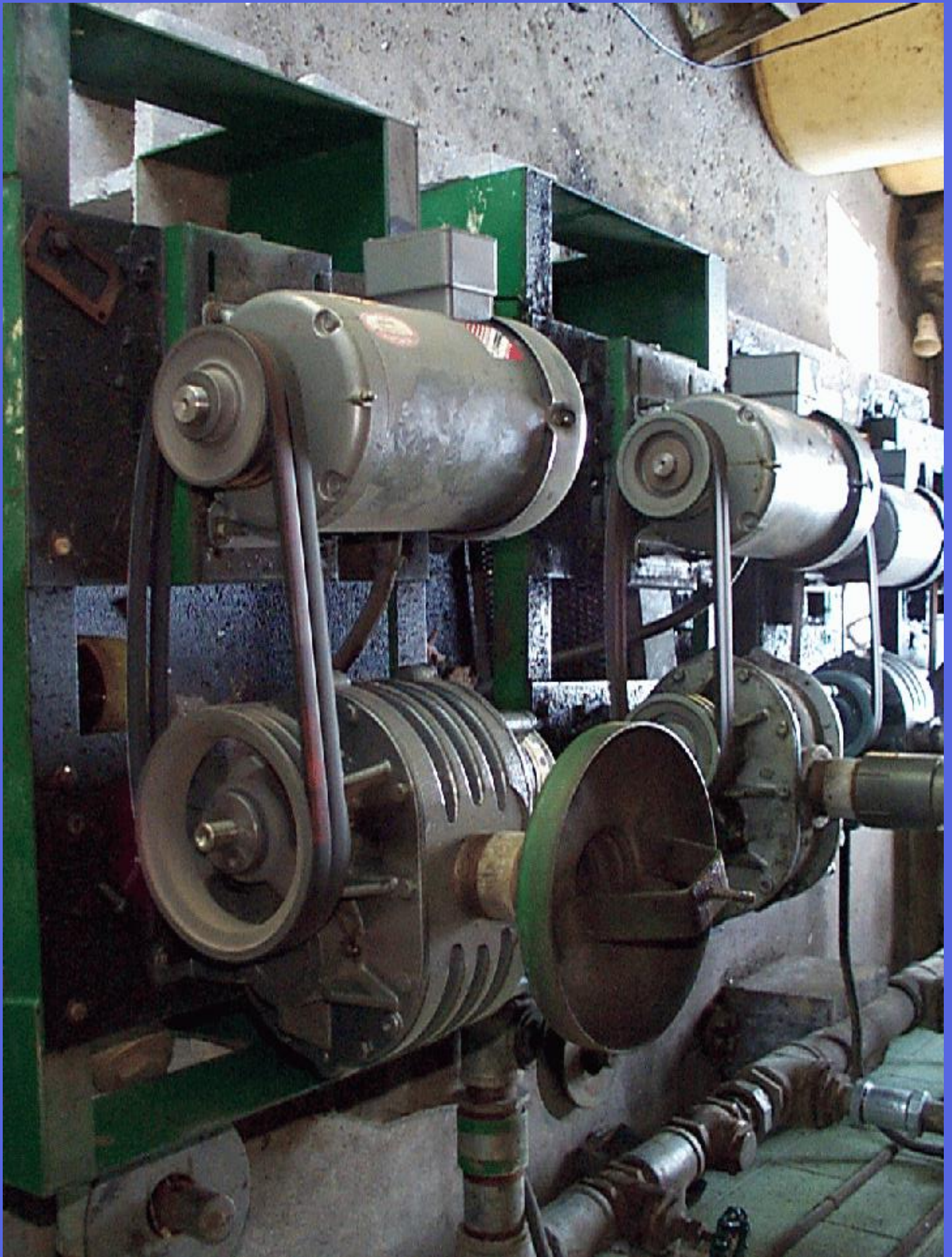
- Aeration tanks
 - Blowers and diffusers
- Clarifiers
 - Skimmers and return sludge lines

Aeration Tank

- Consists of motors, blowers, air lines, control valves, air diffusers, and bacteria
- Designed to handle organic loading
 - convert raw sewage into more bacteria
- The design flow of a wastewater plant is based on the size of this tank

















Clarifier

- Consists of a hopper shaped bottom tank, scum baffle, weir baffle, RAS airlift pump, airlift skimmer pump, and weir.
- Designed to settle out solids and pass clear water to the dosing tank.



Baffle

Sloped settling chamber walls

Chamber floor

Return sludge inlet



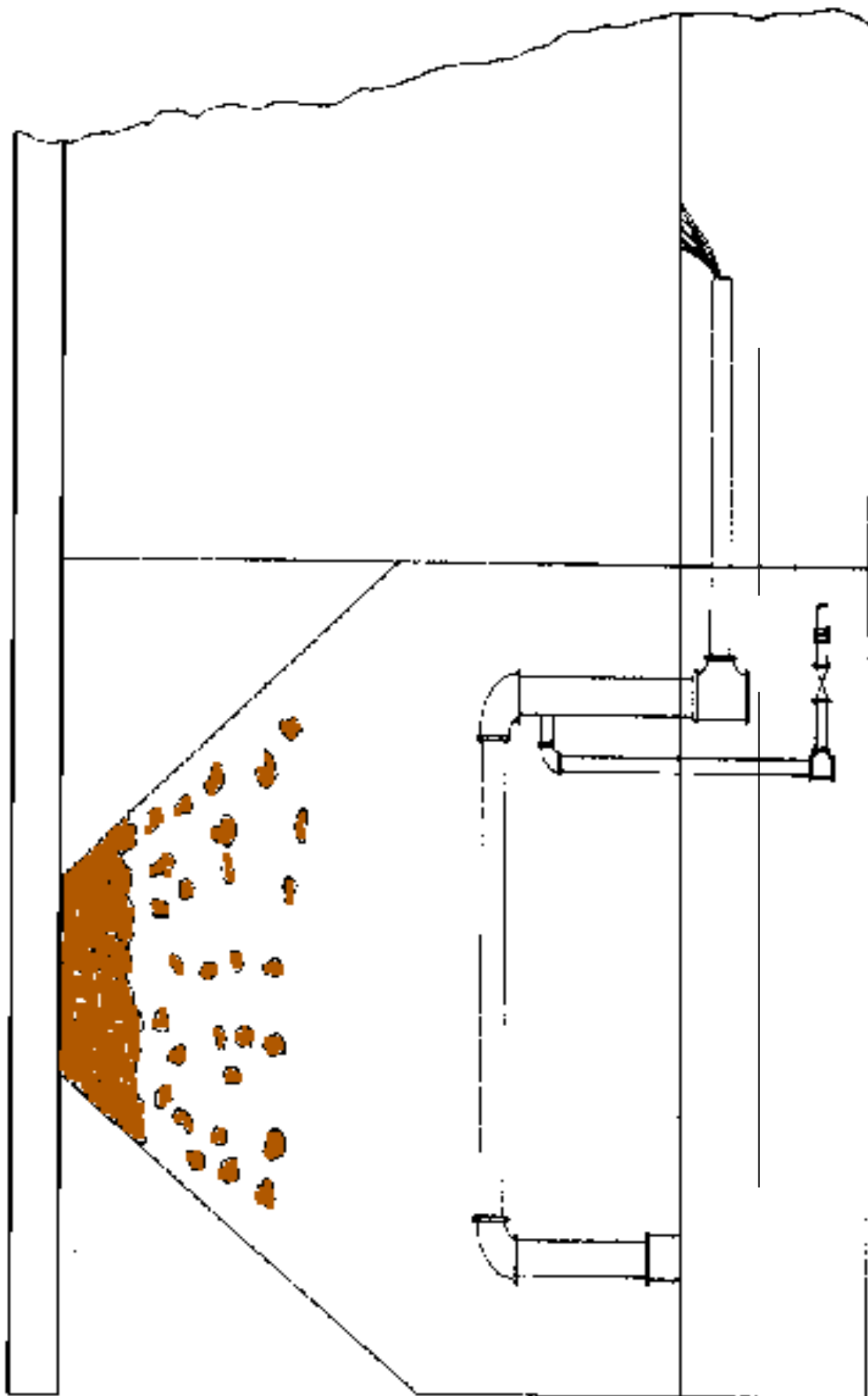












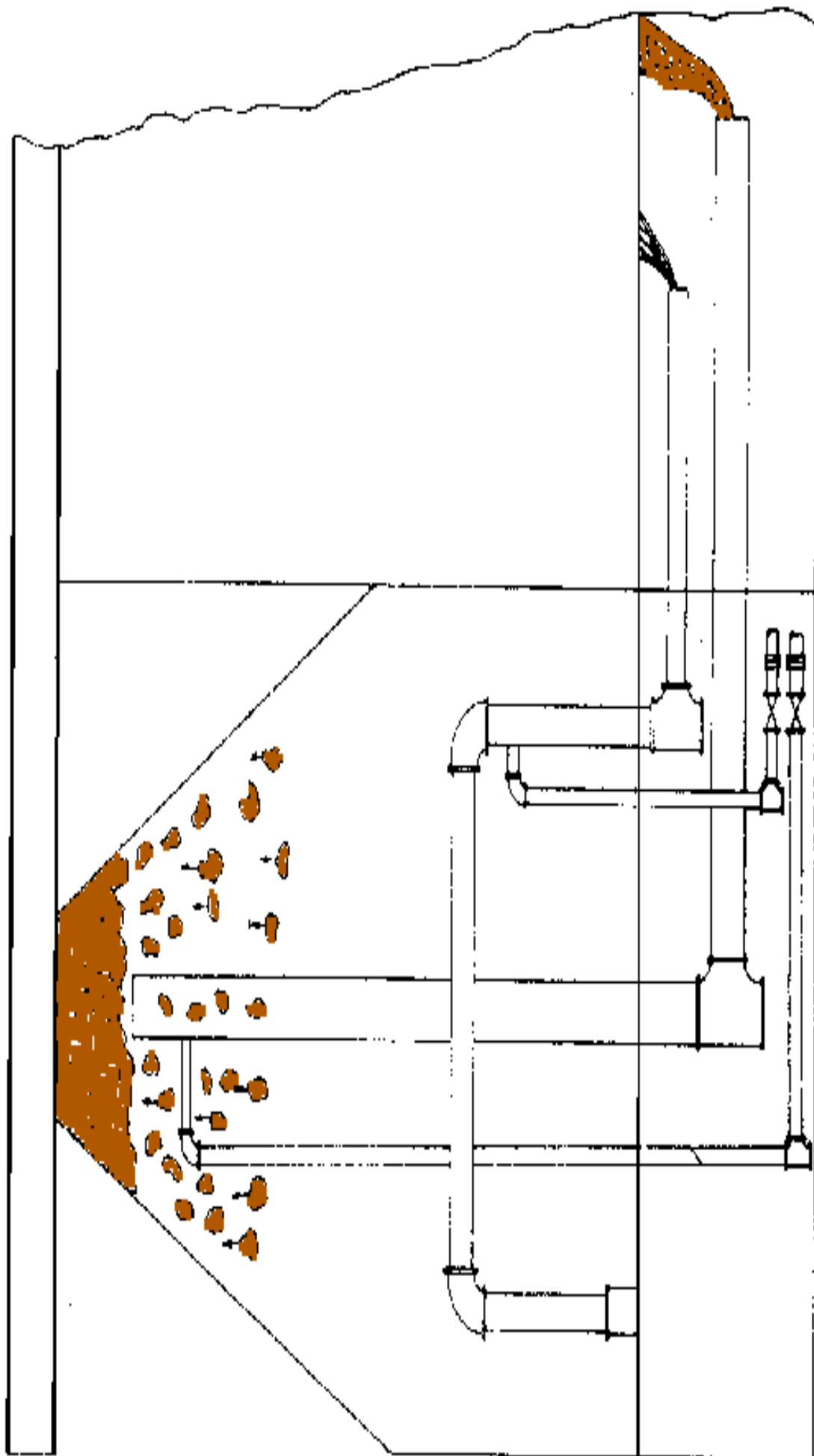












The Tertiary Units

- Filtration
 - Sand filters
 - Fixed Media
 - Polishing ponds
 - Mechanical filters
- Disinfection

Sand Filters

- Consists of sand, pea gravel, $\frac{3}{4}$ " aggregate, underdrain piping, a flow diversion box, and a dosing tank system.
- Designed to capture small amounts of suspended solids and plant upsets















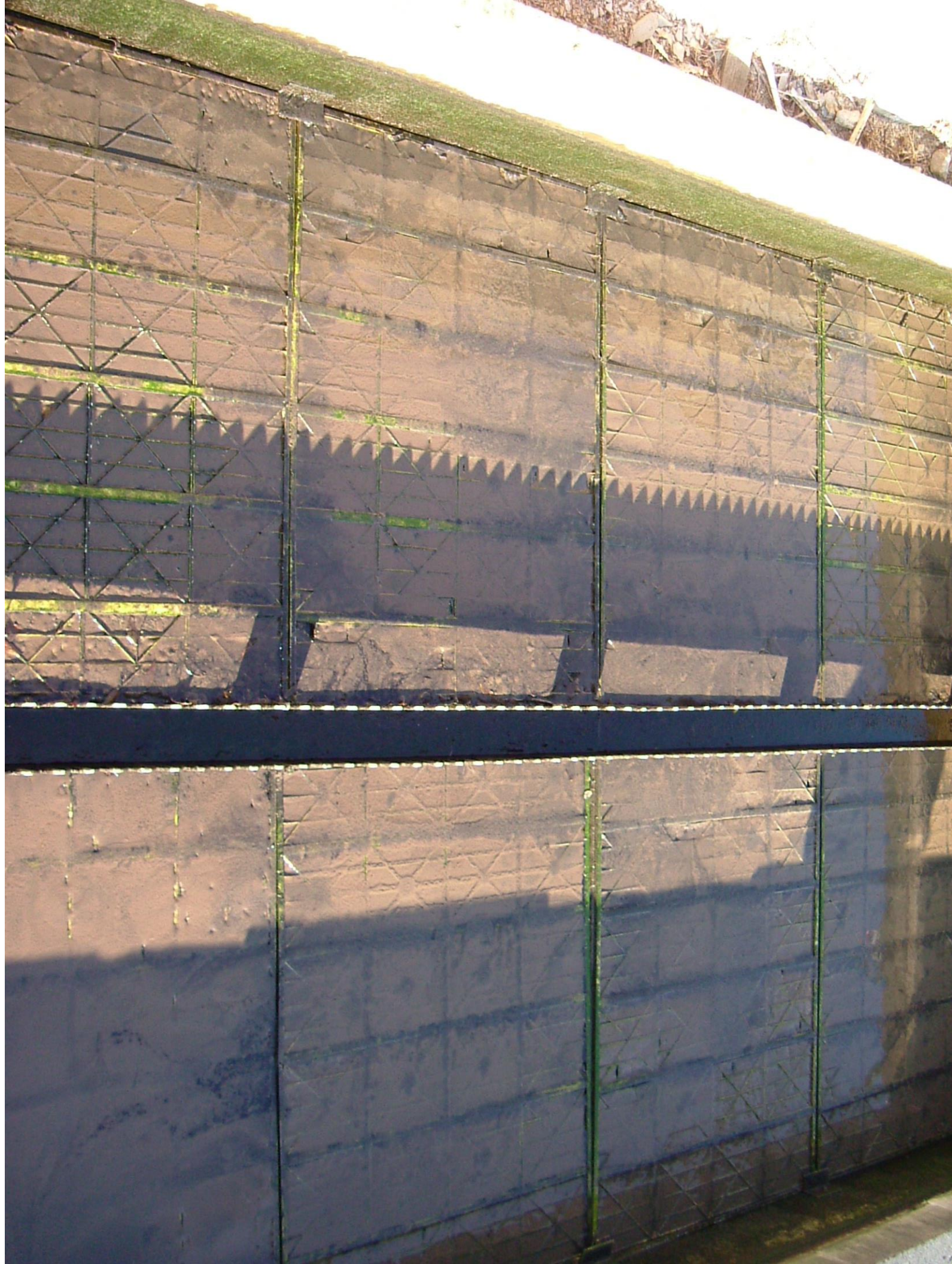


Upflow Media Filters

- Consists of 2 tanks, vinyl wedge decking, 2 submersible pumps, influent baffle wall, and a weir.
- Designed to capture and hold solids that have escaped from the clarifier.













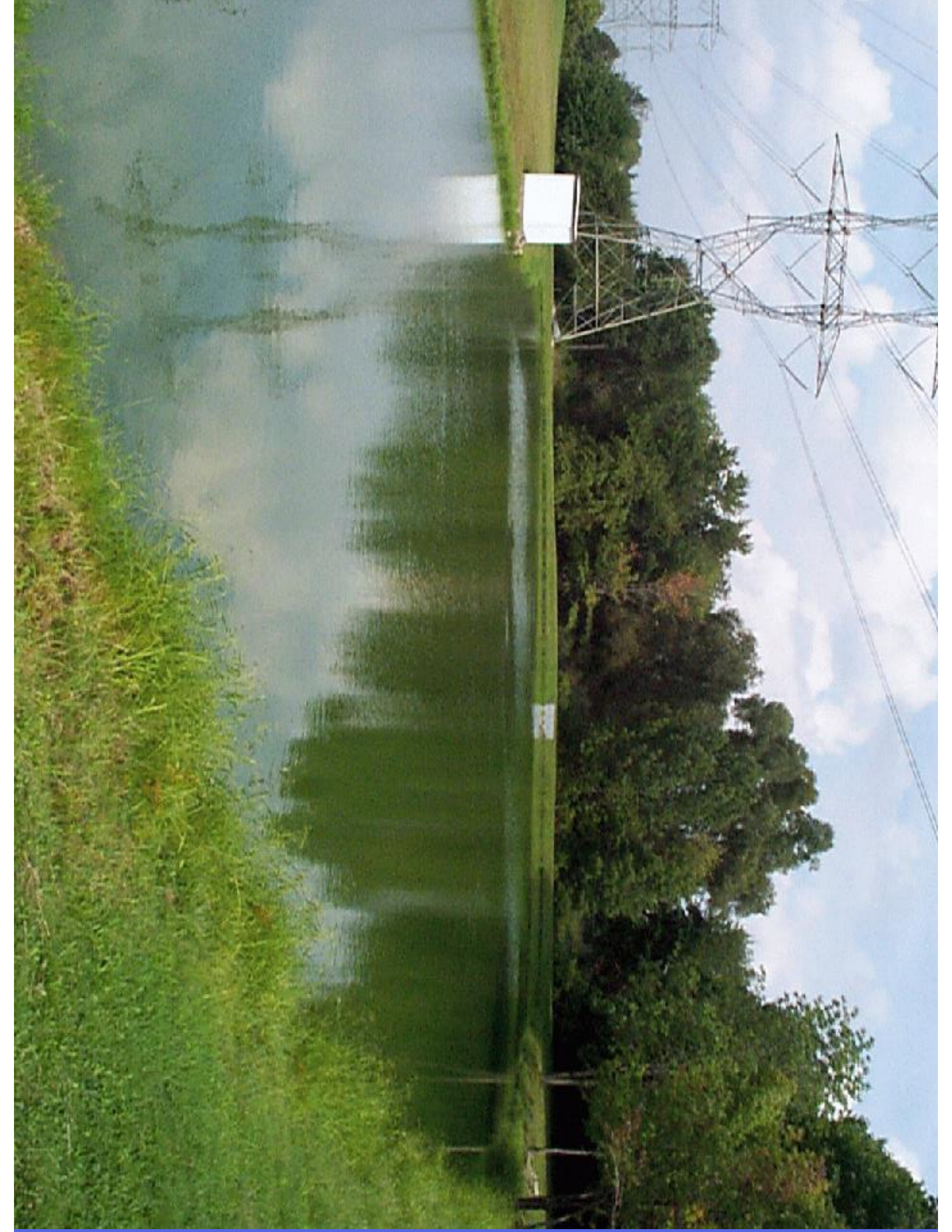
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Control panel with various buttons and switches.



Polishing Pond

- Designed to capture solids that have escaped from the clarifier.





Disinfection

- Designed to protect humans by neutralizing pathogens before reaching the receiving stream.
- 2 types of common disinfection systems:
 - Chlorine
 - Ultraviolet light







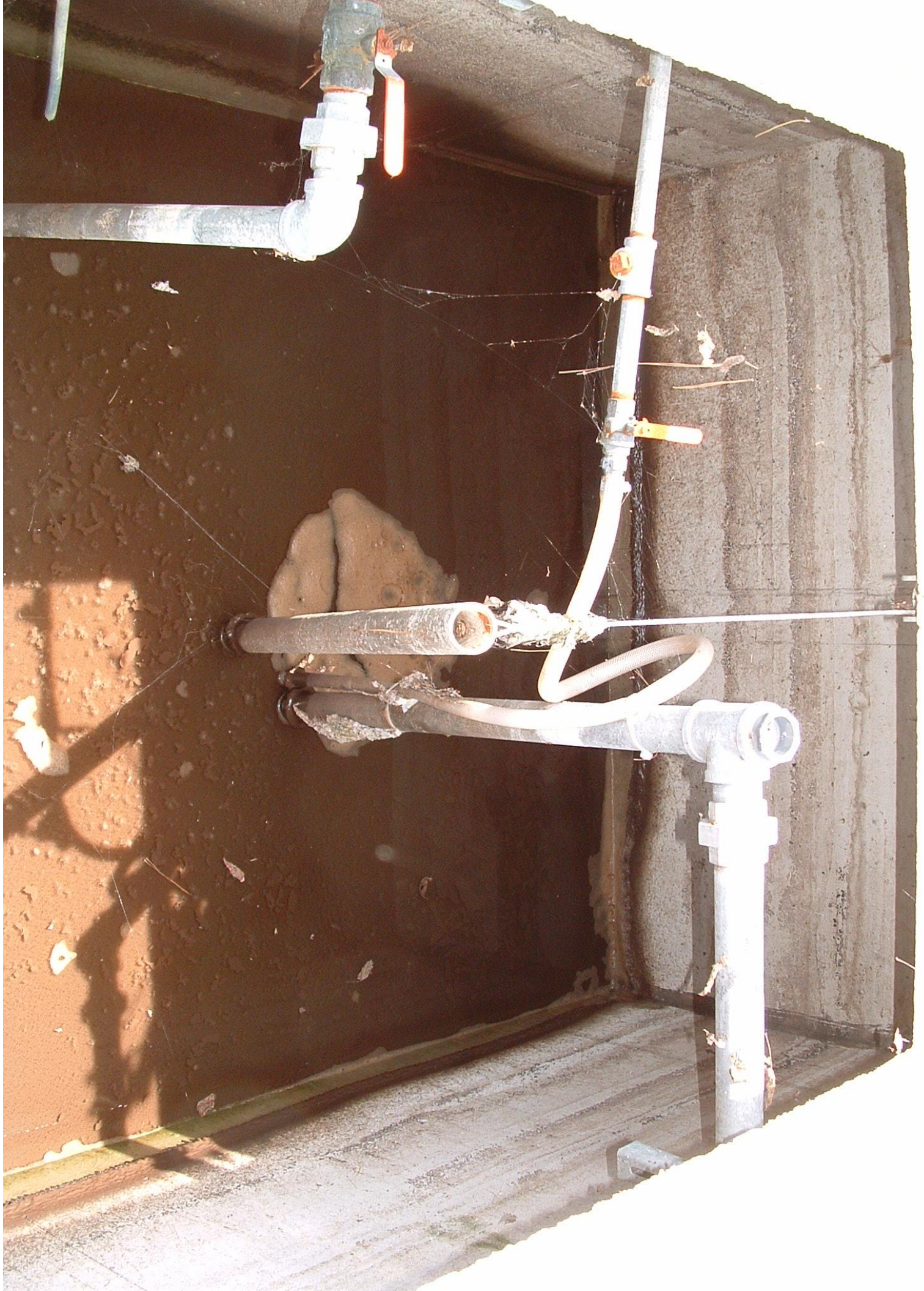






Sludge Holding Tank

- Consists of a small tank, air lines, diffusers, decant airlift pump, and an overflow pipe.
- Designed to gravity thicken excess sludge from the plant allowing the operator to control aeration tank solids concentration.







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Questions?



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