

Sequencing Batch Reactors

Nviro's package Sequencing Batch Reactors (SBR) offer a flexible treatment solution for biological nutrient removal, all while reducing the footprint by treating the wastewater in a single reactor.

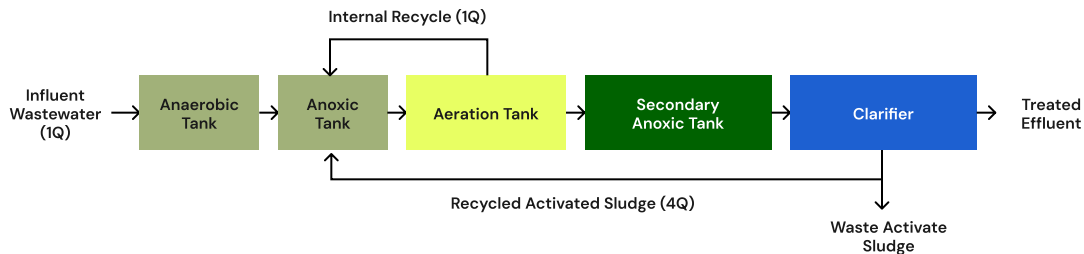


Figure 1: Conventional Activated Sludge process

Conventional activated sludge systems have dedicated basins for each type of treatment needed: anoxic basins for nitrite/nitrate removal, aerobic basins for BOD and ammonia removal, and clarifiers for TSS removal.

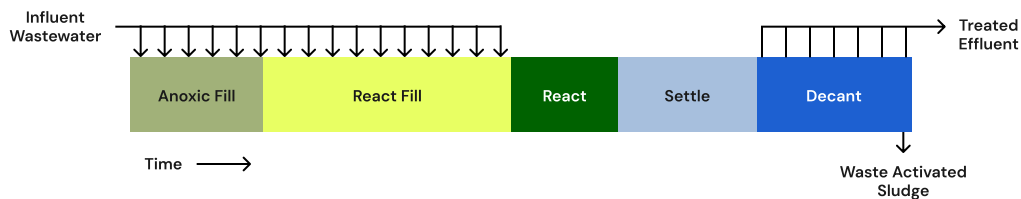


Figure 2: Typical Sequencing Batch Reactor cycle

NVIRO'S SBR SYSTEM

Custom-built equipment skids house all the equipment needed to operate and maintain the system, including blowers, pumps, and valves, all controlled by Nviro's fully automated PLC-based control system.

SBRs can be combined with tertiary ultrafiltration and disinfection systems to meet Title 22 reuse requirements.

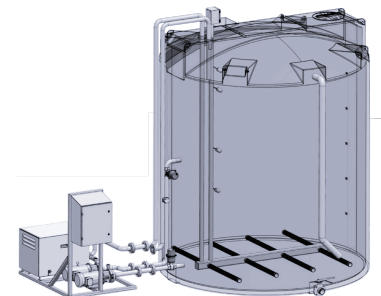


Figure 3: SBR and equipment skid

Key Features

- Biological nutrient removal is performed within a single tank, removing costly recirculation pumps
- Adjustable timer-based controls allow operators to change treatment capabilities in response to changing flows and loads
- Fully automated controls move through the cycle structure set by the operator

PHASES OF OPERATION

1. ANOXIC FILL

- Screened influent enters the reactor
- An anoxic environment is created to promote denitrification of residual nitrites/nitrates (NO_x) using influent BOD
- Anoxic conditions help to limit the growth of filamentous bacteria
- If the plant has a phosphorus limit, the cycle time is extended to enable anaerobic conditions for the release of phosphorus from phosphorus accumulating organisms (PAOs)

2. REACT FILL

- Screened influent continues to enter the reactor
- Aeration begins to provide oxygen for BOD removal and nitrification of influent ammonia
- Blowers cycle on and off to provide intermittent anoxic conditions to denitrify NO_x created from ammonia nitrification to meet a total nitrogen effluent limit
- PAOs take-up luxury phosphorus (more than released in Anoxic Fill), reducing the chemical demand for phosphorus removal

3. REACT

- Influent stops. Flow is diverted to another SBR or an equalization tank.
- Aeration continues to cycle between aerobic and anoxic conditions for BOD, ammonia, and NO_x removal.

4. SETTLE

- Aeration and mixing stop, allowing the contents of the reactor to settle while leaving a clarified supernatant on top of the sludge blanket

5. DECANT

- Floating or suction decanters remove clarified supernatant from the reactor
- Waste sludge is removed at the end of decant.
- After decanting, the SBR starts the next cycle at Anoxic Fill.

