

SECONDARY TREATMENT PROCESS



Rapid Mix

The rapid mix tank is a small basin where the returned flows from several process areas are returned and mixed together before entering the Bio-selector for further treatment.



Bio-selectors

Effluent from the primary clarifiers goes to rapid mix tank next to the DAF (Dissolved Air Flotation) Building where various recycle flows and the RAS (Return Activated Sludge) are mixed with the primary effluent and mixed liquor. The Bio-selectors are four 325,000-gallon basins that can be aerobic, anaerobic, or a combination of both. At present the wastewater treatment plant use a low D.O. (Dissolved Oxygen) system in combination with mixed liquor pumps to recycle mixed liquor back through the system to reduce the nitrates, utilize soluble COD (Chemical Oxygen Demand), and inhibit the growth of filamentous bacteria.



Hoffman Blowers



Air to the Bio-selectors is provided by one or more of the three Hoffman Blowers or by a small Sutor-bilt or small Hoffman Blower. The Hoffman Blowers can also be used to provide air to the Aeration Basins in the event we experience problems with the Turblex Blowers.

The WWTP still uses chlorine gas to help in the destruction of the filamentous bacteria. The chlorine is introduced through the chlorinators to the RAS (Return Activated Sludge) wet well and helps out when the plant experiences foaming problems.



The mixed liquor pumps return flow to the bio selectors from the aeration basins, at a rate of 100% (but have the capacity for up to 500%).



The Bio-selector Effluent flows to the aeration basins.



Aeration Basins

The aeration basins (also known as the AB's) are where the majority of the Activated Sludge biological process takes place. The bacteria/microorganisms grow and reproduce in the AB's digesting the sludge reducing the contaminants in the wastewater. Nitrification and then denitrification take place to remove ammonia and nitrates. The nitrification process utilizes dissolved oxygen, fed through fine bubble diffusers, to change ammonium to nitrite. Ammonia can be stripped off with increased air or converted from ammonia to nitrites by bacteria (microorganisms) called *Nitrosomonas*. The nitrite continues through the basin to the anoxic zone and is broken down from nitrite to nitrate by the bacteria called *Nitrobacter* and then Heterotrophic bacteria convert nitrates to nitrogen gas, nitrous oxide, carbon dioxide (CO₂), and water.



Air is supplied to the bacteria/microorganisms in the AB's by three Turblex Blowers.



Secondary Clarification

The Mixed liquor flows into six 460,000 gallon secondary clarifiers to allow solids to settle to the bottom of the tank. The effluent water flows over the weirs and out of the tanks. The bacteria/microorganisms that have settled are pulled from the bottom of the clarifier, via suction pickup tubes, on the traveling bridges called Clarivacs on secondary clarifiers 1-4. The 5 & 6 clarifiers have skimmers & scrapers that remove the floating & settled solids.