

City of Patterson Waste Water Treatment Plant

www.ci.patterson.ca.us

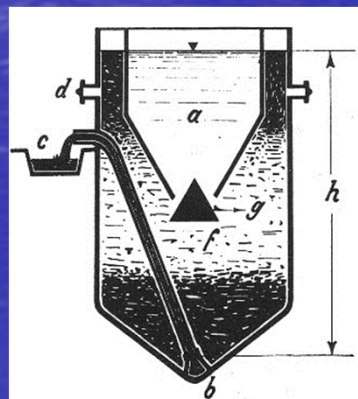
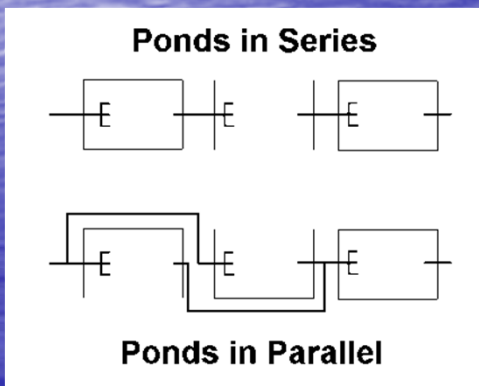


Our Mission:

To manage and operate safe, cost-efficient, and environmentally sound services for the benefit of the citizens of Patterson.

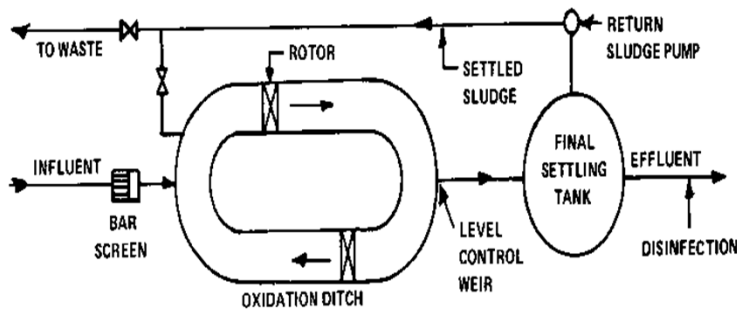
History

- The City's Waste Water Treatment Facility was originally constructed in the 1950's with major improvements completed and in the late 1960's and early 1980's.
- The very first treatment plant, called Imhoff tank was built by the City in the 1950's. From the tank, effluent (waste) was discharge directly to the San Joaquin River.
- In the late 1960's the City made improvements by adding several ponds in series for better treatment. It is not clear if the Imhoff tank was abandon at that time. e



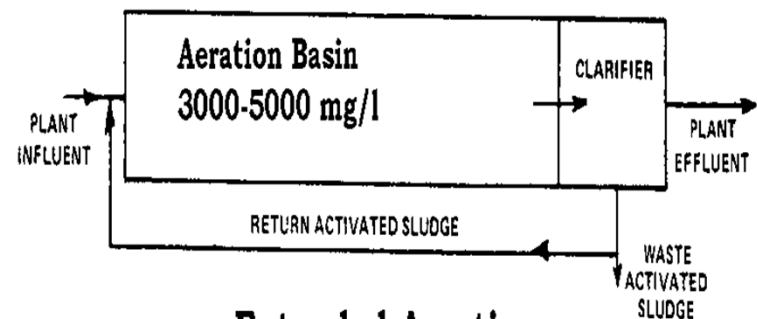
- The **Imhoff tank**, named for *German engineer* Karl Imhoff (1876–1965), is a chamber suitable for the reception and processing of sewage. It may be used for the clarification of sewage by simple settling and sedimentation, along with anaerobic digestion of the extracted sludge. It consists of an upper chamber in which sedimentation takes place, from which collected solids slide down inclined bottom slopes to an entrance into a lower chamber in which the sludge is collected and digested. The two chambers are otherwise unconnected, with sewage flowing only through the upper sedimentation chamber and no flow of sewage in the lower digestion chamber. The lower chamber requires separate biogas vents and pipes for the removal of digested sludge, typically after 6-9 months of digestion. The **Imhoff tank** is in effect a two-story septic tank and retains the septic tank's simplicity while eliminating many of its drawbacks, which largely result from the mixing of fresh sewage and septic sludge in the same chamber.
- All of these lagoon systems utilize bacteriological waste stabilization and long detention times to decompose the organic wastes that make up the BOD loading on the process. The long detention times also result in fecal coliform reduction. Ponds and lagoons can be mechanically aerated, but most are not aerated and rely on the natural oxygen transfer from wind and the symbiotic relationship between the bacteria and the algae in pond.

- In 1980 the City expanded and built the North Oxidation ditch; a form of extended aeration activated sludge. The aeration basin is a large oval shaped tank that resembles a racetrack. Wastewater enters the ditch and is circulated around the track by means of a large horizontal brush/rotor. The rotor assembly is partly submerged in the ditch. As it rotates it pushes the mixed liquor around the "track". The rotor also provides the needed aeration to maintain a DO level of about 2 mg/l in the basin. The BOD loading for oxidation ditches runs from 10-50 lbs/1000 cuft/day. The oxidation ditch effluent passes to the secondary clarifier and RAS is returned to the ditch.



Oxidation Ditch Activated Sludge

- In 2005 Phase II was built. The South Activated sludge is a biological process used to remove organics from wastewater. Like the activated sludge, processes are used to grow a biomass of aerobic organisms that will breakdown the waste and again convert it into more bugs. This is accomplished by our aeration basins. Activated sludge processes return settled sludge to the aeration basins in order to maintain the right amount of bugs to handle the incoming "food". Activated sludge processes have higher removal efficiencies (95-98 %) than trickling filters (80-85 %).



Extended Aeration

About Us

- Wastewater is collected from customers homes and businesses via sewer collection pipes operated by the Collections Division. These pipes connect to our network of 62 miles of pipelines, which convey the wastewater to the Wastewater Treatment Plant. There's approximately 1.5 million gallons of wastewater treated each day.

About Us

- We protect our citizens health and the enviroment by safe conveyance, treatment and disposal of wastewater in the most effective and efficient way possible.
- The Wastewater Division is responsible for the operation, maintenance and repairs of the Wastewater Treatment Facility. The Treatment Plant covers approximately 240 acres and has a design capacity of 2.25 million gallons per day.
- The City's Water Quality Control Facility (WQCF) is located at 14901 Poplar Avenue, and is managed by the City's Wastewater Manager Victorio Tostado.
- Daily operation of the plant is under the guidance of the Chief Plant Operator Johnny Kinimaka. There are currently 3 other operation staff and 2 maintenance part time staff.



Interesting Facts

- The City of Patterson owns and operates the Water Quality Control Facility (WQCF). This facility treats wastewater from Patterson and also, under agreement, serves the community of Diablo Grande.
- Currently wastewater flows to the facility average about 1.5 million gallons per day (MGD). The facility has three separate treatment units.
- The South Activated Sludge Treatment System (SASTS).
- The North Activated Sludge Treatment System (NASTS)
- Advanced Integrated Pond system (AIPS)

South Activated Sludge Treatment System



- The 1.25 MGD Wes-Tec oxidation ditch was put into service in 2005 and can achieve 99% + reduction in BOD, TSS and total nitrogen. This system saves on electrical costs by controlling oxygen levels using (VFD) variable Frequency drive.

North Activated Sludge Treatment System

- **The NASTS** was originally constructed in 1980, and was expanded in 1986 to provide additional capacity. In 2009, this facility was refurbished to provide for nitrogen removal and energy efficiency as needed to meet new regulatory requirements that were not in place when the system was originally constructed.
- This .8 MGD Lakeside Oxidation Ditch typically achieves 99%+ reduction in BOD, TSS and nitrogen. This system saves on electrical costs by controlling oxygen levels using Variable Frequency Drives (VFDs).

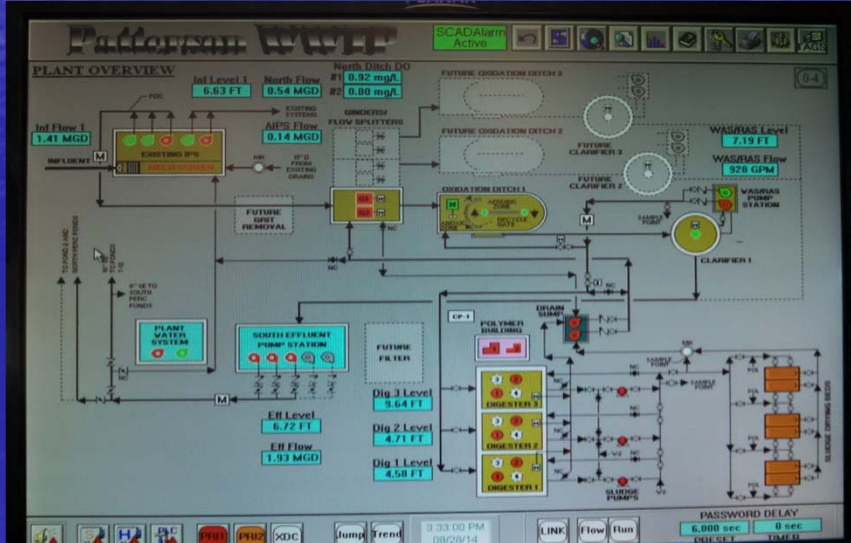


Advanced Integrated Pond System Treatment



- **The AIPS** was built in 2000. With this system, treatment is accomplished in a series of three ponds. The first and second ponds are clay-lined for the protection of groundwater beneath
- The AIPS process relies more on natural methods of treatment, in contrast to the other systems which relies entirely on the use of mechanical equipment.

- Permits from the Regional Board are regularly updated to reflect changes in local, state and federal regulations or to include expansions of the facility. The City's permit was revised in 2000 and 2007.



Regulatory Agencies

- State Water Resources Control Board.

<http://www.swrcb.ca.gov/>

- San Joaquin Valley Air Pollution Control District.

<http://www.valleyair.org>

- Turlock Mosquito Abatement District.

<http://www.mosquitoturlock.com/>

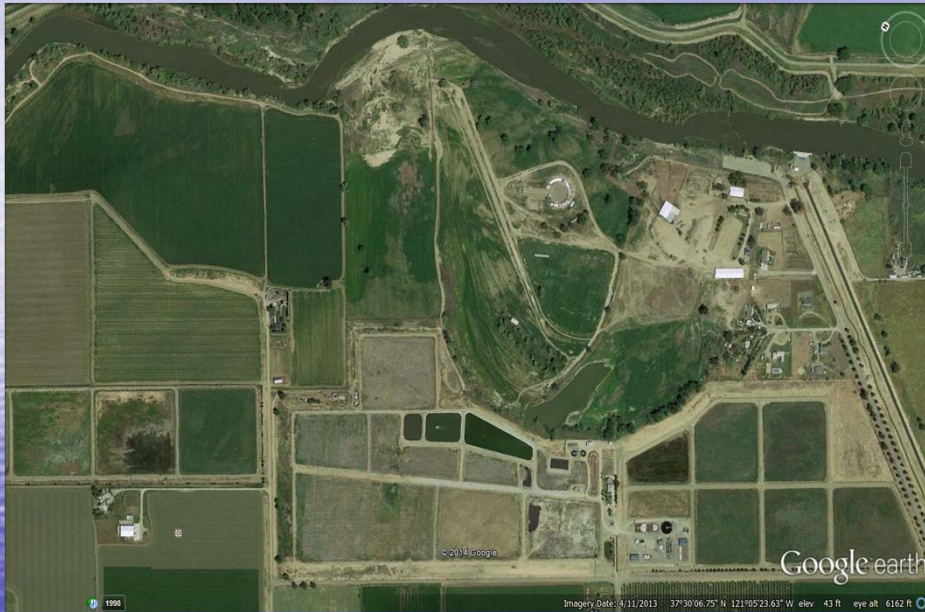
- Environmental Protection Agency.

<http://www.epa.gov/>

- Department of Health Services.

<http://www.dhs.ca.gov/>

Water Quality Control Facility (WQCF) Groundwater Monitoring Program



- The Waste Discharge Requirements (WDR) Order No. R5-2007-0147 for the WQCF includes:
- 16 monitoring wells installed as part of the Monitoring and Reporting Program, developed to determine if groundwater has the potential to be adversely impacted by wastewater treatment and disposal operations.
- Historically, groundwater levels generally graduate downwards towards the east. However can be affected by which ponds are in use. Depth to groundwater varies depending on season, location and local influences, such as irrigation practices.
- The treated discharge from the three processes is discharged to one of fifteen evaporation percolation ponds for disposal. These ponds have a combined total area of more than 100 acres. On an average annual basis, the disposal capacity of these ponds is 3.38 million gallons per day.

Green Projects / Programs

- Addition of solar power
- Electrical vehicles
- Animal Grazing for vegetation Management



Outreach

- Tours

Education is a component the WQCF intends to implement with the public. The facility provides tours and learning opportunities to students of all grades and to large community or business groups who wish to learn more about the management of wastewater and the services provided via the WQCF.

