



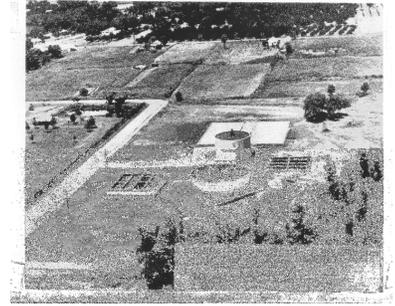
What every resident should know about...

# The Wastewater Plant

Steve Saffels, WW Compliance Coordinator / Frank Coughenour, Utilities Operations Manager

## WITH TIME, COMES CHANGE...

This is true with everything, even in the wonderful world of wastewater treatment! In the 1920's, the wastewater treatment section was known as the "Sanitary Sewage Department," in 1951 "Plant City Sewage Treatment Plant," in 1968 "Plant City Water Pollution Control," and in 1995 it became the "Plant City Water Reclamation Facility." Not only has the name changed over the years, but so has the technology associated with the treatment of wastewater.



## A HISTORY OF EXPANSION...

The earliest recorded sanitary sewage facility in Plant City was in 1913. At that time, the construction of approximately 7 miles of clay pipe for sewer collection was authorized along with the construction of two septic tanks. The pipes directed domestic waste to the septic tanks in the same fashion that most home septic tank systems work, only the treatment process was on a much larger scale.

By 1929 the collection system had expanded to include over 14 miles of sewer lines. The sewage treatment facilities also expanded to include four separate settling tanks, two Imhoff tanks for additional settling and two simple septic tanks.

In 1951 the Imhoff tanks and septic tanks were replaced with a 1.5 million gallon per day (MGD) trickling filter process. The trickling filter treated waste by spraying the domestic wastewater onto rocks that were coated with bacteria that could break down some of the waste, thereby reducing the pollutant load of the treated water. Other plant processes included a sewage pumping station, primary settling tanks, secondary settling tanks, an anaerobic digester, 2 sludge drying beds and disinfection using chlorine. The treated water then discharged into the Westside Canal, which is located along Alexander Street.

In 1961 a new lift station was constructed, the trickling filter was repaired and some minor modifications were made to the treatment plant.

In the late 60's, the Federal Environmental Protection Agency began developing the Clean Water Act. This rule called for the cleaning up of water ways in the United States, and was later finalized in 1977. With this rule coming into effect, federal funds became available for use in construction of wastewater collection systems and advanced wastewater treatment plants.

In 1968 the City began design to extend the collection system to collect more of the residential, commercial and industrial wastewater. Design of a new 4.0 MGD Activated Sludge wastewater treatment plant using the extended aeration process also began, and included: increasing the Master Lift Station flow capacity, a grinder for cutting up of materials that could damage the pumps, a grit removal system, 2 aeration basins with a total capacity of 5.0 million gallons (mg), 2 secondary clarifiers, a 10 acre polishing pond, a return sludge pumping station, a new digester, conversion of the anaerobic digester to aerobic, and 3 additional sludge drying beds. The final discharge flow was then from the polishing pond to the Westside Canal following chlorine disinfection. The entire system was put into operation in 1970.

In 1973, due to the increase in pollutant load and incoming flow, design was started to expand the treatment facility to 8.0 MGD. This expansion included increasing the lift station's pumping capacity, an additional grit removal system, 2 additional aeration basins with an additional capacity of 5.0 mg, 2 additional secondary clarifiers, an increase in pond capacity from 10 to 20 acres, a new return sludge pumping station, 2 additional digesters, and 22 additional sludge drying beds. Final discharge was still to the Westside Canal after chlorine disinfection. This version of the plant was placed into service in late 1975.

*Continued, page 3....*

# Wastewater 101: Bug Farming in Plant City

Patrick Murphy, Chief Plant Operator

The wastewater that leaves customers homes and businesses in the City travels through gravity sewer lines to the Water Reclamation Facility. As the wastewater enters the plant, it goes through a process called preliminary treatment. During preliminary treatment roots, rags, plastics, sand, eggshells, and other substances which do not easily break down are removed by screening. Removal of these large items is important so that they do not damage an upstream process or take up unnecessary space in the plant.

The wastewater then passes into aeration tanks, which are similar to large aquariums, for a process called secondary treatment. The aeration tanks mix the wastewater with naturally growing bacteria and microorganisms (“bugs”) that will use oxygen to eat the raw, organic constituents, thereby removing some of the nutrients from the water. The wastewater then goes into settling tanks called clarifiers, which allow for a portion of the settled bugs to be pumped from the bottom back to the aeration tanks to eat again. The clear water that has been separated from the organisms and settled solids overflows at the top of the clarifiers.

After leaving the clarifiers, the treated water flows through a polishing pond, which provides tertiary treatment, and then is pumped to sand filters. After the filters, the water enters a chlorine contact tank for disinfection in order to be pumped to storage tanks for reclaimed water usage.

If the food to micro-organism ratio (food being wastewater, micro-organisms being the bugs we grow) is not correct, the bugs that are supposed to settle in the clarifiers will not settle properly or treat the water to the degree that is needed. Since the bugs reproduce rapidly, a portion of them must be removed from the process daily.

The bugs are sent to aerobic digesters, or “wasted” from the wastewater treatment process. In the digester, no fresh wastewater is added and the bugs must compete for food in order to avoid starvation. This contributes to the stabilization of the remaining solids which have been removed from the process, since the bugs are forced to adapt to break down even more nutrients.

The remaining residuals and the dead bugs are then pulled from the bottom of a digester to a belt press. At the belt press, water is “pressed out” of the remaining solids, which results in a cake-like stabilized product. The product is then removed from the site and beneficially used for regulated land application.



Above: Preliminary Treatment: Items large enough to be caught by the mechanical screen are removed.

Below: Raw, untreated wastewater moves through the plant.



Left: Aeration basins combine the raw wastewater with the bugs.

Below: After the aeration basins, the treated wastewater flows into a clarifier for further treatment and settling.



Below Right: Water leaving the clarifiers flows to a polishing pond for further treatment.

Above: Water that has left the pond is pumped through the filter and flows to a Chlorine Contact Chamber for disinfection purposes. The purple pumps transfer the water to a storage tank for reclaimed water use.

Left: The solids pumped from the clarifiers are broken down in a digester before being sent to the belt press.



# The Wastewater Plant, continued...

In order to meet new state sludge regulations, the belt filter press was constructed during 1994. The new machine served to dewater solids remaining after the treatment process, and thereby reduced the number of tanker loads of sludge leaving the facility from 6 – 8 loads per day of liquid material to 2 – 3 loads of dry cake.

In 1995, to eliminate discharge into the Westside Canal, and to meet the requirement of reusing treated wastewater to reduce the demand on our drinking water supplies, design began on the Reclaimed Water Production Facility. This facility was placed into service March 1, 1997. This upgrade retained the previous waste treatment systems, and provided additional treatment processes to meet higher stan-

dards. Rather than being discharged into the canal, the water from the pond is instead pumped through a screen, into sand filters, a high level disinfection system, and into one of the two 4.0 mg storage tanks. A High Service Pumping Station then transfers the water into the reclaimed water distribution system. The distribution system for the reclaimed water system runs 11 miles north of the plant to CF Industries, our largest reclaimed water user, where an average of 2.0 MGD is used. CF's use of reclaimed water reduces their need to pump ground water for process cooling, therefore conserving valuable drinking water. Other customers include the I-4 interchanges and irrigation of various orange groves, plant nurseries, and lawns along the way.

Also constructed from 1995 -1997 was a new headworks facility, which is the first structure that treats incoming wastewater: it included new screening equipment, grit removal system, flow measurement, odor control and pumps were installed. This system was placed into operation in September 1997.

Gas chlorine had been used for disinfection of final effluent since 1951. In 1997 – 1998, a system was designed and installed for the on-site production of liquid chlorine.

## CURRENT OPERATION

With all of the upgrades to the facility over the years, the biological treatment section of the wastewater treatment system had not had any significant improvements made to upgrade the treatment levels since it was built. The original system was not designed to meet some of today's strict regulatory requirements 100% of the time. In 2004, design began on a new wastewater treatment system to prepare for future growth, to meet current regulations, and to replace old failing facilities. Design has been completed and the facility is currently under construction.

## CURRENT CONSTRUCTION

This project includes new influent pumps, replacement of the old biological treatment system with an anoxic basin, 3 new aeration basins, 3 new clarifiers, and expansion of the Reclaimed Water Production Facility constructed in 1997 with additional sand filters, additional disinfection, an additional 4.0 mg storage tank and additional High Service Pumps. This project is scheduled to be complete by April 29, 2008. The plant is designed to treat 10 MGD.

## THE FUTURE

The new system has been designed with future expansion in mind. Within the next 10 years it is projected that an additional expansion will include a new headworks facility, one additional aeration basin and one additional secondary clarifier. The piping and structures for future aeration systems and secondary clarifiers have been sized for a capacity of 12 MGD.

The expansion project will increase the City's wastewater treatment capacity, and therefore additional reclaimed water use will be necessary. The City is preparing for a major expansion to the reclaimed water distribution system - soon reclaimed water will be distributed to the East side of Plant City and will provide irrigation for Mike Sansone Park, Ellis Methvin Park, Park Road landscaping, and other additional reclaimed water uses, including residential irrigation. Additional projects are planned to provide reclaimed water service where feasible for irrigation of residential and commercial developments.

The Plant City Water Reclamation Facility operates under Florida Department of Environmental Protection (FDEP) Permit #FL0026557. The facility is staffed 24 hours per day, 7 days per week by personnel certified in the fields of both water and wastewater treatment. Operational staff is responsible for collecting and analyzing routine samples throughout the system to ensure compliance with permit conditions.



**The plant's operational personnel are prepared to give presentations of the facility to schools and civic groups.**

**If you are interested, please contact us at 813-757-9191 for available dates.**

**YOUR PUBLIC WORKS:  
WORKING FOR YOU**



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What is this? What is it doing? Under what conditions might this be found? Best answer by August 18th wins 5 free strawberry shortcakes from Parkesdale Farms. City employees are ineligible to win. Mail submissions to Newsletter Contest at the Public Works address above or

[shimelright@plantcitygov.com](mailto:shimelright@plantcitygov.com)

*Also at the Plant:*

**PUBLIC USED OIL COLLECTION  
CENTER**

1500 W. Victoria Street

What happens when used motor oil is poured on the ground, in storm drains or placed in your household trash?

If poured on the ground, it poisons the soil with contaminants and will seep into underground wells which is Florida's, and definitely Plant City's - primary source of drinking water.

When poured in storm drains, it flows to our waterways, poisoning fish & wildlife and reducing the oxygen produced by aquatic plants. As little as a pint of used oil can form an oil slick as big as a football field on a lake or holding pond.

Used motor oil sometimes gets placed in household trash and will go to a landfill that is designed specifically for household trash only. This means it can seep into the soil and can be as environmentally damaging as pouring it on the ground yourself... contaminants in the soil eventually make their way to the Floridan Aquifer, and that water eventually makes its way to millions of residential faucets.

The City of Plant City has a site established for residents to safely dispose of their oil at no charge. The oil that is disposed of at this site is recycled by US Filter- so by utilizing the free site, you're basically helping the environment TWICE.

In 2005, 323 used oil filters and 9,052 gallons of used oil were collected and recycled. Please help us continue to increase these numbers!



*Sharon's Summer Five Cup  
Salad*

- 1 cup mandarin oranges (drain)**
  - 1 cup crushed pineapple (drain)**
  - 1 cup shredded coconut**
  - 1 cup miniature marshmallows**
  - 1 cup sour cream**
  - 1 cup pecans (pieces or whole – optional)**
- Mix together and refrigerate if desired.**



**CURBSIDE RECYCLING: IT'S WORKING**

With your help, we've been able to recycle more and more of the weekly household trash. That's great news for our community and our planet.

The paper, plastic, aluminum and glass you have been recycling are being made into all sorts of everyday products.

Recycling also helps reduce our nation's use of oil and energy.

**There's just one thing left to do!**

Talk to your family, friends and neighbors and make sure they are recycling and buying products that are packaged in recycled materials.

For information on recycling, or to request a recycle bin, contact the City of Plant City Sanitation Division

**813-757-9208**

