

top performer

wastewater:

PLANT

Team members at the East Central Regional facility include, from left, Keenian Carswell, Martin Flores, Sunday Uzor and Tyler Joseph, operators; Jeff Antonellis, plant utilities coordinator; Clifford Sanders, plant manager; Shemeez Mosadee, operations and maintenance manager; Ed Shelton, maintenance superintendent; Tom Cavanaugh, shift supervisor; Frederick Miller, operator; Ivan Lopez, lead electrician; and Jeremy Derrick, operator.



A Plant on the Rise

THE CLEAN-WATER FACILITY IN WEST PALM BEACH IS GETTING A MAJOR UPGRADE WITH HELP FROM AN INVOLVED AND ENERGIZED OPERATIONS TEAM

STORY: **Ted J. Rulseh** | PHOTOGRAPHY: **Jason Nuttle**



Sometimes a clean-water plant that has performed reliably for years simply gets old and needs renewal. That's the case at the East Central Regional Water Reclamation Facility in West Palm Beach, Florida.

The facility is undergoing major upgrades of its biological treatment and biosolids processes. Meanwhile, the team at West Palm Beach Public Utilities has stepped up recruitment and training to ensure a highly capable operations workforce far into the future.

The East Central Regional facility (70 mgd design, 44 mgd average) sends about 50% of its effluent to deep injection wells. The balance goes to Florida Power & Light's West County Energy Center for use as power plant cooling tower water and to the Ballpark of the Palm Beaches, spring training home for the Houston Astros and Washington Nationals, for irrigation.

As part of the upgrade, the headworks will receive a new perforated screening system (Kusters Water, division of Kusters Zima Corp.), new venturi meters and grit collection system improvements.

The secondary treatment aeration basins are being outfitted with aeration diffusers and an upgraded blower system that will provide enhanced airflow control. The solids side is undergoing a switch from aerobic to anaerobic digestion with potential capture and beneficial use of biogas. The upgraded facility can potentially see a reduction

in electricity usage of 1.35 million kWh per month, equivalent to 1,350 single-family homes.

"In the last year, we have really turned things around," notes Tom Cavanaugh, a plant shift supervisor. "We're doing very well with the process. We have a lot of energetic operators and just wonderful cross-training. We have a whole new attitude thanks to the guidance of Darren Hollifield, our assistant director."

UPGRADES IN PROGRESS

The East Central Regional facility treats wastewater from the cities of West Palm Beach, Riviera Beach and Lake Worth, plus parts of Palm Beach

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County and the town of Palm Beach. After the headworks, the flow passes through a set of grit channels, recently sandblasted and protected by specialty coatings.

The water then enters the aeration basins that include anoxic and aerated zones to aid in phosphorus removal. The first of those basins has been cleaned of accumulated grit and completely retrofitted with new concrete, fine-bubble diffusers



Piping carries air to one of the facility's aeration basins, which are outfitted for biological nutrient removal.

East Central Regional Water Reclamation Facility, West Palm Beach, Florida

www.wpb.org/departments/public-utilities

BUILT:
1970, latest upgrade 2015-19

SERVICE AREA:
Cities of West Palm Beach, Riviera Beach and Lake Worth; Palm Beach County; Town of Palm Beach

POPULATION SERVED:
600,000

FLOWS:
70 mgd design, 44 mgd average

EFFLUENT DISPOSITION:
Reuse for irrigation and power

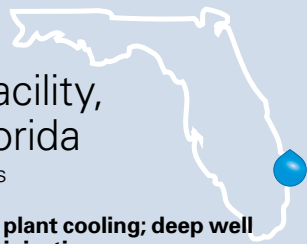
plant cooling; deep well injection

TREATMENT LEVEL:
Tertiary

TREATMENT PROCESS:
Activated sludge with biological nutrient removal

BIOSOLIDS:
Sent to contractor; dried for fertilizer production

ANNUAL OPERATING BUDGET:
\$32 million





The East Central Regional plant leadership team includes, from the top, Ed Shelton, maintenance superintendent; Shemeez Mosadee, operations and maintenance manager; Clifford Sanders, plant manager; and Jeff Antonellis, plant utilities coordinator.

(Sanitaire - a Xylem Brand), counter-rotating mixers, new walkways, and electronic meters for nitrate, ammonia, TSS, phosphate and dissolved oxygen (Hach).

The four aeration basins (8.9 million gallons) are to be upgraded in sequence. "We're making redundancy on all our systems so one unit can be taken down and serviced while the others are online," Cavanaugh says. The two primary basins are designed for luxury phosphorus uptake.

When the upgrades are complete, the flow will come into the racetrack-style basins and run counterclockwise in an anoxic selector zone with counter-rotating mixers.

"In this zone, phosphate accumulating organisms will grow," Cavanaugh says. "In anoxic conditions, they are stressed out and so will release phos-

TRAINED TO SUCCEED

While enjoying an influx of new, motivated and energetic operators, West Palm Beach Public Utilities is backing them up with a comprehensive training program.

"We have been cross-training all relevant employees across different areas of plantwide operations," says Shemeez Mosadee, operations and maintenance manager. "This includes but is not limited to operators, mechanics and administrative staff. By having more people knowledgeable about more areas of the process, we see more efficient treatment and less overtime."

"On the treatment side, more knowledgeable people have enabled process changes that lowered energy use. On the maintenance team, their progressive knowledge has led to greater mechanical efficiency in ways such as standardizing pumps and improving our computerized maintenance management program, which in turn improves the life span of equipment."

To help new hires through the transition to the East Central Regional facility, the utility has created a training program that lists everything new team members need to know and must accomplish within the first six months and in some cases the first year.

The utility has developed a rigorous trainee training program in which trainees must demonstrate their knowledge and competency with each process and associated equipment. This regimen requires that a supervisor or higher must sign off on each process area and the operation of associated equipment. Each trainee is required to complete and document this training and receive a state of Florida Class C operator's license prior to being promoted to operator one.

"It's a notebook guide where new hires also have access to the phone numbers of important city officials and to city policies," says Octavia Galloway, senior accounting clerk. "Managers can check the new hires' progress using benchmarks also included in the guide. New team members have complimented the training program since its inception about a year and a half ago."

phate. As they come around the basin, they will go through a swing zone that can be agitated with mixers or with air. The mixed liquor will move to an aerobic zone where the PAOs grab onto the phosphate that they released and onto additional phosphate."

The flow is then directed to two 8.9 million-gallon aerated treatment basins, also designated for upgrades in the very near future. From there, the flow proceeds to eight circular secondary clarifiers, through a chlorine contact chamber, and then to a pump station that sends the effluent to the injection wells and to the Palm Beach County Reclamation facility, which consists of six deep-bed sand filters (Leopold - a Xylem Brand). It is disinfected with sodium hypochlorite generated by a MIOX system for distribution to the ballpark and the West County Energy Center.

SOLIDS SIDE

The solids side is being upgraded with a new process designed by Hazen and Sawyer and built by general contractor Poole & Kent that's scheduled for commissioning in early 2020. Waste activated sludge will be pumped through Muffin Monster grinders (JWC Environmental), mechanically thickened to 5% solids using gravity belt thickeners and delivered to temperature-phased anaerobic digestion in four mesophilic and two thermophilic digesters. Hauled grease will be co-digested with primary and waste activated sludges.

Zach Spara, operator, checks a clarifier sludge blanket with a Sludge Judge (Nasco).



“Haulers come from all around ... to discharge at our facility. Being such a huge plant, we can accept these materials without upsetting our process.”

TOM CAVANAUGH

Finished biosolids will be dewatered through four centrifuges (Andritz Separation) to 23% solids. The cake will be sent to a contracted site for drying, pelletizing and sale as fertilizer. The utility and engineers intend to evaluate various options for use of captured biogas, including on-site cogeneration, production of renewable natural gas as vehicle fuel and production of pipeline-quality biomethane for export and sale. A final decision is pending.

STAFFING UP

Recruitment and training have been essential to the plant's renewal. Besides Cavanaugh, key members of the Public Utilities team under Poonam Kalkat, director, and Hollifield, assistant director, include: Clifford Sanders, plant manager; Shemeez Mosadee, operations and maintenance manager; Waldo Cruz, plant superintendent; Ed Shelton, maintenance superintendent; James Looney, electrical superintendent; Jeff Antonellis, plant utilities coordinator; and David Willis, plant supervisor.

To help combat the retirement wave, the utility promoted job opportunities broadly among licensed operators in Florida. Highly competitive pay and benefits attracted a number of experienced operators as well as trainees. Trainees are brought up to speed quickly and are encouraged to take part in the strategic process as they shadow experienced operators.

Operator Sunday Uzor analyzes samples.



**East Central Regional Water Reclamation Facility
PERMIT AND PERFORMANCE – FOR DEEP WELL INJECTION**

	Influent	Daily effluent	Daily permit to deep wells	Daily reclaim effluent	Permit reclaim effluent
BOD	194 mg/L	4.0 mg/L	60 mg/L	<2.0 mg/L	5 mg/L
TSS	383 mg/L	12 mg/L	60 mg/L	<2.0 mg/L	5 mg/L



Septage and FOG are accepted at the Raptor receiving station (Lakeside) and co-digested to produce biogas.

New team members are also encouraged to advance their skills and move up the licensing ladder. They're routinely sent to the University of Florida's Training, Research and Education for Environmental Occupations (TREEO) Center. "We send people there to attend classes and help further their knowledge and career with the city as it relates to wastewater treatment," Cavanaugh says.

"We've accessed training offered by the Florida Rural Water Association. We also have a lot of in-house training going on from Andritz, Alfa Laval and the other vendors that are installing equipment in the new biosolids facility."

Then there are the little things that go into creating a positive work environment and morale. "They take care of us really well," Cavanaugh says. "For example, there's a health center where our team members can get free prescriptions and get a physical."

PUSHING INNOVATION

The East Central Regional facility is certified under the ISO 14001 international standard for environmental management in a utilitywide initiative led by Virgilia Baird, environmental management system coordinator.

An engaged operations and maintenance team has produced a number of improvements in the plant. As one example, LED lighting for the outdoor spaces has made a dent in electricity consumption. On the mechanical side, the effluent pumps are being replaced and updated with new motors and variable-frequency drives. Most pumps are being standardized to help simplify preventive and corrective maintenance. Shelton has spearheaded a change to all food-grade oils.

"Our VTScada (Trihedral Engineering) is great because it enables us to trend almost anything — millions of gallons of influent flow, gallons of wasting, amps on motors and much more," Cavanaugh says. "With SCADA we can trend our aeration basin airflow, which is an indicator of dissolved oxygen. If our standard cubic feet per minute is going down, our ammonia is going to go up; and if our ammonia goes up, our nitrate is going to go down. If our nitrate goes up, which indicates good nitrification, our ammonia will go down. It's all a balancing act."

Cavanaugh cites "a huge moneymaker" in the Raptor receiving station (Lakeside) that accepts septage and the FOG that will be co-digested to produce biogas: "Haulers come from all around the tricounty area to discharge at our facility. Being such a huge plant, we can accept these materials without upsetting our process."

As the major aeration and biosolids upgrades proceed, more improvements are in store for the East Central Regional facility. The aeration blowers are most likely next in line, as the existing nine positive displacement blowers are approaching end of life. Also, under discussion is an upgrade of the circular secondary clarifiers to new, deeper clarifiers that have fewer mechanical parts, enhance efficiency and reduce maintenance.

All in all, it's a journey an energized and talented team will be glad to be part of for years to come. **tpo**

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