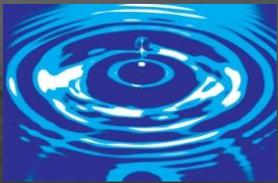


TMDL Project Saves Energy and Improves Sustainability

John E. Collins, Jr., PE
J. Collins Engineering Associates, LLC
and
Donna Kaluzniak, CEP
City of Atlantic Beach



J. Collins Engineering
Associates, LLC

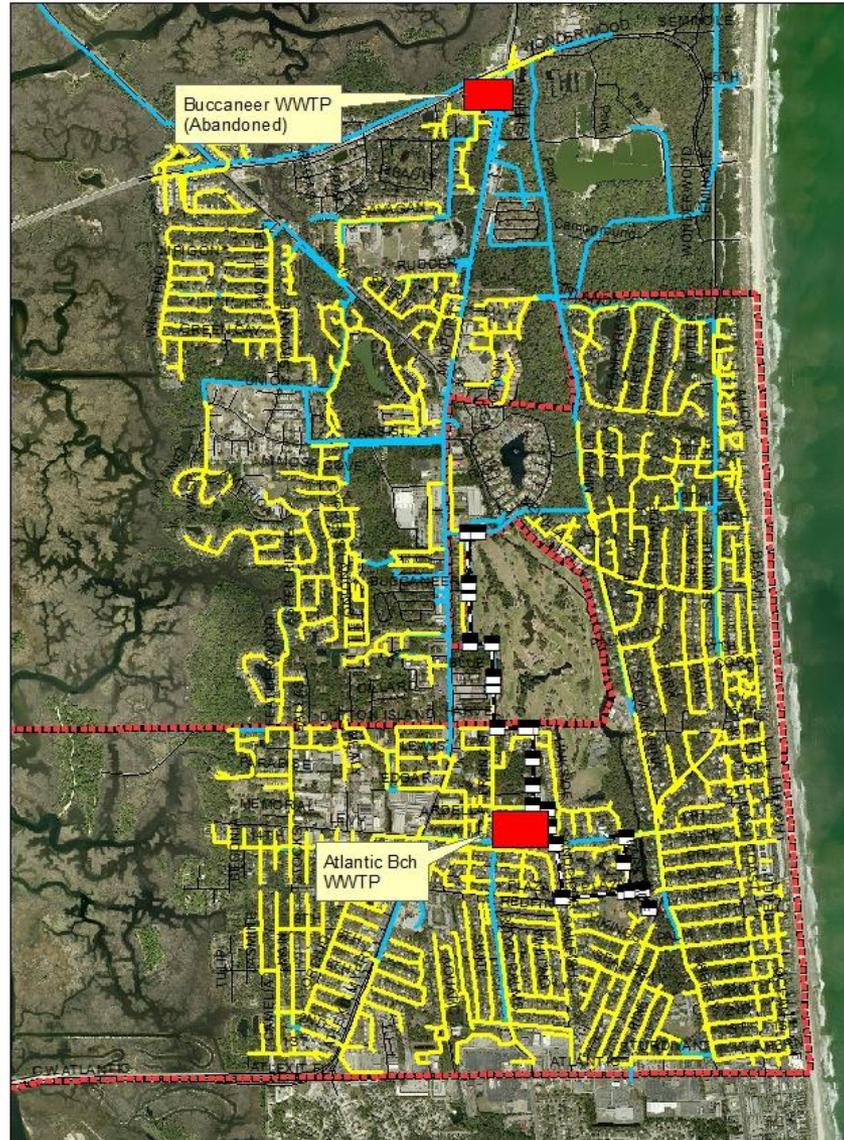


What is a TMDL?

- Total Maximum Daily Load
- Reducing amount of nitrogen discharged to St. Johns River from the City's two wastewater treatment plants



Atlantic Beach Sewer Service Area



Atlantic Beach Wastewater Treatment

Atlantic Beach WWTP



Buccaneer WWTP (Abandoned)



Finding the Best Way to Meet the TMDL

- Looked at life-cycle cost efficiencies
 - Upgrading both WWTPs
 - Upgrading either Buccaneer or Atlantic Beach
 - Sending Buccaneer's flow to JEA
- Most efficient way to meet the TMDL was to abandon Buccaneer WWTP and treat all flows at the larger Atlantic Beach plant.

Transferring Flow from Buccaneer to Atlantic Beach

- Reused ~5,000 LF of existing force main by re-directing flow
- Constructed ~13,000 LF of new force main
- Directional drilling avoided impact to trees and neighborhoods



Energy Efficiency

- Conducted thorough analysis to determine ways to save energy.
- 9 inefficient, high-horsepower blowers were major power users
- Manually operated with very limited control



New Efficient Blowers

- Creative design eliminated 5 blowers with design of strategically placed automatic valves
- Replaced 9 existing blowers with 4 highly efficient turbo blowers
 - Automated
 - Programmable



Automation Reduces Energy Use

Modified Existing Tanks and Installed New Equipment

Remote Dissolved Oxygen Monitoring



Automated Valves to Control Air Flow



Efficient Aeration and Mixing

Fine-bubble diffusers provide better air transfer, use less energy



Energy-efficient, low horsepower mixers



Yard Lights Replaced with High-Efficiency Lighting



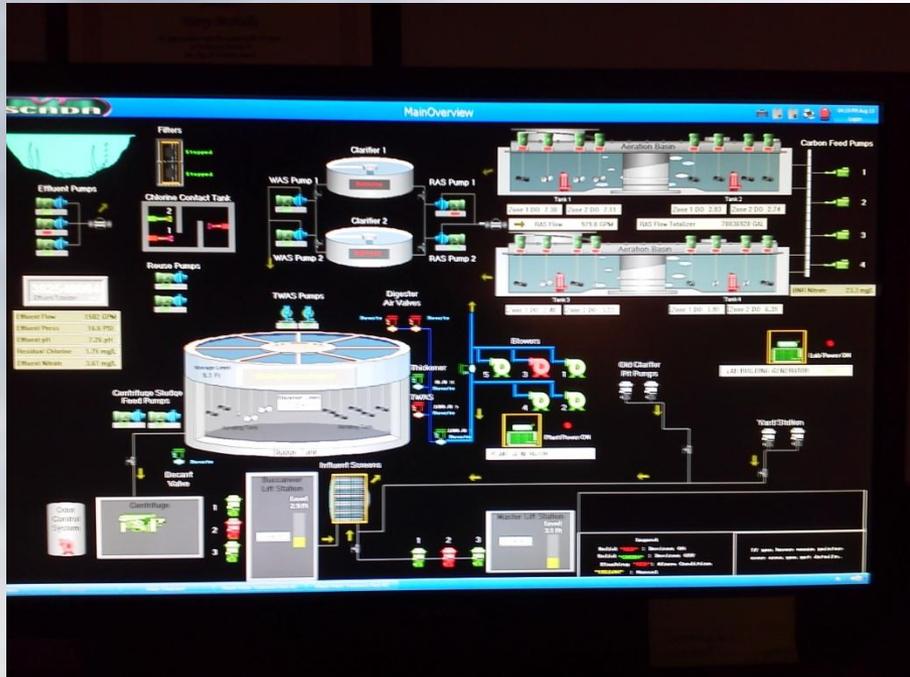
Emergency Generator Consolidation Saves Maintenance Costs and Reduces Fuel Usage

Electrical modifications allowed City to eliminate one existing generator

Another old generator was able to be replaced with a new, smaller generator



Specialized Electrical Programming



- An electrical equipment shedding program was designed to keep large equipment from coming on at the same time.
- Reduces electrical demand.

Effluent Pumping Program



- Large effluent pumps discharge to beaches combined force main
- Special electrical program uses discharge pressure to pump when other 2 cities' pumps are off.
- Saves energy by pumping on low speed at low pressure.

Abandoning the Buccaneer Plant Greatly Reduced Electrical Usage

Eliminated pumps, blowers, jet mixers and other high-use equipment (> 1.5 Million KWH/year)

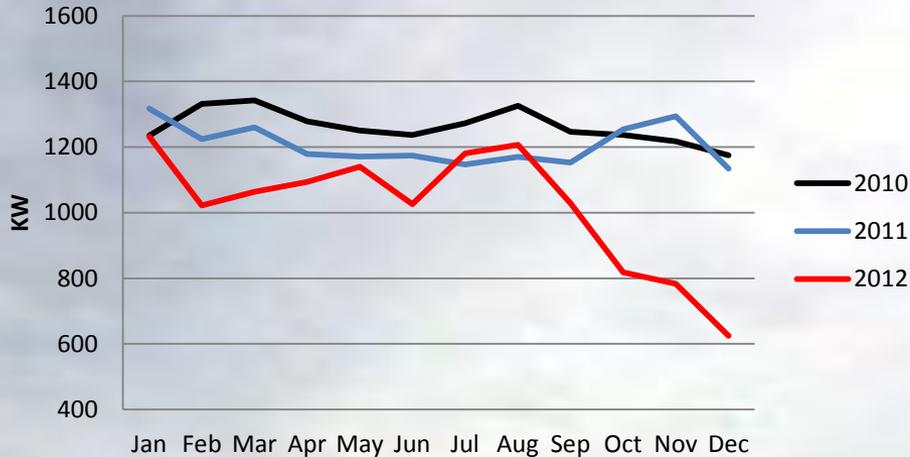


Wastewater plant replaced by a master lift station pumping flows to Atlantic Beach



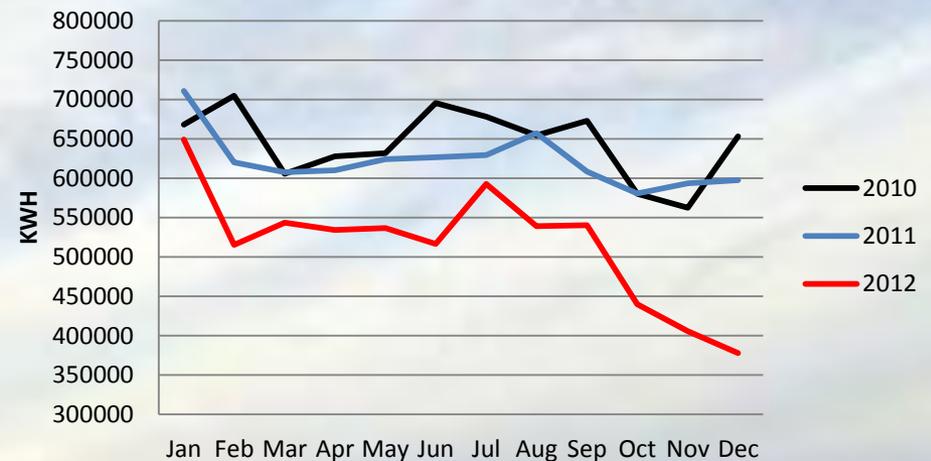
From JEA Account Summary -Electric Statistics Three Year History Shows Dramatic Drop After TMDL Project

Demand



What has been done differently to reduce demand and consumption in 2012?

Consumption



JEA InvestSmart Rebate

- City received a \$147,781 rebate for making power-saving upgrades



Improving Sustainability

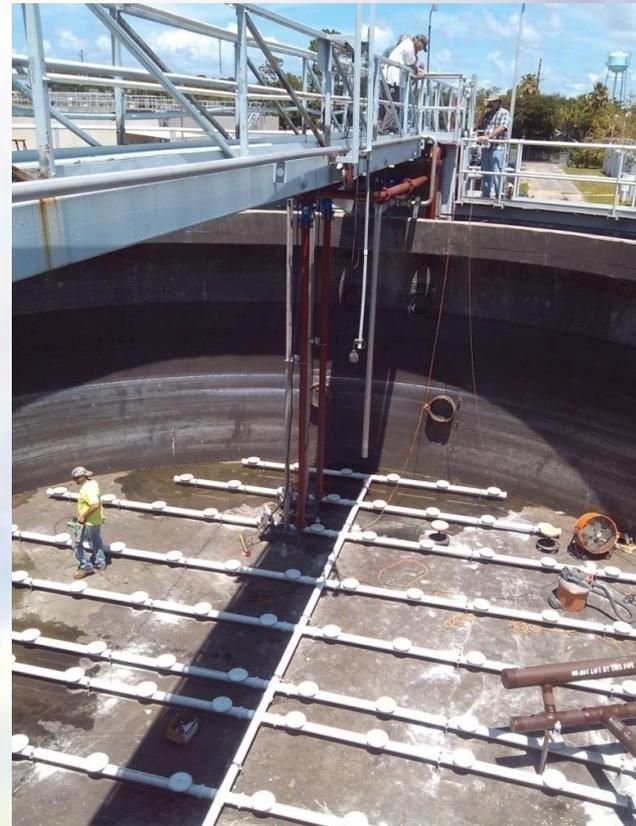
- In-Plant reuse system saves 4 Million Gallons of potable water per year.



Sludge Treatment Improvements

- Sludge is byproduct of treatment process
- Treatment with aeration, followed by dewatering and landfilling.
- Improved aeration and dewatering process.

Added mixers and fine-bubble diffusers, consolidated treatment into one tank.



New Dewatering Facility

Centrifuge produces much drier sludge, better for environment

Reduces trips to the landfill and fuel use (~100 miles round-trip)



Odor Control Improves Neighbor Friendliness

New Odor Control Unit Includes Both Biological and Chemical Controls



New Influent Screens with Covers



Nitrogen Removal

- Effluent Nitrogen is under the TMDL Limit
- Removing > 70,000 pounds per year



Project Costs

- Construction costs ~ \$10 Million
- Received \$1 Million grant from SJRWMD
- Used FDEP State Revolving Fund Loan
- Excellent construction prices by bidding while market was right
- Saved approximately \$600K by using unique procurement process for major equipment (combination of bid and life-cycle costing)

Annual Operating Cost Savings

Item	Annual Savings	Notes
Electrical Savings @ WWTP #1	\$72,800	Due to more efficient equipment. Savings include additional flows from WWTP #2.
Electrical Savings @ WWTP #2	\$155,000	Replacing WWTP with pump station
Personnel	\$15,800	No longer need PT driver to haul sludge from WWTP #2 to WWTP #1
Contractual Services Savings @ WWTP #2	\$71,000	Based on 5-year average, includes electrical/mechanical/point repairs, laboratory testing, janitorial, etc.
City Utilities	\$12,000	City water/sewer/garbage @ WWTP #2
Regulatory Fees	\$6,000	Annual DEP fee for WWTP #2
Operating Supplies	\$5,000	Based on 5-year average, includes lab reagents and supplies, HTH, cleaning supplies, etc.
Total	\$337,600	

Project Benefits

- Reduced energy consumption by > 3 Million KWH per year
 - Equivalent to the carbon footprint of electricity used by 317 homes per year*
- Reduced water use by ~4 Million Gallons per year
- Removing over 70,000 pounds of Nitrogen from the St. Johns River each year.
- Annual operating cost savings of ~340,000/year

*www.EPA.gov/cleanenergy