

Outlook

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JOHNSON
ENGINEERING

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SURVEY HELPS ADVANCE CRUCIAL BRIDGE REPAIR

Access to our vast historical survey records, combined with modern surveying techniques, equipment, and software, creates a 3-D digital map to help replace the only access onto Chokoloskee Island.

A small piece of old Florida can still be found on the remote fishing village of Chokoloskee Island, located at the end of the road on Florida's Gulf Coast. This isolated island is part of the "Ten Thousand Islands" and is only 0.3 square miles, yet is home to just more than 350 people according to the 2010 census. Fishing and tourism dollars make this paradise island an important economic contributor for Collier County.

Chokoloskee's only access, other than by boat, is a 200' bridge over the Chokoloskee Bay built in 1955, which connects the island to Everglades City. In 2009 the bridge was deemed "functionally obsolete" by the FDOT - meaning the bridge is safe for now, but does not meet today's more stringent safety standards.



The only access onto Chokoloskee Island, other than by boat, is by the three mile causeway connecting it to Everglades City.

Collier County officials began negotiations for the replacement of the aging structure and selected TY Lin International - an engineering firm based in San Francisco and specializing in bridge design and construction. TY Lin contracted with Johnson Engineering to perform the design surveys, right-of-way mapping, and hydrographic surveys needed to start the process of preparing plans and eventually replacing the bridge.

Collier County had no records of any right-of-way maps so the first step was to prepare the survey to reestablish the bridge and causeway alignment and the right-of-way width. Hardcopies of the original State Road Department right-of-way maps from 1959 were recovered

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Company Names New Leadership



PEOPLE & PROJECTS: ON THE MOVE



Brittany Smith

joined our environmental team as an ecologist. Brittany bring six years of federal and state experience in the wildlife and environmental field from working with the U.S. Forest Service, Florida Park Service, and the FWC.



Joel Madsen

Water Resources technician, earned the esteemed District Award of Merit, from the Boys Scouts of America Southwest Florida Council, for his exceptional volunteer efforts.



Chokoloskee's 200' bridge built in 1955 was deemed "functionally obsolete" by the Florida Department of Transportation in 2009.

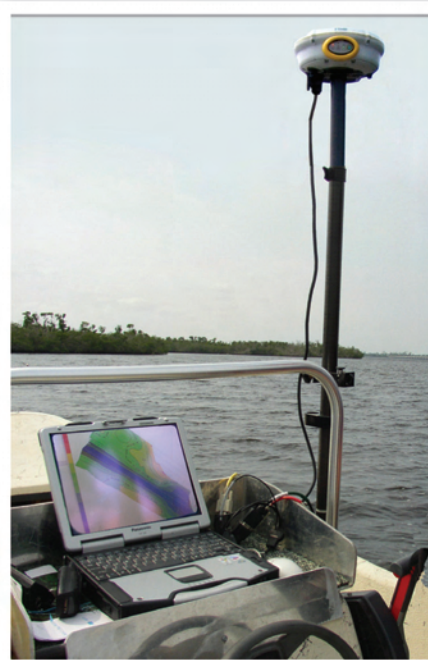
from Johnson Engineering's vast file storage system. Between the old right-of-way maps and the monuments found on the project site, we were able to positively define the location of the road alignment and the right-of-way.

Once the project's horizontal and vertical control was established the data collection began. Most of the ground features were located using Trimble survey-grade GPS (Global Positioning System) system using VRS (virtual reference station) technology. This technology enables the field crews to quickly establish "lock" on to the GPS satellites' signals and obtain accurate locations of utilities, pavement, bridge abutments, and other visible improvements. Traditional survey methods were used to obtain other topographic features including roadway cross-sections, detailed bridge measurements, seawalls, and edge of water locations.

To properly design the bridge and the temporary bridge used during construction, engineers also needed an accurate map of the underwater topography underneath and adjacent to the bridge. Due to the strong currents running through the bridge channel, the team used our 20 foot Kencraft fiberglass skiff powered by a 115 horsepower Yamaha outboard engine. The hydrographic survey data were obtained using the latest technology in hydrographic surveying, including the use of a Trimble 5800 GPS, an Odom HT 100 survey grade depth recorder, and Hypack Max software running on a Panasonic Toughbook laptop computer. Using this equipment, we produced a 3-D model along with contours and cross-sections of the surveyed areas. This technology enables us to conduct hydrographic surveys over large areas in a short time period. The field work for the hydrographic survey was completed by our team in just one day.

Once the field data were collected and verified, CADD technicians "married" the land topographic survey data with the hydrographic data to create a 3-D model of the bridge, causeway, and the surrounding waters. Aerial photography was also incorporated into the model to give engineers a better picture of what was on the ground. The model, created in AutoCAD Civil 3-D, gave TY Lin engineers all the data they needed to design the new bridge, the temporary bridge, the connecting roadways, and the utilities.

This project was challenging, however, very gratifying. It combined the use of historical survey records and modern surveying equipment and software to create a digital 3-D map. This digital map will make it possible for the design and construction of the new bridge that is so desperately needed for the residents and visitors of Chokoloskee Island. ■



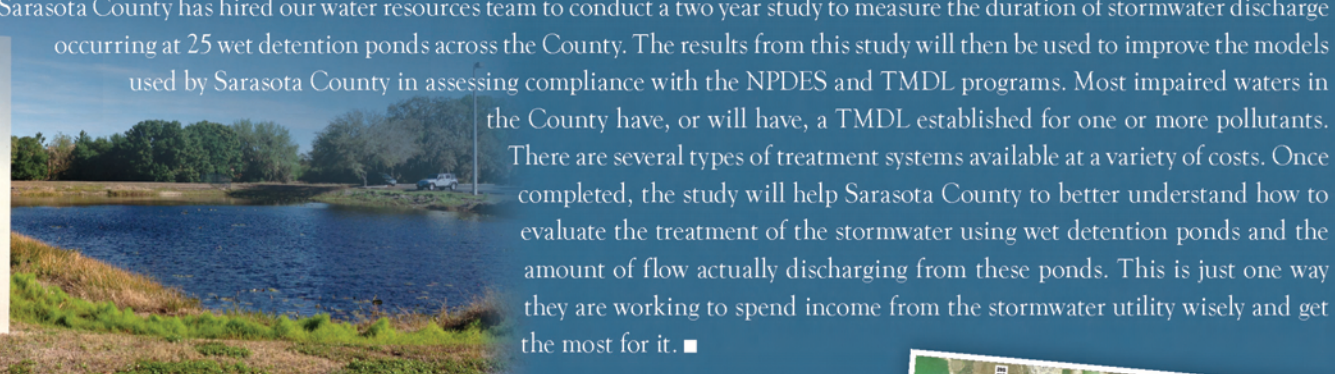
SARASOTA STEPS OUT AHEAD TO IMPROVE WATER QUALITY

Sarasota County has a strong stormwater program for water quality and quantity, which has led to identifying and improving many of their stormwater issues. Knowledgeable of the need for improving water quality and the regulations brought forward by two federal/state programs of the National Pollutant Discharge Elimination System (NPDES) and the Total Maximum Daily Load (TMDL), County staff is now embarking on an effort to gather additional data on how often their stormwater ponds are discharging. The results will be educational, as these stormwater ponds are used by many developments throughout Florida.

The Sarasota County Water Planning and Regulatory group has observed that for much of the year, many wet detention ponds do not have water levels up to the control elevation. Rainfall during this condition may not result in discharge through the outfall control structure. This condition allows the pond to act as a wet retention pond, rather than a wet detention pond for that portion of the year. It has been known for many years that retaining stormwater reduces the discharge of pollutants to a higher extent than detention. Many sites do not use retention as the primary means to meet regulatory requirements since the soil conditions do not allow recovery in a short enough time to meet the storm event criteria.

Sarasota County has hired our water resources team to conduct a two year study to measure the duration of stormwater discharge occurring at 25 wet detention ponds across the County. The results from this study will then be used to improve the models used by Sarasota County in assessing compliance with the NPDES and TMDL programs. Most impaired waters in

the County have, or will have, a TMDL established for one or more pollutants. There are several types of treatment systems available at a variety of costs. Once completed, the study will help Sarasota County to better understand how to evaluate the treatment of the stormwater using wet detention ponds and the amount of flow actually discharging from these ponds. This is just one way they are working to spend income from the stormwater utility wisely and get the most for it. ■



DATA COLLECTION HELPS OPTIMIZE WELLFIELD OPERATIONS

Our groundwater team worked with Lee County Utilities (LCU) to evaluate operations at their 15 MGD Corkscrew wellfield in order to develop strategies to reduce imbalanced hydrogen sulfide (H_2S) loading into parallel treatment trains at the water treatment plant (WTP). Hydrogen sulfide is a foul-smelling gas which is naturally present in raw-water sourced from confined aquifers and is typically removed during treatment at the WTP. The H_2S loading imbalance has presented difficulties to LCU by complicating downstream raw-water treatment processes. They also wanted to improve energy efficiency and reduce impacts on natural systems.

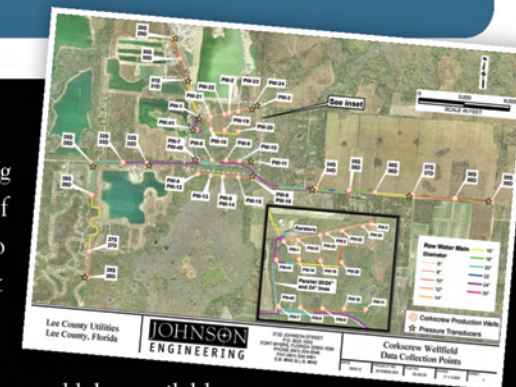
This project involved a complex, multi-variable optimization of wellfield operations with numerous hydraulic, hydrogeological, and regulatory constraints. The evaluation of the wellfield began with a coordinated data-collection effort to measure H_2S concentrations at each of the 55 production wells and hydraulic conditions at selected points throughout the raw-water collection system. These data were used to develop and calibrate a hydraulic model of the wellfield with the ability to simulate H_2S transport and wellfield energy consumption.

We also developed an analytical groundwater model (AGM) to be used in conjunction with the hydraulic model in order to quickly compare the effects of different operating strategies on aquifer drawdowns.

In addition to allowing for the development of operational plans to balance H_2S loading at the plant, these models also indicated that significant energy savings would be available by simply altering the order in which production wells are used to meet raw-water demands.

Our team was able to create an adaptable framework for developing and analyzing operating strategies to account for future wellfield expansions, changes in individual well capacities, and regulatory requirements. These models, and the methodology for employing them, represent a significant asset to LCU because they allow for rapid development of future operating strategies, as well as provide a basis for more routine tasks like selecting replacement pumps.

In the end, we provided LCU with optimized 5, 10, and 15 MGD operating plans for wet-season, dry-season, and 1-in-10 drought conditions. These operating plans met the project objectives and are anticipated to significantly improve wellfield operations in the ever-changing Florida environment. ■



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COMPANY APPOINTS NEW BOARD OF DIRECTOR/VICE PRESIDENT AND STOCKHOLDERS

At the most recent company board meeting, new faces were added to the list of company leaders. Mike Dickey, P.E. was unanimously voted by the stockholders onto the Board of Directors and will also serve as a Vice President for the Company. Laura Herrero, Kim Arnold, P.G., and James 'Vee' Lofton were also named as new stockholders.

Mike has been with Johnson Engineering for the last 15 years and serves as director of the company's utilities market group. He is a second generation Johnson Engineering employee who has grown with the company.



Dickey

Under his leadership, our utilities group has successfully accomplished many large projects, none of which can be seen, as they are water, irrigation, and sewer lines that run beneath us. The result of their expertise has brought water to homes, made lawns and golf courses greener, and provided wastewater services for communities throughout Southwest Florida.

Laura Herrero, a certified ecologist in our environmental group, has 18 years of experience in the environmental field, with an emphasis on the ecosystems and environmental planning/permitting of Southwest Florida.

Kim Arnold, P.G., is a hydrogeologist in our water resources group. She has 11 years of experience performing hydrogeologic investigations, data analysis, modeling, water supply planning, and permitting.

James 'Vee' Lofton, is the Director of our CEI team and is a third generation Johnson Engineering employee. He has more than 25 years of transportation CEI experience in roadway and bridge construction, project administration, and inspection in both traditional design-bid-build and design-build projects.

We are extremely fortunate to have a solid team of exceptionally talented people, who lead by example and provide quality service to all Johnson Engineering's clients. ■



Herrero



Arnold



Lofton

