General Engineering Services | RFQ #17-002

Qualifications

City of Key West, Florida

April 19, 2017

BLACK & VEATCH

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BLACK & VEATCH

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April 19, 2017

City Clerk
City of Key West
1300 White Street
Key West, FL 33040

Janet Muccino – Project Manager

Subject: RFQ #17-002 – General Engineering Services

Dear Janet,

During the last five years, Black & Veatch Team members, including our Project Manager, **Isabel Botero**, Client Director, **Rafael Frias**, and Client Service Advocate, **Robert Chambers** have been working together with the Utilities Department professionals to thoroughly understand the issues impacting the City of Key West now and into the future.

We have learned that the City is tasked with providing a high level of infrastructure services that include wastewater, stormwater and solid waste to its existing customers through proper implementation of its Capital Improvement Plan and maintenance of its facilities. We have also learned that the City could benefit from a firm with proven national experience on the development of infrastructure projects, such as sanitary and storm sewers, and pump stations.

Under our current contract with the City of Key West, **Black & Veatch assisted the City with the preparation of the bid package** to select the **Operations and Maintenance Contractor for the wastewater treatment plant, collections system and stormwater systems**. Also, Black & Veatch is currently executing the **design of the Dennis Street Stormwater pump station**.

To this end, Black & Veatch is committed to continue supporting the Utilities Department by providing a **highly-qualified team** that will bring its **national expertise** and **diverse experience** to implement **local solutions. Black & Veatch** is well suited to also assist the Engineering Department. Our Team is **Ready**, **Responsive** and **Reliable** and its goal for this General Engineering Services (GES) contract is to partner with the Utilities and Engineering Departments in support of its vision of being a leader in environmental protection, while improving the quality of life.

The Black & Veatch Team will provide the following value to the City of Key West:

- A **resourceful Project Manager**, Isabel Botero, who will ensure that the Utilities Department has full access to the best technical resources available within Black & Veatch.

- A **committed Client Director** in Rafael Frias, who will ensure complete Utilities Department satisfaction on all task order assignments performed for the City.

- **National expertise** in wastewater, stormwater, civil and structural engineering with specialized Task Leaders that will focus on successfully completing any assignment for the City.

- A team with **diverse experience and proven capabilities** in civil, utility, and structural engineering services.

- A **wastewater treatment expert** in **Lucas Botero PE**, who has completed multiple wastewater projects nationwide. He has a broad-based knowledge of wastewater treatment process engineering including, activated sludge design including biological and chemical nutrient removal, treatment plant modeling, headworks design, effluent disinfection and sludge processing.

- A **recognized pipeline practice leader** in **Ricardo Vieira PE,** experienced in wastewater and storm-water transmission and conveyance projects in urban environments. Ricardo also brings his experience in the design of roadway improvements, storm drainage systems, site development projects, and modeling and transient analysis.

The Black & Veatch Team includes the local collaboration of small business partners, all of which have successfully completed projects in South Florida, including the City of Key West. Our Team is comprised of **CRJ & Associates** (FDOT certified firm for civil, inspection and transportation projects)**, Avirom & Associates** (surveying) and **Nutting Engineers** (geotechnical and testing).

The Black & Veatch Team believes that our committed leadership and national wastewater, stormwater, and structural engineering n expertise will provide the Utilities and Engineering Departments with value that will result in timely, high-quality work products and cost-effective improvements.

We welcome the opportunity to discuss the details of our qualifications and invite you to contact me at (954) 319-9861. Thank you for your time and consideration; we look forward to partnering with the City of Key West Utilities Department on this important GES contract.

Very truly yours,
BLACK & VEATCH

Isabel Botero, PE
Senior Project Manager

Rafael E. Frias III, PE
Client Director

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Firm Qualifications

The City of Key West Utilities Department is tasked with providing a high level of infrastructure services that include wastewater, stormwater and solid waste to its existing customers through proper implementation of its Capital Improvement Plan and maintenance of its facilities. To this end, **Black & Veatch is committed to supporting the Utilities Department by providing a highly-qualified team that will bring its national expertise and diverse experience to implement local solutions.** Our goal for this General Engineering Services (GES) contract is to partner with the Engineering and Utilities Departments in support of the City's Mission: To preserve and protect our island.

Based on discussions with City staff and our collective experience managing numerous GES contracts, we are ready to support the Utilities Department in delivering the best infrastructure services solutions. Our team is **Ready, Responsive and Reliable**. The ideas and drivers supporting this theme are instilled throughout this proposal and include the following commitments:

- **A resourceful point of contact** in your Project Manager, **Isabel Botero,** for all contractual and administrative matters.
- **A committed** upper management team **with both Project Director Rafael Frias and Client Service Advocate Robert Chambers,** who will ensure complete Utilities Department satisfaction on all task order assignments performed for the City.
- **National expertise** in wastewater, stormwater and structural engineering and specialized Task Leaders to successfully complete multiple, simultaneous task orders.
- A team with **diverse experience and proven capabilities** in utility, environmental and civil engineering services, including **historic building preservation expertise.**
- **Timely, high-quality work products** delivered consistently throughout the term of the contract.

DISCIPLINE OFFERINGS

Black & Veatch is uniquely qualified to provide the City of Key West infrastructure services in the following disciplines, for which we are including our qualifications:

- **Civil Engineering**
- **Utility Engineering**
- **Structural Engineering**

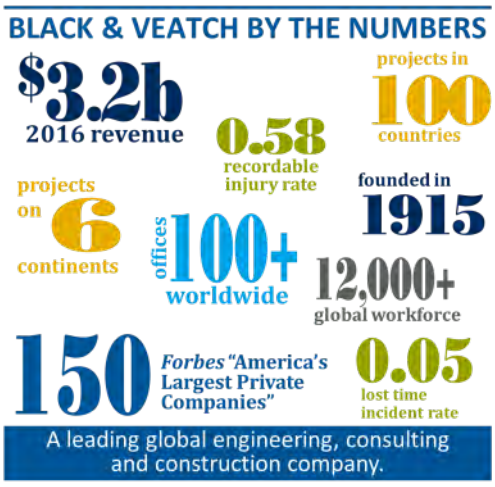
Our proposal will demonstrate Black & Veatch's specialized experience and national technical expertise in these disciplines.

Ready, Responsive and Reliable

The goal of the Black & Veatch Team is to partner with the City of Key West Utilities Department in support of its vision of being a leader in environmental protection, while improving the quality of life.

As a national leader in infrastructure development in the water, environmental, management consulting, energy, telecommunications and federal markets,

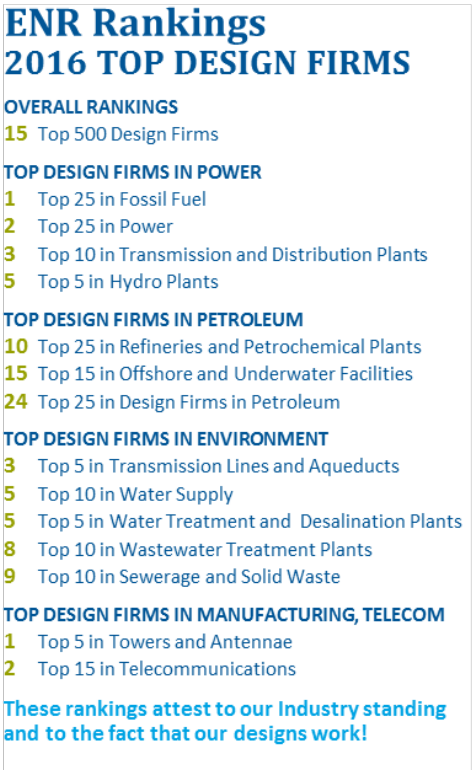
Black & Veatch will provide the Utilities Department with single source solutions for concept-to-completion work and lifecycle support for all City projects.



BLACK & VEATCH COMPANY PROFILE

Black & Veatch Corporation is a leading global engineering, consulting and construction company with the mission of *Building a World of Difference®.* By advancing the frontiers of knowledge, we provide our clients with reliable solutions to their most complex challenges, thereby helping improve and sustain the quality of life around the world.

Founded in 1915, Black & Veatch specializes in infrastructure development in energy, water, telecommunications, and environmental markets as well as management consulting services and special project assignments for the federal government. We provide a full complement of conceptual and preliminary engineering services, engineering design, procurement, construction, financial management, asset management, information technology, environmental, and management consulting services. This knowledge base has allowed us to develop our engineering services skills and capabilities based on our national experience and understanding of all aspects of a project from conception through commissioning. **Black & Veatch's diverse capabilities will enable us to complete any assignment for which the City of Key West Utilities Department requires engineering assistance.**



The firm operates as an employee-owned corporation and maintains more than 100 offices worldwide with approximately 12,000 professionals. Through a network of offices, our clients have access to sophisticated design and planning tools as well as our global network of highly-skilled and experienced engineers, scientists and technicians who specialize in water and wastewater technologies. These experts lead the water and wastewater industry by conducting research and developing new and innovative technologies, enhancing existing processes and integrating the latest industry developments into realistic, reliable and affordable solutions for our clients.

Black & Veatch provides engineering services in Florida from seven offices, located in Miami, Coral Springs, Lake Worth, Fort Myers, Orlando, Tampa and Jacksonville. Black & Veatch has more than 260 professionals in the state with expertise in a broad range of engineering related fields. We have been serving clients throughout Florida since the 1950s.

Our office locations in Florida and a list of our clients are illustrated in the figure below.

Black & Veatch is continuously ranked as one of the top engineering-design firms by Engineering News-Record (ENR). We have risen to the top of our field by providing open and productive working relationships with our clients; effective project management; development and implementation of innovative and sustainable solutions for complex projects; and flexible project-delivery systems that meet aggressive budgets and schedules. Our success is based on principles of sustainable development, which means, we serve public and private clients of every size with a strong focus on life-cycle economy, efficiency and reliability.

By combining the reliability, responsiveness and commitment of our dedicated project Team, with cost-effective specialized support services to meet the unique needs of each City project, Black & Veatch will exceed the Utilities Department expectations. **The Utilities Department can expect high quality, cost effective and safe projects, delivered on time and within budget.**

CIVIL ENGINEERING QUALIFICATIONS

Black & Veatch offers comprehensive civil engineering services, including studies, planning, preliminary and detailed design, permitting assistance, utilities relocation, bidding assistance, construction management and construction phase services involving resident engineers and field inspectors.

Based on our discussions with City staff, we understand that the following Civil Engineering Services are representative of the Utilities Department's civil infrastructure needs: Civil/Site Engineering, Sanitary/Storm Sewers, Transportation/Roads, Environmental Assessment/Remediation, and associated construction services. We have assembled a Team that specializes in these services and will provide full support to the City in the completion of any civil engineering task assignment.

Civil/Site

Black & Veatch provides comprehensive civil/site services related to site development, geotechnical, foundations, buildings, structures and materials handling systems.

Black & Veatch provides civil/site services related to site development, geotechnical, foundations, buildings, structures, and materials handling systems. Our professionals coordinate the development of the site layout and design and prepare construction drawings for site work, roads, railroads, waterways, drainage, and underground utilities. We regularly provide our clients with preparation of subsurface exploration programs, coordination of drilling and laboratory contracting, preparation of boring logs, and preparation of the foundation design recommendations. Also, our engineers define and coordinate the topographic survey tasks required for the design development of our civil designs.

Civil/Site development for a Tampa Bay Water facility.

Black & Veatch employs engineers with a specialized focus in analysis and design of foundations for large vibrating equipment; vibration investigationand alleviations; review of special structures such as chimneys, stacks, and silos; and finite element modeling. We provide feasibility studies, system designs, contract administration, and consultation assistance during erection and system startups.

We also provide basic analysis and design calculations required to prepare documents, specifications, and drawings for geotechnical analysis of foundations, dams, and earth retaining structures in addition to foundation design for shallow and deep foundations. Our detailing capabilities provide projects with in-house steel and reinforcing detailing capability that can significantly shorten the overall project schedule.

Sanitary/Storm Sewers

Black & Veatch has been a leader in the study, evaluation, analysis, design, and implementation of sewer system collection and conveyance facilities. Our sewer system utility planning and design project experience include development of sewer system master plans; and implementation programs as large as $2.2 billion in improvements. State-of-the-art tools such as geographical information systems (GIS) and computer modeling are used to ensure the accuracy and efficiency of each project.

Black & Veatch has helped hundreds of communities with sanitary and storm sewer systems. We have encountered and successfully solved every conceivable type of problem related to the design and construction of sewers, including pre-stressed concrete cylinder pipes.

City of Marco Island, FL, Hydraulic Model in InfoWater

Construction conditions have ranged from highly-developed urban and residential areas to open country, and have required various construction procedures including open-cut, trenching with shoring, tunneling and above-ground piering. A wide range of soil and groundwater conditions has required the use of procedures such as dewatering the trench prior to construction or installing the pipe; piling to prevent settlement; air pressurizing (for tunnels); and weighting to protect against flotation. Highly corrosive soils encountered on some projects have required special corrosion measures such as coating or wrapping the pipe, or the use of cathodic protection systems.

Stomrwater/Wastewater Collection Systems Modeling

Our national hydraulic modeling team are experts in their field and maintain software licenses in most hydraulic model platforms, including Innovyze Products **(InfoWater, H2OMap Water, H2OMap Sewer, CapPlan, Infoworks CS, H2OSurge, and InfoSWMM)**; Bentley products **(WaterGEMS, SewerGEMS, and Hammer)**, DHI products **(Mouse and Mike 11)**, **EPANET, XPSWMM** and **Synergee**. Black & Veatch can also perform **computation fluid dynamic (CFD)** modeling of systems.

Pipeline Rehabilitation

Black & Veatch offers a variety of distribution and conveyance system rehabilitation experience. The firm has been investigating system conditions and designing the rehabilitation of damaged water and wastewater lines for over 50 years. We offer expertise in investigation, repair, and detailed design of distribution and conveyance systems.

Our diverse sanitary and storm sewer pipeline experience will benefit the Utilities Department when designing or rehabilitating piping systems of any size and material, including ductile iron, PVC, steel, and HDPE.

Black & Veatch rehabilitation designs have included all types of materials including vitrified clay, concrete, brick, ductile iron, fiber glass, cast iron, steel and polyvinyl chloride. Based on our extensive and diverse pipeline rehabilitation experience, clients nationwide have called on Black & Veatch to study, analyze, and design system rehabilitation projects.

It is increasingly advantageous to adopt trenchless methods when site constraints limit access or when disruption to traffic or other features is a concern. Black & Veatch has vast experience in the planning, design and construction of pipelines and other underground structures through the implementation of trenchless technologies. Our experience in trenchless technologies include cured-in-place pipe (CIPP), pipe jacking, sliplining, fold and form, epoxy coating, pipe bursting, pipe splitting and spiral pipe repair (SPR). We also continue to stay current on the developments of new methods such as

Black & Veatch is one of the few firms that can provide the City with proven experience sliplining large diameter mains with HDPE liners.

carbon fiber reinforced polymer (CFRP), StrongPipe and UV CIPP. We've frequently helped owners meet tight budgets and even tighter schedules; minimize urban disruption; and implement ambitious safety programs. **As part of an Engineering Services Contract with the City of Fort Myers, Black & Veatch performed a condition assessment of approximately 550-ft section of the 54" RCP Influent gravity sewer to the City's 12 mgd South Advanced Wastewater Treatment Plant. The team utilized CCTV and LIDAR technologies deployed via floating conveyance while the pipe remained in service.**

Black & Veatch professionals keep abreast of new technologies as they evolve, and continually evaluate their effectiveness to ensure that our clients receive high quality and cost-effective products. A sampling of representative pipeline projects performed by Black & Veatch in Florida is provided in the table below.

Black & Veatch Representative Pipeline Experience in Florida

PROJECT | CLIENT	DIAMETER (INCHES)	LENGTH (LINEAR FEET)	PIPE MATERIAL	SERVICES			
				STUDY	DESIGN	PERMITTING	CPS
SW 137th Avenue Force Main Miami-Dade Water and Sewer Department	36-72	53,000	PCCP	■	■	■	■
Water Transmission Main Evaluation and Replacement Florida Keys Aqueduct Authority	36	26,250	Steel	■			
Reclaimed Water Transmission Main Crossing of Caloosahachee River City of Cape Coral	30	16,000	HDPE	■			
Reclaimed Water and Sanitary Sewer Pipelines City of Fort Myers	24	12,000	DIP	■	■	■	
West Lakeland Wasteload Reduction Facility, Influent & Effluent Force Mains City of Lakeland	16-20	8,000	DIP	■	■	■	■
Riverview Transmission Facilities Hillsborough County	8-30	63,360	PVC, DIP, HDPE, HOBAS	■	■	■	■
Falkenburg Reclaimed Water Pipeline Hillsborough County	24	47,520	PVC/DIP	■	■	■	■
Lynn Turner Road Reclaimed Water Main Hillsborough County	20	8,000	PVC/DIP	■	■	■	
Bell Shoals Road/Mulrennan Road Water Main Extension Hillsborough County	10	2,000	DIP	■	■	■	
Carrollwood Springs Reclaimed Water Hillsborough County	8-12	5,000	PVC	■	■		
Armand Drive Gravity Sewer Hillsborough County	10-12	5,000	PVC	■		■	■
Dove Field Place Water Main Interconnect Hillsborough County	10-12	2,000	DIP	■		■	■

Sewer System Evaluation Surveys (SSES) – Infiltration/Inflow Studies

Regulations regarding abatement of sanitary sewer overflows and the need to provide safe and effective sewerage service in our aging infrastructure systems, are resulting in increased attention to infiltration/inflow management. Black & Veatch has helped many communities evaluate the capability of existing facilities and develop a capital improvements program to address population or land use changes. Our systems planning specialists use infiltration/inflow analyses to determine whether more detailed investigations, such as sewer system evaluation studies, should be performed. Sewer system evaluation surveys enable us to evaluate existing collection system conditions through a sequence of tasks, including flow and rainfall monitoring and data analyses, cost effectiveness analyses, and development of an implementation plan. **The SSES would assist the Utilities Department in identifying overloaded sewer lines, system defects, and maintenance conditions that should be addressed.**

Transportation/Roads

The Black & Veatch team offers comprehensive transportation engineering services, including planning, preliminary and detailed design, permitting assistance, studies, utility adjustment, planning, construction management, design/build and construction phase services, including resident engineering and field inspection.

Our multi-disciplinary staff has the proven capabilities to successfully design and manage a diverse array of transportation infrastructure projects. Whether the project requires traffic, civil, bridge, railroad, structural, geotechnical, environmental, telecommunications, or electrical engineers, Black & Veatch has the specialized personnel to address every detail, while meeting the City's schedule and budget goals.

Black & Veatch performed a Traffic Engineering Study for Hulburt Field, Florida which included field investigations, conceptual engineering services, analysis of existing and future traffic conditions, analysis of existing and future parking requirements, and development of short- and long-term transportation improvement projects.

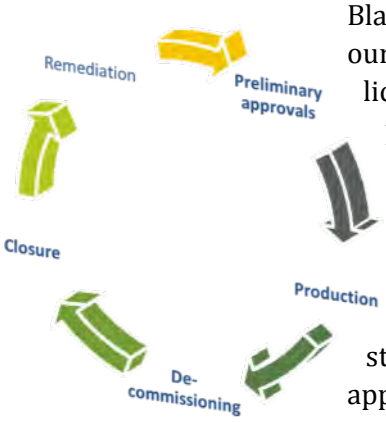
Black & Veatch has provided road design services that address the multiple facets of roadway projects in both the public and private sector. We have designed hundreds of miles of highway and access roads for state government agencies; as well as arterial, collector, and residential roads for municipal clients; and numerous site access roadways for private clients. We have prepared engineering reports, analyzed existing road systems, performed traffic studies, and developed road maintenance programs. Our designs incorporate road improvement programs to resurface, landscape, widen, and beautify major highways and streets. Our roadway experience encompasses the following types of projects: new alignments, roadway widening, highway interchange/ intersection design, signalization, corridor studies, reconstruction, rehabilitation, resurfacing, and restoration.

In addition, our subconsultant, **CRJ & Associates, is a Florida Department of Transportation (FDOT) certified engineering consulting firm with expertise in transportation planning and design, as per FDOT criterion, FDOT construction management (certified FDOT CEI firm), master**

CRJ & Associates, Inc.
Consulting Engineers and Planners

drainage and stormwater studies, FDEP MS4 municipal assistance, and FDEP NPDES SWPPP Inspection services. As part of the Black & Veatch team, they will provide local civil engineering and transportation support to the Utilities Department.

Environmental Engineering



Black & Veatch is currently ranked 16th within the Top 200 Environmental Firms by Engineering-News Record (ENR).

Black & Veatch provides comprehensive environmental engineering services to our clients, including full support in addressing regulatory permitting and licensing requirements. Our environmental services capabilities support all phases of project development including the identification of environmental regulatory requirements, establishment and implementation of a comprehensive licensing strategy, conducting environmental field studies, characterization, modeling and analysis of impacts and preparation of permit applications for review by regulatory agencies and the public. Black & Veatch professionals are also experienced with environmental impact studies, multi-volume environmental assessment reports, site certification applications, and expert testimony.

Black & Veatch has been permitting projects in Florida for over 35 years, and has provided environmental and licensing services to over 15 major industrial and utility projects in the state within the last seven years. Our experienced staff of specialists has played a major role in assisting clients comply with the federal, state and local environmental legislation.

Our areas of expertise include:

- Contaminated site investigation and remediation (e.g. Superfund, brownfields)
- Geospatial data management
- Ecological investigations (e.g. protected species, wetland and habitat delineation)
- Sustainability and conservation
- Due diligence and facility siting

Areas we have provided environmental support in Florida include:

- Environmental Compliance Services
- Wetland Services
- EPCRA Section 313 TRI Form R Support Services
- Permitting Support
- Air Services and Clean Air Compliance
- Major Licensing Support
- Training Services

Representative Black & Veatch Environmental Projects in Florida

PROJECT | CLIENT	REGULATORY REVIEW	CLEAN AIR ACT COMPLIANCE	CLEAN WATER ACT COMPLIANCE	CONSUMPTIVE WATER USE	ENVIRONMENTAL ASSESSMENT	ENVIRONMENTAL COMPLIANCE SERVICES	RCRA COMPLIANCE	EPCRA SECTION 313 TRI FORM R	TRAINING SERVICES	CONSTRUCTION COMPLIANCE	COMPLIANCE PLANS
Treasure Coast | FMPA	■	■	■	■	■	■			■	■	■
West County | FPL											
Turkey Point | FPL			■			■				■	■
Stock Island | FMPA	■	■	■		■	■			■	■	■
Brandy Ranch Generating Station | JEA		■	■	■	■			■		■	■
Northside Generating Station | JEA	■	■	■			■	■	■			
Southside Generating Station | JEA						■		■			
Kennedy Generating Station | JEA		■				■		■			
St. Johns River Power Park | JEA		■						■			
Beckman WWTF | JEA						■					
Hansel Generating Station | KUA	■		■						■		■
Cane Island Power Park | KUA	■	■	■	■	■	■			■	■	■
Stanton | OUC		■	■		■	■			■	■	■
Indian River Plant | OUC			■						■		■
Indian River Plant | Reliant Energy			■	■	■						
Osceola County Power Station | Reliant Energy		■	■		■					■	
Martin Unit 8 & Manatee Unit 3 | FP&L			■			■				■	■
Gainesville Regional Utilities			■								
Palatka Plant | Seminole Electric Cooperative			■								
Separation Technologies		■									
Power Plant | City of Vero Beach			■	■		■					■
Water Treatment Facility | Escambia County		■									

Environmental/Contamination Assessments

Preparing to excavate tar well after placing sheet piling around a structure.

Studies and evaluations may be performed prior to the implementation of future facility improvements to identify the potential alternatives available. Numerous parameters are considered during these evaluations including siting feasibility, operational constraints and conceptual capital costs. Based on the results from these studies, the most efficient and cost-effective improvement alternative is identified for implementation. Black & Veatch is experienced with key technologies that would assist with the completion of studies, including numerous water and reclaimed water distribution system modeling software (e.g. **WaterGEMS/WaterCAD, H2OMap/H2ONet, InfoWater**), **GIS** and **Criterium Decision Plus (CDP)** for evaluation of alternatives and decision-making processes.

Ecological and Environmental Studies

Federal, state, and local regulatory programs often require the preparation of environmental assessment and environmental impact statements (EA/EIS) to assess the impacts of projects and describe proposed mitigation measures. **Black & Veatch staff has experience in preparing EA/EIS reports in accordance with the guidelines of the lead agency identified in the scoping process.** Results of subcontractor investigations are also incorporated.

Placing first load of contaminated soil into containment cell constructed at the Escambia Treating Company site.

When project schedule allows and agencies agree, an EA/EIS report is informally reviewed with the federal, state, and local agencies prior to formal issuance to ensure that the document satisfies all requirements. Experience has shown that the informal review substantially reduces overall review time.

Biological/Habitat Assessment Reports

Environmental scientists at Black & Veatch can provide expertise on changes in water quality; soil and topography; flows; sediments; and land use and how they individually and collectively affect the presence of endangered, protected or exotic species. We provide an understanding of hydrological patterns and determine which key ecological driving forces require restoration or preservation, or wetlands conservation and sustainable management.

Wetlands Monitoring/Mitigation

Wetlands are biologically rich habitats that support thousands of plant and animal species, help minimize downstream flood impacts and improve water quality. In recognition of the valuable ecological benefits of wetlands, laws and regulations have been enacted to ensure development projects avoid, minimize, and/or mitigate wetland impacts. These regulatory programs require development projects to avoid or minimize impacts to wetlands to the maximum

extent possible. Permits and compensatory mitigation are typically required for unavoidable wetland impacts.

Technical considerations for wetland delineation, permitting, mitigation, and constructed wetland design require the involvement of trained personnel to ensure a project complies with applicable regulations and meets project objectives. Black & Veatch offers comprehensive wetland services for all types of development projects. A multi-disciplinary team of botanists, ecologists and engineers will work together to identify the optimum wetlands solution for each project. **Black & Veatch is experienced in identifying and delineating wetlands and preparing permit applications and mitigation plans for impacts to wetlands.**

Black & Veatch has specific experience with wetlands in Florida, including the design of detention structures, as well as mitigation for the construction of infrastructure.

Mitigation Banking

The Final Compensatory Mitigation Rule (May 2008) generally states that the preferred choice for mitigating impacts to jurisdictional waters is through mitigation banking. A project can also take credit for preservation and enhancement. Creation of a new wetland is typically the least preferred choice for mitigating impacts. **Under this framework, we can work with the USACE to determine appropriate burden-sharing options that maximize value to the City of Key West.** Based on our experience with USACE Districts around the country and the world, our coordination efforts can be as brief or as extensive as required by the City's project needs.

Black & Veatch will support the Utilities Department in all facets of wetland design and construction administration for environmental enhancement, mitigation and flood control.

Federal Emergency Management Agency (FEMA)/US Army Corps of Engineers Regulatory and Permitting

The Black & Veatch team has extensive experience in supporting clients on the types of environmental regulatory issues, which require coordination with FEMA and the USACE. Black & Veatch successfully navigates plan formulation and regulatory approval processes with agencies through pre-application consultation meetings held prior to beginning design so that agency concerns can be identified and fully addressed. A series of review workshops are provided during the design phase, application submittal and review process. **This permitting strategy guarantees close coordination with the appropriate agencies**, and in every experience where this process has been utilized, the outcome has been mutually beneficial.

Regulatory Compliance

We are prepared to assist the Utilities Department in obtaining permits and approvals from Federal, state, and local agencies, as needed.

An important step to reducing permitting issues is to attend pre-application meetings and maintain constant communication with regulators. We have also found that early involvement in the project by regulators results in these parties becoming a part of the team. **Meeting with the review agencies and the City**

will result in an approach that affords the permitting authorities the opportunity to have buy-in and ownership of the project's success.

From a regulatory perspective, our experience with Federal and State of Florida stream and wetland mitigation rules and guidelines will be used for successful permitting of all City projects.

Early permit activities will include meetings with applicable regulators to confirm the required permits and requirements. **At the City's approval, members of our team will arrange, coordinate and attend all pre-application meetings with permitting agencies. All permit applications will be prepared for review and signature by appropriate City staff.**

For this GES contract, the principal focus of permitting activities may involve the following regulatory entities:

South Florida Water Management District (SFWMD)

For the City of Key West, coordination with SFWMD may be required and Black & Veatch has proven experience working with SFWMD on behalf of our clients. SFWMD, in conjunction with the Florida Department of Environmental Protection (FDEP), will review and permit site modifications to existing facilities and stormwater control structures, and will issue an Environmental Resource Permit (ERP).

The Utilities Department will benefit from Black & Veatch's experience working with permitting agencies on behalf of our clients.

Florida Department of Environmental Protection (FDEP)

The FDEP will be involved, with the SFWMD in the review and permitting of site modifications through an ERP. FDEP will also review and permit any Underground Injection Control (UIC) Program construction and operation permits. National Pollutant Discharge Elimination System (NPDES) Construction Activity permit applications will also need to be filed with FDEP.

Presently, FDEP is in the process of developing, a new Statewide Stormwater Rule to assure that post-development stormwater conditions and pollutant loads do not exceed pre-development conditions. New statewide Numeric Nutrient Criteria for discharges to streams and lakes were developed in 2016 in compliance with the Clean Water Act and the United States Environmental Protection Agency (USEPA) mandate. Both rules will expand the basis of review currently being implemented under the ERP process.

Building Department

The City's Building Department is responsible for administering and enforcing all ordinances applicable to building and construction. Obtaining a permit may require the interaction and approval of several agencies outside of the Building Department. In particular;

- Together with Florida Department of Health, Environmental Health, Onsite Sewage Programs, Monroe County will review and permit constructions permits for Sewer Tie-In.
- A permit is required from the MC Road Commission Engineering Department for any and all work being conducted within the road right of way.

UTILITY ENGINEERING QUALIFICATIONS

Specific to Utility Engineering Services, the Black & Veatch Team will provide the Utilities Department with comprehensive services that may include master planning, pump/lift stations evaluations, sanitary and storm sewers design, wastewater treatment, stormwater management, hydraulic modeling, hydrogeology support, utility rate studies and bond engineering reporting, organizational optimization and change management, and sustainability and energy efficiency analyses for improved sewer and stormwater system operations and cost savings.

The Utilities Department will benefit from Black & Veatch's experience and expertise in virtually every type of pumping condition, pumping equipment, piping size and material, control scheme and power source.

We understand that the Utilities Department focuses on wastewater, stormwater and solid waste services. Black & Veatch will provide practical solutions to the City of Key West through our world-class technical capabilities specific to these services. **Our proof: Black & Veatch is ranked sixth in the world amongst the Top 25 Firms in Sanitary and Storm Sewers.**

Wastewater

Black & Veatch is *Building a World of Difference®* with wastewater systems that serve your community efficiently while returning treated wastewater to the environment safely and efficiently. With an eye to the future, Black & Veatch can help the City turn wastewater into a valuable resource with water reclamation and reuse strategies. We employ state-of-the-art technologies to collect and pump water, treat wastewater to appropriate standards, manage residuals, remove nutrients and pre-treat industrial systems.

Through the execution of the current General engineering Services Contract with the City of Key West, the Black & Veatch key team members have already become familiar with the current operations and needs at the Wastewater Treatment Plant.

Facility Design

Our Wastewater treatment experience includes all aspects of liquid and solids processing, as well as effluent disposal for both municipal and industrial clients. Liquid and solids treatment services include master plans, feasibility studies, pilot plant studies, conceptual design, final design, bidding, construction management, startup and training, operations troubleshooting, and process and energy optimization. We understand that key aspects of effluent disposal are reuse opportunities, as well as water quality issues with respect to nutrient requirements. Our effluent disposal services include water quality modeling, load allocations, regulatory negotiations and permitting. Other services include vulnerability assessments, air quality modeling, and air permitting.

Process Design

Black & Veatch's global presence has allowed us to research and evaluate treatment technologies in all types of climates and weather conditions. Our process experts have performed extensive process development; process optimization and troubleshooting; preliminary and final design for primary, secondary and tertiary treatment; chemically enhanced pretreatment; ozonation; ultraviolet (UV) disinfection; aerobic and anaerobic digestion; nutrient removal; and odor/air emissions control. Selecting a treatment strategy for new and existing facilities requiring enhancement is driven by treatment objectives (which differ per end

Bundamba is an example of an MBR project designed and constructed in less than a year to meet critical water shortages. Our proposed Project Manager, Isabel Botero, was the lead designer for the residuals treatment systems including DAF treatment and denitrification filters.

user), existing facilities, site constraints, neighborhood, shareholders, flexibility/ adaptability, and funding limitations.

Advanced process options, with which we have extensive experience, include biological aerated filters (BAF), membrane bioreactor (MBR), moving bed biofilm reactor (MBBR), and integrated fixed-film activated sludge (IFAS). We have completed more than 40 MBR treatment facilities throughout the world including at the Bundamba AWT Facility in Australia. What is significant about that project is that because of our partnerships with all of the major MBR suppliers, we were able to expedite equipment orders. The other critical element in a fast-track project is our ability to design around equipment that was fabricated in other locations and brought onsite.

Biosolids Management

Black & Veatch has been performing biosolids management projects, including long-range planning and facility designs for more than 80 years. We are one of the largest providers of biosolids planning, design, and construction services in the nation and have performed evaluations and designs for facilities ranging in size from 0.2 mgd to over 1,000 mgd. Our leadership in biosolids management planning and delivery is based on sound studies and designs that enable our projects to satisfy regulatory requirements; meet our client's specific needs and concerns; and contribute to cost-effective and energy efficient operation and maintenance. Appropriate best-fit solutions mean we help our clients balance their multiple objectives including economic practicality, environmental sensitivity and operational ease.

Wastewater team was performing startup activities at the Cudjoe Key Advanced Water Reclamation Facility. Black & Veatch's local expert staff includes Lucas Botero located in the Coral Springs office serving the Southeast Florida clients.

Black & Veatch has a full-time staff of residuals management specialists – many with "world-class" credentials. These specialists work with regional design teams and client staffs at the early, formative stages to develop creative, cost-effective solutions tailored to specific project needs. We know what works and why through extensive research, global project experience and an extensive international network. By pooling our experience from our regional and worldwide offices but providing service locally, we are able to bring a world of expertise to communities a world apart.

Our scope of services on biosolids-related projects has included technology evaluations, master planning, detailed design, equipment procurement, construction, commissioning, testing and training. We will transfer the lessons learned from these projects related to both technology and delivery to our clients. The transfer of this experience and knowledge will reduce risk and result in a facility that is reliable, sustainable, environmentally sound and cost-effective.

An excellent example of our Biosolids experience at large wastewater plants is the new 240 MGD Enhanced Nutrient Removal (ENR) facility and the development and implementation of its Biosolids facilities for the Metro Wastewater Reclamation District in Denver, Colorado, where the District turned to Black & Veatch for technical and operational excellence.

Black & Veatch has also provided services for nutrient removal projects throughout the world for both municipal and industrial clients, covering a broad range of nutrient removal requirements — nitrification only, upgrades to meet moderate nutrient control requirements, and nutrient removal to the limits of technology.

Table 1. Representative Wastewater Treatment Experience

PLANT NAME / LOCATION	SIZE (MGD)	STUDY	PILOT TESTING	DESIGN	DESIGN/BUILD	CONSTRUCTION MANAGEMENT	UPGRADE / EXPANSION	PRELIMINARY TREATMENT	PRIMARY TREATMENT	SECONDARY TREATMENT	NUTRIENT REMOVAL	DISINFECTION	ODOR CONTROL	BIOSOLIDS IMPROVEMENT	THICKENING / DEWATERING
North Regional Wastewater Treatment Plant (WWTP) Broward County WWS, FL	95			■		■	■			■					
Southern Regional WWTP Hollywood, FL	55.5	■								■	■	■			■
Bayou Marcus Water Reclamation Facility (WRF) Escambia County, FL	8.2			■	■	■	■	■			■	■			
Cudjoe Key Advanced WRF FKKA, FL	0.94			■				■	■	■	■	■			■
JEA Buckman WRF Jacksonville, FL	54	■		■			■	■			■	■	■	■	■
East WRF City of Fort Myers, FL	8			■				■			■	■	■	■	■
Fiesta Village Lee County, FL	5			■			■	■			■				
JEA District 2 WRF Jacksonville, FL	10	■		■			■	■			■	■			
JEA Mandarin WRF Jacksonville, FL	7.5	■					■				■	■			
JEA Southwest WRF Jacksonville, FL	14	■		■			■	■			■	■	■		
Main Street Escambia County, FL	24			■	■	■	■	■			■	■		■	■
Pensacola Beach Escambia County, FL	2.4			■	■	■	■	■			■	■			
Southern WRF Upgrades Orange County, FL	56			■			■			■	■	■	■	■	■
Southwest WRF Manatee County, FL	18			■			■	■			■		■	■	■
Southwest WRF St. Petersburg, FL	20	■					■	■			■	■		■	■
Waterway Estates Lee County, FL	1.5	■		■			■	■		■	■	■		■	■
West Lakeland Industrial Lakeland, FL	1.5	■	■	■				■	■	■	■		■		

Pump/Lift Stations

The Black & Veatch Team understands the Utilities Department is responsible for approximately 22 sanitary pump stations throughout the City. Black & Veatch brings experience and expertise in virtually every type of pumping condition, pumping equipment, piping size and material, control scheme, and power source. Additionally, we have successfully conducted surge analyses for many of these systems, including models to simulate surge conditions; field tests to calibrate the model; and surge control devices including surge anticipator valves, air/vacuum valves, control valves, tanks, flywheels, control systems, and other similar equipment.

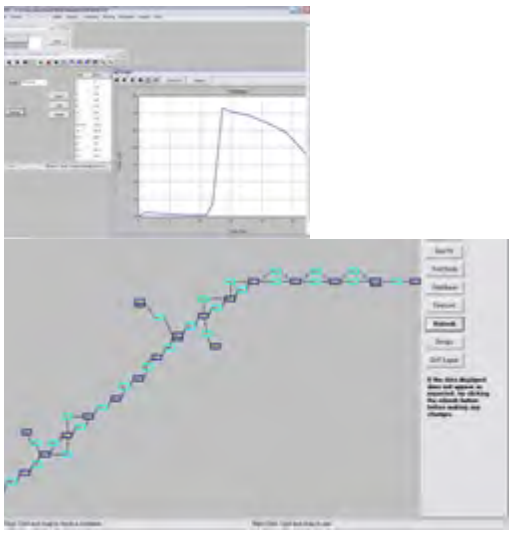
Black & Veatch will provide comprehensive pump/lift station services to the City, including design of new facilities and rehabilitation / upgrading of existing operating systems.

Black & Veatch has designed all types of pumping stations as stand-alone projects and as integral components of treatment facilities. Our experience includes stations with all types of pumps, including horizontal centrifugal, vertical turbine and submersible pumps, many with variable speed capability. Our experience includes new pumping stations, as well as upgrades to existing facilities. Black & Veatch pump station designs provide maximum flexibility to allow for pumping over a wide range of capacities. In addition, our designs include pump stations that resemble and are compatible with local aesthetics, each tailored to the particular capacity and head conditions of the project.

Black & Veatch also has in-depth experience with the design of wastewater lift stations that manage grit and solids in the system and provide odor control technologies to minimize impacts on the neighborhoods. Currently Black & Veatch is working with the Utilities Department with the design of the Dennis Street Stormwater Pump Station to alleviate localized flooding near the high school.

Black & Veatch Representative Florida Pumping Station Projects

PROJECT | CLIENT	WATER	WASTEWATER	SUBMERSIBLE	VARIABLE FREQ. DRIVES	RAW WATER/WSW INTAKE	CONCEPTUAL/PRELIM DESIGN	FINAL DESIGN	CONSTRUCTION/CM	CONST. PHASE SERVICES	NEW	UPGRADE/RETROFIT
North Regional WWTP Outfall PS | Broward County WWS		■		■		■	■		■		■
Master Pump Stations Rehabilitation | Broward County WWS		■				■	■		■		■
Southwest Regional WWTP | Manatee County		■					■		■		■
TBW System Engineer | Tampa Bay Water	■				■				■		
Everglades Agricultural Area Reservoir Phase I | South Florida Water Management District	■						■			■	
Cedar Island & Woodmere Triplex Pump Stations | JEA	■	■	■				■			■	
Oakwood Villa Septic Tank Phase-Out | JEA		■	■				■				■
Buckman WRF | JEA		■					■				■
District II WRF | JEA		■					■			■	
Bradley Road Master Pump Station | JEA		■	■				■				■
Highlands WTP Expansion | JEA	■						■	■			■
C. Wayne Combee WTP | City of Lakeland	■						■		■	■	
WRF Reuse Improvements | City of Ocala		■		■			■				■
Western Regional WTP | Orange County Utilities	■					■	■		■		■
Eastern Regional Water Supply Facility | Orange County Utilities	■			■			■		■		■
Metro West Pumping Station | Orlando Utilities Commission	■						■	■			■
Pine Hills WTP Expansion | Orlando Utilities Commission	■					■	■		■		■
Main Street WWTP | Emerald Coast Utilities Authority	■	■					■	■			■
Consumers WTP | Seminole County Environmental Services	■				■		■		■	■	



Stormwater model in ICPR for Marion County, FL

Stormwater Management

In the not too distant past, civil and environmental solutions for the management and control of urban stormwater runoff consisted mainly of engineered solutions to mitigate peak flows. Minimal consideration was given to the long-term effects of these solutions on biological, water quality and aesthetic aspects. Today, however, stormwater management requires a talented mix of technical and regulatory expertise to consider all of the ramifications of an engineering solution.

To meet these requirements for the City of Key West, Black & Veatch offers unmatched technical expertise, as well as extensive local knowledge of various regulatory issues. From the technical side, we have conducted engineering studies and design of stormwater management systems nationwide that include hydrologic, hydraulic, water quality studies and stream restoration. These facilities include large detention structures, open channels, and underground drainage systems, as well as best management practices (BMPs) evaluations. **For efficient hydrologic and hydraulic stormwater evaluations for the City, we will employ the use of state-of-the-art computer models linked to GIS such as HEC-1, HEC-HMS, HEC-2, HEC-RAS, XP-SWMM and ICPR.**

The City of Key West stormwater system consists of approximately 63 permitted outfalls, 54 vertical exfiltration drains, 5 pressurized wells 121 gravity recharge wells and associated collection and treatment systems. We know that the Utilities Department updated the City's Stormwater Master Plan in 2012. The stormwater system was modeled in ICPR, which is a typical one-dimensional, stormwater link-node model commonly used in Florida. **Black & Veatch has significant experience with ICPR and will use this software for the City's stormwater modeling needs, if it is the preferred tool of the Utilities Department.**

This is a visualization of predicted inundation from a two-dimensional modeling in XP-SWMM for the Dennis Street Stormwater Improvements Project. This project will alleviate flooding issues at the Key West High School.

However, **Black & Veatch's national experience has allowed us to develop expertise with other modeling tools such as XP-SWMM, which is a FEMA-approved stormwater model used throughout the United States, including Florida, with the capability to model both, sewer collection systems and stormwater drainage systems.** On the stormwater side, this software provides the advantages of having two-dimensional capabilities for spatially distributed hydraulic models, resulting in more accurate evaluations of water interaction between surface water (overland flow) and underground systems and natural channels; allowing for precise mapping and representation of flooding extents. XP-SWMM may also be used for the modeling and analysis of stormwater BMPs for water

quality (in addition to water quantity), such as erosion control and street sweeping, for the evaluation of non-point sources and pollutant tracking in watersheds.

The fresh perspective that the Black & Veatch Team brings to the Utilities Department will allow us to recommend nationally-proven state-of-the-art solutions and share our lessons learned to address the City's stormwater needs, while representing the best interests of the City of Key West.

In addition, the stormwater engineering techniques utilized by Black & Veatch focus on natural solutions for land and water resource protection under a green approach. This approach incorporates sustainable projects to meet specific environmental goals and, where applicable, to meet regulatory requirements. Black & Veatch has a strong understanding of implementation of cost effective natural design projects to accomplish these goals.

Green solutions, such as the porous pavement pictured above, can provide benefits to multiple stakeholder groups.

Floodplain Management

A detrimental effect of increasing urbanization is the increase in flooding problems during severe storm events. Black & Veatch is a leader in Floodplain Mapping and Management. **Our extensive work with FEMA throughout the nation on flood insurance studies and in the ongoing Map Modernization Program is evidence that DHS/FEMA has put their trust in Black & Veatch.** Our work has included complex data review, intensive hydrologic/hydraulic analysis to determine floodplain changes over time, mapping floodplains to allow governments, property owners, and others to mitigate specific flooding risks, and communicating updated information to the public and affected agencies. Black & Veatch also has a number of certified flood plain managers on staff to meet our clients' needs in floodplain management.

Black & Veatch certified floodplain managers will be fully available to the Utilities Department in support of its stormwater projects.

Best Management Practices (BMP) Design/Implementation/Retrofits

Black & Veatch provides geomorphic field services including measurements of channel geometry (channel width, bank heights, sinuosity, entrenchment), identification of stream bed and stream materials (soil gradation, rock sizes and types), identification of stream bank vegetative conditions (riparian buffer, wetlands), identification of bank failure conditions (bank cutting, mass wasting), and sediment transport (sediment deposition/scour). We also provide habitat and biological field services including identifying channel habitat conditions (pool and riffle structure), habitat complexity, substrate conditions, presence of invertebrates, amphibians, fish and other wildlife.

A BMP locator GIS procedure developed by Black & Veatch aims to find suitable locations for implementation of structural stormwater BMPs. The procedure also allows the selection and design of appropriate BMPs based on location within the watershed, contributing drainage area and site conditions. The procedure takes into account topography, land use/cover (including impervious surfaces mapping), zoning and land ownership to find suitable locations. It then characterizes the individual potential locations in terms of

Black & Veatch was selected by the Water Environment Research Foundation (WERF) to conduct a study of stormwater BMPs and sustainable urban drainage systems (SUDS), which can be used by the Utilities Department to manage the adverse impacts of stormwater.

their contributing drainage area size and land use/cover characteristics, soil types, local topography, and proximity and connectivity to streams. These characteristics allow estimating stormwater discharges, respective contaminant loads and their impact to the receiving water bodies.

Recharge/Injection Wells/Hydrogeology

Thorough understanding of the local hydrogeologic conditions is critical to ensure proper design and installation of a new well and pipeline or rehabilitation of an existing well and pipeline. The evaluation of groundwater conditions may include groundwater flow modeling, geological exploration, aquifer testing, aquifer yield estimates, and well troubleshooting, among others.

Members of our team have been involved with all types of well construction design from 2-inch monitor wells to Class I injection wells in South Florida since the 1980s. Our team has practical experience with the local geology, aquifer systems, confining units, aquifer parameters (such as hydraulic conductivity, recharge, leakance and storage), water quality and production zones.

A summary of Black & Veatch's overall representative water resources, stormwater and hydrogeology experience throughout Florida is provided in the table below.

Black & Veatch Representative Water Resources, Stormwater and Hydrogeology Experience

CLIENT	Groundwater	Surface Water	Stormwater	Erosion Control	Water Quality Treatment	Water Quality Evaluation	Water Quality Monitoring	Structures	Reuse Assessment	Source Water Assessment	Pollutant Loadings	GIS	BMP Evaluations	Wetlands	Dams/Levees	Pumping Stations	Reservoirs/Channels/Flowways	Wells	Inspection	Rehabilitation	Permitting	Modeling
Key West			■													■						■
Florida Power & Light	■	■	■	■											■		■	■			■	■
EPA Region 4 – Palm Beach Co.	■				■	■	■					■				■		■	■		■	
Florida Keys Aqueduct Authority	■															■		■			■	
City of Fort Myers									■					■							■	
City of North Port	■	■			■	■		■	■	■		■				■		■			■	■
Manatee County	■	■	■	■	■	■		■	■			■			■		■		■	■	■	■
Heartland Water Alliance	■	■	■			■		■	■	■		■		■			■	■			■	■
City of Lakeland		■			■	■	■		■	■	■					■		■	■		■	■
South Florida WMD	■	■	■	■	■	■	■	■			■	■	■	■	■	■	■	■	■	■	■	■
City of Ocala	■	■	■	■	■			■	■		■	■	■		■	■	■	■	■		■	■
Orlando Utilities Commission	■	■	■	■	■	■	■	■	■	■	■				■	■	■	■	■		■	■
Orange County Utilities				■												■	■	■	■			
Tampa Bay Water	■	■			■	■	■	■	■	■		■				■	■	■			■	■
Hillsborough County	■	■		■		■			■		■					■	■	■				
City of St. Petersburg					■	■			■							■		■		■	■	
Tampa Electric Company	■	■	■	■	■	■	■		■	■	■						■	■			■	■
Sarasota County	■	■			■				■							■						
St. Johns River WMD	■	■	■		■	■		■	■	■		■			■	■	■				■	■
Reliant Energy Osceola			■	■	■	■	■		■												■	
Jacksonville Electric Authority	■	■	■	■	■	■	■		■	■	■		■	■		■	■	■	■	■	■	■
Nestle' Water of America	■	■				■	■			■								■			■	■
Florida Power Corp.	■			■	■	■	■	■		■								■			■	■
KUA	■	■	■	■	■	■	■		■	■	■							■	■		■	■
Escambia County Utilities									■		■			■		■	■					

Utility Rate Studies and Bond Engineering Reports

Utility Rate Studies

Black & Veatch specializes in providing financial and management consulting services to public and investor-owned utilities, government agencies, and industry. **In the past five years, Black & Veatch has performed over 1,000 financial and management studies and services.** Utility consulting services are provided in three key areas: Strategic Financial Planning/Modeling, Information Management, and Institutional Planning/Management. Revenue requirements, Capital Improvements Program review, rate studies, innovative user charges, financial modeling, bond feasibility, asset/resource management, management information systems strategic services, performance measurement/evaluation, utility strengthening services, and customer community relations are just some of the services Black & Veatch has performed to support utility objectives.

We conduct cost-of-service based rate studies in a systematic manner that will provide the Utilities Department with a reasonable and legally defensible mechanism to recover system costs.

Utility rates are the primary source of revenues for supporting a utility's operations and capital funding needs. As such, a periodic review and evaluation of rates is necessary to ensure that the revenue requirements are sufficiently recovered, and that cost recovery is done in an equitable manner. In general, a cost-of-service based rate study provides a methodology to distribute costs by functional component to customer classes using class units of service. With this information, the proportional responsibility of each customer class for the total system costs can be specifically identified. The resulting allocation of costs to the various customer classes can then be compared to the revenues generated under existing and proposed rates from each class in order to determine if cross-class subsidizations are occurring and the ability of the utility to meet class cost obligations due to factors such as drought mandates and triggers.

An additional rate study aspect is the development of projected operating results for future planning periods. The customer and level of service characteristics identified in the study can be used to forecast future revenues from user rates. **Applying the revenue forecasts against projected revenue requirements provides a mechanism to estimate the timing and magnitude of future rate adjustment and the associated impacts on customers.** In general, projected operating results will provide utility management with a strategic planning tool to help guide budgeting and capital funding decisions.

Bond Engineering Reports

Black & Veatch is often engaged in the role of Bond Engineer of Record. As such, specific utility bond indenture and rate covenants constitute the manner in which the Bond Engineer serves the utility. **Black & Veatch has served in this capacity by developing materials, such as annual reports, to be included in official statements for the sale of utility revenue bonds, including the normally required engineer's certificate of financial feasibility and/or an independent engineer's report.** In addition, bond indenture provisions frequently require that the independent engineer's report include an inspection

of utility plant facilities to determine the adequacy of facilities to meet future customer requirements and whether or not the properties have been maintained in good repair and sound operating condition.

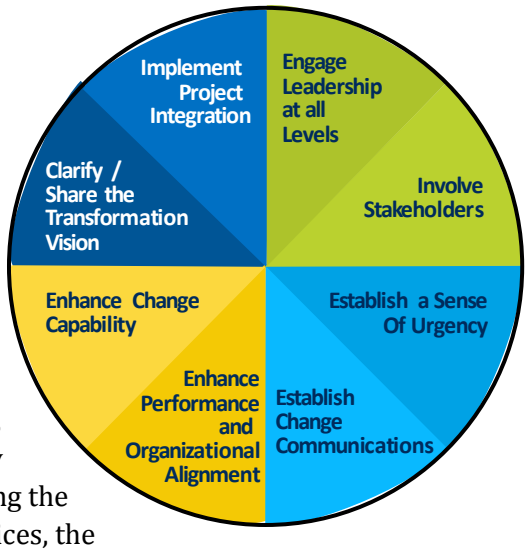
Black & Veatch has completed such physical reviews in conjunction with engineering certifications. In addition to the physical inspections, the engineering reports also generally include an assessment of the proposed capital improvement program, an evaluation of the adequacy of the overall organization and staff to carry out the utility's mission, a review of the compliance with regulatory requirements, and a financial projection showing compliance with bond indenture requirements.

Over the past five years, Black & Veatch has been involved in assisting clients with the issuance of over $10 billion in utility revenue bonds; we'll bring our lessons learned to the City of Key West.

Black & Veatch personnel have coordinated entire official statements from text writing, demographic and economic summaries, and inclusion of auditor and bond attorney statements, to the printing of the official statement and bid forms and the mailing of this material to prospective bidders.

Organizational Optimization and Change Management

Black and Veatch's approach focuses on understanding how the existing processes, new processes, and organizational changes will impact an organization. Creating detailed maintenance plans, management policies, and operating procedures to communicate potential change all begins with developing a thorough understanding of the basic functional operations of the utility system.



The desired benefits of improved services, improved compliance, and productivity enhancements are not automatically realized by just implementing and documenting the processes and configuring the system accordingly. To maintain and improve upon existing services, the support and understanding of desired improvement by personnel at all levels within the organization is important to the successful implementation of any program.

Black & Veatch has been successful at completing and implementing specific organizational optimization programs and recommendations by researching, managing and communicating early through all stages of the development cycle.

Stormwater Utility Evaluations

Stormwater utilities evaluations are not widely used in Florida, but their implementation is growing. Since 1991, Black & Veatch has conducted a bi-annual national inventory and assessment of stormwater utilities covering more than 20 states in the U.S.

Black & Veatch has supported government (finance, public works, manager, commission, etc.) in structuring the governance necessary to establish and evaluate Stormwater Enterprise Funds.

Black & Veatch is leading the industry in the area of stormwater utilities. Our benchmarking capabilities can be used to successfully evaluate the City's stormwater utility.

When it comes to the development and evaluation of stormwater utilities, Black & Veatch is not only a Thought Leader, but also leads the practice of assessing the potential for entities to develop and implement such a program. Specific stormwater utility benchmarks are housed and tracked by Black & Veatch.

Sustainability/Energy Efficiency

The Black & Veatch Team understands that as part of its sustainability efforts, the City of Key West has developed a **Sustainability Advisory Board.** The Mission and duties of the Sustainability Advisory Board are listed below:

The Energy Efficiency Masterplan for the City of Hollywood, FL master plan resulted in the development of a capital improvement plan (CIP) for the implementation of 19 energy conservation measures (ECMs) for combined annual energy savings of 7 GWh or 15% of the Utility's total energy use. The CIP also results in a net present value of $4.7 million over the life of the improvements.

- To promote the sustainability of the community as a whole, considering public and private actors and their effects on ecological, economic and community systems.
- Advise and assist the City Commission in efforts to make City operations more sustainable.
- Assist in the development of plans and policies to enhance the sustainability of the City as a whole.
- Educate and support other Key West organizations to become more sustainable.
- Educate and engage the public in efforts to make the community of Key West, including residents, businesses and institutions, more sustainable.

This is a great forward-thinking approach by the City to climate change adaptation and we look forward to partner with the City on these efforts.

As part of our **Ready, Responsive and Reliable** philosophy, we are working to develop innovative solutions to address climate change, water scarcity, green space design and sustainability planning. Many clients today are seeking triple-bottom-line solutions that meet social, economic and environmental goals; are sustainable; and are politically and commercially viable. Examples of the types of sustainability services our team can offer the City of Key West are listed in below.

- Energy Audits of Existing Facilities
- Sustainability Assessments
- Supply/Demand Gap Analysis
- Best Management Practices (BMPs)
- Triple Bottom Line Analysis
- Green Infrastructure Network Analysis
- Social Impact Analysis
- Environmental Impact Assessment
- Low Impact Development (LID)
- Urban Water Resource Planning
- Economic Assessments and Trade-Off Analysis
- Energy/Carbon/Water Footprint Assessments
- Risk Management and Statistical Analysis
- Total Water Management Planning

Based on Black & Veatch's 2016 Strategic Directions in the U.S. Water Utility Industry Report, which evaluates the input of water and wastewater utilities worldwide, the most significant sustainability issue facing utilities is energy efficiency, as energy can account for as much as 30 percent of utility budgets. Black & Veatch has worked with many clients around the world to implement energy management strategies that address demand and supply side issues. We have designed facility enhancements incorporating advanced technologies that can help reduce energy demand, either directly or indirectly due to adjacent benefits.

Black & Veatch routinely considers energy conservation for all new and retrofit projects. Black & Veatch helps clients develop implementable plans that minimize energy requirements consistent with economic constraints through the use of an on-site energy audit. Black & Veatch audit teams consist of two or more experienced professionals with mechanical and electrical backgrounds, as well as knowledge of system operations and building systems technologies. The audit team will work with the client, learning about site-specific facility operations and reviewing the electrical load profile of the facility. The audit team will conduct a walk-through of the facilities, collecting data and observing existing plant conditions. **From experience, we find that using the experience of senior level professionals provides flexibility to the audit and enhances the resulting report by providing additional energy savings recommendations.**

Operations and Maintenance - Startup and Commissioning

Black & Veatch has a dedicated Operations Technology Group (OTG) that provides numerous services after the construction to support the client's O&M Team to efficiently and effectively operate the treatment process. These services include:

- Execution of full startup & commissioning scope procedures, turnover packages and startup schedule development
- Startup & commissioning execution program
- Warranty administration
- Spare parts assessment
- Outage planning, scheduling and coordination
- Operations & maintenance training, development and delivery
- Hands-on operator training– on the job and classroom, including CEU credit approval
- E-learning program development
- Pre-commissioning, commissioning & startup procedures
- Operations and maintenance startup procedures
- Plant chemistry evaluation and troubleshooting
- Plant O&M services
- Preparation of facility specific operations manuals
- Authoring Standard Operating Procedures (SOPs)

Our Operations professionals will be the interface between the engineering/design team and the City's Operations staff, providing tangible solutions to facilities facing operational difficulties, equipment failure, process upsets, staffing issues or noncompliance concerns.

- Process control optimization and troubleshooting
- Onsite technical support for the completion of facility startup and commissioning
- Facility assessments and reports, including facility operations, staffing and maintenance.
- Benchmarking review
- Laboratory design and equipment specification development and onsite laboratory reviews
- Troubleshooting of wastewater and biosolids processes

Safety is integrated into all Commissioning & Startup work practices, and is guided through a comprehensive set of core safety and health processes that combine technical field procedures with ongoing training programs.

OTG is an interface between the engineering/design team and the City's O&M team, providing tangible solutions to facilities facing operational difficulties, equipment failure, process upsets, staffing issues or noncompliance concerns. Our goal is to complete our project tasks on time, within budget and exceed the expectations of our project managers and clients.

STRUCTURAL ENGINEERING SERVICES QUALIFICATIONS

Specific to Structural Engineering Services, the Black & Veatch Team will provide the Utilities Department with comprehensive services that may include planning, existing facilities rehabilitation evaluations, full-scale engineering, design, permitting, bidding and construction phase services for improved facilities that may require detailed Structural Engineering, Architecture/**LEED Buildings**, and **Historic Building Preservation.**

Structural

For Tampa Bay Water, Black & Veatch designed a new building to house an aqua ammonia storage/feed system and process water booster pump station. The building was constructed of split-face concrete block with a decorative standing seam metal roof.

Black & Veatch has a large base of structural engineers and technicians focused on delivering customized structural packages to meet the City's specific standards. This group provides erection drawings, fabrication drawings, bills of material, point-to-point bolt lists and field assembly lists. The section can also supply computer numerical control (CNC) information to fabricators and helps support projects, which are detailing steel out-of-house by advising the steel designers on alternate or more economical connection design.

Black & Veatch has provided structural services on projects for Florida clients such as the City of Lakeland, Orlando Utilities Commission, City of St. Petersburg, Tampa Bay Water, Orange County, Manatee County, New Smyrna Beach Utilities Commission, City of Ocala, JEA, Sarasota County, Emerald Coast Utility Authority, and Hillsborough County. These services have included structural analysis, support and foundation design, site plans, permitting, and construction support.

Foundation Design

Black & Veatch has more than 175 professionals specializing in underground infrastructure with emphases in geology, geotechnical engineering, mining, civil engineering, structural engineering, tunneling and geo-engineering expertise. Our professionals are the class of the industry, many holding advanced degrees, with experience executing a wide range of water projects around the world.

Pump station designed by Black & Veatch to resemble a private residence.

Architectural/LEED Buildings

Architectural

Black & Veatch provides architectural services to clients in a variety of technical roles. The professionals in our architectural group hold professional registrations in 29 states. They are well versed in all methods of project delivery, are a company leader in the execution of projects utilizing Black & Veatch's global workforce and regularly interface between various Black & Veatch divisions. **Our Architectural Department technicians are proficient in 3D modeling and BIM+ implementation, which improve project design efficiency.**

Our rendering views of a facility from any angle, inside or out, will illustrate the City exactly how a space or building will appear when construction is complete, helping solve design issues before construction.

Black & Veatch provides full modeling and rendering services. Using computer software to create an electronic model of the design, Black & Veatch creates an exact model of a facility including rooms, spaces, stairs and furniture, as well as pipes, pumps, equipment, and ductwork. In addition, the model can be expanded to include the surrounding site showing roads, vehicles, landscaping and other existing buildings or facilities. Walkthroughs of the interior spaces take the viewer through the space on a predetermined path, while flyovers take the viewer over and around the exterior of a facility or site.

Black & Veatch offers a wide variety of architectural services including:

- Conceptual Design
- Code Analysis
- Programming
- Laboratory Design & Layout
- Color, Finish & Furniture Selection
- Sustainable Design & LEED Certification Assistance
- 3D Modeling
- Intelligent Design
- Marketing and Presentation
- Computer Renderings & Animations
- Artist Renderings
- Construction Documents (Plans & Specs)
- Construction Phase Services
- Permitting Assistance
- BIM+ Execution

Additional Information on our LEED qualifications is located in the "Other Certifications" section of this document.

A current project for the City of Durham, NC includes a goal of LEED Silver certification for a new Administration Building at the Brown WTP.

LEED

Black & Veatch has 29 professionals on staff who are LEED™ accredited (Leadership in Energy and Environmental Design). LEED is the nationally accepted benchmark for the design, construction and operation of high-performance green buildings and facilities. Design and construction industry practices incorporating sustainable design and construction principles embodied in the LEED™ rating system have become an integral part of our clients design solutions.

These individuals are fully qualified, through both formal training and practical work experience, to integrate all aspects of sustainable design into the performance of City projects. Throughout our history, we have incorporated the concepts of environmentally friendly design and cost-effective reuse of waste materials into our projects for both the US Government and private clients. These strategies were pursued as much for economic benefit as for minimizing environmental impact. For example, lowering construction costs through the reuse of waste material, or optimizing heating/cooling effectiveness through careful ventilation and window design affords both environmental and economic benefits.

"Black & Veatch Engineering Firm was absolutely outstanding, especially working in such a tight, historically sensitive area, an area of early irreplaceable homes. Archeologists were utilized when needed and the onsite inspector allowed no detail to escape his watchful eye. In addition, neighbors were regularly informed, consulted, and advised."

Excerpt from an unsolicited letter from a homeowner in downtown Charleston, SC.

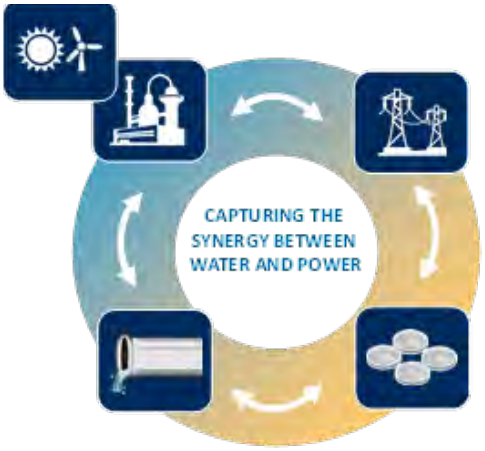
In recent years, however, as the nation's understanding of the potential environmental impacts of both large and small construction projects has grown, Black & Veatch has worked even harder to integrate the latest technology and insightful thinking into our designs. These design strategies, grouped under the umbrella of Sustainable Design, or alternatively, Green Building, are not pursued as simply eco-friendly add-ons to an existing project. They are considered at the beginning of the design process and are seamlessly and almost invisibly integrated into the final product.

Historic Building Preservation

Black & Veatch has provided architectural, engineering and planning services for the preservation and maintenance of historic assets throughout the United States. Specialized knowledge is necessary for the design and construction of these special facilities; **Black & Veatch is able to offer our structural and historic building preservation knowledge to the City of Key West to ensure cost-effective structural evaluations, design, accurate cost estimates and viable construction schedules.**

Black & Veatch has provided asset assessments for the National Park Service (NPS), including historical preservation, at well over 100 of the 390 parks in the NPS portfolio. We led a $130M multi-phase tunnel replacement program under historic downtown Charleston, South Carolina that involved an extensive cultural resource impact study to ensure minimization of the impact to historic structures. **We have been entrusted by our clients to**

provide services such as security upgrades and risk assessments at the Mount Rushmore National Memorial and the St. Louis Arch. We also designed a communication data network for the Yosemite National Park; Black & Veatch understands the cultural significance and design limitations that must be considered when working at historical sites.



We will use our water-energy nexus experience and expertise to develop energy-efficient designs and that will support the City's goal of becoming a Resilient Utility.

Sustainability – Envision™-ing a Triple Bottom Line Approach

Black & Veatch is a charter member of the **Envision™** Sustainable Infrastructure Rating System, with over 50 certified Envision™ Sustainability professionals to date. **The Black & Veatch Team will use Envision™ to evaluate and rate the triple bottom line (TBL) benefits provided by a compliance project as they relate to community, environmental and economic impacts of the project.**

The effective use of the **Envision™** rating system, in addition to a robust business case evaluation for screened options, **will provide the City of Key West with a reliable, repeatable process to validate the life-cycle design decision made on a compliance project.**

Construction

Black & Veatch has the experienced staff to support the City with every aspect of implementing any project undertaken as part of the Capital Improvement Program. This includes bidding phase services, construction phase services, and facility commissioning and training.

Bidding Phase Services – Black & Veatch routinely administers the advertising of construction contracts, and will help receive competitive bids from qualified contractors and timely award of the contract. Through identifying prospective contractors and suppliers, conducting a pre-bid conference, responding to questions from bidders, preparing addenda, and reviewing bids and qualifications, we will help maximize the competition on projects, and recommend the bid providing the best value for the City.

We will help maximize the competition on projects and recommend the bid that provides the best value for the City.

Construction Phase Services – Black & Veatch is prepared to provide a full array of field and office related construction services to ensure that the construction work is being carried out in accordance with the Contract. We have considerable experience in fostering a team approach to completing the construction work. Black & Veatch has qualified individuals experienced in observing the construction work. We are committed to providing a full-time or part-time resident project representative, as well as specialty disciplines inspections, in support of the construction effort, and will provide the best professional from our team for the work.

ProjectWise V8i (SELECTseries 3)

Control of all project documentation, from routine correspondence, memoranda, meeting minutes and the like up to complex 3D model files and complex

drawings created by relating many CAD sheets or models requires a comprehensive document management system. **Black & Veatch utilizes Bentley ProjectWise V8i, which provides complete and robust functionality to manage and control documents in a centralized database-driven platform, resulting in increased project efficiencies.**

Microsoft Office SharePoint Server is used in conjunction with ProjectWise to provide a web-based content management and maximize collaboration between project Team members. SharePoint facilitates the aggregation and integration of content from a number of sources in a web portal setting. User access to this portal can be secured as necessary and appropriate, but can also be expanded to the public and agencies outside the project team. Each individual's access and the content exposed to them can be tailored to their role and responsibility.

Through the use of a custom-designed database and our technology tools, we have a proven, efficient means to track the processing of shop drawings for the project. In addition, on several recent projects, RFIs have been managed on-line between Black & Veatch and the Contractor through the use of our technology tools, providing all parties with current information to manage the project more efficiently. Following construction, we will prepare record drawings to document changes that occurred during construction.

Our technology tools provide an efficient means to track the processing of shop drawings, reducing the shop drawings review time for a project.

Construction Management – Black & Veatch offers the City the combination of proven construction management experience and technical excellence to drive its projects through construction to successful startup and operation. Black & Veatch provides integrated engineering, procurement, and construction management services worldwide to optimize the efficiency of project delivery.

Black & Veatch is ranked by Engineering News-Record as 16th in the Top 50 Program Management Firms and 13th in the Top 100 Construction Management-for-Fee firms.

As Construction Managers, Black & Veatch will manage projects giving in a way that will give the Utilities Department control of project safety, cost, schedule and quality through the use of Black & Veatch's integrated construction management system and experienced engineers and construction personnel. We will manage the City's construction projects as though they were our own, with the same project management philosophy and systems Black & Veatch uses for our own "at risk" construction projects.

GENERAL ENGINEERING SERVICES CONTRACTS EXPERIENCE

Black & Veatch has provided engineering services under continuing services contracts in Florida for over 50 years and we have performed more than a thousand individual Task Orders under these contracts. Black & Veatch has extensive experience successfully serving clients under GES contracts. Assignments for these clients have been diverse, including planning, permitting, design, bidding, construction, and various studies relating to water, wastewater, reclaimed water, and stormwater systems. We have provided civil, environmental, mechanical, electrical, geotechnical, structural and hydrogeological engineering, as well as architectural and financial services. The table below lists a sampling of the assignments we have completed under recent continuing services contracts. We have been selected by the majority of these clients for multiple contract terms, which demonstrate our ability to deliver responsive service and complete successful projects.

Black & Veatch Representative GES Services Contract Projects

CLIENT, LOCATION	PROJECTS	
City of Key West (2012 – Ongoing)	▪ Wastewater and Stormwater Systems Operations and Maintenance Contract RFQ Development	▪ Dennis Street Stormwater Pump Station Project
Miami-Dade Water and Sewer Department (2009 – 2015)	▪ Comprehensive Rate, Cost of Service and Facility Inspections ▪ Preparation of an Assessment of the Department's SCADA (Supervisory Control and Data Acquisition) Systems ▪ Development of Preliminary Multi-Year Renewal & Replacement Plan for the Department's CIP ▪ Sewer Service to Commercial Properties in Miami-Dade County ▪ Cross-Connection Control Program Manual	▪ Review and Audit of Meter Installation and Maintenance, and Meter Reading and Billing Practices ▪ Evaluation of Alternative Project Delivery Options for the Proposed High Level Disinfection (HLD)/Deep Injection Project at the Central District WWTP (CDWWTP) ▪ Water Infrastructure Improvements to Non-Residential Zoned Properties in the Miami-Dade Service Area
City of Hollywood (2014 – Ongoing)	▪ Energy Efficiency Master Plan for the City's Water, Wastewater and Reuse Systems ▪ Solids Dewatering System SCADA Improvements ▪ Chlorine Disinfection System SCADA Improvements	▪ Effluent Outfall Pump Station SCDA Improvements ▪ High Purity Oxygen System SCADA Improvements
Broward County Water and Wastewater Services (2013 – Ongoing)	▪ Clarifiers Rehabilitation - Design and Construction Management Services Project ▪ Transformer Replacement - Design and Construction Management Services Project ▪ Shorting Contactors Replacement for Ocean Outfall Panel - Design and Construction Management Services Project ▪ Master Pump Stations 452, 458, and 460 Wetwell Refurbishment Design and CMS	▪ Mechanical Aerator Shrouds Repairs in Basins A & B - Construction Management Services Project ▪ Pump #3 Concrete Pad Repair and Wetwell Assessment Construction Management Services Project ▪ Incident Control Center HVAC System Rehabilitation Design
South Florida Water Management District (2014 – Ongoing)	▪ IT Shelter Replacement Construction Management Services ▪ Golden Gate Weir Canal Structure Design	▪ S-127 Command and Control Center North Shore Path Automation Construction Management Services

CLIENT, LOCATION	PROJECTS	
Palm Beach County Water Utilities Department (2014 – 2017)	▪ Developed an Strategic Sustainability Plan (SSP) ▪ Smart Wellfield Dashboard Concept Development	▪ Asset Management Framework Assessment ▪ Maximo Reconfiguration ▪ Smart Integrated Infrastructure and GIS Technology Assessment
City of Deerfield Beach (2013 – 2017)	▪ Evaluation of Existing Corrosion Control Program	
Florida Keys Aqueduct Authority (2006 – 2016)	▪ Water System Audit and Non-Revenue Water Analysis ▪ 36-Water Transmission Main Evaluation and Replacement ▪ Value Engineering – WWTP Process Evaluation Study	▪ Pipeline Condition Evaluation Study ▪ Key Largo Transmission Main Replacement – Design and Construction Phase Services ▪ Cudjoe Key AWRF - Construction Phase Services
Marco Island, Florida (2008-Ongoing)	▪ Water System Hydraulic Modeling (InfoWater)	
Cape Coral, Florida (2008-Ongoing)	▪ Funding Alternatives Study ▪ Caloosahatchee River Reclaimed Water Crossing Study	
City of St. Petersburg, Florida (1986-Ongoing)	▪ WRF Disinfection Alternatives Study ▪ Southwest Water Reclamation Facility Master Plan ▪ Oberly Water Distribution Pumping Station Improvements ▪ Washington Terrace Water Pumping Station Improvements ▪ Gulf-to-Bay Pumping Station Transformer Replacement ▪ Water System Vulnerability Assessment ▪ Water System Emergency Operations Plan	▪ Cosme WTP Electrical System Rehabilitation ▪ Oberly Pumping Station Construction Services ▪ Oberly Pumping Station 150 kVA Transformer Replacement ▪ Cosme WTP Electrical Switchgear Rehabilitation ▪ Water Supply Electrical Transformer Evaluation ▪ Sludge Handling and Disposal Study ▪ Reclaimed Water System Expansion
Tampa Bay Water Clearwater, Florida (1998-Ongoing)	▪ Hundreds of assignments as System Engineer ▪ Surface Water Treatment Plant Expansion ▪ Seawater Desalination Facility – Remediation Efforts ▪ Energy Management Program Roadmap and Energy Efficiency Services ▪ Hydraulic Modeling	▪ Facility Design, Permitting, and Construction Services ▪ Value Engineering Studies ▪ Technical Reviews ▪ Bond Report ▪ Water Supply and water Quality Planning ▪ Water Quality Modeling ▪ Pipelines
Lakeland, Florida (2001-Ongoing)	▪ West Lakeland Wasteload Reduction Facility Design ▪ C. Wayne Combee Water Treatment Plant and Well field Treatability Study ▪ C. Wayne Combee WTP and Wellfield ▪ C. Wayne Combee Chlorine Process Safety Manual ▪ English Oaks Booster Station and Pipeline	▪ Drane Field Road Booster Pumping Station ▪ Air Park Lift Station ▪ WWTP Operator Training ▪ English Oaks Site Suitability Study ▪ Glendale Water Reclamation Facility Operations Assistance ▪ Wastewater Pretreatment Plant Pilot Plant Study and Design

SAFETY

At Black & Veatch we take a structured, comprehensive approach that requires safe working methods and strong safety consciousness by all of our employees, supervisors, contractors, and suppliers. Our overarching goal is to "Think, Plan and Act for Zero Injuries Today."

We are well-versed in the safety requirements of complex projects, and work closely with our clients to comply with any specific safety considerations. Our teams implement best practices and lessons learned from safety and health programs, policies, and procedures worldwide, and work closely with governmental agencies as well as industry groups to enhance safety and health efforts across industries.

The City of Key West will benefit from Black & Veatch's attention to safety in the work scopes, schedules, and construction documents prepared.

SUBCONSULTANT COMPANY PROFILES

Anticipating the types of services and projects to be facilitated through contracts resulting from this RFQ, we intend to use local, south Florida small business subconsultants for the following services as noted, as they may be applicable to the specific City project:

- Civil Engineering and Transportation: **CRJ & Associates, Inc.**
- Surveying: **Avirom & Associates, Inc.**
- Geotechnical: **Nutting Engineers, Inc.**

Black & Veatch makes every effort to ensure effective utilization of local businesses in the delivery of engineering services for the City of Key West, including alignment with goals and objectives for diversity in the provision of professional services through the utilization of Minority and/or Women-owned Business Enterprises and Micro-Local Business Enterprises. The above identification of potential team members is not intended to be limited; in the course of development of detailed requirements for assignments resulting from this RFQ, we will ensure due diligence in identifying opportunities and candidates for such opportunities for providing professional services with the goal of ensuring inclusion reflective of the City's diverse business community.

The remainder of this section provides information on the history and qualifications of the subconsultant firms. Please refer to the 'Staff Qualifications and Experience' section of this document for expanded role definitions and resumes of key subconsultant personnel.

CRJ & Associates, Inc.

CRJ & Associates, Inc. Consulting Engineers and Planners

Anticipated Service Offerings: Civil Engineering, Transportation, FDOT and LAP

CRJ & Associates (CRJ) is a minority-owned multi-disciplined engineering consulting firm with expertise in engineering design, aviation planning, construction management, environmental engineering, and site inspection services. **CRJ is qualified by the FDOT, Florida Department of Management Services and other government agencies to perform roadway design, construction inspection and management, aviation planning, and related civil engineering services.**

CRJ's staff of highly qualified engineers, planners and technicians offers over 65 years of combined civil engineering experience and is available to provide comprehensive services to the City in support of the Black & Veatch Team. CRJ has offices throughout South and West Central Florida and is a certified disadvantaged business enterprise (DBE) with the FDOT, Florida Department of Management Services, and major Florida airports in Jacksonville, Miami, Orlando, Tampa and West Palm Beach.

Avirom & Associates, Inc.

Anticipated Service Offering: Surveying

Avirom & Associates, Inc. was founded in 1981, as a company dedicated solely to the land surveying profession, with the philosophy to provide the highest quality product in a timely and professional manner. The firm continues to achieve this through customer service, extensive knowledge of the land surveying profession and our commitment to excellence.

Avirom has a staff of 22 employees with an average length of service of 17 years. The dedication of our employees is a testament to Avirom & Associates' integrity and values as both an employer and a professional land surveying firm. We are one of the few firms in the State of Florida that has six Registered Land Surveyors. Our 31-year history represents our firm's strength and stability in the South Florida area. **Avirom maintains a dedicated service office in the City of Key West.**

Avirom has considerable experience in creating legal descriptions, having submitted in excess of 200 submerged land leases throughout the State of Florida for the FDEP and the USACE. The firm is knowledgeable and experienced with the formats and requirements of these agencies for submittals.

Avirom has worked with many engineering and architectural firms throughout South Florida, and strives to provide a seamless product for design. Our surveys have been the base maps for numerous designs, not only for engineering and architecture, but also landscape architectural and urban design firms.

Nutting Engineers of Florida

Anticipated Service Offering: Geotechnical/Materials Testing

Nutting Engineers of Florida, Inc. (Nutting), has been one of the premier **geotechnical** engineering firms in South Florida since its inception in 1967. Prior to this date, work was performed under the name Nutting Engineers, Inc., which originated in 1956 preceded by H.C. Nutting in Miami from 1932 until 1956. Nutting's comprehensive range of services include geotechnical exploration and engineering including soil borings and groundwater well drilling, monitoring of pile installation, groundwork modification and chemical grouting procedures, quality control/ quality assurance testing of construction materials, structural inspections (special/threshold) of structures.

Past Work Experience

Black & Veatch has been serving clients in Florida for over 50 years, providing engineering services from our six Florida offices with a total staff of more than 115 professionals. The firm has more than 120 professional engineers registered in the State of Florida. These engineers are backed by Black & Veatch's 100 years of experience providing services in a wide range of disciplines including civil, structural, water, wastewater, reclaimed water, architectural, geotechnical, environmental, electrical, and mechanical engineering, as well as construction, operations, science, economics, planning and finance.

Since its establishment, Black & Veatch has completed more than 32,000 projects for more than 6,400 different clients worldwide, including the City of Key West. Over 80 percent of Black & Veatch's work comes from repeat clients. These repeat engagements demonstrate that we are a firm that listens to, and works with our clients to produce a final product that meets or exceeds expectations.

Survey respondents to Environmental Technology Magazine rated Black & Veatch as their #1 choice among providers of consulting services, based on such evaluation criteria as "*demonstrated experience in related projects*", "*qualifications of key personnel*" and "*price and ability to meet time constraints*".

Our experience includes all aspects of Utility Engineering, Environmental Engineering and Civil Engineering services including:

- Wastewater and Stormwater Collection Systems
- Wastewater and Stormwater Master Planning and Modeling
- Environmental Studies
- Hydrogeologic Studies and Modeling
- Hazardous Waste Remediation
- Regulatory Review and Permitting
- Solid Waste Management
- Construction Inspection and Management
- Financial Planning
- Sustainability and Energy Efficiency Planning

The broad range of experience and specialized expertise of our Team members ensures the Utilities Department of our ability to produce quality work.

PAST FIVE YEARS OF SPECIFIC RELEVANT EXPERIENCE

The following project descriptions provide details of representative projects completed within the past five years and the involvement by our proposed team members. Client and contractor references are provided for each project.

We encourage you to contact our references to gain a better understanding of our expertise and capabilities to complete projects on time, within budget, and to the complete satisfaction of the client.

Relevant Project Elements
- Stormwater Modeling
- Electrical Generator
- Structural
- Surveying
- Geotechnical
- Pump Sizing

Scope of Services Provided
- Data Evaluation
- Site Selection
- Preliminary Design
- Survey
- Geotechnical Investigation

Key Team Members
- Rafael Frias, Project Director
- Isabel Botero, Project Manager
- Tammy Martin, Engineering Manager
- Richard Hayslett, Hydrologic Modeling

Period of Service
August 2016 – October 2017

Cost
Design Fee $114,034
Construction.....TBD

Client Reference
John Paul Castro
Utilities Director
City of Key West
Jcastro@cityofkeywest-fl.gov
(305) 809-3902

Contractor Reference
Not Applicable

Dennis Street Stormwater Improvements Pump Station

Key West, Florida

Black & Veatch was asked by the City to provide preliminary design services for a new 18.5 cubic feet per second (cfs) stormwater pump station including a diversion structure and vortex separator upstream of the pump station and backup power for the pumping units. It is anticipated that the new pump station will be located near the intersection of Dennis Street and Venetia Street.

The initial design concept included the addition of a new drainage well for subsurface discharge downstream of the pump station. However, during design development Black & Veatch was asked to evaluate using an existing outfall by the Key West High School as the discharge location in lieu of the new drainage well. Since the existing outfall is part of a stormwater gravity system discharging to salt ponds located to the south of the Key West High School, hydrologic modeling was added to the project to ensure there would be no negative impacts to the existing system.

Additional hydrologic modeling was added when the City asked Black & Veatch to evaluate smaller design storms with a higher frequency as the basis for potentially reducing the required pump station capacity. Previous computer modeling efforts using ICPR conducted for the City indicated that a pump station capacity of 18.5 cubic feet per second (cfs) would be able to handle the peak flow of the 100-year 72-hour storm with acceptable levels of flooding so Black & Veatch is evaluating the 5-year, 24-hour storm, the 25-year, 24-hour storm and the 25-year, 72-hour storm.

Development of RFQ – Wastewater Treatment Plant, Sewer and Stormwater Collection Systems Operations & Maintenance

Key West, Florida

Black & Veatch has been providing General Engineering Services for the City of Key West since November 2012 for civil engineering, utilities engineering and environmental engineering projects. This Task Order included the development a Request for Qualifications to select a Contractor for the Operations and Maintenance (O&M) of the City's Wastewater Treatment Plant, Sewer and Stormwater Collection Systems.

The project included the following tasks:

- Review of scope of services to be included in the new O&M agreement, as well as the existing O&M agreement, City's front end contract documents, current facility permitting data, operational costs, operational information and requirements and easements.
- Black & Veatch coordinated and conducted site visits with the potential bidders to the wastewater treatment plant, lift stations and drainage wells. High-security access logistics was coordinated by Black & Veatch staff.
- Development of submittal requirements, statement of qualification. Technical approach requirements, project schedule selection and scoring criteria for the bidders.
- Evaluation of three submittals for compliance and responsiveness.
- Financial review of data provided by proponents to assess capability to provide the required O&M services.

Relevant Project Elements
- Wastewater
- Stormwater
- Collection Systems

Scope of Services Provided
- Technical Assistance
- Evaluation Criteria Package Document Development
- Operations Vendor Evaluation

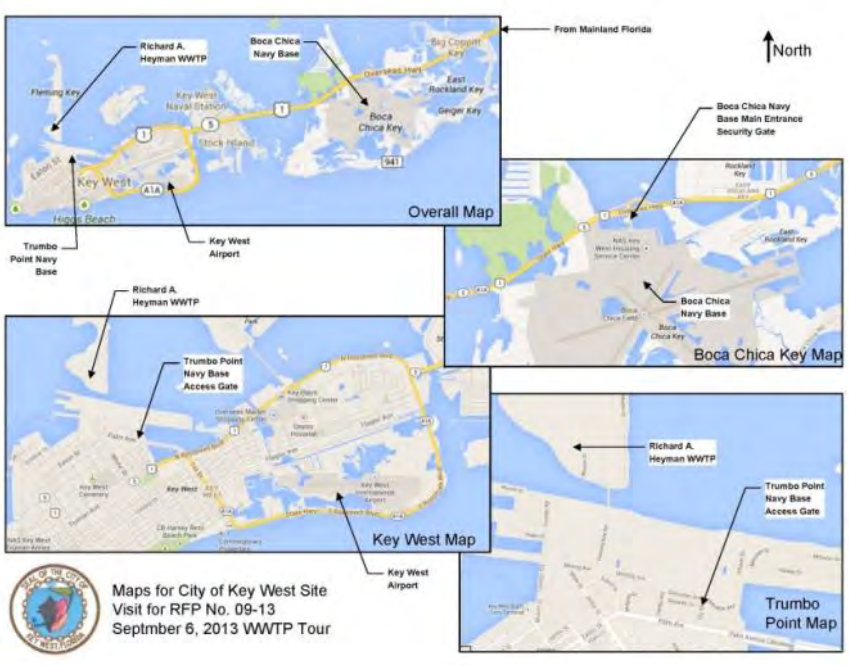
Key Team Members
- Brent Reuss, Managing Director
- Rafael Frias, Project Director
- Isabel Botero, Project Manager
- Ron Parker, Operations Specialist

Period of Service
March 2013 – December 2013

Cost
Design Fee $64,235
Construction - Not applicable

Client Reference
John Paul Castro
Utilities Director
City of Key West
Jcastro@cityofkeywest-fl.gov
(305) 809-3902

Contractor Reference
Not Applicable



Project Elements
- Wastewater Treatment Plant General Engineering Services
- Rehabilitation Projects
- Detailed Design and Specifications
- Construction Phase Services

Key Team Members
- Rafael Frias, Project Director
- Isabel Botero, Project Manager
- Tammy Martin, Engineering Manager
- Kevin Cevallos, Design Engineer
- Michele Roth, Building Mechanical
- Brad Vanlandingham, Structural
- Lucas Botero, Wastewater Process

Period of Service
2013 - Ongoing

Cost
Design Fee.....$590,000
Construction Cost...$949,191

Client Reference
Oscar Asgar
Project Manager
2555 W. Copans Road
Pompano Beach, FL 33069
(954) 831-0983
OAsgar@Broward.org

Contractor References
Alen Construction Group
Ruben Alen
(954) 252-1372
Ruben@alenconstructiongroup.com
Turning Water Industries
Rawson "Rusty" Goff
(813) 426-5171
rmgoff@turningwaterindustries.com

BCWWS Clarifier – Clarifier A3 Rehabilitation Construction Project

Continuing Engineering Services for Wastewater Treatment and Disposal System – Multiple Projects

Broward County Water and Wastewater Services, Pompano Beach, Florida

Black & Veatch has been providing Continuing Engineering Services for the Broward County Water and Wastewater Engineering Division since December 2013. The project's scope of services includes the following: providing full range of professional engineering services necessary and related to pre-design, design, permitting, negotiations with municipality/environmental regulatory agencies, bid/award, preparing construction documents, and providing engineering services during construction of the Projects.

The following sections describe the miscellaneous projects that have been completed or are being performed at the WWTP and the master pump stations.

Structural Engineering Services

Under the incidentals work authorization, Black & Veatch structural engineers have been providing inspections of existing concrete structures at the NRWWTP. Areas inspected included a wastewater clarifier and sludge holding areas.

Pump Stations No. 452, 458 and 460 Wetwell Refurbish - Design and Construction Management Services Project

This project includes detailed design to perform structural modification at three existing master wastewater pump stations for improved and safer operations and maintenance access. This project is currently under construction and Black & Vaeth is performing submittal reviews, RFI's, contract administration and construction inspections.

Incident Control Center HVAC Replacement - Design Project

This project includes detailed design to replace the HVAC system at the Incident Control Center located in the NRWWTP. The SCADA room is being re-purposed to house vital IT servers, and the heat loads have increased significantly form the original design.

Clarifier A3 Rehabilitation - Design and Construction Management Services Project

This project includes technical support and construction phase services for the replacement of the existing clarifier A-3 equipment that was supplied by EIMCO PMD in 1973. The team will perform an engineering technical review of the proposal for replacement/installation options from Ovivo USA, LLC (Ovivo). Black & Veatch performed construction management services of the clarifier A-3 rehabilitation work.

Transformer Replacement - Design and Construction Management Services Project

This project included design and construction phase services to replace immediately the existing Transformer No. 1 at the NRWWTP. The existing transformer was leaking and needed to be replaced as soon as possible. The project was later amended to add the replacement of a second transformer under the construction contract.

BCWWS Outfall Pump Station – Shorting Contactor Replacement Construction Project

Shorting Contactors Replacement for Ocean Outfall Panel - Design and Construction Management Services Project

The Shorting Contactors Project included detailed design and construction phase services to reinstall shorting contactors and interface them with the new PLC-based Ocean Pump Station Control Panel in order to overcome the inherent limitations to the Liquid Rheostat controller that prevented the motor from running full speed when engaged.

BCWWS Aeration Basin – Mechanical Aerator Shrouds Replacement Construction Project

Mechanical Aerator Shrouds Repairs in Basins A & B - Construction Management Services Project

This project includes the replacement of three aerator shrouds in aeration basins shroud Basin B2, sandblasting and painting of aerator shrouds in four other aeration basins, and miscellaneous steel and concrete repairs. The activities included review of engineering design, shop drawings and construction management services as the repairs were carried out.

Pump #3 Concrete Pad Repair and Wetwell Assessment Construction Management Services Project

Black & Veatch assisted with structural engineering design and construction management for the proper repair of the concrete pad of ocean outfall pump #3.

BCWWS Electrical Load Center no. 1 – Transformer replacement Construction Project

Project Elements
- Hydraulic Modeling
- CIP Planning
- Funding and financing review

Key Team Members
- Rafael Frias, Project Manager
- Isabel Botero, Engineering Manager
- Steven Cook, Modeling Lead
- Cristin Holmgren, GIS
- Alejandro Toro, Financial Evaluation
- Mike Etem, Estimator

Period of Service
2013 to 2013

Cost
Engineering Fee $178,662
Estimated Construction $273,600,000

Client Reference
Daniel Edwards
Master Planning Section Chief
Miami-Dade Water and Sewer Department
3071 SW 38 Avenue
Miami, Florida 33146
786.552.8354
DJEDW01@miamidade.gov

Contractor Reference
Not Applicable

Sewer Service to Commercial Properties in Miami-Dade County

Miami-Dade Water and Sewer Department, Florida

As a result of a resolution from Board of County Commissioners of Miami-Dade County directing to provide a plan to extend sewer service to commercial and industrial areas, Black & Veatch assisted the Miami-Dade Water & Sewer Department (MDWASD) with the development of a Master Plan for the expansion of sewer infrastructure to commercial properties within the MDWASD service area, currently not connected to the system. The Master Plan used MDWASD's sewer collection system models in InfoWorks, integrated with GIS, to connect non-sewered commercial properties and including planning level cost estimates and projects implementation schedules.

Miami-Dade County's Consent Decree (Case 1:12-cv-24400-FAM) has a provision for the County to implement a Supplemental Environmental Project that includes the installation of approximately 7,660 linear feet of gravity sewers to connect sewer service to 74 business entities, located along the Miami-Dade Green Technology Corridor, that are currently using septic tanks. The Sewer Service Master Plan includes the sewer connections proposed for the Miami-Dade Green Technology Corridor and extends sewer service to an additional 2, 194 commercial properties, covering an area 1,189 acres within Miami-Dade County. The additional sewer system is comprised of:

- 48 miles of gravity sewers
- 15 miles of force mains
- 45 new pumps stations
- 3 upgraded and rehabilitated pump stations

This Master Plan project supports the needs of the Consent Decree and the Supplemental Environmental Project by significantly benefiting more than the 74 business entities identified by the supplemental project.

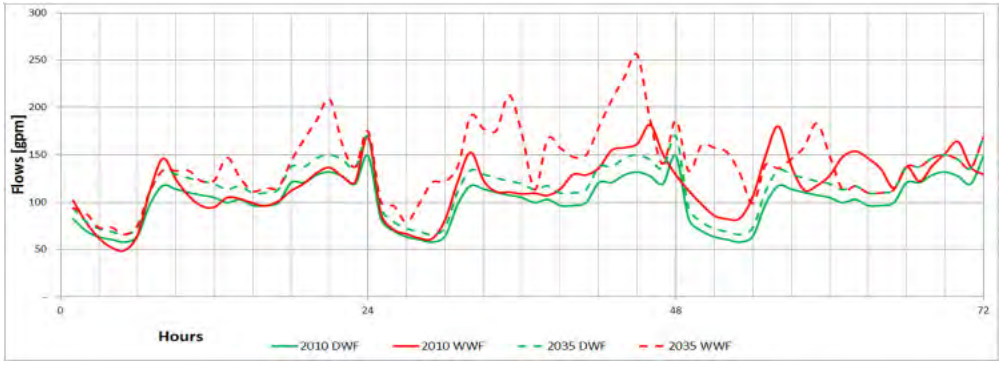
Planning services performed by Black & Veatch included:

- **Sewer System Extensions** – Gravity sewer routes were developed from the commercial sites to the nearest point of connection in the existing collection system. All gravity sewers slopes were assumed to be installed at minimum slope for the appropriate diameter. Where sewer extensions were not feasible, new pump stations were developed to pump into the manifolded force main network.
- **Pump Station Basin Capacity Assessments** – Sub-models for the specific pump station basins where the commercial sites would discharge into were extracted from MDWASD's existing collection system model for further hydraulic modeling and sewer capacity assessments. The capacity of the new sewer system was evaluated for existing and 2035 demand conditions.

System capacity constraints were identified for locations where the surcharged peak hydraulic grade line (HGL) was within 4 feet of grade elevation. At these locations, capacity improvements were recommended to alleviate the surcharging conditions along the flow path from the commercial sites to the pump station.

Baseline model develop for existing conditions.

- **Pump Station and Force Main Capacity Analysis** – Once the new commercial properties were connected to the sewer system, pump station capacity assessments were performed to determine if the additional incremental load from the added properties caused a capacity issue at the downstream pump station, or any of the pump stations manifolded to the downstream pump station, resulting in sewer overflows. Improvements were recommended to the pump stations and force mains to address the capacity concerns such that the pump station's firm capacity was not exceeded. The Ocean Outfall Legislation Compliance Plan model was used for these evaluations.
- **Capital Improvements Planning Level Cost** – Developed a capital improvement planning level cost based on the improvements identified. The opinion of probable construction cost included the construction, engineering, and land acquisition costs for each proposed improvement.
- Financial Evaluation – Identified the pros and cons of different financing mechanisms, which could include traditional bond funding, Department cash funding, establishment of special assessment districts, developer contributions, and the collection of established connection fees, for funding the recommended improvements.
- **Project Schedules Development** – Worked with MDWASD staff to provide a general prioritization of projects and develop cost loaded schedules in Primavera, utilizing the planning level costs, to provide MDWASD with annual expenditure projections for inclusion in the CIP.



Wet Weather Flow Patterns were developed to allocate to the pump station basins

Scope of Services
- Detailed Design
- Geotechnical and Survey
- Construction Phase Services
- Hydraulic Modeling

Project Elements
- Civil, Structural, Electrical, Mechanical, and I&C Design
- Deep foundation design
- Hydraulic structures
- Land acquisition

Key Team Members
- Rafael Frias, Client Director
- Isabel Botero, Project Manager
- Tammy Martin, Engineering Manager
- Richard Hayslett, Hydrologic Modeling
- Robert Rampetsreiter, Structural
- Larry Brouillette, I&C
- Michele Roth, Mechanical
- Mike Hetzel, Electrical
- Mike Etem, Estimator

Period of Service
2014 - Ongoing

Cost
Golden Gate
Design Fee $797,516
Engineer's Construction Estimate..... $4,000,000
IT Shelters Replacement
CMS Fee $299,647
Construction $2,336,300
S-127 Command and Control Center North Shore Path Automation
CMS Fee $447,896
Construction $6,186,691

Client Reference
Mike Bogie
Project Manager
3301 Gun Club Rd.
West Palm Beach, FL 33406
(561) 262-6856
mbogie@sfwmd.gov
Anthony Rosato
Project Manager
3301 Gun Club Rd.
West Palm Beach, FL 33406
(561) 682-2604
arosato@sfwmd.gov

Contractor References
Florida Design Contractors
Steve Flannery
(561) 248-0691
Steve@Floridadesigncontractors.com
Revere
Joey Didona
(813) 376-0034
JDidona@reverecontrol.com

Operation, Maintenance, Repair, Replacement and Rehabilitation Contract – Multiple Projects

South Florida Water Management District, Collier, Henry, Glades, Martin, Okeechobee and Palm Beach Counties, FL

The South Florida Water Management District is a regional governmental agency that manages the water resources in the southern half of the state, covering 16 counties from Orlando to the Florida Keys and serving a population of 8.1 million residents. It is the oldest and largest of the state's five water management districts. The agency is responsible for flood control, water supply, water quality and natural systems. The District operates approximately 2,100 miles of canals and 2,000 miles of levees/berms; more than 600 water control structures and 625 project culverts; 71 pump stations; and about 3,500 hydrological monitoring stations at more than 625 flow sites.

Golden Gate Weir Replacement, Collier County, Florida | 2015-Ongoing

This project included the development of ready-to-advertise bid documents to construct a replacement structure for the current Golden Gate 4 Weir Structure (GG4) that is in the same location. The Golden Gate Canal Weir No. 4 (GG4) is a SFWMD water control structure located in Collier County, within the Big Cypress Basin. In October 2015, the SFWMD gave Black & Veatch the notice to proceed to perform the detailed design services for the GG4 structure. The project includes complete replacement of the existing GG4 structure which is a central fixed-crest weir with two manually operated, bottom opening sluice gates. The current weir length is 100 feet with a design capability of 980 cubic feet per second. It is a 26-year old structure in generally good condition but its operation is limited to manually operating the relatively modest-size side gates based on defined headwater stage or as part of pre-storm draw down effort. As a result, the existing structure has limited draw-down and storage capacity coupled with operational boundaries associated with retaining and storing fresh water during certain times of the year.

The new GG4 structure will include a 55-foot wide fixed crest weir next to two 10' x 8' slide gates. The gates will be fully automated and there will be an on-site control building with liquid propane generator to ensure that the gates remain operable at all times. By increasing the gate size, and effectively the outflow, it will be possible to maintain the structure within the upper ranges of approved criteria with no corresponding loss of flood protection. The project included survey of the canal and surrounding properties as well as geotechnical field work, analysis, and foundation recommendations. The site/civil design included improvements to nearly 500 feet of canal and new gravel access roads on each side of the canal. The structural design included the gate structure and weir, crane staging area, pedestrian bridge, access platforms for in-canal instrumentation, and the foundation for a precast control building. The project also included electrical and instrumentation design work.

IT Shelter Replacement Construction Project, Palm Beach and Hendry Counties, Florida | 2015-2016

This project included assisting in the construction management of four (4) IT shelters in Palm Beach and Hendry County for the South Florida Water Management District with associated electrical improvements including new backup power, HVAC, electrical conduit routing and site work. Black & Veatch provided a resident project representative (RPR) during the entire construction period to perform construction observation staff, management of submittals/RFIs/cost proposals/change orders and quality control testing. Black & Veatch also executed all the soils and concrete field quality assurance testing.

S-127 Command and Control Center North Shore Path Automation, Glades, Martin, and Okeechobee Counties, Florida | 2015-2017

This project included construction administration and inspection services for the S-127 Command and Control Center (C&CC), North Shore Path Automation Project (Project). This Project will create a network of remotely monitored and remotely operated pump stations with central control from the S-127 C&CC. The C&CC will serve the S-127, S-129, S-131, S-133, and S-135 Pump Stations and will be configured to serve an additional five (5) pump stations including S-382, C-44 Reservoir, the future S-191 and two (2) additional pump stations.

Black & Veatch provided a resident project representative (RPR) during the entire construction period to perform construction observation staff, management of submittals/RFIs/cost proposals/change orders and quality control testing. Black & Veatch also coordinated the specialty microwave towers inspections.

S-127 Command and Control Center North Shore Path Automation Construction Project – Microwave Tower

IT Shelter Replacement Construction – New SCADA Building

Scope of Services
- Basin retrofits
- Fine Bubble diffusers
- Blower upgrades
- Screening
- Grit removal
- Odor control

Project Elements
- Wastewater Treatment Plant Engineering Services
- Rehabilitation Projects
- Detailed Design and Specifications
- Bidding and Construction Phase Services

Key Team Members
- Kenny Blanton, Project Manager
- Andy Westfall, Technical Advisor
- Bryan Martin, Design Engineer
- Richard Taylor, Electrical
- Brad Vanlandingham, Structural
- Larry Brouillette, I&C

Period of Service
1998 - 2016

Cost
Design Fee.....$7 M
Construction Cost....$60 M

Client Reference
Charles Crosby
Manager – WW Treatment Reuse
5420 118th Street
Jacksonville, Florida 32244
(904) 665-8352
croscf@jea.com

Contractor Reference

Southwest Water Reclamation Facility Headworks Improvements and Studies

Jacksonville, FL

JEA's Southwest Water Reclamation Facility (WRF) is a 14-mgd wastewater treatment facility. Black & Veatch has provided planning, study, design, bidding, permitting, and construction phase services for a series of improvements at the Southwest WRF since 1998, with the latest effort completed in 2016.

BNR Upgrade. BNR improvements included conversion of two existing treatment trains and the addition new treatment train to allow biological reduction of nitrogen. The treatment process has been successful at meeting the design goal for effluent total nitrogen < 7 mg/L. Each treatment train consisted of anoxic zones, submersible mixers, mixed liquor recycle, and fine bubble membrane diffusers. The design includes several features to help minimize operation and maintenance costs. A PLC-based monitoring and control system was provided to automate many tasks that were performed manually. The aeration process is automated to minimize blower usage by monitoring and automatically adjusting blower output. Dissolved oxygen in the aeration basins can be programmed as the control variable for adjusting the blower output.

Process Optimization and Operations Advisement Services. Black & Veatch assisted Southwest WRF operations staff with process optimization and process operational training. The outcome of this effort provided recommendations for improving plant performance, process control, troubleshooting, and increased operations staff confidence level in operational decision-making.

UV Retrofit and Effluent Pump Station. Improvements included converting the existing chlorine contact basin to a UV disinfection and re-aeration basin with an effluent pump station to allow effluent pumping discharge when required by water levels in the river. As part of the UV effort, Black & Veatch provided an Alternative Disinfection Study that led to the selection of UV as the disinfection system of choice.

Headworks: Bar Screens, Grit Removal and Odor Control. Black & Veatch designed the replacement of influent screening, new grit removal system and the biofilter odor control. The old static screen was replaced with two automatic, continuous travel bar screens. The old grit removal basin was replaced with vortex-type Fluidyne systems to allow more efficient grit removal as well as cleaning and dewatering of the collected material. Concrete channels were modified to install the new equipment. Biofilters reduced the level of odor omissions from the facility.

Disinfection Facilities Upgrade

Lakeland, Florida

Black & Veatch provided engineering services to support major upgrades to disinfection facilities at the City of Lakeland's T.B. Williams WTP, Glendale WWTP, and Northside WWTP. These facilities were feeding chlorine gas stored in one-ton containers. Because of the hazards associated with gaseous chlorine and the potential danger to the public, local residents, and plant operators, the City desired to evaluate disinfection alternatives to replace or improve the existing chlorine gas system.

The disinfection alternatives evaluation included the following options:

- Continued use of chlorine gas building hardening and chlorine gas scrubbers
- bulk delivery of 12.5 % sodium hypochlorite
- on-site generation of sodium hypochlorite, 0.8% strength solution
- on-site generation of sodium hypochlorite, 12.5% strength solution

The evaluation compared capital costs, debt service, operating costs, building size requirements, O&M requirements, and safety. The evaluation also recommended upgrades for the purpose of enhancing safety and security features as well as replace aging equipment and perform overall repair and rehabilitation.

Based on the disinfection alternatives evaluation, the City opted to remain with gaseous chlorine because the long term annual costs were less; however from a risk management perspective the recommended alternative would have been to switch to bulk sodium hypochlorite. To mitigate safety concerns and hazards associated with gaseous chlorine, the chlorine storage building was enclosed and provided with dedicated chlorine gas scrubbers and additional safety features were added.

Project improvements implemented included the following.

- Structural and architectural improvements to enclose existing open-sided structures
- Addition of dry chemical chlorine gas scrubbers
- Addition of building HVAC systems
- Replacement of aging chlorinators, piping and controls and chlorine scales
- Addition of access control and surveillance systems
- Electrical and control systems upgrade, including new lighting
- Aesthetic and other miscellaneous improvements throughout the plant site.

Upgrades were implemented while facilities remained in service, requiring careful construction staging and enhanced safety features to protect existing chlorine facilities during construction.

Scope of Services
- Disinfection alternatives evaluation
- Master planning study

Project Elements
- Preliminary design
- Detailed design
- Permitting
- Cost estimating
- Bidding services
- Construction phase services
- Resident project representation

Key Team Members
- Andy Westfall, Project Manager
- Brad Vanlandingham, Engineering Manager
- Bryan Martin, Project Engineer
- Larry Brouillette, I&C
- Richard Taylor, Electrical

Period of Service
2010 - 2013

Cost
Design Fee..... $378,000
Const. Estimate ... $2,632,000
Const. Actual $2,700,000

Client Reference
David Bayhan
Utilities Director
401 Sixth Street SW
Winter Haven, FL 33880
(863) 291-5853
dbayhan@mywinterhaven.com

Contractor Reference
Wharton-Smith
Todd O'Donnell
(813) 288-0068

Scope of Services
- Disinfection Upgrades
- Disinfection Alternatives Evaluation
- Wastewater treatment capacity expansion
- Digester cover replacement

Project Elements
- Preliminary design
- Detailed design
- Permitting
- Cost estimating
- Bidding services
- Construction phase services

Key Team Members
- Kenny Blanton, Project Manager
- Brad Vanlandingham, Engineering Manager
- Bryan Martin, Project Engineer
- Larry Brouillette, I&C
- Violet Vanatta, CADD Technician

Period of Service
2009 – Ongoing

Cost
Design Fee ..... $8 M
Construction Est..... $63 M

Client Reference
Mr. Alan Gay
(407) 254-9724
Orange County Utilities
Engineering Division
9150 Curry Ford Road
Orlando, Florida 32825

Contractor Reference
MWH Constructors
Billy Logan
(813) 505-8074

South WRF Phase V Improvements

Orange County Utilities, Florida

Black & Veatch has provided a variety of engineering services for the Orange County Utilities South Water Reclamation Facility (SWRF) since 2009. The most signficant of the improvements is the Phase V Improvements project that will expand the wastewater treatment capacity from 43 MGD to 56 MGD AADF.

Improvements include construction of new facilities combined with major and minor modifications to existing facilities consisting of new influent screening, new vortex grit removal systems, convert abandoned rectangular clarifiers to step-feed biological nutrient removal (BNR) basin, new secondary clarifier, effluent filtration facilities, expanded disinfection facilities, effluent pumping & storage, sludge thickening and dewatering upgrades, electrical & control improvements, odor control, and general site improvements. Black & Veatch completed design for the SWRF Phase V Improvements in 2015 and the project is currently under construction with anticipated completion March 2019. The following are additional elements of the design services.

Disinfection Alternatives Evaluation. Provided an evaluation to determine the best option for effluent disinfection storage and feed. Options considered in the evaluation included the following.

- Maintain current use of chlorine gas
- Bulk sodium hypochlorite
- Onsite generation of 1% strength sodium hypochlorite
- Onsite generation of 12.5% strength sodium hypochlorite
- Ferrate – bench scale testing for Ferrate Treatability Test

The evaluation compared capital costs, operating costs, operation and maintenance requirements and relative safety of each alternative. Due to cost concerns, the County initially deferred changing from chlorine gas but ultimately decided to use bulk sodium hypochlorite.

Sidestream Treatment Analysis. Developed concepts for sidestream treatment to determine the best approach to handling dewatering return streams high in ammonia and phosphorus.

Digester Cover Replacement. Provided design and construction phase services for replacement of four anaerobic digester covers and upgrades for use of the digester gas in the hot water boilers.

Centrifuge Dewatering. Provide design services for new dewatering equipment in the sludge handling building to improve the efficiency of the dewatering system by installing two new high-solids centrifuges to replace existing belt filter presses.

Westport Stormwater Management Study

Kansas City, Missouri

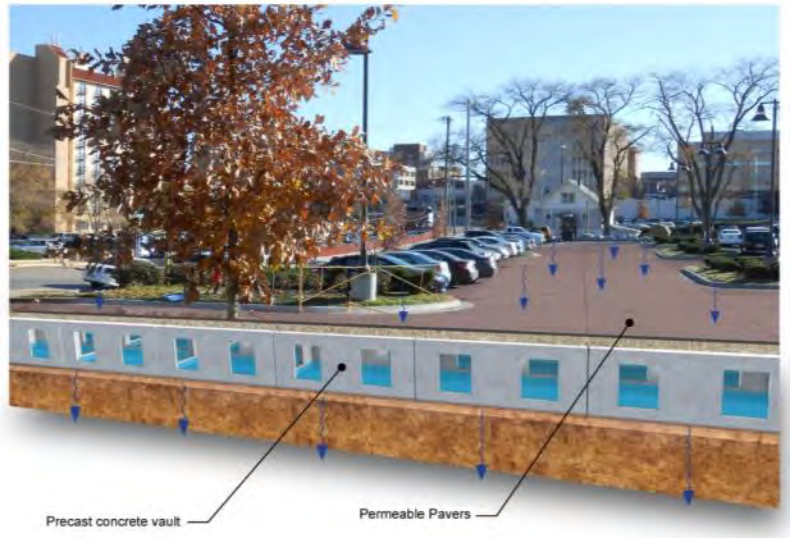
Stormwater Planning in a Dense Urban Environment

The Westport District of downtown Kansas City Missouri is a culturally and historically important area. The area's vibrant shops, cafes, and nightlife are all too often impacted by rainfall events, with extensive street flooding for events as common as the 2-year storm. The Water Services Department of Kansas City, Missouri trusted Black & Veatch to investigate potential solutions for this high-profile area.

The Westport District is serviced by a combined sewer system, which introduces an additional layer of complexity when analyzing solutions. In addition, many of the sewers in this area are placed extremely deep, further impacting solution costs. Finally, the area is completely built out with some single family residential in the far upstream portions of the watershed and dense urban environments throughout the vast majority of the area.

Several alternatives have been developed as a part of this project. Technologies investigated to help control the stormwater include underground detention vaults for both separated and combined systems. Limited separation was investigated to allow for separated basins. In addition, a heavy emphasis was placed on green infrastructure where possible, including an extensive look at green street applications including pervious pavers. The project also investigated the possibility of some increased conveyance in conjunction with detention.

The analysis of the area includes one dimensional and 2D modeling, extensive public involvement, and in-depth costing analysis. Furthermore, with limited capital improvement funds available for stormwater improvements, the team is working with local businesses and community groups to find alternative methods of funding the construction of the improvements.



Scope of Services
- Stormwater Modeling

Project Elements
- Master Planning
- Hydrologic Modeling
- Alternative Funding

Key Team Members
Jeff Henson, Client Director/Project Manager
Andrew Smith, Engineer Manager
Laura Adams, Hydraulic Modeler
Rich Hayslett, Senior Technical Reviewer

Period of Service
2014 - 2016

Cost
Design Fee
$265,000

Client Reference
Bob Davis
Kansas City Water Services Department
(816) 513-0573
robert.davis@kcmo.org

Contractor Reference
Not Applicable

Scope of Services
- Sustainable Water Management

Project Elements
- Master Planning
- Hydrologic Modeling

Key Team Members
Robert Osborn

Period of Service
2014

Client Reference
Brad Moore
(334) 616-7888

Contractor Reference
Not Applicable

Sustainable Water Management Plan, FL and GA

Apalachicola Chattahoochee Flint Stakeholders (ACFS)

A multi-state non-profit organization, called the ACF Stakeholders, retained Black & Veatch in partnership with the Georgia Water Resources Institute to help the organization develop a Sustainable Water Management Plan. Recognizing that litigation and politics have been unable to resolve the issues, a grassroots effort was launched by the individuals and groups most impacted by the situation – the stakeholders themselves. The ACF Stakeholders brought together a diverse group representing all water use sectors, organized by geographical basin caucuses. The ACF Stakeholders was incorporated as a 501(c)3 nonprofit in late 2009, and has since begun working together to achieve a common goal: the development of a sustainable water management plan. The ACFS's mission is to recommend equitable water-sharing solutions among stakeholders that balance economic, ecological and social values while ensuring sustainability for current and future generations.

The main objectives of the development of this sustainable water management plan are:

- To provide detailed metrics on the water quantity and quality needs of the basin stakeholders. These will be used to test different options and explore trade-offs.
- To offer one or more viable alternative water management scenarios, presented in a visually informative way that can be readily understood by non-technical stakeholders. Hydrologic modeling will serve as the basis for the ACFS's Shared Vision Planning.
- To reach consensus on a forward-thinking basin-wide solution for ACF water management.

Work on the Sustainable Water Management Plan is ongoing. Currently ACFS is evaluating iterative modeling against the indicators/metrics identified as a part of this project. The complete of the plan is expected this spring of 2014.

This stakeholder driven planning process is a unique example of empowerment of impacted water users seeking to develop consensus around water management priorities.

Nature's Way Pump Station Upgrade

Hillsborough County, Florida

Black & Veatch provided services to Hillsborough County to implement upgrades to the Nature's Way Pumping Master Pumping Station. Under this project, the capacity of the facility was increased from 5,600 to 9,200 gpm. Improvements were made throughout the facility, including:

- Refurbish two existing wetwells and add a third new wetwell (12' diameter, 25' deep)
- Install six (six) new submersible pumps two (2) in each of the three wetwells
- Replace existing pump electrical equipment, providing VFDs for all pumps
- HVAC improvements in electrical building to accommodate the increased heat loading associated with the new drives
- Provide new instrumentation and control equipment including flow metering and level sensing devices, and a new PLC to control the entire station
- Site work and miscellaneous improvements to support these improvements, including the implementation of a new stormwater management system.

The pumping station was successfully upgraded in a staged approach whereby the facility remained operational throughout the construction. Neighborhood sensitivities include odor, noise, and aesthetics.

Services provided by Black & Veatch included preliminary and detailed design, permitting, bidding services, and construction administration and construction observation.

The facilities were designed to be neighborhood friendly taking into consideration odor, noise, and aesthetics.

Project Elements
- Wastewater Pumping
- Emergency Backup Power
- Odor Control Accommodations
- Refurbishment of Existing Facilities
- Expansion of Capacity
- Comprehensive Electrical Upgrade
- New Stormwater management System
- Complex Construction Staging

Key Personnel Involved in Design Phase Services
Andy Westfall, Project Manager
Richard Taylor, Electrical
Larry Brouillette, I&C
Steven King, Staff Engineer

Period of Service
2008 - 2012

Cost
Engineering Fee
$480,000

Construction Cost Estimate
$2,795,000

Project Award Amount
$2,555,813

Client Reference
Hillsborough County
Jim Adair
925 E. Twiggs Street
Tampa, FL 33602
813.272.5977 Ext 43490

Contractor Reference
RTD Construction
Alex Zettel
5344 9th Street
Zephyrhills, FL 33542

Wastewater and Stormwater Strategic and Management Consulting Services

City of Key West, Florida

Project Elements
- Rate Sufficiency Analysis
- Cost of Service
- Stakeholder Engagement
- Procurement/Financing Support

Key Personnel Involved in Design Phase Services
Robert Chambers

Period of Service
2015

Cost
Engineering Fee
$86,000

Construction Cost Estimate
Not Applicable

Project Award Amount
Not Applicable

Client Reference
City of Key West
John Paul Castro
3132 Flagler Avenue
Key West FL 33040
305.809.3902

Contractor Reference
Not Applicable

Black & Veatch has been providing financial and management consulting services to the City of Key West as the City endeavors to complete over $50 million in wastewater construction projects required to enhance environmental protection in the Florida Keys. The City, which operates a wastewater collection and treatment system as well as a stormwater system, is responding to requirements of the Florida Department of Environmental Protection, as well as the desires of the citizenry.

Recently, Black & Veatch supported the City in performing a complete cost and strategic assessment related to services provided to existing and future anticipated utility services to customers. In addition, the City is implementing a construction program that has been supported by the acquisition of Federal and State grant funds and revenues of the wastewater and stormwater enterprise funds. Black & Veatch has supported the City in providing feasibility assessments too determine the feasibility of the program.

Rate Study for Water and Wastewater Service

North Miami, Florida

Project Elements
- Cost of Service Analysis
- Rate Design Analysis
- Operations Management
- Stakeholder Engagement

Key Personnel
Robert Chambers

Period of Service
20014-2016

Cost
Engineering Fee
$128,000

Construction Cost
Not Applicable

Client Reference
City of North Miami
Aleem Ghany
776 NE 125 Street
North Miami, FL 33161
(305) 895-9830

Contractor Reference
Not Applicable

Black & Veatch completed on-going water and sewer financial services engagements which include the implementation of conservation based rates in order to be compliant with the South Florida Water Management District water use permit mandates. The studies required a comprehensive analysis of the cost and rates associated with providing water and sewer service to the City's customers.

In addition, Black & Veatch has performed high level operations management review to assist the City in determining certain efficiencies that can be gained through systematically aligning the organization's capabilities and skill sets with the services required by customers.

As a part of completing these studies, Black & Veatch facilitated numerous workshops and public open house meeting to listen and retain feedback from existing customers and stakeholders as the utility implemented the financial and operations management objectives.

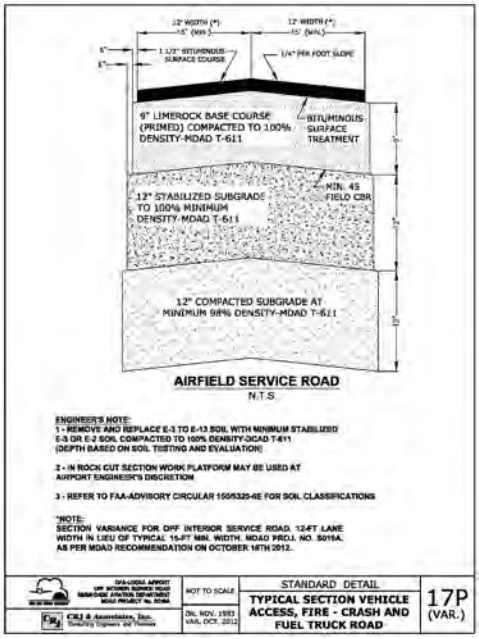
Finally, Black & Veatch led the effort in procuring over $25.0 million in State Revolving Fund monies for the City to complete planned utility system upgrades to the water and wastewater utility system.

Opa-Locka Executive Airport Interior Service Road Miami-Dade Aviation Department Project No. S019A

Miami, Florida

CRJ & Associates, Inc. was awarded this through the Miami-Dade EDP Program based on our qualifications for Aviation Design, with specific abilities in working within an Airport's AOA. In short, MDAD's senior staff entrusted that CRJ had the technical cap abilities for devising a 2.8 Mile two-lane roadway that shall serve as the future interior service road for new Fixed Based Operators (FBO) and their fueling needs at OPF. CRJ was the prime consultant on this effort and the firm has completed the Construction Bid Documents as well as all warranted permitting. CRJ performed as MDAD's Construction Inspection Services (CIS) consultant for the 400-calendar day effort. **CRJ receiving MDAD's consultant evaluation for scoring of 4.0, "superior performance."** CRJ's overview of our efforts for the Project:

- Modifications to roadway typical section width to best facilitate future FBO development.
- Alignment modifications for compliancy to Taxiway Object Free Area of 129.5ft offset (Category IV Aircraft)
- SFWMD ERP Permitting under the new FDEP format effective October 1st 2013
- The total construction site area was 20.4 Acres that includes the roadway and environmental challenges.
- Specific attention and BMPs were provided to the SWPPP due to the proximity of the Opa-Locka Canal.
- Coordination of the design between: CRJ, MDAD and Miami-Dade WASD to avoid a 54-inch Force Main.
- AOA Fence relocation issues that warranted specific phasing conditions.
- Meeting "worst case" criterion for encountered contaminated soils
- Burrow Owl Nesting concerns.
- No RFI's generated on the Project – CRJ took extreme pride in this aspect of the Project.



Project Elements
- Construction Phase Services
- Road Resurfacing

Key Personnel Involved in Construction Phase Services
Marc Fermanian (CRJ), Project Manager
Debbi Powers (CRJ), Senior CAD Designer

Period of Service
2012 - 2016

Cost
Engineering Fee
$316,000

Construction Cost Estimate
$2.7 M

Actual Construction Cost
$2,724,220

Client Reference
Alejandro Montalvo
Project Manager
Miami-Dade Aviation Dept. (MDAD)
Bldg. 3030 2nd Floor
Miami Int'l Airport
Miami, Florida 33159
(305) 876-7513
amontalvo@miami-airport.com

Contractor Reference
General Asphalt Co. Inc.
Robert Lopez
robert@generalasphalt.com

Project Elements
- Detail Design Services
- Construction Inspection Services

Key Personnel Involved in Construction Phase Services
Marc Fermanian (CRJ), Project Manager
Carlos Ortega (CRJ), Project Engineer
Debbi Powers (CRJ), Senior CAD Designer

Period of Service
2011-2014

Cost
Engineering Fee
$165,000

Construction Cost Estimate
$6,400,000

Project Award Amount
$6,652,000

Client Reference
Jonathan P. Miller
President
Galaxy Aviation of Lantana, Inc.
2633 Lantana Rd., #18
Lake Worth, FL 33462
(561) 656-9815
jmiller@fboassociates.com

Contractor Reference
AutoBuilders
Robert W. Rawe II
(561) 622-3515
rwr@autobuilders.net

Galaxy Aviation – Parcel S-5 / Parcel Opt. 1 Development

Palm Beach International Airport (PBIA), West Palm Beach, FL

In CRJ's continued efforts in working with Galaxy Aviation and PBCDOA, our firm was responsible for the Civil Site Design and Construction Management for the largest Fixed Based Operator's Site Development at Palm Beach International Airport (PBIA). The work demonstrates CRJ's ability to work with both the Private and Municipal Sectors in working within an Airport's AOA. This effort was a unique and technically challenging site development. The concept was to take an abandoned landside restaurant (i.e., PBIA's Bomber Squadron 391st Restaurant Site) and convert it into a 9.19 Acre Site Development that had included the following challenges for CRJ were as follows:

- Design/Construction of the single largest FBO Hangar at PBIA (65,000 sf)
- Design and Construction of a Parking Lot to facilitate both landside and airside totaling 1.12Acres
- Design of appropriate Aircraft Mix for Asphalt (P-401) Apron comprised of 4.51 Acres
- Landscaping Features, green-space and entrance features totaling roughly 1 Acre

- Landside to Airside Gate Access for Fixed Based Operator to access AOA via 'trap gate' system.
- Meeting all SFWMD stormwater criterion for PBIA under Permit 50-00471-S
- Design and Permitting efforts with: PBCWUD, PBC-Fire, PBC-Health, PBCDOA, and PBC-Bldg. Dept.
- Meeting criterion for NFPA 409 for hangar fire suppression system.
- 10-inch DIP Water Main Loop for both Life Safety Systems and consumptive use.

This project demonstrates CRJ's abilities not only in design capabilities, but also Client 'trust' in seeing a project from concept to completion. This was an amazing effort and marked our thirtieth (30th) Project with Galaxy Aviation.

U.S. Environmental Protection Agency

Region 4 (AL, FL, GA, KY, MS, NC, SC, TN)

Response Action Contract IV 68-W-99-043

Remedial Action Contract II EP-S4-09-02

Firm Role: Prime Contractor – Technical and Management Services

Overall Contract Description: Black & Veatch Special Projects Corp. (Black & Veatch) is contracted to provide professional architect/engineering, technical and management services in support of remedial response, enforcement oversight, and non-time critical removal activities under the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA).

Project Elements
- Site Management
- Remedial Investigation
- Feasibility Study
- Remedial Design
- Construction Oversight
- Construction Management
- Remedial Action
- Negotiation Support
- Community involvement
- Sampling and Analysis Support
- Risk Assessment
- Long-Term Response
- Pre-Design Investigations

Key Team Members
- Cal Butler, Project Geologist
- Ernest Mott-Smith, Project Engineer
- Suzanne Prouty, Data Validation
- David Behnke, Construction Supervisor

Period of Service
OU1 Design: 2006-2009
OU1 RA: 2007 - 2009
OU2 RI/FS: 2005 - 2014

Cost
- OU1 Design: $957,024
- OU1 Remedial Action: $6,365,234
- OU2 RI/FS: $2,124,511
- Total: $9,446,769

Client Reference
USEPA Region 4
Erik Spalvins,
USEPA RPM
404-562-8938
Spalvins.Erik@epa.gov

ESCAMBIA TREATING COMPANY OU1/OU2

The Escambia Treating Company (ETC) site is a 26-acre abandoned wood preserving facility located in Pensacola, Florida. The ETC facility operated from 1942 until its closing in 1982. The facility treated utility poles, foundation pilings, and lumber with coal-tar creosote and pentachlorophenol (PCP). Wastewater generated as part of the wood treating process was disposed in two unlined impoundments. Operations at the ETC site have contaminated the soils and groundwater within the former facility and the surrounding residential neighborhoods with wood treating chemicals and their byproducts including creosote, polynuclear aromatic hydrocarbons (PAHs), PCP and dioxins.

Starting in 1991, the EPA conducted an emergency removal action at the ETC Site which involved the excavation of the former holding ponds and highly contaminated shallow soil. An estimated 225,000 cubic yards of heavily contaminated soil were placed into a high-density polyethylene (HDPE) lined and capped soil stockpile. The EPA also demolished the ETC facility buildings, disposed of miscellaneous chemicals, and secured the site with a fence. Starting in 1997, EPA began relocating residents from the neighborhoods surrounding the ETC facility. Nearly 400 families were relocated as part of this effort which ranks as the third largest relocation effort by the EPA. An estimated additional 250,000 cubic yards of soil in excess of the established cleanup goals still remained at the site and the surrounding neighborhoods. In addition, the groundwater beneath the facility has been contaminated to a depth of over 170-feet (ft) and over one-mile downgradient of the Site towards Bayou Texar. The groundwater contamination and contiguous soil is being addressed as a separate operable unit (OU) #2. Black & Veatch completed a remedial design (RD) and remedial action (RA) for the OU1 soils and has completed a site-wide Feasibility Study (FS), Focused FS, and Pilot Scale Treatability Test for the OU2.

Escambia Treating Company (circa 1975)

OU1 Project Recognitions

"I have seen a lot of engineering designs in my day, both good and bad. The design put together by Black & Veatch is definitely a good one." - Peter Dohms, Pensacola Chamber of Commerce.

"It is good to have a resourceful construction manager on a job like this. I wish someone like David Behnke (Black & Veatch's construction manager) *could be on all of our projects."*
- Rob Stern, EPA Project Officer.

OU1 RD. Task Order No.: 677. EPA Project Manager: Eric Spalvins. Black & Veatch Project No.: 048677.

OU1 RD. Task Order No.: 719. EPA Project Manager: Eric Spalvins. Black & Veatch Project No.: 048719.

EPA selected containment as the remedy for OU1 soils. Black & Veatch worked with the U.S. Army Corps of Engineers (USACE) on a pre-design investigation to better delineate contaminated soils, resulting in a total of 425,000 cubic yards. We then relied on our extensive experience in landfill design to design the excavation plan and vault. Contaminated soils were placed into the lined and capped subsurface on-site containment cell. The most highly contaminated soils were solidified with cement to immobilize the contaminants and form a 2- to 3-ft thick subcap. Black & Veatch provided comprehensive community relations support and coordinated with the local government and EPA to allow future development of the property for light commercial use or a commercial park. This action turned a once-blighted area into a productive part of the community.

OU1 RA. Task Order No.: 708. EPA Project Manager: Eric Spalvins. Black & Veatch Project No.: 048708.

Black & Veatch's RA tasking included management of the liner construction, engineering support, and coordination with the Emergency and Rapid Response Services (ERRS) contractor that completed the earthwork to assure compliance with plans and specifications. During clearing and grubbing activities, Black & Veatch decided to mulch the trees and other plant material and combine it with clean fill from areas of the property not impacted by site operations to create topsoil, which reduce RA costs by approximately $500,000. Black & Veatch provided two full-time construction staff in the field maintaining the construction health and safety program, managing the construction quality assurance (QA) program, monitoring air emissions from the construction activities, and tracking construction progress. Black & Veatch's perimeter air monitoring program is based on a site-specific evaluation of the health risks from the inhalation of particulates, dioxins, and PAHs. There were no exceedances of allowable levels. Our health and safety performance was noteworthy: Zero Occupational Safety and Health Administration (OSHA) -recordable incidents after over 50,000 man-hours, including construction (over 30 persons on-site for over nine months).

Escambia OU1 Soil Stabilization/Containment

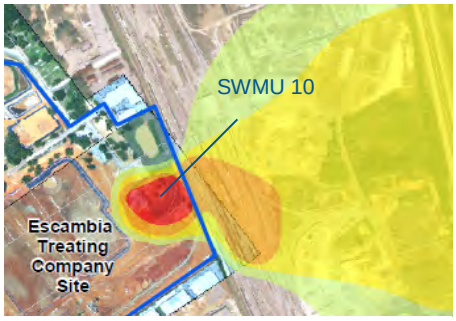
OU2 RI/FS Task Order No.: 376. EPA Project Manager: Eric Spalvins. Black & Veatch Project No.: 046376.

OU2 RI/FS Task Order No.: 676. EPA Project Manager: Eric Spalvins. Black & Veatch Project No.: 048676.

Horizontal Oxygen Infusion Well

Well Bundle

OU2 encompasses the deeper soil contamination under a former impoundment at Solid Waste Management Unit (SWMU) 10 and the extended semi-volatile organic compound (SVOC) dissolved plume emanating from this source. The contaminated ground water plume extends into the Floridian aquifer, the primary drinking water aquifer in the area. Black & Veatch completed the off-site OU2 FS in June 2008 and recommended a synergistic remedy of *in situ* chemical oxidation (ISCO) and *in situ* enhanced bioremediation (ISEB) using a combination of strategically placed ISCO vertical wells installed along the edge of the SWMU 10 source area, and aerobic bioremediation of the of the high concentration SVOC plume underlying the CSX railroad yard and further downgradient. Monitored natural attenuation (MNA) is planned for the leading edge of the dissolved plume. Black & Veatch designed, installed and operated a $914K pilot scale treatability study to provide a design basis for the biodegradation approach. Black & Veatch contracted Directed Technologies Drilling to install three, two-inch diameter well casings and screens in a single 100-ft deep borehole for this project. The well screen materials were staggered across the width of the plume and comprised three different materials to assess their effectiveness for future cleanup efforts. Aerobic bioremediation was enhanced through the injection of 90% oxygen into the screens. Performance monitoring wells installed for the test showed a very successful outcome with a convergence of high dissolved oxygen levels (approaching saturation), increases in both naphthalene microbial populations and dioxygenase markers, increased respirometry, and subsequent declines in dissolved SVOCs. These wells will be reused for the RA phase, thus reducing costs for the groundwater OU.



Location of SWMU 10 and SVOC Plume

Creosote Stringer, ETC

OU2 RI/FS. Task Order No.: 036. EPA Project Manager: Eric Spalvins. Black & Veatch Project No.: 048036.

EPA tasked Black & Veatch with the site investigation and preparation of a focused FS to address the deeper creosote contamination at SWMU 10 along the eastern property boundary. A detailed investigation using Tar specific green optical screening tool (TarGOST®) laser induced fluorescence with confirmatory soil borings was used to delineate the extent of residual and mobile NAPL and stained soils in the predominantly sand and silty sand soil. 42 TarGOST® points were installed during the assessment phase. This high resolution data was used with residual saturation laboratory testing to derive an innovative finite element mass estimate with a derivation of over 195,000 gallons of creosote (equivalent to approximately 0.6-ft of NAPL in the former 1-acre impoundment over 40 years). Soil directly impacted with NAPL as layers, stringers, or stains comprised approximately 42,000 cubic yards out of a total SWMU 10 volume of 828,000 cubic yards. EPA's Office of Technology assessment has studied these results and Black & Veatch's TarGOST® data interpretation and confirmation technique for possible incorporation in an industry wide protocol. The Focused FS examined several robust technologies for SWMU 10 in conjunction and as stand-alone approaches: vertical engineered barriers with a cap/cover, thermal remediation, ISCO, and stabilization. Thermal treatment using steam stripping was recommended as the preferred main source area technology. The use of ISEB and ISCO was included in the selected alternative to treat marginal zones of contamination. Black & Veatch also prepared a mass flux estimate for four transects downgradient of the SWMU10 source area and supported discussions with the State of Florida for incorporation of these results into the phasing for monitored natural attenuation of the downgradient dissolved SVOC plume.

OU2 Project Recognitions

"Very impressive and informative to read through", "awesome study" – Doug Peters (EPA), (re mass flux study)

"Great job in the field" – Erik Spalvins (EPA), (re TarGOST® field work)

Staff Qualifications & Experience

The City of Key West expects the highest level of service from the engineering firm selected to perform GES. Black & Veatch is proud to offer the City this level of service with a highly-qualified team that understands the various issues associated with municipal facility planning, design, and construction. With a reputation for providing innovative solutions and turning obstacles into opportunities, we offer a highly skilled team of professionals to work with City staff on their important projects.

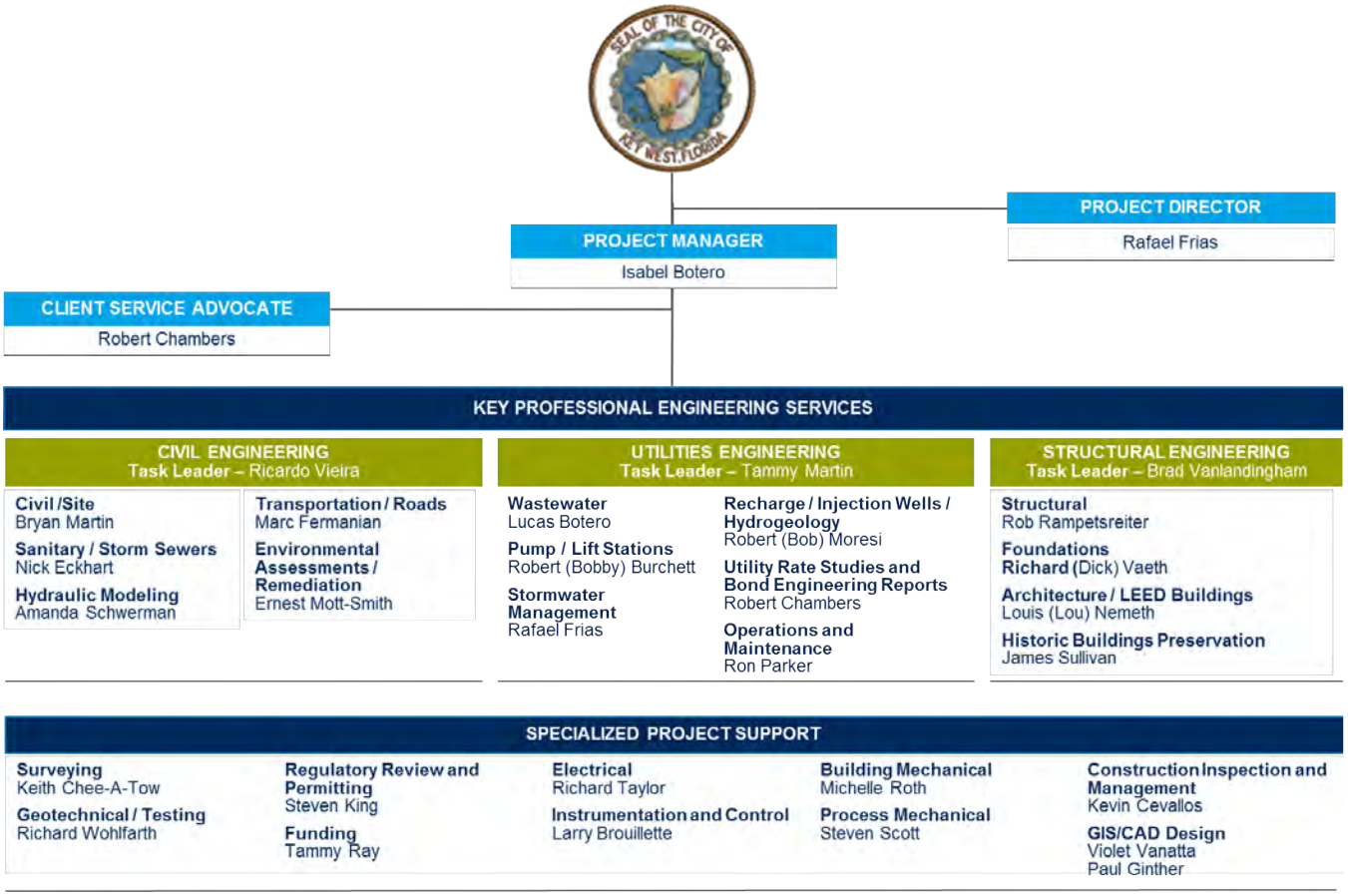
The Black & Veatch team will work with the Utilities Department to deliver economic, operable, reliable and flexible solutions that are tailored to meet the City's specific needs.

This section of our proposal will demonstrate the high quality of professionals who will work for the City and their capacity to accomplish work under any task that may be assigned.

IDENTIFICATION OF TEAM MEMBERS

To follow through on our commitment to apply effective management, available resources and quality deliverables, we have taken great care to bring to this project our most qualified technical staff by assembling a Team that provides redundancy in some skill sets. Redundancy provides assurances that our Team resources will not be stretched by the requirements of this GES contract, and that a high level of expertise rounds out our team.

Our team structure is designed to yield maximum results for the Utilities Department.



CAPACITY OF ASSIGNED PERSONNEL

Isabel is a Project Manager with proven experience. She has a deep understanding of City's project implementation processes and knows how to collaborate with Engineering and Operations staff to successfully implement the projects.

Successful delivery of any project will require close collaboration with City staff, a skilled and experienced team, and 100 percent accountability. Our **Project Manager, Isabel Botero,** is a resourceful, take-charge leader who motivates others and focuses on close communication between clients and our project teams. She will ensure that appropriate resources are provided to support any task required by the City, and that our projects are delivered on time and within budget.

Isabel Botero will lead the projects and serve as the City's primary point of contact. As Project Manager, Isabel will provide leadership and direction, as well as consistency through project tasks during their entire duration. Her responsibilities will entail budget estimates and schedules, meeting facilitation, technical input initiation, and assuring conformance with the City's objectives.

Isabel has experience in wastewater systems, water resources and civil engineering projects. Isabel currently serves as **Project Manager for the current General Engineering Services contract with the City of Key West**. Under the current contract with the City of Key West, **Isabel assisted the City with the preparation of the bid package to select the Operations and Maintenance Contractor** for the wastewater treatment plant, collections system and stormwater systems. Also, Black & Veatch is currently executing **the design of the Dennis Street Stormwater pump station under Isabel's leadership.**

The City of Key West will directly benefit from Isabel's experience, attention and commitment to client service. In addition, she will apply his skill in communicating complex technical ideas to a broad audience in the areas of civil, stormwater and wastewater treatment. She will work closely with his Task Leaders to successfully deliver projects to the City.

KEY PERSONNEL EXPERTISE

One project management philosophy guided how we selected the Black & Veatch Team — to provide access to a proven, experienced Team of experts through an accessible, knowledgeable and local leader.

Key to fulfilling the City's objectives is a team that understands the technical, regulatory, financial and operational requirements of effective civil, utility and environmental facilities. The experienced specialists and technical experts that compose our Team were selected with close regard to the need to deliver successful deliver projects in all aspects of the identified disciplines.

Supporting Isabel is a core Team of discipline Task Leaders and Specialists, who bring specialized expertise to the Utilities Department in their respective areas. They will support Isabel by overseeing the design team members performing services for the City.

Our Task Leaders and Specialists will apply a systematic framework that focuses on delivering quality products, which will:

- Define all planned quality activities to establish expectations for the team;
- Provide confidence that the documents are complete, and issues related to the ease of bidding and construction are addressed;

- Produce a quality product that will meet performance requirements; and
- Provide QC techniques and practices to ensure the quality of the performance of our team during project execution.

In the following pages, we have included brief qualifications of selected key Team members identified in the organizational chart.

Expertise of Task Leaders and Specialists

Rafael Frias | Project Director

Our **Project Director, Rafael Frias,** has **20 years of experience** and is a resourceful, take-charge leader who motivates others and focuses on close communication between clients and our project teams.

Rafael's experience is in water resources, including Water, Wastewater and Reclaimed Water Treatment, Collection/Distribution and Transmission System; he has completed numerous projects in Florida and Puerto Rico, involving water supply, wastewater, reclaimed water and stormwater. Rafael served as Project Director for the implementation of over $450 million of capital improvements for the Puerto Rico Aqueduct and Sewer Authority that involved planning, design and construction management services for water and wastewater projects.

Rafael served as **Project Director for the completion of Black & Veatch's effort under the current General Services Agreement**. This effort included the **preparation of the bid package to select the Operations and Maintenance Contractor** for the wastewater treatment plant, collections system and stormwater systems, and the **current design of the Dennis Street Stormwater pump station**.

Rafael is a resourceful Project Director with strong leadership and communication skills. As the Manager of our Florida and Caribbean operations, he will provide the City with access to Black & Veatch's pool of talented professionals and will commit the necessary resources for successful execution of all tasks under this contract.

Robert Chambers | Client Service Advocate, Specialist

As the Client Service Advocate, Robert will lead the involvement of Black & Veatch and sub-consultant resources to ensure that all project deliverables and milestones are meeting the City's needs and expectations.

Robert is a Project Manager with Black & Veatch and has extensive utility and consulting experience involving a variety of projects associated with water and wastewater, both public and private, throughout the southeastern United States. His utility knowledge covers a wide range of utility finance issues, including support, alternative financing analysis, utility rates, utility regulatory processes, economic feasibility studies and cost-of-service studies. In addition, Mr. Chambers has developed dynamic and interactive financial models for utility cost-of-service studies, rate studies, financial benchmarking, data retrieval and analysis, feasibility analyses, system expansion programs, capital acquisition alternatives, wholesale capacity transactions and utility regionalization scenarios. On an on-going basis, **Robert has successfully completed a Wastewater and Stormwater Utility Rate, Cost of Service and Feasibility Analysis for the City of Key West,** which involved the evaluation of wastewater

Robert holds a MBA with a concentration in Finance; he has led projects similar in nature in southeast Florida and will serve the City of Key West as Client Service Advocate and Specialist for all Business Processes assignments.

and stormwater rates and supporting over $50 million in wastewater construction projects required to enhance environmental protection in the Florida Keys.

Ricardo's experience as a local pipeline expert and hands-on management approach will provide the City of Key West with certainty of successful project execution on all linear project improvements.

Ricardo Vieira | Civil Engineering Task Leader

As Civil Engineering Task Leader, Ricardo will be in charge of the daily execution of all civil engineering tasks being performed for the City of Key West.

Ricardo has **17 years of experience** and is a proven performer as a manager and technical professional with a comprehensive and working knowledge of all aspects of civil Engineering. He has a particular expertise in the design of pipeline systems, and **has designed more than 500,000 linear feet of pipelines** and has published multiple National and International pipeline-related papers.

Ricardo has a depth of knowledge on trenchless technologies projects, including the use of **Micro-Tunnels, Horizontal Directional Drillings, Sliplining, Cured in Place Pipe, Carbon Fiber Repairs, and StrongPIPE,** among others. **His National Experience includes projects up to 156" in diameter with materials such as PCCP, DIP, HDPE, PVC, FRP, Steel, and Bar Wrapped Concrete Cylinder Pipe (C-303).**

The City of Key West will directly benefit from Ricardo's experience, attention and commitment to client service and project execution skills. In addition, **he will work closely with his design team to successfully deliver all civil projects to Key West.**

Tammy is an engineering manager and environmental engineer with 10 years of experience and knowledge of water and wastewater engineering and pump station mechanical process design.

Tammy Martin | Utilities Engineering Task Leader

As a Task Leader for utilities engineering tasks, Tammy will lead the involvement of Black & Veatch and subconsultant resources during the completion of utility projects for the City.

Ms. Martin is an engineering manager and environmental engineer with 10 years of experience and knowledge of water and wastewater engineering and pump station mechanical process design. Ms. Martin has served as project engineer on a number of environmental engineering projects, including stormwater design, permitting, and construction management. She is proficient with WaterGEMS modeling, HEC-RAS modeling, and Arc GIS. She has participated in detailed design and construction of alternative delivery methods (design/build/operate).

Tammy currently serves as **Engineer Manager for the design of the Dennis Street Stormwater pump station.**

Brad Vanlandingham | Structural Task Leader

Brad will lead all structural engineering tasks under this contract. **As a structural engineer, Brad has extensive experience designing and evaluating civil facilities for a variety of projects including water and wastewater treatment plants, solid waste transfer stations, laboratories, and power stations.** He has served as the project engineer for regional water treatment facilities in Orange and Seminole counties which included new supply wells, raw water mains, treatment facilities, storage, and high service pumping. He recently headed as the structural engineer for the design of improvements to the City of St. Petersburg's Oberly and Washington Terrace Water distribution pumping stations.

Brad will lead all Civil Engineering tasks, utilizing his 20 years of structural engineering experience designing and evaluating facilities for a variety of projects.

James Sullivan | Civil Engineering – Historic Building Preservation Specialist

James is an Architectural Historical Preservationist and has proven experience with historic building preservation, including structural evaluations. James has been trained to perform preservation analysis by the National Park Service at the National Center for Preservation Technology and Training in Natchitoches, LA. Training covered historical and building pathology, diagnostics methodology, and treatment strategies for preserving historical landmarks. The program was focused on a practical approach to engineering for older and historical buildings. A summary of the buildings he as evaluated for the National Park Service includes structures along the Cane River Creole National Historical Park (approximate age of structures: 300 years). **His knowledge also includes experience with the National Historical Preservation Act (NHPA) and Historical American Building Survey (HABS).**

James is Black & Veatch's historic building preservation expert. As an Architectural Historical Preservationist and member of the National Trust of Historic Preservation, James has proven experience assessing and restoring historic buildings. He will be fully available to the City of Key West for structural evaluation and preservation of its historic buildings.

James completed building deficiency assessments and developed new spreadsheets for the National Parks Service for historical fort sites, which included Fort Moultrie and Sumter located in Charleston, SC. **In Pensacola, Florida, historical forts and batteries inspected included Fort Pickens, Fort Barrancas, Battery 234, Battery Langdon, Battery Worth, Battery Pensacola, and Battery Van Swearingen.** Task included developing methods to document material loss rates that could be recorded onto spreadsheets; defining terminology unique to the fort; listing and breaking down building components into manageable parts, based on function that would be used as a tool for estimating repairs. Mr. Sullivan has inspected and reviewed projects for adaptive reuse that included Washington National Monuments and Memorials, Visitor Center in Stehekin, WA, American and British Camp in San Juan Island, WA, and Townsend Hall (Battle Seminar Facility) at Fort Leavenworth, KS.

Key Team Member Expertise

Our Team can provide each of the services required by the City, and has successfully worked together on multiple projects for the Key West Utilities Department in the past. The team members selected for the project have proven their ability to address the issues and elements that are expected and have successfully implemented similar projects for other communities. Highlights of

Please refer to the resumes included as an appendix for additional details and specific project experiences of each Team member.

our team members' expertise and qualifications are included in the following table. Please refer to the resumes included as an appendix for additional details and specific project experiences of each Team member.

Key Team Member Expertise

NAME | ROLE	EXPERTISE & QUALIFICATIONS
Ricardo Vieira Civil Engineering Task Leader	• Experienced in leading and completing design management, program management, project management, and task management for water, wastewater, reclaimed, and storm-water transmission and conveyance projects in urban environments • Extensive condition assessment of buried infrastructure experience, pipeline, rehabilitation and point repairs design
Tammy Martin Utilities Engineering Task Leader	• Well rounded engineer who has worked on multiple infrastructure projects in South Florida for water, wastewater and stormwater structures including projects for the City of Key West • Participated in the design and construction phase services for multiple improvements projects at the North Regional WWTP for Broward County • She is proficient with WaterGEMS modeling, HEC-RAS modeling, and Arc GIS
Brad Vanlandingham Civil Engineering Task Leader/Structural	• Extensive experience designing and evaluating facilities for a variety of projects including water and wastewater facilities, pumping stations, solid waste transfer stations, laboratories, and power stations • Performed structural engineering for numerous municipal facilities including buildings, pump stations, and retaining walls for multiple municipalities and utilities in Florida
Bryan Martin Civil/Site	• Civil site planning layout out of water/wastewater infrastructure • Recently completed the assessment of existing facilities, site planning, civil/mechanical design and permitting for project in Orlando to implement production of Biosolids Class A
Nick Eckhart Sanitary/Storm Sewers	• Variety of experience in civil engineering, focused on wastewater and stormwater collection and pumping including design, permitting and construction management tasks • Recently complete in Jacksonville the design of 4,100 LF of 14-inch reuse water pipeline in an FDOT right-of-way and across private property, including multiple railroad track crossings
Ernest Mott-Smith Environmental Assessments / Remediation	• 32 years of experience in process design engineering, consulting, and environmental regulatory interaction • Senior Remediation Technology Consultant with a primary focus of remedial technology consulting and the development of intra-company technical resources
Lucas Botero Wastewater	• Lucas is a Wastewater Technical Leader with over 20 years of experience successfully delivering wastewater treatment systems for multiple municipalities and utilities in Florida and the US • Exemplary involvements relevant to this contract include the Cudjoe Key AWRF and the Glades Treatment Plant Gravity Filter Rehabilitation in Boca Raton, Florida
Bobby Burchett Pump/Lift Stations Hydraulic Modeling	• Experience with water and wastewater system master planning studies, energy efficiency and management, hydraulic modeling, water quality modeling and pump station analysis and design
Bob Moresi Recharge/Injection Wells/Hydrogeology/ Regulatory Compliance	• Spent 25 years in water resources consulting including Florida's Water Management Districts for 10 years where he was instrumental in early development of rules and regulations, as well as Director of Water Use Permitting for two Districts • Studies of regional wellfields, dredging, solid waste, watershed management, emergency response, spring development, groundwater remediation, and well construction for most all purposes
Ron Parker Operations and Maintenance	• Directly involved with the preparation of the bidding package for the selection of the City's WWTP, Sewer and Stormwater Collection Systems Operations & Maintenance contractor. • Over 32 years of experience in the management of treatment plant operations, facilities O&M, treatment plant startup and commissioning, and process control troubleshooting

NAME | ROLE	EXPERTISE & QUALIFICATIONS
Rob Rampetsreiter Structural	• 29 years of experience in the structural engineering field • Performed structural engineering for numerous municipal facilities including water and wastewater treatment plants, buildings, pump stations, and retaining walls
Dick Vaeth Foundations	• More than 40 years of professional experience in the areas of geotechnical design for water, wastewater, hydropower and transportation projects • Has reviewed geotechnical reports and prepared specifications and provided input to foundation design and drawing preparation for multiple infrastructure projects
Lou Nemeth Architecture/LEED Buildings	• Well versed in all phases of architectural services including building design, construction document production, specification writing and constructability reviews • Experience includes work on water and wastewater treatment facilities as well as participating in value engineering studies
James Sullivan Historic Building Preservation	• Experience in developing LEED checklists, architectural design, developing architectural presentations, preparation of contract documents, estimating, project procurement, value engineering, construction administrative, and historical preservation
Marc Fermanian (CRJ) Transportation/Roads	• Diverse background in both civil engineering and construction; has worked on FDOT Projects in Districts 1, 3, 4, 6, and 7 • Skilled in developing civil site/ land development construction plans, as well as roadway design plans utilizing FDOT plans preparation standards and indexes
Keith Chee-A-Tow (Avirom) Surveying	• Over 38 years of land surveying experience, including boundary, topographic, hydrographic and GPS surveys, jurisdictional wetlands, aerial mapping and expert witness testimony.
Richard C. Wohlfarth (Nutting Engineers of Florida) Geotechnical/Testing	• Experience includes interpretation of subsurface conditions, planning and execution of laboratory testing programs, geotechnical analysis and design of foundation elements of structures, management of geotechnical projects and preparation of numerous geotechnical reports providing conclusions and recommendations
Steve King Regulatory Review and Permitting	• Experience in regulatory coordination and permitting for wellfields, pump stations, pipelines, stormwater, and treatment facilities within Florida.
Tami Ray Funding	• Wide variety of grant and loan experience with strong emphasis on federal and state program development and multi-discipline project funding and management • Created financial initiative plans that provide alternative financial resources for programs exceeding $1.6B in Florida
Richard Taylor Electrical	• Experience in project management, design and implementation of process automation and control systems in water, wastewater, oil and gas, citrus, pulp and paper and petrochemical industries
Larry Brouillette Instrumentation & Controls	• Senior I&C engineer with experience in process design and development of various wastewater, reclamation, and potable water facilities • Participated in a wide range of project activities including feasibility studies, alternative technologies review, design, construction services, final commissioning and training
Michele Roth Building Mechanical	• Mechanical systems, including heating, ventilating, and air conditioning (HVAC), odor control, plumbing, and dehumidification systems for many water and wastewater treatment, distribution, and collection facilities • She is currently the department sustainable design/LEED specialist
Steven Scott Process Mechanical	• Design of pumping, digester gas, blower, compressed air, and engine-generator systems as well as pipe stress, hydraulic, and pump system transient analysis • Mechanical systems for new and existing water and wastewater treatment plants, pumping stations, and hydropower stations

NAME | ROLE	EXPERTISE & QUALIFICATIONS
Kevin Cevallos Construction Inspection and Management	• Experienced in onsite observation and contract administration of construction of improvements to existing wastewater treatment plants, and pump stations. • Participated in the construction phase services for the current Broward County and SFWMD contracts.
Violet Vanatta	• 19 years of experience in the water, wastewater and stormwater drafting/engineering field • Site/Civil, Water, Wastewater, Stormwater Facilities CAD Coordination and Drafting
Paul Ginther GIS/CAD Design	• Has supported a variety of asset management integrations, master plan developments, demand analysis, and information solutions 30 years of GIS/Information Management experience with consulting and implementation on projects for engineering, pipeline, utilities and government agencies

Management Approach

Our Project Management approach describes the process Black & Veatch has successfully implemented on previous GES contracts, as well as the process planned for use on the City's projects. This approach has been successfully applied to water, wastewater, stormwater, transportation, energy and other municipal projects. Additionally, we have described the process envisioned to interface with the City through our **Project Manager, Isabel Botero,** supported by the Task Leaders

Black & Veatch has provided engineering services under GES contracts in Florida for over 50 years and we have performed more than a thousand individual Task Orders under these contracts. Through our extensive experience under these agreements, we have developed a project management approach that is highly effective at meeting our clients' needs.

A key objective of our approach to this project is to ensure that we have a firm understanding of your needs for each assignment for which we are selected. We will gain this understanding by working with the City's Project Manager and the City personnel involved with the project. By focusing on the City's specific needs and asking questions, we will work with the City's staff to zero in on the most cost-effective solutions that truly meet the project objectives.

Coordination and Communication

Isabel Botero as Project Manager will provide the City with a primary point of contact, therefore, facilitating communication and ensuring consistency in administrative functions. She will also be the primary point-of-contact for task order assignments as they are provided by the City, and will be responsible for the reporting requirements set forth by the Utilities Department.

Isabel's skills and experience are well suited for this role. She has strong-working knowledge to manage different assignments under the continuing professional services contract. **Isabel has prior experience working for the City and a strong working knowledge of City's organization, processes, wastewater and stormwater systems, and staff.** Isabel will identify the best engineers and scientists to assign to a given project and the most knowledgeable specialists to solve the tough and complex challenges that any project may involve. To aid information management and communication, the Black & Veatch team can provide access to documents, schedules, reports and other materials through a secure web portal site to our ProjectWise Database to appropriate City staff and subconsultants.

Proven Methods of Communication

The Black & Veatch Team will utilize the following methods of communication to interact effectively with the City of Key West:

Document Control and Management
Microsoft Office SharePoint Server will be used to provide a web-based content management and collaboration environment for this project. SharePoint facilitates the aggregation and integration of content from a number of internal and external sources in a web portal environment.

Email
Utilized for communications that need more immediate response, and to transmit electronic documents. This will be the most common communication.

Face-to-Face
Utilized to discuss key issues, Face-to-Face interaction is more personal, and allows team members to interact in-person to solve problems and discuss important items.

Written Documents
Written reports and technical memoranda will be used to formally provide updates to the City.

Telephone and Conference Calls
Used frequently, calls allow team members, both local and remote, to discuss issues and problem solve as a group.

Video Conferencing and Screen Sharing
Great tools which often help yield results that would normally come from a face-to-face meeting, while saving on travel costs. Screen sharing can be done from anywhere there is an internet connection.

Approach to Task Order Development

Black Veatch's project management approach involves enhanced single-point-of-contact communications, firm understanding of each assignment, use of local resources, continuous progress reporting, schedule and budget control, and detailed quality control.

Black & Veatch recognizes the value of a solid upfront effort in the development of new Task Orders. Thorough coordination with the City's Project Manager, along with operations staff, is essential to define a scope of services that will meet the City's needs with respect to schedule, budget, and usefulness of project deliverables. The Black & Veatch Project Manager, Isabel Botero, will meet with City staff as necessary to clearly identify the goals of an effort, to develop a detailed project schedule, and to define the specific deliverable requirements. All of these issues will be incorporated into the scope of services for a given task.

Isabel will then oversee the development of Task Order proposals and will always submit a draft version to the City's Project Manager for review to ensure agreement with the scope, schedule, and deliverable requirements. **A project schedule will be included as an attachment to the scope of services in each new Task Order.** The schedule would be presented in MS Project (or other format as preferred by the City) and would identify all major project milestones and significant phases of the effort.

Innovative Management Tools and Techniques

Managing multiple task orders has always provided opportunities to develop and apply innovative management tools and techniques. There are several key tools and techniques that will be applied to this contract.

We will apply a deliberate approach that ensures calculations, specifications, equipment components, systems, operating processes, and constructed facilities provide high quality infrastructure for the City of Key West.

The internet provides a host of opportunities for improved coordination and communication, both within single and multi-firm projects and between the project team and the City. Centralized document management, file sharing for maps, drawings, photos and videos, version control for design and contract documents, and access to the most recent schedule and cost information are some examples of efficiencies realized using electronic communications, all of which will be used for this contract. These systems will be established and managed by Black & Veatch, and secure access will be provided to all team members and subconsultants, as well as to the City.

We have learned over many years of multi-firm projects that standardized tools and procedures are necessary to manage the flow of information. We also plan to coordinate our design work with the City's existing standard specifications and design details. For example, the Black & Veatch team will standardize by using the following software tools:

Our proven project management plan will make the City's job easier, improves quality, eliminates rework, and keeps the project on budget and on schedule.

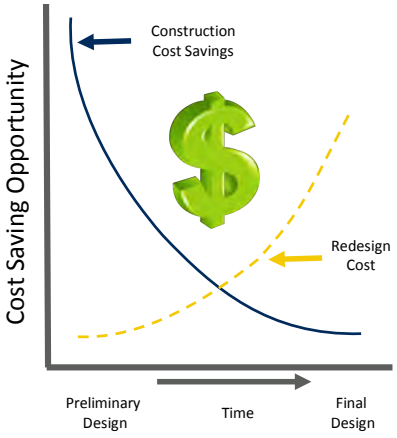
- **Microsoft Outlook** for email and meeting scheduling.
- Scheduling using **Microsoft Project**.
- Document Tracking using **Primavera's Scheduling and Contract Manager** V12.0.
- **SharePoint**, an internet- based archival and document control system.
- Groundwater Modeling – **MODFLOW**.
- Hydrologic and Hydraulic modeling (stormwater management) – **HEC-HMS, HEC-RAS, ArcGIS, ICPR and XP-SWMM**, as needed.
- Water Distribution Modeling – **Cybernet, EPANET, H20NET, WaterCAD, InfoWater**, as needed.
- Computer-Aided Drafting and Mapping – **AutoCAD, Civil 3D and ArcGIS**

Approach to Meeting Project's Schedules and Budgets

Budget and Schedule Control

At the commencement of each Task Order, the Black & Veatch Project Manager will define project scope, schedule and budget in consultation with the City's Project Manager. Our Project Manager will closely monitor and measure critical path activities to ensure the project is delivered on time and on budget.

Black & Veatch's Project Controls system, complete with budget information, will be used to track time and cost expenses for earned value **(EV) reporting** on all aspects of each project with the City. EV is a method of reporting project performance against in terms of schedule and budget. Every month as part of the invoicing process, the EV of each activity is computed based on the percent complete of each task and the budget expended. This process reveals problem tasks in terms of budget or schedule (or both), allowing for timely corrective actions.



Cost Opportunity Curve – Opportunity to reduce costs early in the project.

Our Project Controls system and commitment to accountability for change is crucial to meeting project quality and budget goals and will save money to the City by preventing cost overruns.

Willingness and Ability to Meet Schedule and Budget

There are numerous factors that drive the need for timely project completion. These include meeting regulatory deadlines, bringing additional capacity on-line ahead of growing demands, or simply working within the fiscal schedule established by the City's CIP funding process. Completing projects within budget is equally as important to work within the constraints of

the City's budgeting process and to satisfy the local administration and the general public. Black & Veatch will approach schedule and budget performance with the highest priority.

It is standard procedure for Black & Veatch Project Managers to develop a project schedule and engineering budget at the onset of every assignment. We have developed powerful tools for use by Project Managers in tracking schedule and budget progress. Through our project accounting network, data on project charges is available to Project Managers within one-day of time reporting. This supports timely adjustments to ensure that the appropriate level of effort is being expended to complete the work on time and under budget. Through application of this approach, we have an excellent record of success. **The table below summarizes our success meeting the engineering budget on previous assignments completed under continuing services contracts.**

TASK AUTHORIZATION ASSIGNMENT	PERFORMANCE
WASD: Bond Engineering Contract (2012-2015) Tasks 1 thru 22	On Budget
WASD: Bond Engineering Contract (2009-2012) Tasks 1 thru 16	On Budget
Broward County: North Regional Wastewater Treatment Plant Outfall Pump Station Repairs	Under Budget
Broward County: North Regional Wastewater Treatment Plant Aeration Shrouds Replacement	On Budget
Broward County: Master Wastewater Pump Stations Wetwell Refurbish	On Budget
Key West: O&M WWTP, Sanitary and Stormwater Sewers	On Budget
SFWMD: IT Shelters Replacement Construction Management Services	Under Budget
SFWMD: S-127 Automation Construction Management Services	On Budget
Lakeland: Disinfection Alternatives Evaluation	On Budget
Lakeland: Disinfection Facility Upgrades Preliminary Design Report	On Budget
Lakeland: Williams WTP Process Control System Upgrade Design	On Budget
Tampa Bay Water: Surface WTP Expansion Construction Management & Program Management	Under Budget
Hillsborough County: River Oaks Sinkhole Remediation	Under Budget
Hillsborough County: NWRWRF 36^{in} Isolation Valve Replacement	Under Budget
Hillsborough County: Armand Drive Gravity Sewer Replacement	Under Budget
Hillsborough County: Gunn Hwy. Utility Relocations	On Budget
St. Petersburg: Water System Vulnerability Assessment	Under Budget
St. Petersburg: Oberly P.S. Improvements (BODR)	Under Budget
Combined	**> $2 Million Under Budget**

Construction Cost Estimating

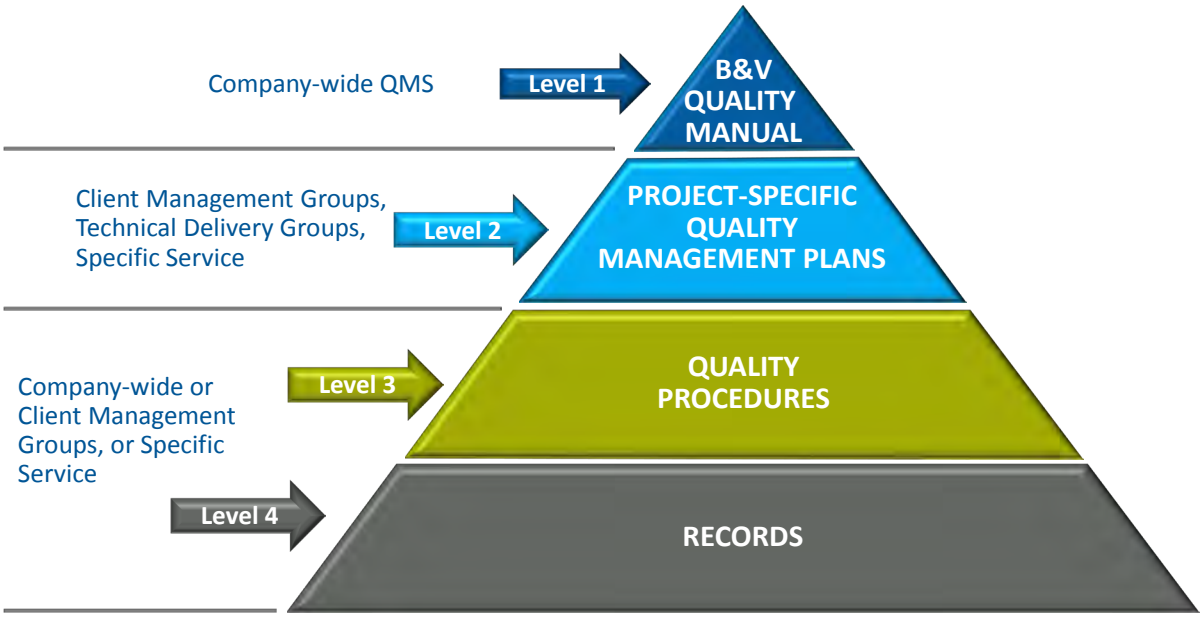
Black & Veatch is a leading contractor in the water and wastewater industry, with half of our project volume coming from alternative delivery projects in recent years. Through the expertise of our construction and procurement professionals, Black & Veatch is in-touch with the latest trends and supply chains of construction pricing. We have developed sophisticated estimating tools and databases which we utilize in developing our own bid prices. Few consultants can offer the level of detail and accuracy in construction cost estimating that is available through application of this construction expertise. Accurate construction estimates are a key element in helping the City properly budget projects and control project costs during a progressing design. We will develop an opinion of cost at the onset of each project and update it at each project milestone. We utilize trend logs to track project changes and associated cost impacts, and we will communicate those impacts to the City throughout design, making adjustments to the design to ensure a project can be constructed within budget. The table below provides a few examples of recent effective construction cost estimating by Black & Veatch.

Construction Cost Estimating

PROJECT/LOCATION	ENGINEER'S ESTIMATE	ACTUAL BID	VARIANCE
Williams WTP Process Control System Replacement, Lakeland, FL	$2,000,000	$1,904,000	4.8%
Nature's Way Pump Station Upgrade, Hillsborough County, FL	$2,541,000	$2,535,488	0.2%
Oberly and Washington Terrace PS Improvements, St. Petersburg, FL	$7,939,313	$7,770,000	2.1%
Fawn Ridge Chemical Feed Trim Improvements, Hillsborough County, FL	$1,585,370	$1,405,000	11.4%

Quality Assurance/Quality Control Program

For all of the projects under this contract, our goal will be to provide the City with quality on-time deliverables that can be counted on. Black & Veatch has a long history of providing high-quality professional services to our clients' satisfaction. We recognize that quality is a continuous improvement process updated through a constant feedback process to incorporate successful techniques and lessons learned from our project execution practices.



Black & Veatch's Quality Management System (QMS) is a company-wide documented system of planned processes and activities that ensures the effective operation, planning and control of our processes. Our QMS is based on ISO 9001:2015 Quality Management System-Requirements and addresses all elements of the standard as well as any project-specific codes, standards, contracts, drawings, and objectives. All Black & Veatch professionals are familiar with Black & Veatch's QMS.

Understanding and Awareness of Permitting Requirements

Black & Veatch has obtained permits with all the key agencies for water related projects in Florida and nationwide, including the EPA.

Our Team will focus on early stakeholder engagement and communication which will provide as a benefit a smoother permitting process, as the agencies are aware of the project long before a permit application is delivered. Our approach is to communicate with the required regulatory agencies early and often to keep them abreast of the project status, ensure timely approval of permits and minimize delays. We will develop a permit matrix as one of our technical submittals so that responsibility for permits is clearly identified to avoid a permit falling through the cracks.

Ability to Perform Expeditiously

Black & Veatch will approach tasks in a consistent and uniform manner that will allow us to efficiently respond to changing project requirements, while developing engineering solutions that meet the City's needs. The foundation of this strategy is effective communications and establishing clear responsibility and understanding of the work requirements at the outset of the task.

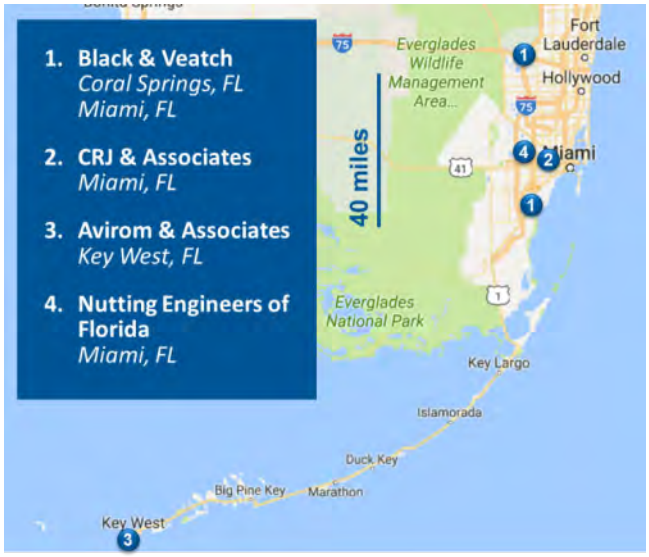
The numerous technical and non-technical issues of potential projects will require a collaborative approach that encourages the direct involvement of City staff in workshops and selected meetings; we believe this approach is vital to the success of the project. Our collaborative approach will bring together project stakeholders on a regular basis.

Black & Veatch recognizes the importance of meeting schedule and budget requirements. **We are prepared to devote the necessary resources to meet even the most challenging schedules.** We control the schedule and budget on projects through experienced and attentive project management. Development of a Work Plan at the beginning of each project and diligent adherence to that Work Plan are key to executing projects in an efficient and timely manner. Our Project Manager, Task Leaders and Technical Support Staff are highly experienced in the types of work to be performed under this GES contract, providing them the knowledge to develop a solid Work Plan and efficiently guide the work.

Black & Veatch will ensure that the City receives top quality services in an efficient, timely and cost-effective manner.

LOCATION

Although Black & Veatch is a large company with worldwide resources and unmatched engineering expertise, we take a local approach to serving our clients and have established stable, self-sufficient regional offices for that purpose. **This GES contract will be led and executed from our Coral Springs and Miami offices, together with our subconsultants' offices in Key West and Miami.** Through our local south Florida offices, we have developed relationships and practices to bring the company's global expertise and nationally-recognize resources to the City of Key West.



AVAILABILITY

Ability to Perform with In-House Staff

Black & Veatch employs more than 260 professionals in Florida.

Black & Veatch is committed to providing the key staff identified in this proposal as well as other local, regional, national and international resources required to successfully complete any task assigned by the Utilities Department. Based upon our current level of commitment and the recent and upcoming completion of several projects, **Black & Veatch has sufficient available capacity to complete multiple task orders under this General Engineering Services contract.**

The group of Black & Veatch professionals in our local offices is diversely skilled and highly productive. We are backed by tremendous firm-wide resources that enhance the efficiency and quality of our services. Our local offices are equipped with state-of-the-art drawing and document production equipment. Our self-sufficiency as production offices and unmatched resources support our daily ability to meet the needs of our clients and respond quickly to task-order related requests.

Access to Company-Wide Resources

Only Black & Veatch gives the Utilities Department access to a unique cross-discipline workforce that brings together some of the best brains in the global water business to share information and develop new, tailored solutions to the City of Key West.

Black & Veatch currently has a global workforce of more than 12,000 working in over 100 offices worldwide with projects completed in more than 100 countries on six continents. Black & Veatch has 20 regional offices on the East Coast, with more than 1,000 professionals working from these offices. For the City of Key West, we will coordinate and provide our expert and dedicated service from our full-service design office in Coral Springs. Additional nearby expertise and support will be provided from our additional Florida offices as required. We will provide specific technical expertise from other offices of our firm, as needed, to bring the best and latest technology to the Utilities Department that we have to offer. **The combination of Black & Veatch's local and national experts available to the City and our global technical resources provides the Utilities Department a "value added" relationship that will meet and exceed the requirements and expectations of any GES assignment under this contract.**

Other Certifications

LEED

With national membership in USGBC (U.S. Green Building Council) and 29 LEED® Accredited Professionals (APs) representing every discipline; Black & Veatch is well prepared to implement LEED certification requirements on new construction and major renovation projects for the City of Key West. To date, our teams of LEED APs have assisted in designing more than 45 buildings with a LEED certifiable rating or better. These APs are fully qualified, through both formal training and practical work experience, to integrate all aspects of sustainable design into the construction and life-cycle performance of our green projects. Black & Veatch has the capability to design to any LEED rating level, and to execute USGBC-required commissioning for the purposes of registration and certification of LEED projects. Our team offers the tools to truly bring environmental conservation to the City's water and wastewater facilities.

Black & Veatch is ranked in the Top 100 Green Design Firms by Engineering-News Record (ENR).

To date, our over 85 LEED APs have assisted in designing more than 45 buildings nationwide. Our LEED capabilities will provide the City with Energy and Environmental efficient projects.

Black & Veatch focuses on continuously upgrading standard design practices so that LEED certification is a readily employed option for our projects. Project execution strategies place emphasis on the integrated design efforts necessary for successful projects seeking LEED certification. As many of the LEED prerequisites and credits depend on site selection, meeting certain design requirements, and selecting acceptable materials, the siting study and conceptual development period is the optimal time to consider the incorporation of LEED elements into the design.

Black & Veatch designed and constructed a LEED Certified 14,000 square foot Plant Services Building for Pacific Gas & Electric as part of the Gateway combined cycle power generating plant in Antioch, California. The Black & Veatch LEED accredited project architect and team leaders worked closely with the client in early meetings to understand their specific needs before initiating the design process, to educate the team on the LEED rating system and the certification process, and to establish consensus on the targeted LEED points. Black & Veatch involved the commissioning agent early and worked closely with them through design and construction. When the contract was awarded, Black & Veatch LEED personnel trained the general contractor's team on the LEED intent and process, and worked closely with all the engineering and construction disciplines to obtain and compile all necessary documentation for certification. When review feedback was received from USGBC, Black & Veatch LEED personnel worked with the engineering and construction disciplines to implement the additional requirements to obtain the LEED Certification. Notice of successful LEED certification from USGBC was issued to Black & Veatch for the building in 2009.

With early involvement of all stakeholders, we not only get the points necessary for certification, we ensure that the points pursued make sense and are the best fit for each unique project and client.

LEED® Integration into Renovation and Repair Projects

Black & Veatch can integrate the requirements of LEED for Existing Buildings: Operations & Maintenance and Energy Star programs into renovation and repair projects at existing facilities. Black & Veatch has a long history of providing services geared toward optimizing the performance of and extending the life of existing facilities.

Black & Veatch designs will be geared to optimizing the performance of and extending the lifespan of existing City facilities.

Black & Veatch LEED accredited professionals provided LEED-Existing Building (EB) consulting services to Athens-Clarke County Public Utilities Department in Georgia. The client desired obtaining LEED-EB certification for the Administration Building at the Middle Oconee Water Reclamation Facility. Black & Veatch LEED accredited personnel conducted a thorough on-site investigation and prepared a detailed report outlining the modifications and requirements needed to certify the building under LEED for Existing Buildings. Black & Veatch LEED personnel worked closely with the client's staff, providing education on the LEED rating system requirements and tailoring the LEED-EB recommendations to the needs of the stakeholders.

Energy Star is one of a number of energy analysis and optimization tools used by Black & Veatch professionals. The Green Lights program became part of Energy Star in the year 2000 and is included by reference to Energy Star.

Black & Veatch developed a Utility-Wide Strategic Energy Plan for the Philadelphia Water Department (PWD). As part of this work, Black & Veatch determined energy benchmarks for three water pollution control plants owned by PWD using the Energy Star Portfolio Manager tool. Black & Veatch compiled facility data to populate Portfolio Manager and analyzed the resulting Energy Star performance rating for the three plants. The Energy Star Portfolio Manager program benchmarks against data from a sample population of 257 U.S. wastewater treatment plants. A thorough understanding of the processes and facilities at these plants allowed Black & Veatch to interpret the results of the Energy Star rating to more accurately assess how the PWD plants compare to their operational peers. This understanding also allowed Black & Veatch to customize energy saving recommendations for renovation projects at the PWD facilities.

FDOT

Our subconsultant, **CRJ & Associates**, is certified in the following FDOT categories:

- Group 3 – Highway Design – Roadway; 3.1 – Minor Highway Design
- Group 10 – Construction Engineering Inspection; 10.1 – Roadway Construction Engineering Inspection

FDOT

Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

JIM BOXOLD
SECRETARY

April 20, 2016

Marc Fermanian, President
CRJ & ASSOCIATES, INC.
2699 Stirling Road, Suite B-201
Fort Lauderdale, Florida 33312

Dear Mr. Fermanian:

The Florida Department of Transportation has reviewed your application for qualification package and determined that the data submitted is adequate to technically qualify your firm for the following types of work:

Group 3 - Highway Design - Roadway

3.1 - Minor Highway Design

Group 10 - Construction Engineering Inspection

10.1 - Roadway Construction Engineering Inspection

Your overhead audit has been accepted, enabling your firm to compete for Professional Services projects advertised at the unlimited level, with estimated fees of any dollar amount. This status shall be valid until June 30, 2017 for contracting purposes.

	Home/Branch Office	Facilities Capital Cost of Money	Overtime Premium
Indirect Cost	148.60%	0.107%	Reimbursed

Should you have any questions, please feel free to contact me by email at carliayn.kell@dot.state.fl.us or by phone at 850-414-4597.

Sincerely,

Carliayn Kell

Carliayn Kell
Professional Services
Qualification Administrator

Required Forms

- Addendum No. 1, dated March 20, 2017
- Anti-Kickback Affidavit
- Public Entity Crimes Certification
- Indemnification
- Equal Benefits for Domestic Partners Affidavit
- Cone of Silence Affidavit
- State of Florida Board of Professional Engineers License
- State of Florida Certificate of Status
- Insurance Certificate Samples

THE CITY OF KEY WEST
Post Office Box 1409 Key West, FL 33041-1409 (305) 809-3883

ADDENDUM NO. 1

GENERAL ENGINEERING SERVICES / RFQ # 17-002 **March 20, 2017**

This addendum is issued as supplemental information to the RFQ for clarification of certain matters of both a general and a technical nature. The referenced Request for Qualifications (RFQ) package is hereby amended in accordance with the following items:

On Page 2 of 49 Please make the following change:

For information concerning this Request for Qualifications please contact **Janet Muccino, Project Manager**, Engineering Services Department only in writing and requests for information must be received at least ten (10) days prior to the date fixed for opening of responses to RFQ. The contact email address is jmuccino@cityofkeywest-fl.gov . The City's "Cone of Silence" Ordinance Section 2-773 does not allow verbal communication.

On Page 9 of 49 Please make the following change:

Contacts:

All requests for information should be only in writing and emailed to **Janet Muccino, Project Manager at jmuccino@cityofkeywest-fl.gov** and requests for information must be received at least ten (10) days prior to the date fixed for the opening of responses to the RFQ. Any and all such interpretations and any supplemental instructions will be in the form of written addendum to the RFQ. If City issues an addendum, the Respondent has sole responsibility to receive any such addendum or any interpretations shall not relieve such Respondent from any obligation under his response as submitted. All addenda so issued shall become a part of the Contract document.

All Bidders shall acknowledge receipt and acceptance of this Addendum No. 1 with Attachment by submitting the addendum with their proposal. Proposals submitted without acknowledgement or without this Addendum may be considered non-responsive.

Signature

Black & Veatch Corporation

Name of Business

ANTI-KICKBACK AFFIDAVIT

STATE OF Florida)
: SS
COUNTY OF Orange)

I, the undersigned hereby duly sworn, depose and say that no portion of the sum herein bid will be paid to any employees of the City of Key West as a commission, kickback, reward or gift, directly or indirectly by me or any member of my firm or by an officer of the corporation.

By: _____
Brent M. Reuss, P.E.

Sworn and subscribed before me this

10 day of April, 2017.

Christine Waalewyn
NOTARY PUBLIC, State of Florida at Large

My Commission Expires: September 13, 2020

CHRISTINE WAALEWYN
Commission # GG 030123
Expires September 13, 2020
Bonded Thru Troy Fain Insurance 800-385-7019

SWORN STATEMENT UNDER SECTION 287.133(3)(a) FLORIDA STATUTES ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICE AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted with Bid, Bid or Contract No. RFQ# 17-002 for

2. This sworn statement is submitted by
(Name of entity submitting sworn statement)

whose business address is 2855 N. University Dr, Suite 210, Coral Springs, FL 33065

Black & Veatch Corporation and (if applicable) its Federal Employer Identification Number (FEIN) is 43-1833073 (If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement.)

3. My name is Brent M. Reuss, P.E. and my relationship to
(Please print name of individual signing)

the entity named above is Vice President.

4. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including but not limited to, any Bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, material misrepresentation.

5. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(l)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication guilt, in any federal or state trial court of record relating to charges brought by indictment information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

6. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means

   1. A predecessor or successor of a person convicted of a public entity crime: or

   2. An entity under the control of any natural person who is active in the management of t entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

7. I understand that a "person" as defined in Paragraph 287.133(1)(8), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter

into a binding contract and which Bids or applies to Bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

8. Based on information and belief, the statement, which I have marked below, is true in relation to the entity submitting this sworn statement. (Please indicate which statement applies.)

☑ Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.

___ The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND (Please indicate which additional statement applies.)

___ There has been a proceeding concerning the conviction before a hearing of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. (Please attach a copy of the final order.)

___ The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. (Please attach a copy of the final order.)

___ The person or affiliate has not been put on the convicted vendor list. (Please describe any action taken by or pending with the Department of General Services.)

(Signature) _____

(Date) 4/10/17

STATE OF Florida

COUNTY OF Orange

PERSONALLY APPEARED BEFORE ME, the undersigned authority, Brant Reuss

(Name of individual signing) who, after first being sworn by me, affixed his/her signature in the space provided above on this 10 day of April, 20 17.

My commission expires: September 13, 2020
NOTARY PUBLIC

CHRISTINE WAALEWYN
Commission # GG 030123
Expires September 13, 2020
Bonded Thru Troy Fain Insurance 800-385-7019

INDEMNIFICATION

To the fullest extent permitted by law, the CONSULTANT expressly agrees to indemnify and hold harmless the City of Key West, their officers, directors, agents, and employees (herein called the "indemnitees") from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees and court costs, such legal expenses to include costs incurred in establishing the indemnification and other rights agreed to in this Paragraph, to persons or property, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the CONSULTANT, its Sub-consultants or persons employed or utilized by them in the performance of the Contract. Claims by indemnitees for indemnification shall be limited to the amount of CONSULTANT's insurance or $1 million per occurrence, whichever is greater. The parties acknowledge that the amount of the indemnity required hereunder bears a reasonable commercial relationship to the Contract and it is part of the project specifications or the bid documents, if any.

The indemnification obligations under the Contract shall not be restricted in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the CONSULTANT under workers' compensation acts, disability benefits acts, or other employee benefits acts, and shall extend to and include any actions brought by or in the name of any employee of the CONSULTANT or of any third party to whom CONSULTANT may subcontract a part or all of the Work. This indemnification shall continue beyond the date of completion of the work.

CONTRACTOR: Black & Veatch Corporation

2855 N. University Dr, Suite 210, Coral Springs, FL 3306

Address

Signature

Brent M. Reuss, P.E.

Print Name

Vice President

Title

April 10, 2017

Date

EQUAL BENEFITS FOR DOMESTIC PARTNERS AFFIDAVIT

STATE OF Florida)
: SS
COUNTY OF Orange)

I, the undersigned hereby duly sworn, depose and say that the firm of Black & Veatch Corporation provides benefits to domestic partners of its employees on the same basis as it provides benefits to employees' spouses per City of Key West Ordinance Sec. 2-799.

By: _____
Brent M. Reuss, P.E.

Sworn and subscribed before me this

10 day of April, 2017.

Christene Waalewyn
NOTARY PUBLIC, State of Florida at Large

My Commission Expires: September 13, 2020

CHRISTINE WAALEWYN
Commission # GG 030123
Expires September 13, 2020
Bonded Thru Troy Fain Insurance 800-385-7019

City Ordinance Sec. 2-799
Requirements for City Contractors to Provide Equal Benefits for Domestic Partners

(a) Definitions. For purposes of this section only, the following definitions shall apply:

(1) ***Benefits*** means the following plan, program or policy provided or offered by a contractor to its employees as part of the employer's total compensation package: sick leave, bereavement leave, family medical leave, and health benefits.

(2) ***Bid*** shall mean a competitive bid procedure established by the city through the issuance of an invitation to bid, request for proposals, request for qualifications, or request for letters of interest.

(3) ***Cash equivalent*** means the amount of money paid to an employee with a domestic partner in lieu of providing benefits to the employee's domestic partner. The cash equivalent is equal to the employer's direct expense of providing benefits to an employee for his or her spouse.

The cash equivalents of the following benefits apply:

a. For bereavement leave, cash payment for the number of days that would be allowed as paid time off for the death of a spouse. Cash payment would be in the form of the wages of the domestic partner employee for the number of days allowed.

b. For health benefits, the cost to the contractor of the contractor's share of the single monthly premiums that are being paid for the domestic partner employee, to be paid on a regular basis while the domestic partner employee maintains such insurance in force for himself or herself.

c. For family medical leave, cash payment for the number of days that would be allowed as time off for an employee to care for a spouse who has a serious health condition. Cash payment would be in the form of the wages of the domestic partner employee for the number of days allowed.

(4) ***Contract*** means any written agreement, purchase order, standing order or similar instrument entered into pursuant to the award of a bid whereby the city is committed to expend or does expend funds in return for work, labor, professional services, consulting services, supplies, equipment, materials, construction, construction related services or any combination of the foregoing.

(5) ***Contractor*** means any person or persons, sole proprietorship, partnership, joint venture, corporation, or other form of doing business, that is awarded a bid and enters into a covered contract with the city, and which maintains five (5) or more full-time employees.

(6) ***Covered contract*** means a contract between the city and a contractor awarded subsequent to the date when this section becomes effective valued at over twenty thousand dollars ($20,000).

(7) ***Domestic partner*** shall mean any two adults of the same or different sex, who have registered as domestic partners with a governmental body pursuant to state or local law authorizing such registration, or with an internal registry maintained by the employer of at least one of the domestic partners. A contractor may institute an internal registry to allow for the provision of equal benefits to employees with domestic partner who do not register their partnerships pursuant to a governmental body authorizing such registration, or who are located in a jurisdiction where no such governmental domestic partnership registry exists. A contractor that institutes such registry shall not impose criteria for registration that are more stringent than those required for domestic partnership registration by the City of Key West pursuant to Chapter 38, Article V of the Key West Code of Ordinances.

(8) ***Equal benefits*** mean the equality of benefits between employees with spouses and employees with domestic partners, and/or between spouses of employees and domestic partners of employees.

(b) Equal benefits requirements.

(1) Except where otherwise exempt or prohibited by law, a Contractor awarded a covered contract pursuant to a bid process shall provide benefits to domestic partners of its employees on the same basis as it provides benefits to employees' spouses.

(2) All bid requests for covered contracts which are issued on or after the effective date of this section shall include the requirement to provide equal benefits in the procurement specifications in accordance with this section.

(3) The city shall not enter into any covered contract unless the contractor certifies that such contractor does not discriminate in the provision of benefits between employees with domestic partners and employees with spouses and/or between the domestic partners and spouses of such employees.

(4) Such certification shall be in writing and shall be signed by an authorized officer of the contractor and delivered, along with a description of the contractor's employee benefits plan, to the city's procurement director prior to entering into such covered contract.

(5) The city manager or his/her designee shall reject a contractor's certification of compliance if he/she determines that such contractor discriminates in the provision of benefits or if the city manager or designee determines that the certification was created, or is being used for the purpose of evading the requirements of this section.

(6) The contractor shall provide the city manager or his/her designee, access to its records for the purpose of audits and/or investigations to ascertain compliance with the provisions of this section, and upon request shall provide evidence that the contractor is in compliance with the provisions of this section upon each new bid, contract renewal, or when the city manager has received a complaint or has reason to believe the contractor may not be in compliance with the provisions of this section. This shall include but not be limited to providing the city manager or

his/her designee with certified copies of all of the contractor's records pertaining to its benefits policies and its employment policies and practices.

(7) The contractor may not set up or use its contracting entity for the purpose of evading the requirements imposed by this section.

(c) Mandatory contract provisions pertaining to equal benefits. Unless otherwise exempt, every covered contract shall contain language that obligates the contractor to comply with the applicable provisions of this section. The language shall include provisions for the following:

(1) During the performance of the covered contract, the contractor certifies and represents that it will comply with this section.
(2) The failure of the contractor to comply with this section will be deemed to be a material breach of the covered contract.
(3) If the contractor fails to comply with this section, the city may terminate the covered contract and all monies due or to become due under the covered contract may be retained by the city. The city may also pursue any and all other remedies at law or in equity for any breach.
(4) If the city manager or his designee determines that a contractor has set up or used its contracting entity for the purpose of evading the requirements of this section, the city may terminate the covered contract.

(d) Enforcement. If the contractor fails to comply with the provisions of this section:

(1) The failure to comply may be deemed to be a material breach of the covered contract; or
(2) The city may terminate the covered contract; or
(3) Monies due or to become due under the covered contract may be retained by the city until compliance is achieved; or
(4) The city may also pursue any and all other remedies at law or in equity for any breach;
(5) Failure to comply with this section may also subject contractor to the procedures set forth in Division 5 of this article, entitled "Debarment of contractors from city work."

(e) Exceptions and waivers.

The provisions of this section shall not apply where:

(1) The contractor does not provide benefits to employees' spouses.
(2) The contractor is a religious organization, association, society or any non-profit charitable or educational institution or organization operated, supervised or controlled by or in conjunction with a religious organization, association or society.
(3) The contractor is a governmental entity.

(4) The sale or lease of city property.

(5) The provision of this section would violate grant requirement, the laws, rules or regulations of federal or state law (for example, The acquisition services procured pursuant to Chapter 287.055, Florida Statutes known as the "Consultants' Competitive Negotiation Act").

(6) Provided that the contractor does not discriminate in the provision of benefits, a contractor may also comply with this section by providing an employee with the cash equivalent of such benefits, if the city manager or his/her designee determines that either:

a. The contractor has made a reasonable yet unsuccessful effort to provide equal benefits. The contractor shall provide the city manager or his/her designee with sufficient proof of such inability to provide such benefit or benefits which shall include the measures taken to provide such benefits or benefits and the cash equivalent proposed, along with its certificate of compliance, as is required under this section.

(7) The city commission waives compliance of this section in the best interest of the city, including but not limited to the following circumstances:

a. The covered contract is necessary to respond to an emergency. b. Where only one bid response is received.

c. Where more than one bid response is received, but the bids demonstrate that none of the bidders can comply with the requirements of this section.

(f) City's authority to cancel contract. Nothing in this section shall be construed to limit the city's authority to cancel or terminate a contract, deny or withdraw approval to perform a subcontract or provide supplies, issue a non-responsibility finding, issue a non-responsiveness finding, deny a person or entity prequalification, or otherwise deny a person or entity city business.

(g) Timing of application. This section shall be applicable only to covered contracts awarded pursuant to bids which are after the date when this section becomes effective.

CONE OF SILENCE AFFIDAVIT

STATE OF Florida)
: SS
COUNTY OF Orange)

I the undersigned hereby duly sworn depose and say that all owner(s), partners, officers, directors, employees and agents representing the firm of Black & Veatch Corporation have read and understand the limitations and procedures regarding communications concerning City of Key West issued competitive solicitations pursuant to City of Key West Ordinance Section 2-773 Cone of Silence (attached).

(signature)
April 10, 2017
(date)

Sworn and subscribed before me this

10 Day of April, 2017.

Christene Waalewyn
NOTARY PUBLIC, State of Florida at Large

My Commission Expires: September 13, 2020

CHRISTINE WAALEWYN
Commission # GG 030123
Expires September 13, 2020
Bonded Thru Troy Fain Insurance 800-385-7019

Florida Board of Professional Engineers
2639 North Monroe Street, Suite B-112
Tallahassee, FL 32303-5268

Black & Veatch Corporation
11401 LAMAR AVE. P3F1
OVERLAND PARK, KS 66211

Each licensee is solely responsible for notifying the Florida Board of Professional Engineers in writing the licensee's current address.

Name changes require legal documentation showing name change. An original, a certified copy, or a duplicate of an original or certified copy of a document which shows the legal name change will be accepted unless there is a question about the authenticity of the document raised on its face, or because the genuineness of the document is uncertain, or because of another matter related to the application.

At least 90 days prior to the expiration date shown on this license, a notice of renewal will be sent to your last known address. If you have not yet received your notice 60 days prior to the expiration date, please call (850) 521-0500, or write, Florida Board of Professional Engineers, 2639 North Monroe Street, Suite B-112,Tallahassee, FL 32303-5268 or e-mail: board@fbpe.org. Our website address is http://www.fbpe.org.

State of Florida

Board of Professional Engineers

Attests that

Black & Veatch Corporation

FBPE
FLORIDA BOARD OF PROFESSIONAL ENGINEERS

Is authorized under the provisions of Section 471.023, Florida Statutes, to offer engineering services to the public through a Professional Engineer, duly licensed under Chapter 471, Florida Statutes.

Expiration: 2/28/2019
Audit No: 228201902414 R

CA Lic. No: 8132

State of Florida
Department of State

I certify from the records of this office that BLACK & VEATCH CORPORATION is a Delaware corporation authorized to transact business in the State of Florida, qualified on December 22, 1998.

The document number of this corporation is F98000006965.

I further certify that said corporation has paid all fees due this office through December 31, 2016, that its most recent annual report/uniform business report was filed on May 5, 2016, and that its status is active.

I further certify that said corporation has not filed a Certificate of Withdrawal.

Given under my hand and the Great Seal of the State of Florida at Tallahassee, the Capital, this the Fourth day of January, 2017

Ken Detzner

Secretary of State

Tracking Number: CU9836181618

To authenticate this certificate,visit the following site,enter this number, and then follow the instructions displayed.

https://services.sunbiz.org/Filings/CertificateOfStatus/CertificateAuthentication

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 11/1/2017 | 3/28/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Lockton Companies 444 W. 47th Street, Suite 900 Kansas City MO 64112-1906 (816) 960-9000	CONTACT NAME: PHONE (A/C, No, Ext): FAX (A/C, No): E-MAIL ADDRESS:
INSURED 1387566 BLACK & VEATCH CORPORATION 11401 LAMAR OVERLAND PARK KS 66211	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : Zurich American Insurance Company — 16535 INSURER B : American Zurich Insurance Company — 40142 INSURER C : Lexington Insurance Company — 19437 INSURER D : INSURER E : INSURER F :

COVERAGES BLAVE01 **CERTIFICATE NUMBER:** 14587645 **REVISION NUMBER:** XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY	N	N	GLO 4641358	11/1/2016	11/1/2017	EACH OCCURRENCE	$ 1,000,000
A	CLAIMS-MADE X OCCUR			GLO 0139245	11/1/2016	11/1/2017	DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 300,000
A	X CONTRACTUAL			GLO 4641367	11/1/2016	11/1/2017	MED EXP (Any one person)	$ 10,000
	X BFPD & C/O & XCU						PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	POLICY PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$ 1,000,000
	OTHER:							$
A	AUTOMOBILE LIABILITY	N	N	BAP 4641355	11/1/2016	11/1/2017	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$ XXXXXXX
	X OWNED AUTOS ONLY; SCHEDULED AUTOS						BODILY INJURY (Per accident)	$ XXXXXXX
	X HIRED AUTOS ONLY; X NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$ XXXXXXX
								$ XXXXXXX
C	X UMBRELLA LIAB X OCCUR	N	N	62785285	11/1/2016	11/1/2017	EACH OCCURRENCE	$ 1,000,000
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$ 1,000,000
	DED RETENTION $							$ XXXXXXX
B A A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? N (Mandatory in NH) N/A If yes, describe under DESCRIPTION OF OPERATIONS below		N	WC 4641353 (AOS) WC 4641354 (ID, MA, WI) WC 0139244	11/1/2016 11/1/2016 11/1/2016	11/1/2017 11/1/2017 11/1/2017	X PER STATUTE OTH-ER	
							E.L. EACH ACCIDENT	$ 1,000,000
							E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

NOTE: AON RISK SERVICES, LOCATED AT 8182 MARYLAND AVE., SUITE 1500, ST LOUIS, MO 63105, IS THE BROKER OF RECORD FOR THE UMBRELLA POLICY EVIDENCED ABOVE. THIS INSURANCE CERTIFICATE HAS BEEN ISSUED FOR INFORMATIONAL PURPOSES UNTIL CONTRACT AWARD

CERTIFICATE HOLDER

14587645
SAMPLE

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Joseph M Arnello

CERTIFICATE OF LIABILITY INSURANCE

11/1/2017

DATE (MM/DD/YYYY) 3/28/2017

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PRODUCER Lockton Companies 444 W. 47th Street, Suite 900 Kansas City MO 64112-1906 (816) 960-9000	CONTACT NAME: PHONE (A/C, No, Ext): FAX (A/C, No): E-MAIL ADDRESS:
	INSURER(S) AFFORDING COVERAGE — NAIC #
	INSURER A : Lexington Insurance Company — 19437
INSURED 15218 BLACK & VEATCH CORPORATION 11401 LAMAR OVERLAND PARK KS 66211	INSURER B : INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES BLAVE01 **CERTIFICATE NUMBER:** 14587648 **REVISION NUMBER:** XXXXXXX

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY CLAIMS-MADE / OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY / PRO-JECT / LOC OTHER:			NOT APPLICABLE			EACH OCCURRENCE	$ XXXXXXX
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$ XXXXXXX
							MED EXP (Any one person)	$ XXXXXXX
							PERSONAL & ADV INJURY	$ XXXXXXX
							GENERAL AGGREGATE	$ XXXXXXX
							PRODUCTS - COMP/OP AGG	$ XXXXXXX
								$
	AUTOMOBILE LIABILITY ANY AUTO OWNED AUTOS ONLY / SCHEDULED AUTOS HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY			NOT APPLICABLE			COMBINED SINGLE LIMIT (Ea accident)	$ XXXXXXX
							BODILY INJURY (Per person)	$ XXXXXXX
							BODILY INJURY (Per accident)	$ XXXXXXX
							PROPERTY DAMAGE (Per accident)	$ XXXXXXX
								$ XXXXXXX
	UMBRELLA LIAB / OCCUR EXCESS LIAB / CLAIMS-MADE DED / RETENTION $			NOT APPLICABLE			EACH OCCURRENCE	$ XXXXXXX
							AGGREGATE	$ XXXXXXX
								$ XXXXXXX
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y / N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		NOT APPLICABLE			PER STATUTE / OTH-ER	
							E.L. EACH ACCIDENT	$ XXXXXXX
							E.L. DISEASE - EA EMPLOYEE	$ XXXXXXX
							E.L. DISEASE - POLICY LIMIT	$ XXXXXXX
A	PROFESSIONAL LIABILITY	N	N	026030198	11/1/2016	11/1/2017	$2,000,000 PER CLAIM & ANNUAL AGGREGATE FOR ALL PROJECTS	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
THIS INSURANCE CERTIFICATE HAS BEEN ISSUED FOR INFORMATIONAL PURPOSES UNTIL CONTRACT AWARD

CERTIFICATE HOLDER

14587648
SAMPLE

CANCELLATION

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AUTHORIZED REPRESENTATIVE

Joseph M Agnello

Staff Resumes

TABLE OF CONTENTS

Rafael E. Frías III, P.E.

PROJECT DIRECTOR, STORMWATER MANAGEMENT

Office Location
Sunrise, FL

Education
- Master of Civil Engineering, University of Kansas, December 2002
- BS, Biological Engineering, Louisiana State University, December 1997

Professional Registration
PE – 2004, FL, 61912
PE – 2011, PR, 24726
PE – 2003, KS, 17469

Specialization Certification and Awards:
- Designing for Effective Sediment and Erosion Control
- 10-hour OSHA Safety and Health Construction Certification
- AWRA A. Ivan Johnson Outstanding Young Professional Award – 2006
- Public Works Magazine 2007 Trendsetters List
- Member of the Board of Directors for AWRA – 2010
- Member of the Potable Reuse Committee for the WateReuse Association – Florida

Professional Associations
- American Water Resources Association
- Water Environmental Federation
- American Water Works Association
- WateReuse – Florida

Year Career Started
1997

Year Started with B&V
1999

Mr. Frias serves as a Senior Project Manager and Client Director with the global water business of Black & Veatch Corporation and is responsible for the management of the Company's operations in Southeast Florida and Puerto Rico. Rafael specializes in the management of water resources projects, including water supply, water treatment, hydropower and stormwater planning and design. Mr. Frias is also experienced in incorporating sustainability principles into project designs and in the development of sustainable water planning technologies for the management of watersheds and ecosystems, water scarcity and wet-weather conditions. Rafael is an active member of the numerous professional associations for which he as published papers and delivered presentations on comprehensive water resources issues, including sustainable water planning, surface water management, water treatment technologies, aquifer storage and recovery (ASR) and small hydropower.

Some of Mr. Frias' key recent assignments and experience include:

- Project management for dam failure studies in Puerto Rico.
- Program Management/Construction Management for implementation of a $455 million Capital Improvement Program in Puerto Rico.
- Experience using of surface water and groundwater modeling applications including HEC-1, HEC-HMS, HEC-GeoHMS, HEC-RAS, HEC-GeoRAS, XP-SWMM, ICPR, TR-55, EPANET, Processing MODFLOW, PLUMES, ArcGIS and project scheduling applications, including Primavera P3e/c and Microsoft Office Project.

PROJECT EXPERIENCE

PRASA | Program Management/Construction Management Services; Puerto Rico

Program Manager/Client Service Manager. Currently assisting with the management of Black & Veatch's Program Management Consortium (PMC) for the Puerto Rico Aqueduct and Sewer Authority (PRASA) South Region. The main task of the PMC is to implement PRASA's five-year $455 million Capital Improvement Program (CIP) to improve the reliability of water and wastewater services; replace, expand or rehabilitate treatment facilities (either for compliance issues, changes in regulatory requirements or as a result of deterioration); and create value and sustainability in the water and wastewater systems of Puerto Rico. Responsible for the project management of planning projects, including evaluation and optimization of water supply systems, assessment of water and wastewater collection systems (pipeline conditions assessments), value engineering for the Rio Valenciano Dam Project, and implementation of renewable energy projects. In addition, responsible for client management and business development activities.

Hillsborough County | South/Central Wastewater Service Area Wastewater Master Plan Update Report; Tampa, FL

Engineering Manager. Managed support services for the production of the South/Central Service Area Wastewater Master Plan Update Report for Hillsborough County. The updated report evaluates different configuration alternatives for a wastewater and reclaimed water system. Support services included technical and editorial review, quality control, cost evaluation and development of GIS schematics for each evaluated alternative.

South Florida Water Management District | L-63N Canal ASR System Reactivation for the Lower Plan; West Palm Beach, FL

Project Manager. Managed the Bench-scale and pilot-scale testing efforts for the L-63N Canal Aquifer Storage and Recovery (ASR) Reactivation project, as part of the Lake Okeechobee and Estuary Recovery (LOER) Plan developed by the South Florida Water Management District (SFWMD) and other state agencies. The objective of the project is to implement a 5 mgd water treatment system, expandable to 10 mgd, at the Taylor Creek/Nubbin Slough ASR site. The new system would use a combination of filtration and disinfection to meet primary drinking water standards, prior to storage. Bench-scale and pilot-scale testing was recommended to determine the best filter and disinfectant for reducing total coliforms to less than 4 cfu/100 mL and resulting in the absence of fecal coliforms. The testing project included a combination of the Gunderboom Marine Life Exclusion System (MLES) for filtration and ozone, UV, peracetic acid/UV, chlorine, and chlorine dioxide for disinfection.

Tampa Bay Water | Continued SWFWMD ERP Permitting Services – Inspection of Stormwater Treatment Facilities; Tampa, FL

Engineering Manager. Managed the completion of numerous inspections for all of Tampa Bay Water's stormwater treatment facilities to assure compliance with SWFWMD ERP requirements. The stormwater inspections involved qualitative evaluations of the facilities to assure proper operation and maintenance, based on specific permit requirements. Statements of Inspections for Proper Operation and Maintenance were submitted to the District for all facilities, together with detailed inspection reports, and all statements received District approval. Final deliverable to Tampa Bay Water included an inspection log identifying all stormwater facilities requiring inspection and the suggested time frame for the inspection to assist with proactive inspections of all facilities in the future.

PRASA | Optimization of the Lajas Valley Irrigation System; Puerto Rico

Engineering Manager. Managed the development of a Water Balance Model (WBM) for the optimization of the Lajas Valley Irrigation System (LVIS), located in the southwestern part of Puerto Rico. The LVIS includes 5 reservoirs, with a total drainage area of 65 square miles, located in 3 different watersheds and interconnected through a series of tunnels, totaling approximately 13 miles in length. Black & Veatch's WBM was used to estimate the yield of the LVIS and optimize its operations, while evaluating the impacts on streamflows, reservoir

levels and hydropower generation. A graphical user interface (GUI) was also developed as part of the model to make it more user-friendly. Numerous scenarios were analyzed for engineering feasibility and conceptual cost estimates for different alternatives were developed. A cost/benefit analysis, including the cost per acre-foot of additional storage, was performed for each alternative and the most cost-effective alternative was identified.

City of Lakeland | English Oaks Wastewater Booster Pump Station Project; Lakeland, FL

Engineering Manager. Managed the stormwater modeling, site grading and drainage facilities design, and ERP permitting efforts for the Drane Field and Air Park facilities. A Standard General ERP was completed for the Drane Field facility and a Noticed General ERP for the Air Park facility. Hydrologic and hydraulics calculations were performed for the Drane Field facility in ICPR. A wet detention system was designed to treat the stormwater runoff that would result from the site and attenuate the peak runoff flow, based on SWFWMD ERP requirements.

City of Ocala | Lake Tuscawilla and Old City Yard Watersheds Flood Analysis; Ocala, FL

Engineering Manager. Managed the evaluation of stormwater drainage systems modeled by the Federal Emergency Management Agency (FEMA) for the Flood Insurance Study (FIS) of Marion County, Florida, to compare with data modeled by the City of Ocala for the Lake Tuscawilla and Old City Yard watersheds. By using the previous XP-SWMM models developed for the City watersheds, project results showed that the additional drainage system details provided in the City models allow for lower BFEs, which may be used to update the FEMA FIRMs for the City.

City of Ocala | Consumptive Use Permit (CUP); Ocala, FL

Project Engineer. Assisted the City of Ocala with a response to a Request for Additional Information (RAI) from St. Johns River Water Management District (SJRWMD), regarding the City's application for renewal of its CUP. Processing MODFLOW and DRAWDOWN, a localized groundwater model, are being used to model aquifer drawdown and analyze the impacts to wetlands, springs, surface water bodies, and interference to existing legal users in the vicinity of the City's wellfields for projected groundwater withdrawals over the next 20 years. ArcView GIS is being used to develop drawdown contours for the Surficial and Upper Floridan Aquifer (UFA) to present impact results.

South Florida Water Management District | Everglades Agricultural Area (EAA) Reservoir A-1, Seepage and Borrow Canal Excavation; West Palm Beach, FL

Project Engineer. Assisted in the preparation of design drawings for the construction of a seepage collection canal and borrow canal. The seepage collection canal would control the seepage from the Everglades Agricultural

Area (EAA) Reservoir A-1 by collecting the flows that result at variable depths. The borrow canal would collect the low water within the reservoir. The soil volume excavated for the construction of the canals would be separated into 3 types of fill materials (rock fill, random fill, and raked random fill) and used for the construction of the 21-mile long reservoir embankment. The construction package included design drawings, specifications, schedule, and opinion of probable cost for the construction of both canals.

City of Ocala | Old City Yard Drainage Study and Detention Basins Design; Ocala, FL

Project Engineer. The Old City Yard watershed has a drainage area of approximately 150 acres. The project involves the completion of a drainage study that involves hydrologic and hydraulic modeling with XP-SWMM to determine the amount of runoff resulting from various rainfall events, including the 25-year 96-hour and 100-year 24-hour storms. The model will also be used to analyze and design improvements to the existing Old City Yard drainage retention area to increase its water quality and quantity storage volume. ArcView GIS is being used to determine specific hydrologic and hydraulic parameters and expedite the development of the model. This project is part of a Stormwater Master Plan that includes the Lake Tuscawilla, Thompson's Bowl, and Old City Yard watersheds, which Black & Veatch is developing for the City of Ocala as part of the City's Downtown Redevelopment Plan.

South Florida Waters Management District | Everglades Agricultural Area Reservoir A-1, Water Balance Model; West Palm Beach, FL

Project Engineer. As part of the design of the Everglades Agricultural Area (EAA) Reservoir A-1, a Water Balance Model (WBM) was developed to analyze and optimize the storage capacity and operations of the reservoir on a daily basis (time step), while evaluating the impacts on flows in the North New River Canal, Miami Canal, Holeyland Distribution Canal, and the STA 3/4 Supply Canal. The WBM was also used to evaluate pumping facility locations and the distribution of releases from the reservoir for agricultural irrigation and environmental purposes. To make the model more user-friendly, a graphical user interface (GUI) was created to allow the input of reservoir characteristics and display results. The model has the capabilities of evaluating numerous water balance scenarios, providing instant results, and optimizing water supply operations. The Water Balance Model was designed by Black & Veatch and may be tailored to other water balance projects.

Isabel C. Botero, P.E.

PROJECT MANAGER

Office Location
Sunrise, FL

Education
- MS, Environmental Engineering, University of Kansas, 2004
- BS, Civil and Environmental Engineering, University of Missouri-Kansas City, 1999

Professional Registration
PE – 2007, FL, 67176
PE – 2005, MO, 2005001044
PE – 2013, PR, 25626

Professional Associations
- Water Environmental Federation, Florida Water Environment Association

Year Career Started
2000

Year Started with B&V
2000-2007; 2012

Ms. Botero is a Project Manager and environmental engineer with fifteen years of experience and knowledge of water and wastewater systems. Ms. Botero has served as project manager, engineering manager, and project engineer on a number of environmental engineering projects including water and wastewater treatment plant facilities design. She has participated in detailed design of water and wastewater projects for alternative delivery methods (design/build/operate). She is also experienced in developing scope documents for pricing of design/build projects.

PROJECT EXPERIENCE

SFWMD | Golden Gate Weir Replacement, Collier County, FL

Project Manager. Ms. Botero is currently leading the dosing of a new water control structure with two automated roller gates, overflow weir structure and new control building to replace an existing weir structure with smaller manual gates.

SFWMD | IT Shelter Replacement Construction Project, Palm Beach and Hendry Counties, FL

Project Manager. Ms. Botero is currently assisting in the construction management of four (4) IT shelters in Palm Beach and Hendry County for the South Florida Water Management District. The project includes construction observation staff, management of submittals/RFIs/cost proposals/change orders and quality control testing.

MDWASD | Water Service Improvement to Non-Residential Properties

Project Manager. Ms. Botero assisted the Miami-Dade Water & Sewer Department (MDWASD) with developing a plan, including planning level cost estimates and project schedules for the improvements of water infrastructure to non-residential zoned properties within MDWASD's service area currently under-sized to bolster commercial re-development. Once the project is implemented, over 15,000 parcels sites will have improved water service.

BCWWS | Improvement Projects – General Engineering Services

Engineering Manager. As part of the execution of the General Engineering Services for wastewater, Ms. Botero has participated on the design and construction phase services for multiple improvements projects at the North Regional WWTP including replacement of pump pads for the effluent pumps and improvements to the aeration basins, shorting contactors panels replacement at the outfall pump station and clarifiers rehabilitation.

PRASA | Redevelopment of the Lago Loiza (Carraizo) Hydroelectric Facilities

Engineering Manager. The project includes rehabilitation of one turbine generator unit to supply approximately 1.1 MW. The energy generated by the

rehabilitated facility will supply power to a raw water pump station supplying water to a water treatment plant.

MDWASD | Sewer to Commercial Properties

Engineering Manager. Ms. Botero assisted the Miami-Dade Water & Sewer Department (MDWASD) with developing a plan, including planning level cost estimates and project schedules for the addition of sewer infrastructure to commercial zoned properties within MDWASD's service area currently not connected to these systems to bolster commercial re-development. Over 3,000 parcels sites were analyzed for sewer system extensions.

City of Key West | RFQ Development

Engineering Manager. Ms. Botero is currently developing a Request for Proposals (RFP) to select a contractor for the Operations and Maintenance of the Wastewater Treatment Plant, Sewer and Stormwater Collection Systems for the City of Key West. After the publication of the RFP, Ms. Botero will participate in the review and ranking of the submittals for the final City's selection.

PRASA | Lago Cidra Dam and Candelas Pump Station Rehabilitation

Engineering Manager. Ms. Botero assisted in the development of the accelerated design for improvements to the Lago Cidra Dam and Candelas Pump Station. The project included the replacement of mechanical equipment, including valves, gates and pumps at the existing PRASA facilities. Improvements to the electrical system and instrumentation and controls were also part of the project.

City of Hollywood | Energy Efficiency Master Plan

Engineering Manager. Ms. Botero participated in the development of a comprehensive Energy Efficiency Master Plan for the City of Hollywood's Water and Wastewater systems and facilities. The master plan resulted in an implementation plan for 20 recommended energy cost savings projects and strategies with a net positive value of $4.4 million to the City over the life of the improvements.

PRASA | PRASA Hydroelectric System Evaluation

Engineering Manager. Ms. Botero assisted in the evaluation of existing hydroelectric facilities. The initial phase included the assessment of the existing facilities and issuing recommendations on rehabilitation and modernization. A water availability model and operation reservoir curves were developed for the Loco, Luchetti, Guayo, Yahuecas and Prieto reservoirs. The final component of the project include an economic feasibility evaluation for the implementation of the improvements.

Bogota Water & Sewer Authority | Water Distribution System Master Plan; Bogota, Colombia, South America

Project Manager. Preparation of the Water Distribution System for the City of Bogota which serves approximately 8 million people. The master plan issued recommendations for infrastructure improvements for a period of 20 years in the future.

Bogota Water & Sewer Authority | Water Pipeline Geotechnical Stabilization; Bogota, Colombia, South American

Project Manager. Preparation of the final design of geotechnical stabilization measures for two water distribution mains, a 24-inch and a 60-inch situated in critical locations of the City of Bogota.

City of Boynton Beach | East Water Treatment Plant Disinfection System Upgrade; Boynton Beach, FL

Construction Project Manager. Execution of the disinfection system upgrade for the 24-mgd East Water Treatment Plant.

Miami Dade County | Alexander Orr Jr. Water Treatment Plant, Chlorine Gas Onsite Generation System; Miami, FL

Project Manager. Design of a new chlorine gas onsite generation system for the 215-mgd water treatment plant with an average consumption close to 9,000 pounds per day (ppd). The system is designed with a firm capacity of 20,000 ppd of chlorine production and will replace the existing practice of storing 90-ton chlorine gas railcars at the plant located in a residential area.

City of Dania Beach | Solids Handling System and Backwash Recovery Modifications; Dania Beach, FL

Project Manager. Led the design of a new lime sludge thickener for the existing water treatment plant, and modifications to the existing backwash recovery basin to improve the residuals handling system at the water plant.

Solid Waste Authority of Palm Beach County | North County Resource Recovery Facility Alternative Water Supply Evaluation; Palm Beach County, FL

Project Engineer. Identified the current and future water demands for the facilities to help identify various water supply alternatives. Several alternative water supplies were evaluated including different reuse options and LPRO treatment onsite.

City of Boynton Beach | East Water Treatment Plant Disinfection System Upgrade; Boynton Beach, FL

Project Manager. Responsibilities included development of preliminary design of the new on-site sodium hypochlorite generation system, obtaining the Palm Beach County Health Department Permit, and development of bidding documents. The new disinfection system is housed in the existing chlorine building, including coordination of demolition and new construction while

maintaining the existing plant online with a temporary chlorination system. The system will have a capacity to treat 24-mgd.

South Florida Water Management District | Lake Okeechobee Fast Track (LOFT) Project; Lakeside Ranch, FL

Project Engineer. Preliminary design and coordination with multiple sub-consultants during the development of two new pump stations to support the LOFT project. The design includes the S-191A flood control pump station with 450-cfs capacity, and the intake pump station with 250-cfs capacity for the Lakeside Ranch stormwater treatment area. Managed survey work.

Seacoast Utility Authority | Hood Road Water Treatment Plant Membrane Conversion; Palm Beach Gardens, FL

Project Engineer. Provided detailed design of the transfer system (from the new clearwell to the existing ground storage tanks) and the NF and LPRO concentrate pumps using the WATERGEMS modeling application for the 30.5-mgd plant. Also assisted with the design of the NF and LPRO membrane feed pumps.

Western Corridor Recycled Water Pty Ltd | Bundamba Advanced Water Treatment Plant; Brisbane, Australia

Engineering Manager. Developed technical scope documents for pricing and procurement for the 20-mgd design-build reuse plant. Process equipment included ultraviolet (UV) disinfection, microfiltration (MF) and reverse osmosis (RO) membranes, plate settlers, clarifiers, and denitrification filters. Responsibilities included coordination of the detailed design of the following areas: treated water, residuals, and chemical feed facilities with team members located in offices in three different continents.

Yucaipa Valley Water District | Wochholz Wastewater Treatment Plant Secondary Treatment Expansion; Yucaipa, CA

Project Engineer. Assisted with completing the detailed design of an integrated fixed-film/activated sludge (IFAS) aeration system, return activated sludge pumping, and UV disinfection to expand the plant from 4.5 to 8 mgd. Developed a hydraulic profile for the entire facility to include all the improvements to existing structures and the addition of new processes.

Maricopa County | White Tanks Water Treatment Plant; Maricopa County, AZ

Engineering Manager. Provided detailed design for a new 13.4-mgd water treatment plant. The design included: intake structure, raw water pump station, raw water tanks, flocculation, dissolved air flotation system, filters, UV disinfection, finish water reservoir and pump station, site layout, and underground utilities plan. Developed documents to obtain construction permits of all facilities.

City of Phoenix | Lake Pleasant Water Treatment Plant; Phoenix, AZ

Project Engineer. Assisted in the development and coordination of the basis of design report for this 80-mgd water treatment plant.

City of Phoenix | Lake Pleasant Water Treatment Plant; Phoenix, AZ

Design Engineer. Provided the technical design for a design/build proposal including 80-mgd Actiflo complex (rapid mixing, coagulation, flocculation and sedimentation), ozone contact basins and building, and UV disinfection facilities.

Metropolitan Council Environmental Services | Eagles Point WWTP; Cottage Grove, MN

Design Engineer. Provided detailed design for a design/build project including expansion of a 10-mgd wastewater treatment plant. Provided design for UV disinfection facilities, a re-aeration basin, influent pumping station (rated at 30-mgd), screening facilities, site drainage and yard piping. Developed drawings and specifications using client standards.

Puerto Rico Aqueduct and Sewer Authority (PRASA) | CIP Annual Inspections; Puerto Rico

Inspector. Inspected, evaluated, and collected field data of the urban San Juan potable water distribution system. The facilities inspected included potable water booster pumping stations, and reservoirs. The evaluation included existing maintenance conditions and structural integrity of the facilities visited. She also evaluated preventive maintenance and capacity of response to emergency situations.

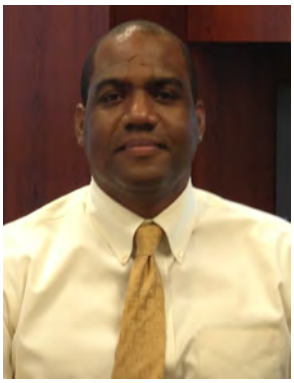
USAID/FHIS | Hurricane Mitch Relief Projects; Honduras, Central America

Design Engineer. Design engineer for a group of reconstruction projects located in the south region of Honduras. The projects included the design of water, wastewater, and solid waste systems. Served as a liaison between the design work done in Kansas City headquarters and the local office at Tegucigalpa Honduras.

AFI | Dorado Regional Wastewater Treatment System, AFI; Dorado, Puerto Rico

Design Engineer. Provided preliminary design of different options for the headworks building including influent pumping station, intermediate pumping station, and stormwater pumping station. Prepared a Request for Proposals document and cost estimate. Other responsibilities included developing liquid and solids schematics, and layout for the plant; and coordinating with other disciplines involved in the project. Performed research on different equipment manufacturers to be added to the PRASA approved manufacturers list.

Robert Chambers



CLIENT SERVICE ADVOCATE, UTILITY RATE STUDIES AND BOND ENGINEERING REPORTS

Office Location
Orlando, FL

Education
- BS, Finance University of Central Florida, 2002
- BA, Finance University of Central Florida, 2002
- MBA, Crummer Graduate School of Business, Rollins College, 2007

Year Career Started
2001

Year Started with B&V
2010

Mr. Chambers is a Manager with extensive utility and consulting experience involving a variety of projects associated with electric, water and wastewater, both public and private, throughout the southeastern United States. His utility knowledge covers a wide range of utility finance issues, including capital financing analyses, valuation studies for acquisitions, revenue bonds, utility rates, utility regulatory processes, economic feasibility studies and cost-of-service studies.

In addition, Mr. Chambers has developed dynamic and interactive financial models for utility cost-of-service studies, rate studies, financial benchmarking, data retrieval and analysis, feasibility analyses, system expansion programs, capital acquisition alternatives, wholesale capacity transactions and utility regionalization scenarios. Mr. Chambers has spoken at national utility programs such as AWWA – Utility Management and the Southwest Florida Government Financial Officers Association conferences on topics such as demand management, program development, and financial planning, and he has earned a Masters of Business Administration with a concentration in Finance.

PROJECT EXPERIENCE

City of Key West | Wastewater & Stormwater Utility Rate & Feasibility Analysis; Key West, FL

Black & Veatch has been providing financial consulting services to the City of Key West as the City endeavors to complete over $50 million in wastewater construction projects required to enhance environmental protection in the Florida Keys. The City, which operates a wastewater collection and treatment system as well as a stormwater system, is responding to requirements of the Florida Department of Environmental Protection, as well as the desires of the citizenry. The construction program has been supported by the acquisition of Federal and State grant funds, and is being completed using retained revenues of the wastewater and stormwater enterprise funds. Black & Veatch has conducted annual rate study updates for the City's wastewater and stormwater system since the inception of the wastewater construction project. Mr. Chambers has served as the project manager for these engagements.

Broward County | Water & Wastewater Rate Structure Review; Broward County, FL

Over the last fifty years, the South Florida region has experienced a total of nine periods of significant water scarcity. These drought conditions emanated from monthly rainfall deficits and a decline in water storage volumes which prompted the Water Management Authorities to issue drought management mandates.

As a result of the most recent drought condition (2007 – 2010 ongoing), the Water and Wastewater services of Broward County ("the County") has experienced significant reduction in total treated water which created difficulty in forecasting projected revenues. The County required water and sewer rate

structure review that simulated the County's revenue generation ability based on specific environmental, market, and regulatory conditions. Mr. Chambers lead the project team that performed an independent review of the assumptions and philosophical drivers that were taken into consideration prior to developing the County's existing rates and developed specific simulations of water and wastewater revenues utilizing price elasticity coefficients, simulating the impact of the South Florida Water Management District phased drought conditions, incorporated specific customer water usage characteristics in the South Florida region, whilst maintaining the original rate setting principles of revenue stability and water conservation during the process of simulating specific events.

Miami-Dade Water and Sewer Department | Common Cost Allocation Study; Miami-Dade County, FL

Miami-Dade Water and Sewer Department required a common cost allocation assessment to assess their common cost allocation procedures related to regional and local water and wastewater functions. The cost allocation assessment was performed utilizing the principles established in the Federal Office of Management and Budget Circular A-87, which established a dedicated procedure that governmental agencies must follow in calculating the direct and indirect cost that may be included for grant applications and other federally funded projects. Mr. Chambers served as the project manager on the project team that completed the assessment.

City of Venice | Water & Wastewater Rate Study; Venice, FL

The City of Venice required a comprehensive financial and rate analysis to determine its ability to meet the annual utility system obligations. The project team, in association with the appropriate city staff, developed a financial forecast for the period FY 2010 through FY 2014, which was designated as the forecast period. The financial forecast provided the city with the ability to understand the financial responsibilities, address and mitigate potential revenue requirement needs, determine a plan to fund annual renewal and replacement needs, and establish the revenue needs of the utility system over the forecast period.

In addition, the project team performed a cost service analysis, designed new water and sewer, and reviewed all the utility system rates charged by the City of Venice. Mr. Chambers served as the Project Manager of this engagement. At the completion of the analysis, Mr. Chambers presented the final results of the entire study to the appropriate City staff, the City Council, and other stakeholders as directed by the City. The project team was successful in retaining approval of the financial forecast and rate design from the City Council.

Ricardo Vieira, PE

Experienced in leading and completing design management, program management, project management, and task management for water, wastewater, reclaimed, and storm-water transmission and conveyance projects in urban environments. Experience includes preparing and leading multiple preliminary engineering reports, construction documents, design-build criteria packages, design specifications and plans; permitting, operations and maintenance manuals, project tracking and management. His experience brings together all elements of the design process into a single coordinated effort.

Experience also includes the design of roadway improvements, storm drainage systems, site development projects, and modeling and transient analysis.

TASK LEADER: CIVIL ENGINEER

Office Location
Miami, FL

Education
- BS, Civil Engineering, Universidad Central de Venezuela, 1998

Professional Registration
PE – 2011, FL, #73166

Professional Associations
- Water Environment Federation (WEF)
- Florida Water Environment Association (FWEA)
- American Water Works Association (AWWA/FSAWWA)
- ASCE /ASCE Palm Beach/ FAU Practitioner/Advisor/ Committee Chair

Year Career Started
1999

Year Started with B&V
2016

PROJECT EXPERIENCE

Miami-Dade Water and Sewer Department | 96-inch Raw Water Main Limited Manned Entry and Field Observations; Miami, FL

Project Manager. Involved in the site visit during the rehabilitation of the pipeline, performed a limited manned entry assessment of the pipeline's internal condition, and performed a quality assurance review of the ongoing CFRP efforts of this raw water line.

Miami-Dade Water and Sewer Department | 54-inch Water Main Limited Manned Entry and Field Observations; Miami, FL

Project Manager. Involved in the preparation of condition assessment report for a 54-inch carbon fiber repairs located along Red Road Ave that transfers water from the John E. Preston Treatment Plant to the City of Hialeah and other areas of North Miami-Dade County. Mr. Vieira performed a limited manned entry assessment of the pipeline's internal condition. The condition assessment portion included a total of 12 pipe sections and had the following tasks: visual inspection of carbon fiber repairs and soundings to asses existing conditions, identify deficiencies, recommend an approach for rehabilitating distressed sections of line.

Miami-Dade Water and Sewer Department | 72-inch Force Main Design Build Criteria Package; Miami-Dade County, FL

Project Manager for Pipeline Rehabilitation/Replacement Basis of Design Report and Design Criteria Package. Mr. Vieira provided recommendations for a pipeline rehabilitation method(s), along with the preparation of the Design-Build Criteria Package for the selected alternative. He provided support and assistance to MDWASD for the Request of Proposals and presented the criteria package at the pre-bid meeting. He is assisting the County during selection process of contractor of the replacement/rehabilitation of the 72-inch force main Interceptor, approximately 3.5 miles long which conveys wastewater along NW/NE 159th Street to the North District Wastewater Treatment Plant. Mr. Vieira will also provided an orientation workshop to the evaluation committee.

Miami-Dade Water and Sewer Department | North Bay Village Force Main Design; Miami, FL

Project Coordinator. Approximately 13,650 LF of 16-inch force main piping from the City of North Bay Village's existing Main Pump Station, to a connection point with the WASD wastewater system located in the City of Miami. The force main route included three water crossings, one which crossed beneath the Intracoastal Waterway. The crossing between Treasure Island and North Bay Island is approximately 1,200 LF, North Bay Island and Pelican Harbor Island is approximately 1,390 LF, and Pelican Harbor Island and the City of Miami is approximately 2,680 LF. The pipeline was designed, permitted, constructed, flushed, pressure tested, and certified complete as required by WASD, with all permitting agencies having jurisdiction as specified.

MDWASD | Design-Build Criteria for the Government Cut 20-inch Water Main and 54-inch Force Main Replacement; Miami, FL

Project Coordinator. Mr. Vieira was part of the design team developing design-build criteria package for the replacement of the existing 54-inch force main that runs from Miami Beach to the Central District Wastewater Treatment Plant (CDWWTP) and for the replacement of the existing 20-inch water main from Port Island to Fisher Island.

This project involved the horizontal and vertical alignments, identification of land rights and properties affected by the alignment, recommendation method of construction and details of water main replacement, project schedule through construction and opinion of probable construction costs, assist MDWASD through the procurement process, selection of design-build team and negotiations and provide limited construction management support to MDWASD in responding to RFIs, reviewing shop drawings, change orders and claims, and site visits and/or inspections.

Miami-Dade Water and Sewer Department | Design of a 72-inch Raw Water Main; Miami, FL

Project Cordinator. Mr. Vieira designed of a 72-inch Raw Water Main (RWM) to transport raw water from the WASD Northwest Wellfield to the Hialeah/Preston Treatment Plant. The proposed RWM will serve as a redundant pipeline to the existing 96-inch RWM running along NW 74th Street. Mr. Vieira's tasks included developing design criteria and construction constraints, and performing route and pipe material evaluations.

Miami-Dade Water and Sewer Department | Design of a 60-inch Force Main; Miami, FL

Project Coordinator. Design of a 60-inch force main more than two miles from the South Miami Heights Water Treatment Plant, to an existing 72-inch force main leading to the South District Wastewater Treatment Plant. His tasks included developing design criteria and construction constraints, and performing route and pipe material evaluations.

Miami-Dade Water and Sewer Department | Design of 16-inch Distribution Pipeline for Reclaimed Water; Miami, FL

Project Coordinator. Mr. Vieira was responsible for 3.4 miles of 16-inch reclaimed water pipeline. The scope of work included the preparation of a Basis of Design Review (BODR) Report; 30%, 60%, and 90% submittal, construction documents, technical specifications, and permitting.

Miami-Dade Water and Sewer Department | Evaluation of 54-inch Red Road Water Main Failure; Miami, FL

Project Coordinator. The MDWASD experienced a catastrophic rupture of a 54-inch diameter PCCP water transmission main which provided potable water to the City of Hialeah and northern Miami-Dade County. Mr. Vieira was part of the team for the failure evaluation and report for the assessment evaluation of the 54-inch water main.

City of Houston | 72-inch Waterline along Fuqua; Houston, TX

Project Engineer. Mr. Vieira performed design and construction phase service activities. This project involved the design and construction of 12,400 LF of 72-inch water transmission line by open cut and tunneling methods. In addition to the main line work, multiple off-site projects were added to the bid package. Mr. Vieira collaborated and managed subconsultants to add a 48-inch steel waterline along Northcourse, a 30-inch steel waterline along Westview, and pump station improvements for Southwest PS.

City of Houston | 30 and 42-inch Waterline from Knight and Holmes Road to Sims Bayou Pump Station; Houston, TX

Project Coordinator. Mr. Vieira was part of the team responsible for design and construction phase service activities. This project involved 39,000 LF of 42-inch water transmission line. In addition, the project included extensive pavement reconstruction along concrete roadways.

City of Houston | 156-inch Northeast Water Transmission Line Partnership Feasibility Study; Houston, TX

Task Leader. Mr. Vieira focused on a Phase I Preliminary Design for approximately 11 miles of diameters ranging from 72 to 156-inch water transmission lines. The routing included evaluations of existing and proposed easements and TxDOT crossings. The primary objectives of the analysis considered improving water system pressures, decommissioning groundwater plants, and providing additional surface water to the ETJ areas of the City of Houston.

City of Houston | Condition Assessment of 60-inch Water Main; Houston, TX

Project Coordinator. Mr. Vieira utilizalized Geographic Information System (GIS) to perform transient analysis and condition assessment of the existing 60-inch water transmission main. The existing PCCP segment was approximately

10,000 feet long within the right-of-way of Polk, Bastrop, Bell, Denver, and Clay streets.

West Harris County Regional Water Authority (WHCRWA)| Surface Water System Planning; West Harris County, TX

Project Coordinator. WHCRWA contracted with LAN to identify feasible alternatives and determine the cost of treatment and transmission of surface water to customers currently using groundwater. Mr. Vieira used GIS software to analyze historic groundwater production; summarize census tract population, water use, and demand by geographic areas; and to calculate and assign water demand to nodes in a hydraulic model of the surface water distribution system.

City of Houston | Southhampton Main Replacements; Houston, TX

Task Leader. Construction plans, specifications, and documents for the preparation of Operations Plan (OP) manuals for approximately 21,000 feet of an 8-inch water main.

Tammy M. Martin, P.E.

TASK LEADER: UTILITIES ENGINEERING

Office Location
Coral Springs, FL

Education
- BS, Civil Engineering (summa cum laude), Florida Atlantic University, 2005

Professional Registration
PE – 2011, FL, 73892

Year Career Started
2006

Year Started with B&V
2015

Ms. Martin is an engineering manager and environmental engineer with nine years of experience and knowledge of water and wastewater engineering and pump station mechanical process design. Ms. Martin has served as project engineer on a number of environmental engineering projects including stormwater design, permitting, and construction management. She is proficient with WaterGEMS modeling, HEC-RAS modeling, and Arc GIS. She has participated in detailed design and construction of alternative delivery methods (design/build/operate).

PROJECT EXPERIENCE

SFWMD | Golden Gate 4 Weir Replacement; Collier County, FL

Engineering Manager. Ms. Martin is currently managing the design of a new water control structure to replace an existing manual weir structure. The new structure will consist of two automated roller gates, an overflow weir structure and new control building.

City of Hollywood | SCADA Improvements for Sludge Process Control; Hollywood, FL

Engineering Manager. Black & Veatch is currently supporting the City of Hollywood with the development of Automation and SCADA improvements for the Optimization of the City's Southern Regional Wastewater Treatment Plant sludge process control system and Ms. Martin is managing the design.

SFWMD | IT Shelter Replacement Construction Project; Palm Beach and Hendry Counties, FL

Engineering Manager. Ms. Martin is currently assisting in the construction management of four (4) South Florida Water Management District IT shelters in Palm Beach and Hendry Counties. The project includes construction observation staff, quality control testing, and document control of submittals, RFIs, cost proposals, change orders, and pay applications.

BCWWS | Improvement Projects – General Engineering Services

Engineering Manager. As part of the execution of the General Engineering Services for wastewater, Ms. Martin has participated on the design and construction phase services for multiple improvements projects at the North Regional WWTP including clarifier rehabilitation and the replacement of transformer number 1. She has also provided construction phase services for the painting at master lift stations 226 and 452 and design services for the wetwell refurbishment at pump stations 452, 458, and 460.

Solid Waste Authority of Palm Beach County | Palm Beach Renewable Energy Facility No. 2; Palm Beach County, FL

Project Engineer/Assistant Construction Manager. For the Solid Waste Authority of Palm Beach County's (SWA) new 3,000-tpd mass burn Waste-To-

Energy (WTE) facility, Ms. Martin created several separate WaterGEMS hydraulic models of existing process systems and proposed new process systems for the selection of six different pumps. To select pumps for the smaller process systems, she prepared hydraulic calculation spreadsheets. She reviewed and revised civil and process mechanical specifications and prepared, reviewed and edited civil and process mechanical plan set in close collaboration with the Orlando design team. Ms. Martin also reviewed and assisted with the hydraulic calculations for the extensive rainwater harvest system, piping layouts, and connections to the 2 MG tank. After working for several months as a design engineer, Ms. Martin transitioned to continue working on the project during construction. As the on-site project engineer, she provided coordination between the design engineers and the construction of the onsite roadways, drainage, utilities, landscaping, grading, and fencing. She was the link between the design engineers and the construction of the tipping floor building, as well as the building for air pollution control, ash handling, maintenance/warehouse, and all services and utilities therein. Additionally, the project included constructing the siding and roofing on the refuse pit, boiler water treatment, and turbine generator buildings and the design and construction of a Platinum LEED®-certified visitor center. She was responsible for reviewing and processing all submittals and requests for information (RFIs) received from the subcontractors and coordinating with the design engineers for their timely input. She maintained the project as-built surveys, redline drawings, and record drawings and specifications and ensures that all on-site team members have the most up-to-date set of drawings. She attended and participated in various weekly meetings with subcontractors, internal project team members, the prime contractor, and the owner.

City of Boca Raton | Water Supply Wells; Boca Raton, FL

Project Engineer. Ms. Martin created a WaterGEMS hydraulic model of three new water supply wells and their connection to the city's existing water treatment plant. She then utilized the model output to select pumps for the three water supply wells. She reviewed and revised civil and process mechanical specifications and prepared, reviewed and edited civil and process mechanical plan set. She attended and participated in internal project meetings, coordinated with the surveyor, and conducted a tree survey along the proposed pipeline.

City of Lake Worth | Lake Worth Park of Commerce Infrastructure Assessment; Lake Worth, FL

Project Engineer. Ms. Martin created a WaterGEMS model of the city's existing water distribution system within the Park of Commerce boundaries as well as possible improvements to the system based on future growth in the area. Her written analysis of the modeling was included in the overall infrastructure assessment report.

South Florida Water Management District | S-650 Pump Station Engineering Services during Construction; Martin County, FL

Project Engineer. Conducted shop drawing reviews for all process mechanical submittals and prepared responses to requests for information (RFIs) from the contractor. She worked closely with project team members and the client, responding to requests for documents, figures, and information. Additionally, Ms. Martin attended the physical model test of the pump and intake structure by a South Carolina hydraulic laboratory.

South Florida Water Management District | S-191A Pump Station Design; Okeechobee County, FL

Project Engineer. Assisted in the design of the S-191A Pump Station, including mechanical process design calculations; coordination with pump manufacturers and preliminary pump selection; coordination with subconsultants; report preparation; reviewing and revising specifications; and reviewing and editing project plan set. She attended and participated in client and internal project meetings. She also worked closely with project team members and the client, responding to requests for documents, figures, and information. In addition, Ms. Martin assisted with preparation of responses as part of the client's technical review process.

Miami-Dade County | Alexander Orr Jr. Water Treatment Plant, Chlorine Gas Onsite Generation System; Miami, FL

Project Engineer. Assisted in the design of the on-site chlorine gas (OSG) system including design calculations for the containment area and associated piping for the salt/brine storage tank area; mechanical process design calculations for the chlorine feed pumps for the eductor room; coordination with pump manufacturers and preliminary pump selection; coordination with subconsultants; report preparation; reviewing and revising specifications; and reviewing and editing project plan set. She attended and participated in client and internal project meetings. During the bid phase of the project, Ms. Martin reviewed and summarized the bid packages and attended meetings with the client and prospective bidders including delivering a presentation on the Alexander Orr project.

Seacoast Utility Authority | Hood Road Water Treatment Plant Membrane Conversion and Raw Water Repump Facility; Palm Beach Gardens, FL

Project Engineer. Designed a lift station for the Seacoast Utility Authority Water Treatment Plant (WTP) conversion project site, assisted in the preparation and filing of the lift station permit, reviewed and edited technical specifications, and created a preliminary site layout for the Hood Road Raw Water Repump Facility. Ms. Martin also revised the client's existing WaterGEMS models for their potable water distribution system and reclaimed water distribution system to include several new "what-if" scenarios assist the client with planning of future projects and presented the modeling results in a memorandum and several meetings with the clients.

South Florida Water Management District | S-650 Pump Station Design; Martin County, FL

Project Engineer. Assisted in the design of the S-650 Pump Station, including design calculations, coordination with subconsultants, report preparation, reviewing and revising specifications, and reviewing and editing project plan set. She attended and participated in client and internal project meetings. She worked closely with project team members and the client, responding to requests for documents, figures, and information. Ms. Martin worked with the project manager and team to prepare a presentation for the client's Value Engineering study. In addition, Ms. Martin assisted with preparation of responses as part of the client's technical review process.

Duke Energy | Cliffside Landfill Permit and Design; Charlotte, NC

Project Engineer. Completed the WaterGEMS model for the leachate collection and distribution system as part of the design of two new landfill cells for Duke Energy. She obtained pump data and revised technical specifications for the submersible leachate collection pumps and the axial flow pumps for the leachate distribution system.

Florida Department of Environmental Protection | Indian River Lagoon Tributaries Total Maximum Daily Load Model Support; Florida

Project Engineer. Assisted as project engineer in the total maximum daily load (TMDL) model support. She compiled, summarized, and organized climatological data, including hourly and daily rainfall, wind speed air temperature, solar radiation, cloud cover, dew point temperature, and pan evaporation. She performed a geospatial analysis of the data coverage in support of hydrologic modeling and assisted with report preparation.

Florida Department of Environmental Protection | Total Maximum Daily Load Model Development, Kissimmee River Watershed; Florida

Project Engineer. Collected data for the development of the HSPF model for the Kissimmee River Basin. Her responsibilities included compiling climatological data, including hourly and daily rainfall, wind speed air temperature, solar radiation, cloud cover, dew point temperature, and pan evaporation; geospatial analysis of the data coverage in support of hydrologic modeling; and report preparation.

Palm Beach County Water Utilities | Lake Region Water Treatment Plant; Palm Beach County, FL

Project Engineer. Created geographic information system (GIS) figures showing the geographic distribution of the historical development of Belle Glade, South Bay, and Pahokee using historical aerial photographs in conjunction with data from Palm Beach County. She also created GIS figures displaying the geographic distribution of large and small water meters in Belle Glade, South Bay, and Pahokee. These figures were used for analysis of the pipe network and modeling efforts.

South Florida Water Management District | Lake Okeechobee Fast Track (LOFT) Project; Okeechobee County, FL

Project Engineer. Assisted with the basis of design report for a 26,400 ac-ft reservoir and a 2,700 acre stormwater treatment area for the SFWMD. She attended client and stakeholder meetings and prepared meeting summaries. She created GIS figures of project sites for multiple sections of the design report; researched and photocopied 150 groundwater well permits at SFWMD offices for use by the groundwater modeling team; obtained rainfall and stage data from DBHYDRO for use by the SWMM modeling team; and assisted with the initial preparation of the HEC-RAS dam breach model for the reservoir. In addition, she performed a hazard potential classification for the Lakeside Ranch STA that included several HEC-RAS dam breach model scenarios and report.

Bradley Vanlandingham, P.E.

Bradley has extensive experience designing a variety of projects including water and wastewater treatment plants, solid waste transfer stations, laboratories, and power stations.

TASK LEADER: STRUCTURAL ENGINEERING

Office Location
Orlando, FL

Education
- BS, Civil Engineering, Rose-Hulman Institute of Technology, 1985

Professional Registration
PE-1991, FL, 44795

Professional Associations
- American Water Works Association
- Water Environmental Federation

Year Career Started
1986

Year Started with B&V
1986

PROJECT EXPERIENCE

New Smyrna Beach Utilities Commission | Smith Street and Glencoe WTP Pumping Station Improvements & 20-inch Pipeline; New Smyrna Beach, FL

Project Engineer. Responsible for providing the construction phase services for two potable water pumping stations, yard piping modifications and over 3 miles of 20-inch pipeline through an urban setting. Total installed pumping station capacity is 12 mgd. The Smith Street pumping station includes a complete site design, environmental resource permitting, demolition of existing facilities and a new building to house the new pumping station and engine generator. The 20-inch pipeline connects the two pumping stations and includes both jack-and-bore and directional drill trenchless crossing. A routing study was performed to identify the optimum route for this pipeline as it is installed in an urban setting.

Orange County | Orangewood and Hunters Creek Water Supply Facilities; Orlando, FL

Project Engineer. Responsible for the design and permitting of modifications at two existing water plants. Modifications at Orangewood include replacing the entire electrical and control systems, a new engine generator, constructing a well house around one of the existing wells, new roof on the High Service Pump Building, new flow meter for finished water, and demolition and removal of old high service pumps and discharge piping. Modification at Hunters Creek include adding a high service pump, adding a cascade tray aerator on top of an existing ground storage tank, and increasing the size of the piping between the two ground storage tanks to decrease head loss.

City of St. Petersburg | Oberly and Washington Terrace Pumping Station Improvements; St. Petersburg, FL

Structural Engineer. Performed detailed structural design and construction phase services for improvements to the City's 80 mgd Oberly P.S. and 45 mgd Washington Terrace P.S. to accommodate improvements that included addition of pump VFDs, replacement of emergency engine-generators, and replacement of pump switchgear.

Tampa Bay Water | System Engineer; Clearwater, FL

Project Engineer. Contributed to numerous projects as part of a $600 million expansion program for Tampa Bay Water which includes a desalination plant, a surface water treatment plant, pumping stations, and pipelines. Brad was the Project Engineer for the System Enhancements Contract 1 project at the Regional Facilities Site which included the addition of a booster pump station, sodium hypochlorite and ammonia feed systems, engine generator, and variable

frequency drive for a high service pump. Brad also assisted in evaluating chemical feed improvements at the Regional Facilities Site and designed a canopy to cover the lime mixing basins in accordance with FDEP regulations concerning CT. He also designed cleaning solution storage tank at the Desal Plant and evaluated structural concerns at the Cypress Creek Pump Station.

Tampa Bay Water | Water Pipeline; Clearwater, FL

Structural Engineer. Designed anchorage for a line stop in a 72-inch PCCP water line. Design included steel sheet piling and massive concrete placement to restrain a temporary plug inserted in the pipeline under pressure.

City of St. Petersburg | Cosme WTP; St. Petersburg, FL

Structural Engineer. Designed electrical building including foundation, masonry walls, and concrete roof.

Orlando Utilities Commission | Pine Hills WTP; Orlando, FL

Structural Engineer. Designed operations building foundation, steel frame with masonry walls, and a 2-mg cast-in-place reservoir.

Manatee County | Stilling Basin Wall Instigation; Bradenton, FL

Structural Engineer. Conducted a study of tall retaining walls downstream of the gated spillway of the Lake Manatee Dam to determine cause of movement and recommend remedial actions. Tasks included specifying surveying work, design of movement indicators, reviewing field data, performing structural calculations, and writing a report summarizing the work.

Manatee County | Lake Manatee Dam Annual Inspection Report; Bradenton, FL

Civil/Structural Engineer. Assessed the condition of civil/structure aspects of an earthen dam and its gated service spillway, emergency spillway, intake structures, and embankments. Determined the cause of deficiencies and recommended repairs.

Sarasota County | Wastewater Collection System, Lift Station SCADA System; Sarasota, FL

Structural Engineer. Design of supports for control panels, RTU's and telemetry antennas. Design wind speed was 150 mph and materials were limited to aluminum and stainless steel.

JEA | Westside Service Center, Bushing Building Modifications; Jacksonville, FL

Structural Engineer. Designed steel framing and foundations to add a bridge crane in an existing pre-engineered metal building. The design required that a separate frame be constructed inside of the existing frame due to inability of the existing framing to support the added loading.

Bryan M. Martin, P.E.

Mr. Martin has 10 years of experience specializing in water and wastewater treatment plant and pipeline design including site assessment, site planning and construction phase services.

CIVIL /SITE

Office Location
Orlando, FL

Education
- BS, Civil Engineering, University of Central Florida, 2007

Professional Registration
PE – 2012, FL, #73989

Professional Associations
- FSAWWA

Year Career Started
2007

Year Started with B&V
2007

PROJECT EXPERIENCE

Orlando Utilities Commission | Ozone Improvements Program-Southwest Water Treatment Plant; Orlando, FL

Field Engineer. Field engineer for the conversion of ozone treatment process from air prep to liquid oxygen system. Responsibilities included Prolog document management coordinator, site supervision, and permitting.

Orange County Utilities | Meadow Woods WSF Modifications; Orlando, FL

Project Engineer. Project engineer during design phase for conversion of an existing water treatment plant into a wellfield and reclaimed water storage and re-pump facility. This was accomplished by modifying existing wells to pump to nearby Southern Regional WSF. Responsibilities include site layout, civil design, permitting, assessment of existing facilities, and preparation of design drawings and specifications

City of Lakeland Water Utilities | Disinfection Facilities Upgrade; Lakeland, FL

Project Engineer. Project included improvements to existing chemical feed facilities at one water treatment plant and two wastewater treatment facilities. Responsibilities include site layout, civil design, permitting, assessment of existing facilities, and preparation of design drawings and specifications preparation of bid issue documents, also served as Resident Project Representative (RPR).

Orange County Utilities | Southern Regional Water Supply Facility; Orlando, FL

Project Engineer. Project engineer during planning, design and construction of a new 30 MGD potable water supply facility. The new plant includes five new wells, a 3,000 lb/day ozone system for hydrogen sulfide treatment, sodium hypochlorite for disinfection, fluoride, high service pumping, and two 5 million gallon circular prestressed ground storage tanks. Responsibilities included site planning, pilot study set-up and operation for ozone disinfection, and permitting. Review of contractor submittals, responding to RFIs, and maintenance of construction document management system, and coordination between contractor, client and design team.

Utilities Commission, City of New Smyrna Beach | Glencoe WTP Improvements and Smith Street Pumping Station Project; New Smyrna Beach, FL

Project Engineer. Project engineer during design and construction phases for a new transfer pump station at the Glencoe WTP and a new high service pump station at the Smith Street facility. Responsibilities included site planning,

hydraulic analysis and pump selection, coordination with sub-consultants and preparation of project specifications, permitting, and review of contractor submittals and other construction phase services.

Utilities Commission, City of New Smyrna Beach | 20-Inch Potable Water Transmission Main; New Smyrna Beach, FL

Project Engineer. Project engineer during planning, design and construction phases for a 20-inch low pressure transmission main. Responsibilities include alignment selection, hydraulic analysis, coordination with sub-consultants and drafters/designers, preparation of project specifications, and permitting.

City of Lakeland Water Utilities | Northeast Wellfield Well Pump Relocation; Lakeland, FL

Design Engineer. Project engineer during design of relocation of existing well pump based on recommendation of energy effieciency study. Responsibilities included site layout, preparation of contract drawings and coordination with internal design team.

City of Orlando| Conserv II – Bioset System; Orlando, FL

Project Engineer. Project engineer during planning and design phases for a Bioset alkaline stabilization system for production of Class A biosolids Responsibilities included assessment of existing facilities, site planning, civil/mechanical design and permitting.

Orange County Utilities | South Water Reclamation Facility, Phase V Improvements; Orlando, FL

Project Engineer. Project engineer during planning and design phases for expansion of an existing water reclamation facility from 43 mgd to 56 mgd. The expansion included converting the former North Plant rectangular clarifiers into a step-feed biological nutrient removal (BNR) treatment process, constructing a new 165-ft clarifier and associated return and waste sludge pumping stations, and adding screening and grit removal, filters, chlorine contact volume, effluent storage, and biosolids thickening and dewatering units. Responsibilities include assessment of existing facilities, coordination with design staff and client, bench-scale testing for use of alternate chemical for disinfection, odor-control sampling and testing, sodium hypochlorite cost analysis, PDR development, hydraulic analysis of new BNR train, and design of upgrades to existing biosolids handling facilities.

Nick W. Eckhardt, P.E.

Mr. Eckhardt has 13 years of experience of commercial and municipal water and wastewater treatment facilities, and is currently responsible for multiple water and wastewater projects with Black & Veatch as an Engineering Manager. In this capacity, he is responsible for a diverse range of utility projects including: studies, preliminary design, detailed design, permitting, construction administration, site inspections and certifications, and quality assurance/ quality control.

Additionally he has extensive knowledge and experience with residential and commercial swimming pools, spas, interactive water features and non-interactive water features. He has been involved with both public and private sector projects including conceptual design, hydraulic design, code compliance, and multi-discipline coordination.

SANITORY/STORM SEWERS

Office Location
Tampa, FL

Education
- Bachelors, Civil Engineering, University of North Florida, 2004
- Associates, General Studies, St. Johns River Community College, 2000

Professional Registration
PE - Civil, 69144, FL, 2015
Notrary Public, DD774775, FL, 2008
Certification, Civil, 11000100090, FL, 2005

Year Career Started
2000

Year Started with B&V
2007

PROJECT EXPERIENCE

New York City Department of Environmental Protection | NYCHA (New York City Housing Authority) Water Meter Program | New York, NY

Project Engineer. Design and Construction Management services to support installation of meters and backflow prevention devices (BPD) on approximately 650 currently unmetered and unprotected water service lines to various NYCHA developments across Brooklyn, Queens, and the Bronx. Work involved site investigations, site report reviews, development of recommendations and drawings, creating BPD permit packages, coordinating work with client, owner, subs, and other engineering staff.

JEA (Jacksonville Electric Authority) | Buckman Water Reclamation Facility Digester Covers Replacement Project; Jacksonville, FL

Project Engineer. The JEA Buckman Biosolids Facility, a regional biosolids processing facility, includes two 110' diameter anaerobic digesters. Design services included the replacement of the two anaerobic digester covers with fixed concrete covers and associated rehabilitation of the digester gas mixing equipment, along with repairs to the digested sludge holding tank Dystor gas storage system. The digester gas will continue to be the main fuel source for the dryer, with excess gas utilized in both the boilers and stand-by engine generator. Study and preliminary design services were provided. A Preliminary Design Report was completed in 2011; detailed design was completed in 2013. Construction, started March 2014, and scheduled to be completed by March 2016.

City of Atlanta | Intrenchment Creek and South River - Water Reclamation Centers; Atlanta, GA

Project Engineer. Engineer assigned to various upgrades and additions to the ICWRC decommissioning and SRWRC improvements. Work included a new headworks, equalization storage and transfer pumping at ICWRC, and

decommissioning of ICWRC. Work at SRWRC includes new primary clarifiers, sludge pumping, digesters, and upgrades to final clarifiers, blowers, and solids handling. Total flow for both plants is 48 mgd. Engineer provided support on the facilities various component, and was the primary designer for the clarifier scum pump stations using vertical recirculating chopper pumps; the Head House design which included four inline grinders, eight hose pumps, two clarifier drain pumps, and the basement's sump pumps; and two junction boxes which included various sluice gates and vertical mixers.

Orange County Utilities | South Water Reclamation Facility; Orlando, FL

Project Engineer. Engineer assigned to design the thickening system which included multiple progressive cavity pumps, two new gravity belt thickners, as well as modifications and relocations to other existing equipment and piping. Engineer also provided support to other parts of the project; pump station, basin medications, digester medications and odor control.

St. Johns County Utility | Southground Booster Pump Station; Augustine, FL

Project Engineer. Responsible for the rehabilitation design of the existing Southgound booster pump station. Design includes reviewing the existing structures and as-built drawings to determine the best manner to rehabilitate the station. Additional responsibilities include coordinating the electrical, Instrumentations/Controls, and structural disciplines; as well permitting. Construction started May 2014 and was completed May 2015.

Orange County Utilities | Group "5B" Master Pump Stations Replacement/Rehabilitation; Orlando, FL

Project Engineer. Project involved improvements to five master pump stations including new wetwells, pumps, piping, generator, odor control, electrical and instrumentation equipment, and site work. Pump stations range from a duplex with 250 gpm pumps to 6 pump-stations with 1,500 gpm pumps. Design incorporates concepts to maintain existing pump station services and minimizes the need for bypass pumping. Responsibilities include preparation of preliminary report presenting improvement alternatives, basis of design memorandum, detailed design plans and specifications, Bid Phase services, and Construction phase services including as-builts and final certifications.

Metropolitan Sewer District of Greater Cincinnati | Mill Creek Wastewater Treatment Plant Preliminary/Primary Treatment System; Cincinnati, OH

Project Engineer. Project consists of the replacement of an existing detritor grit removal facility with a new vortex type grit facility designed to handle wet weather flows up to 450 mgd and achieve 90+% grit capture to reduce wear on downstream equipment that has been plaguing the plant for many years. Responsible for construction submittal and RFI tracking and management, and miscellaneous construction coordination and meetings.

Amanda Schwerman, P.E., ENV SP

Ms. Schwerman's experience is focused on water and wastewater-related planning projects. Her expertise lies in water and wastewater hydraulic modeling, but she has experience with process/mechanical design as well. She is involved with professional societies including chairing the WEF Collections System Committee's workshop group, working on the WEF Envision Taskforce, participating with AWWAs Engineering Modeling Applications Committee (EMAC) and M32 Updates, is a Trustee and the Membership Chair for WateReuse Florida and is a certified Envision Sustainability Professional.

PROJECT EXPERIENCE

City of Tampa | Potable Water Master Plan; Tampa, FL

Engineering Manager & Lead Modeler. Responsible for executing the potable water master plan and deliverables. The project included: updating and calibrating the existing hydraulic model using **InfoWater**, distribution analysis and improvements for four planning years (2015, 2020, 2025, and 2035), pumping and storage facility capacity assessments, resiliency and reliability assessments, asset management program development, risk based pipeline prioritization using **InfoMaster**, capital improvement program and Master Plan documentation. The City of Tampa distribution service area serves a population of approximately 610,000 people across 1 pressure zone at an average day demand of approximately 70 MGD. The distribution system includes one water treatment plant, five repump stations with tanks and several interconnections with Hillsborough County and Tampa Bay Water.

Gwinnett County Department of Water Resources | Sewer Basin Model Updates; Gwinnett County, GA

Engineering Manager/Modeler. Provided professional services to GCDWR to update the pipe and manhole inverts throughout several sewer basins based on the updated GIS and perform dry and wet weather calibration using Bentley's **SewerGEMs**. The primary objective of the projects was to provide the County with updated/calibrated models ready for them to perform capacity analysis evaluations.

- The Level Creek Sewer Basin (2015 – 2016) contains 8 pump stations, 60 miles of gravity mains, 15 miles of force main, approximately 1,700 manholes, five gravity flow meters and discharges to another pump station within a separate sewer basin.
- The Brooks Rd and Ezzard Rd Sewer Basins (2015) contains 25 pump stations, 137 miles of gravity mains, 35 miles of force main, approximately 4,000 manholes, seven gravity flow meters and discharges to another pump station within a separate sewer basin.
- The Richland Creek Sewer Basin (2014 – 2015) contains 8 pump stations, 67 miles of gravity mains, 6 miles of force main, approximately 2,000 manholes,

HYDRAULIC MODELING

Office Location
Tampa, FL

Education
- B.S., Engineering, Colorado School of Mines 2005
- M.S., Environmental Science and Engineering, Colorado School of Mines 2006

Professional Registration
PE – 2010, FL, #70751
Envision™ Sustainability Professional

Software Experience
- INNOVYZE Software:
- Info Works CS & WS; InfoWater; InfoWater UDF; H2O Map
- Bentley (Haestad):
- Sewer GEMS; WaterGEMS; SewerCAD; WaterCAD; HAMMER
- ARCGIS
- AutoCADD

Professional Associations
- American Water Works Association (Engineering Modeling Applications Committee, and M32 Update Contributor)
- Water Environmental Federation (Collections Systems Committee, Workshop subcommittee Vice Chair)
- Florida Water Environment Association
- WateReuse Association (Trustee 2016 – 2019 and Membership Chair)

Year Career Started
2005

Year Started with B&V
2013

three gravity flow meters and discharges to another pump station within a separate sewer basin.

Greenville Water | Facilities Master Plan; Greenville, SC

Distribution System Evaluation Task Lead Modeler. Responsible for executing the water distribution system evaluation work and deliverables. Distribution system tasks included: performance criteria development; population, growth, and demand projections; all-pipes hydraulic model build from GIS; hydraulic model update and calibration/verification using **WaterGEMS** software; pressure zone delineation assessment; system capacity assessments for normal and fire flow demand conditions and pumping, storage, and pipeline improvement alternatives; asset management assessments of condition and criticality for pumping and storage facilities; system monitoring and SCADA assessments; prioritize CIP through the year 2040; development of CIP and financial forecasting tool; and facilities plan report. Project also included a water treatment evaluation. At the time of the project, Greenville Water's water system served a population of approximately 500,000 people in the City of Greenville and surrounding communities in Greenville County across 15 pressure zones at an average day demand of approximately 60 MGD.

SJWD | Water Master Plan; Wellford, SC

Distribution System Evaluation Task Lead Modeler. Responsible for executing the water distribution system evaluation work and deliverables. Distribution system tasks included: performance criteria development; population, growth, and demand projections; hydraulic model update and calibration/verification using **InfoWater** software; system capacity assessments for normal conditions and pumping, storage, and pipeline improvement alternatives; prioritize CIP through the year 2040; development of CIP; and facilities plan report. At the time of the project, SJWD's water system served approximately 45,000 people across 5 pressure zones at an average day demand of approximately 4.5 MGD.

City of Atlanta | Intrenchment Creek PS Surge Analysis; Atlanta, GA

Lead Modeler. Provided professional services to perform a surge (a.k.a. transient) analysis of the proposed Intrenchment Creek Pump Station and existing force main system using Bentley's **HAMMER**. The primary objective of the project was to assess transient impacts of an emergency shutdown of the proposed pump station during maximum flow. The existing force main is RCCP and the maximum pressure allowed during a transient event was 50 psi. Transient improvement measures such as combination air/vacuum valve (CAV) optimization, surge anticipator/relief valves and surge tanks were analyzed. The Intrenchement Creek PS is design with five pumps and the existing force main is 2.9 miles in length ranging from 24-inch to 42-inch in diameter.

Marc A. Fermanian, MSCE, P.E.

TRANSPORTATION/ ROADS

CRJ & Associates, Inc.

Office Location
Parkland, FL

Education
- BSCE, University of Massachusetts-Lowell (1992)
- MSCE, University of South Florida (1997) (GPA 3.8 Cum Laude)

Professional Registration
- Professional Engineer
- #0052626 (Florida), February 1998
- Member of NSPE/FES, 1995
- FSA Member
- SFWMD Peer Review Committee

Year Career Started
1993

Year Started with CRJ
2001

Mr. Fermanian serves as a project drainage engineer and project manager for several transportation and land development projects. He is responsible for both large and small- scale stormwater designs and permitting for these projects. Marc has provided stormwater designs, calculations, and master drainage plans for: airports, ports/harbors, roadway projects, university campuses, and a diverse of miscellaneous civil site projects. In addition, he has a diverse background in both civil engineering and construction; Marc has worked on FDOT Projects in: District 1, 3, 4, 6, and 7over his 19-year career in Florida. His initial start in working in Florida was roadway design per FDOT Design Standards and Specifications.

Mr. Fermanian is skilled in developing civil site/ land development construction plans, as well as roadway design plans utilizing FDOT plans preparation standards and indexes. Mr. Fermanian was the author of several airport and roadway drainage preliminary/final reports. He has also provided detail drainage calculations and construction plans for the Palm Beach County Department of Airports (PBC-DOA) that have acquired construction permits from SFWMD, FDEP, the ACOE, and the EPA. Mr. Fermanian has also assisted in the development of the University of South Florida Master Drainage Plan and the Tampa Port Authority's Master Drainage Plan. Marc's stormwater abilities have been recognized by several constituents, technocrats, and colleagues to allow him to be an accepted and active member of SFWMD's Peer Review Committee.

He has served as a Construction Engineer Inspector (CEI) Project Manager responsible for construction administration and overall project schedule control in which he coordinated and reviewed requests for further information (RFI's) and material invoices from the contractor; reviewed, prepared and processed job estimates that included material and labor costs; recorded the progress of construction activities; Davis-Bacon employee wage rates; and participated in on-site inspections.

PROJECT EXPERIENCE

City of Parkland | General Consulting Services; Parkland, FL

Within the past 1 ½ Years in working with the City of Parkland, CRJ has conducted close to thirty (30) tasks for the City. Work efforts have included: roadway design, Construction Inspection/Construction Management, recreational pathways, Special Inspection/Threshold Inspections, NPDES compliance inspections for the City's MS4 Program, City Planning and utility design.

Florida Department of Transportation, District 1 | Interstate 4/S.R. 400 - Design Section Six

Responsibilities included preparation of FDOT construction plans, alignment justification reports, lane closure analysis, pond siting report, evaluation of

"Two Critter" crossings (low level bridges) for state wildlife criteria within the Green Swamp Region of Polk County, Florida. Prepared design calculations for both swale and wet detention ponds for roadway stormwater treatment system

Florida Department of Transportation District 4 | Roadway Improvements/ Sidewalk & Bikelane Development; Deerfield Beach, FL

Prepared design plans for Quiet Water Park and Tradewinds Park.

Florida Department of Transportation, Office of Tolls (OTO) | Crosstown Expressway - West Plaza Administration Building Renovations

Construction Inspection Manager and Civil Design. Project consisted of a complete rehabilitation of the existing structure including: complete rework of all electrical systems including toll collection, security and fire alarm; elevator installation within existing structure constituting foundation shoring; architectural interior/exterior renovations; asbestos removal; and civil site rehabilitation for maintaining toll services through construction phasing, and parking facilities design.

Florida Department of Transportation, District 7 | Ulmerton Road (State Road 688), Vicinity of 34th Street and Interstate 275; Clearwater, FL

The proposed roadway improvements were to modify the existing four- lane rural roadway to a six-lane rural typical section from 34th Street eastward to the I-275 interchange. Marc was a design engineer on this 1.6 Mile roadway widening that involved jurisdictional wetlands identified by both the ACOE and SWFWMD along Roosevelt Creek; a saltwater marsh.

Florida Department of Transportation, District 7 | S.R. 50 (Barnett Road) Roadway Design Engineer and Stormwater Designer for Urban

Roadway section widening. Marc was responsible for grading and stormwater culvert design and coordination with FDOT for compliance with MUTCD striping standards and Maintenance of Traffic.

Florida Department of Transportation, District 7 | S.R. 54 (FDOT Project No. 14570-3521) Watersheds 'B', 'D' & 'E'

Design Engineer and Stormwater Designer for 0.75 miles of 6-lane median divided rural roadway within sensitive wetland areas. Marc worked on: grading, establishing roadway grades, swale sizes and roadway geometry.

Florida Department of Transportation, District 3 | S.R. 261 (Capital Circle)

The proposed roadway improvements were to develop the ultimate six-lane divided rural configuration and make modifications to the intersection of S.R. 20. Marc worked on: grading, establishing roadway grades, swale sizes and roadway geometry. Marc also conducted the Pond Site Report for the south segment of the Project.

Ernest Mott-Smith, P.E.

Mr. Mott-Smith has 32 years of experience in process design engineering, consulting, and environmental regulatory interaction. He serves as a Senior Remediation Technology Consultant for Black & Veatch with a primary focus of remedial technology consulting and the development of intra-company technical resources. This work is primarily done through B&V's EPA Response Action Contracts (RAC) in Regions 4 and 7. Project technical work responsibilities include preparation and review of feasibility studies, conceptual designs, work plans, and design and specifications for hazardous waste site remediation projects throughout the United States. Mr. Mott-Smith has extensive engineering design and regulatory experience on nationwide projects for DoD, DOE, EPA (CERCLA and RCRA), USACE, and State Agencies. He also has been involved in engineering QC reviews for more than 275 projects, project management, engineering supervision/management, and technical training.

In his role as a senior remediation technology consultant, Mr. Mott-Smith is responsible for supporting a technology development plan to keep Black & Veatch in the forefront for emerging and innovative technologies for site remediation. This role encompasses technology training, mentoring, and coordination with outside technical resources to augment Black & Veatch's in-house capabilities. Mr. Mott-Smith is a subject matter expert for the process development and technical support for *in situ* chemical oxidation (ISCO) projects and provides project technical support for a variety of additional technologies such as *in situ* enhanced bioremediation (ISEB), *in situ* chemical reduction (ISCR), thermal enhanced treatment, air sparging, metals remediation, groundwater recovery and treatment, and soil vapor extraction. Mr. Mott-Smith has extensive project and design experience with the development of innovative remedial approaches for ISCO including the creation of design programs, cost estimating tools, engineering practices and field techniques. His earliest work with ISCO included one of the earliest ozone sparging projects for pentachlorophenol and both the permanganate ISCO and steam injection implementations at the Cape Canaveral Interagency DNAPL Consortium field technology demonstrations. He has authored 15 conference and technical papers/presentations since 1995.

Previously, Mr. Mott-Smith has also held positions as engineering manager, regional engineer, client program manager, and project manager. He spent three years with the Florida Department of Environmental Protection (FDEP) Bureau of Waste Cleanup as a design review engineer. In this role, he reviewed more than 150 project designs for petroleum, hazardous waste, and DOD sites. Before that, he served as a design review engineer for wastewater treatment facilities and as a resident engineer and construction coordinator for State and CERCLA hazardous waste assessment/remediation sites.

ENVIRONMENTAL ASSESSMENTS/ REMEDIATION

Office Location
Tampa, FL

Education
- Post Graduate Coursework, University of South Florida, 1994
- BS, Environmental Engineering, University of Florida, 1984

Professional Registration
PE – 1989, FL, #41114
PE – 2013, MS, #25293
PE – 2014, GA, #20470
PE – 2014, SC, #31836

Military Experience
Lieutenant, USNR, Civil Engineering Corps, 1989 - 1996

Training
- OSHA 40-Hour HAZWOPER
- OSHA Renewal, 8-Hour HAZWOPER Refresher
- OSHA 8-Hour Supervisor Training
- OSHA Confined Space Entry Training
- EPA's Green Remediation Primer
- Groundwater Flow and Solute Transport
- NGWA Treatment Technology
- Construction Management
- Hazardous Waste Site Sampling
- Linear System Design and Construction
- Directional Well Drilling
- Remediation Technology
- ISCO
- Project Management
- FAR/CAS Overview/Exam
- Ethics & Compliance
- Contracts

Professional Associations
- Society of American Military Engineers
- National Groundwater Association

Year Career Started
1984

Year Started with B&V
2007

PROJECT EXPERIENCE

Power South Energy Cooperative | CCR Groundwater Remedial Alternative Evaluation, Lowman Power Plant; Leroy, AL

Project Technical Support. Developed recommendations for additional site investigation and prepared remedial alternatives and cost estimates for treatment of arsenic contaminated soil and groundwater associated with CCR ash ponds. Treatment alternatives included zero valent iron and emulsified oil permeable reactive barriers and groundwater recovery and treatment. Supporting basis for ash pond closure options in conjunction with long-term groundwater remediation goals.

EPA Region 4 | Remedial Action, Brunswick Wood Preserving Site; Brunswick, GA

Project Technical Lead. Mr. Mott-Smith Provides technical support for a former creosote site impacted by both residual and mobile creosote NAPL fraction located beneath a major gas transmission line, high voltage line, and railroad line. He provided support for technical scope development, evaluation of aquifer studies, Tar-Specific green optical screening tool (TarGOST) studies, and bench and field scale treatability testing for bioremediation and oxidation. Provided support and technical reviews/oversight for a $1.6M full-scale ISCO ozone/peroxide injection system. Presented at two conferences on correlation of TarGOST results with soil cores and laboratory soil NAPL residual saturation testing and worked with EPA's Technical Assessment Branch to further define protocols for TarGOST data interpretation. Developed focused feasibility study for NAPL impacted zones with recommendations for *in situ* soil stabilization, *in situ* geochemical stabilization, and chemical enhanced oil recovery. Assisting in hydraulic study of enclosed impoundments with vertical engineered barriers and caps along with proposed design for a solar-powered phytoremediation system for long term water management control.

JEA | Corrective Measures Study, Northside Generating Station; Jacksonville, FL

Project Technical Lead. Supported development of remedial alternatives for a site-wide Corrective Measures Study at the Jacksonville Electric Authority Northside generating station. Evaluated metal geochemistry analyses, engineering alternatives and provided cost-benefit analysis for remediation of the combined vanadium and nickel plume. The CMS included several optimization scenarios, including the use of a modular treatment train to remove metals prior to discharge.

EPA Region 4 | Remedial Design, Smalley-Piper Superfund Site; Collierville, TN

Technical Consultant/Designer. Developed hydraulic groundwater model and preliminary design for a groundwater recovery and treatment system for an extended hexavalent chromium plume. Supported multi-disciplinary engineering team to optimize remedy design using modular treatment components.

Lucas Botero, P.E., BCEE, ENV SP

Mr. Botero has been involved in studies, design, construction, and resident phase engineering in several infrastructure, water, wastewater, and reuse projects. His involvement has included project development and contract preparation, project planning and budgets, preparation of construction documents and project schedules, and resident engineering services.

Mr. Botero has over 20 years of experience in environmental engineering. He has a broad-based knowledge of wastewater treatment process engineering with an emphasis on plant capacity evaluations, activated sludge design including biological and chemical nutrient removal, treatment plant modeling, industrial waste treatment, headworks design, effluent disinfection and sludge processing. Mr. Botero is primary author of Chapter 11 of the WEF Manual of Practice No. 8 "Design of Municipal Wastewater Treatment Plants," as well as other manuals of practice.

Medina County Sanitary Engineer | Liverpool WWTP Energy Services Performance Contracting Improvements; Medina, OH

Process Specialist. Mr. Botero served as lead process specialist for the liquid processes modifications of the WWTP. The project included decommissioning a Zimpro process and evaluating and modifying the plant processes to incorporate anaerobic digestion. Different alternatives for dealing with industrial contributions and sidestream treatment were evaluated as part of the Investment grade Audit.

City of Las Vegas | WPCF Facility Plan Update; Las Vegas, NV

Process Specialist. Mr. Botero served as process specialist for the facility plan of the 91 mgd AADF WPCF. The facility plan included projections for wastewater demand for the next 20 years and proposed alternatives for to take the facility through 2035 including fermentation upgrades, BNR process upgrades, sidestream treatment technologies for N and P, contaminants of emerging concern (CEC), biogas utilization alternatives, and addition of solar power capacity.

Pinellas County | South Cross Bayou WRF Assessment and Optimization Program Development; Pinellas County, FL

Process Specialist. Mr. Botero served as process specialist for the optimization programs plan of the South Bayou WRF. Specifically, Mr. Botero helped with the optimization evaluation of the grit removal system.

Florida Keys Aqueduct Authority | WWTP Improvements; Cudjoe Key, FL

Process Specialist. Mr. Botero served as process specialist for startup phase of the Cudjoe Key WWTP improvements. This greenfield plant included fine screening, equalization, five-stage Bardenpho®, secondary clarifiers, filtration, chlorination, deep well injection, RDT thickening, aerobic digestion, and centrifuge dewatering. The plant is design to meet TN below 3.0 mg/L and TP below 1 mg/L. The design included secondary carbon addition via methanol or MicroC. The project included modeling of different startup conditions and strategies.

WASTEWATER

Office Location
Sunrise, FL

Education
- MS, Civil Engineering, California State University, Long Beach, 2000
- BS, Civil Engineering, Pontificia Universidad Javeriana, Bogota, Colombia, 1996

Professional Registration
PE – 2007, FL, 67242
PE – 2003, KS, 17687

Certifications
Board Certified Environmental Engineer (BCEE), American Academy of Environmental Engineers

Envision® Sustainability Professional (ENV SP), Institute for Sustainable Infrastructure

Professional Associations
- Water Environmental Federation
- International Water Association
- Member, WEF, Municipal Wastewater Treatment Design Subcommittee
- Chair of WEF's Grit Characterization Task Force

Honors/Awards
ACODAL (WEF Colombia) Order of Merit

Year Career Started
1996

Year Started with B&V
2000

City of St. Charles | WWTP TP Alternatives, Evaluations and Plant Improvements; St. Charles, IL

Process Specialist. Mr. Botero served as process specialist for the St. Charles WWTP improvements including leading the evaluation of alternatives to comply with TP of 1.0 mg/L and contemplation of 0.5 mg/L in the future and a general WWTP capacity assessment.

City of Geneva | WWTP TP Alternatives Evaluations and Plant Improvements; Geneva, IL

Process Specialist. Mr. Botero served as process specialist for the Geneva WWTP improvements including leading the evaluation of alternatives to comply with TP of 1.0 mg/L and contemplation of 0.5 mg/L in the future, diagnosing and determining the required improvements to the air delivery system, and a general WWTP capacity assessment. The project included the a comparative evaluation of different blower, diffusers, and mixing technologies for the plant, including the development of energy costs for each alternative during the preliminary design phase to aid in the technology selection.

City of Geneva | WWTP TP Leachate Acceptance Project; Geneva, IL

Process Specialist. Mr. Botero served as process specialist for the Geneva WWTP Leachate acceptance project. The project included an evaluation of the Geneva WWTP landfill leachate acceptance and included an evaluation of plant sludge bulking.

City of Reidsville | WWTP Improvements; Reidsville, NC

Process Engineer. Mr. Botero served as lead process engineer for the design of the new compressed air system for the Reidsville WWTP. The project included the conversion from surface aerators to high efficiency turbo blowers with fine bubble diffusers, and the design of a new bio-selector. Mr. Botero performed a comparative evaluation of different blower, diffusers, and mixing technologies for the plant, including the development of energy costs for each alternative during the preliminary design phase to aid in the technology selection.

DC Water | Blue Plains WWTP Wet Weather Train; Washington, DC

Process Engineer. Mr. Botero served as lead process engineer for the new grit removal system for the 250 mgd (Phase I) Enhanced Clarification Facility (ECF) train at the Blue Plains WWTP. The system included evaluations of mechanical and hydraulic primary grit concentrators, the selection and design of a secondary grit concentration and classification units, and the design of a new grit slurry pumping system. The grit system design also included the layout of the grit structure and the new grit handling building for housing the concentration and classification and units.

Robert (Bobby) Burchett, P.E.

Mr. Burchett has experience providing engineering services to municipal clients for a variety of water, wastewater and reclaimed water projects. His experience includes water and wastewater system planning; and detailed design, permitting and construction phase services for water and wastewater system infrastructure. He has extensive experience with water and wastewater system master planning studies, energy efficiency and management, hydraulic modeling, water quality modeling and pump station analysis and design.

PUMP/LIFT STATIONS

Office Location
Tampa, FL

Education
- BS, Civil Engineering, Georgia Institute of Technology, 2000

Professional Registration
PE – 2006, Florida, 64762

Professional Associations
- American Water Works Association

Year Career Started
2000

Year Started with B&V
2000

PROJECT EXPERIENCE

City of Marco Island | Water System Modeling; Marco Island, FL

Project Manager. Responsible for performing numerous evaluations to determine improvements that would enhance the operations and reliability of the City's water distribution system. Tasks included: updating and calibrating the existing water system model, hydraulic analysis of current and projected future operating scenarios, system expansion planning, emergency scenario planning, fire flow analysis, fire hydrant spacing analysis, and water age/water trace analyses. Black & Veatch also assisted the City with prioritizing the recommended system improvements for CIP planning purposes.

City of St. Petersburg | Oberly and Washington Terrace Pumping Station Improvements; St. Petersburg, FL

Project Engineer. Basis of Design Report for improvements at two high service pumping stations. Engineering tasks included: existing facility assessment, field pump testing, hydraulic modeling, defining recommended improvements, and development of a Basis of Design Report.

Tampa Bay Water | Morris Bridge Booster Station Expansion; Tampa, FL

Project Manager. Responsible for planning, permitting, design, and construction phase services for improvements to an existing 45 mgd pump station and groundwater treatment facility. Improvements include the addition of a 1000 HP vertical turbine pump, and numerous upgrades to the electrical, instrumentation and controls, and chemical feed systems.

JEA | Oakwood Villa Septic Tank Phase-Out; Jacksonville, FL

Project Engineer. Developed preliminary plans for a gravity sewer system to replace septic tanks in an existing neighborhood. Tasks included SewerCAD modeling, developing a preliminary gravity collection system layout, and sizing of gravity pipelines, forcemains, and lift stations.

Tampa Bay Water | US-41 Booster Station; Pasco, FL

Design Engineer. Responsible for planning, permitting, design, and construction phase services for an expansion to 5 mgd booster pump station facility. Pump station improvements involve the addition of a new horizontal

centrifugal pump with variable frequency drive and associated electrical improvements.

City of Hollywood | Energy Efficiency Master Plan; Hollywood, FL

Energy Management Team Lead. Responsible for leading technical evaluations of energy efficiency improvement alternatives as part of the development of a comprehensive energy efficiency master plan for the City's Water, Wastewater, and Reclaimed Water Systems and Facilities. The master planning effort includes: electric utility rate analyses; industry benchmarking; development and use of an energy project decision cash flow model; energy assessments of facilities, equipment and infrastructure; renewable energy generation feasibility assessment; and business case evaluations to define and support recommended energy efficiency projects.

Tampa Bay Water | System Configuration II Program; Pinellas, Pasco and Hillsborough Counties, FL

Project Engineer. Participated in a variety of planning, engineering analyses and program management support activities for the development and implementation of the System Configuration II Program. The System Configuration II Program includes ten projects that will provide Tampa Bay Water with an estimated 25 mgd of additional supply capacity during a median year. Five of these projects will increase the yield from Tampa Bay Water's existing Enhanced Surface Water System, and the other 5 projects involve improvements to increase the hydraulic capacity of Tampa Bay Water's transmission system.

Tampa Bay Water | Long-Term Water Supply Plan; Pinellas, Pasco and Hillsborough Counties, FL

Project Engineer. Responsible for evaluating hydraulic and water quality impacts that potential future water supply options would have on a wholesale water supply and transmission system that provides water to approximately 250,000 customers in the tri-county Tampa area. The long term water supply planning process included the identification of water supply project alternatives, the formation of a planning advisory panel, and the development of a public involvement effort to gather public input on various water supply concepts. The alternatives were screened and a short-list of project was investigated in more detail, including the development of order of magnitude project costs. The short-list was evaluated, and a number of potential projects were recommended for further detailed evaluation.

City of Clearwater| P.S. 65 Forcemain Extension; Clearwater, FL

Project Engineer. Completed hydraulic analyses for the design of a 1.5 mile raw water forcemain needed to divert flow to an alternate collection basin feeding the City's Northeast WRF.

Robert J. Moresi, P.G.

RECHARGE/ INJECTION WELLS/ HYDROGEOLOGY

Office Location
Tampa, FL

Education
- Bachelors, Natural Sciences, University of South Florida, 1969
- Bachelors, Geology, University of South Florida, 1972
- Graduate Studies, Water Resources Engineering/Hydrogeology, University of South Florida, 1972

Professional Registration
PG – FL, 281
PG – VA, 642

Professional Associations
- American Water Resources Association

Year Career Started
1969

Year Started with B&V
2003

Mr. Moresi is a Senior Hydrogeologist with more than 35 years of planning, design, assessment, and management experience encompassing all elements of surface and groundwater resources projects. His experience ranges from providing technical support for the acquisition of permits, to water resources assessment and development. Mr. Moresi worked for Florida's Water Management Districts for 10 years where he was instrumental in early development of their rules and regulations, as well as Director of Water Use Permitting for two Districts. Mr. Moresi has spent the past 25 years in water resources consulting.

His project experience includes studies of regional wellfields, dredging, solid waste, watershed management, emergency response, spring development, groundwater remediation, and well construction for most all purposes. His experience has included water supply planning for sustainability and conjunctive uses, wellfield protection, and water supply development. Mr. Moresi is Past President of the American Water Resources Association.

PROJECT EXPERIENCE

Heartland Water Alliance, Central Florida

Senior Hydrogeologist. Providing oversight and technical support to the assessment of water resources and development of alternative water supplies for 4 central Florida counties. The study was to develop supplies to meet 2030 water supply demands.

St. Johns River Water Management District, FL

Technical Consultant. Provided technical oversight and maintained client relationships on a costing analysis study that resulted in a computer based tool for estimating the costs of various facilities such as water treatment plants, desalination facilities, pipelines, ASR systems, injection wells, and support facilities.

Tampa Bay Water, FL

Technical Consultant. Provided technical support and quality assurance review of a water supply plan report that assessed future water supplies, sustainability, water source availability, and regulations.

Everglades Agricultural Area EAA A-1 Reservoir, SFWMD, FL

Client Manager. As part of the design of the Everglades Agricultural Area (EAA) EAA Reservoir A-1, a Water Balance Model (WBM) was developed to analyze and optimize the storage capacity and operations of the reservoir on a daily basis (time step), while evaluating the impacts on flows in the North New River Canal, Miami Canal, Holeyland Distribution Canal, and the STA 3/4 Supply Canal. In addition, the project is part of the Comprehensive Everglades Environmental

Restoration project, and includes a 190,000 Acre-foot storage capacity reservoir. In-field test cells, and facility design was also part of the project.

Wellfield Assessment and Relocation, Ocala, FL

Senior Hydrogeologist. Assessed the location of the City of Ocala's wellfield and the need to relocate well #6. The assessment included developing a well testing program, reviewing well locations relative to a probably cause of bacteria contamination, and recommendations on wellfield and water treatment facility design to protect the well and manage the wellfield.

Water Supply Plan, Ocala, FL

Senior Hydrogeologist. Assisted in the hydrogeologic study to develop an alternative water supply to meet future potable demands for the City of Ocala. The assessment concentrated on groundwater options and wellfield designs in the Upper and Lower Floridan aquifers.

Wellfield Site Assessment, SRWMD, FL

Project Manager. The project included the assessment of potential wellfield sites for the City of Madison. The assessment included considerations of land use and size, their location, existing municipal facilities, the potential for contamination and long term productivity, and hydrogeologic factors for groundwater protection and production rates. The assessment required ranking the sites and proposing the best possible site for a wellfield.

General Services Contract – Water Supply Planning, St. Johns River Water Management District

Project Manager. The project was a general services contract to assist the SJRWMD in water supply planning services. Work orders were received with the following scopes of work: provide technical support to East Central Florida Water Supply Planning group by maintaining meeting minutes and reports on Group activity; Assess the potential for using the Ocklawaha River near Palatka as a potable water source and calculate preliminary costs to implement a plan; and assess the SJRWMD's permitting data base and assist them in designing the e-permitting program.

US Environmental Protection Agency, FL

Senior Hydrogeologist. Conducted data review on hydrogeologic conditions at a superfund site concerning solvents. The assessment included data review, well construction recommendations, and hydrogeologic interpretation.

City of Ocala, Florida

Senior Hydrogeologist. Conducted an assessment on the occurrence of elevated nitrates in a waste water spray field. The assessment included geologic data, water quality analyses, aerial photography, and a site visit. The assessment developed a theory on Nitrate origin, and proposed a solution for corrective action.

Ron E. Parker

Mr. Parker has more than 32 years of experience in the management of treatment plant operations, facilities operation and maintenance (O&M), treatment plant startup and commissioning, disinfection and neutralization of assorted structures and pipelines, operator training, process control troubleshooting, equipment maintenance, and O&M manual preparation. His experience also includes plant operations management and technical specialties, project procurement and evaluation, and contract management.

Formerly a senior operations manager of a large wholesale water supply system, Mr. Parker was responsible for the operation of numerous water treatment plants and related subsystems, as well as quality assessment/quality control (QA/QC) programs, plant analysis, operator training, and plant expansion supervision.

PROJECT EXPERIENCE

Tampa Bay Water Contract Operator Evaluations | Tampa, FL

Operations Specialist. Tampa Bay Water uses a public/private partnership at five water treatment plants. At three of these plants, the contract operator performs the operation and maintenance activities; with only maintenance activities being performed at the other two facilities. The operation and maintenance contracts vary from five years (if renewal option years are used) to twenty year service agreements. Tampa Bay Water has started a program to evaluate the existing contract agreements against other operational alternatives. An evaluation report was prepared for Tampa Bay Water which included assessments of the existing contract, a review of service fee costs, plant assessments, and benchmarking of the costs and staffing size with similar sized plants. Contract operating alternatives were also evaluated and include modifications to existing contracts, new contracts, or self-performance. Each of these areas included an economic and non-economic analysis, a pros and cons summary, a preliminary transition plan if implemented, and a preliminary staffing plan.

Tampa Bay Water Contract Audits | Tampa, FL

Operations Specialist. Tampa Bay Water uses a public/private partnership to operate and maintain Tampa Bay Water's Regional Surface Water Treatment Plant (120 mgd) and Seawater Desalination Plant (25 mgd). Annually, Tampa Bay Water reviews the contract operator's performance with an operational audit. An audit report was prepared for Tampa Bay Water which included calculations to determine the new fiscal year service fee adjustments based on specific market indices, an annual settlement for incentives earned or damages assessed, and an annual inspection of plant conditions for process/equipment deficiencies. The service fee adjustments include the contract operator's base pay, allocations to the reserve funds, liquidated damage adjustments for

OPERATIONS AND MAINTENANCE

Office Location
Tampa, Florida

Education
- BS in Education, Missouri Western State College, 1979
- AA Degree, Butler County Community College, 1975

Professional Registration
Certified Class IV Water Supply Operator, State of Kansas, 1982
Semester Water School, Salina Area Technical School, 1982

Professional Associations
- American Water Works Association

Year Career Started
1979

Year Started with B&V
1999 to 2004, 2012

production shortfalls and water quality, and the maximum amounts of chemical and power incentives for superior performance.

Tampa Bay Water Keller WTP/POC Improvements | Tampa, FL

Operations Specialist. The existing Keller WTP is a 36 mgd groundwater treatment facility with forced draft aerators for hydrogen sulfide removal. Improvements to the plant consisted of new air monitoring and process control analyzers, new destruct unit pH and ORP adjustment, waste stream flow monitoring, new bypass piping with a temporary chemical feed system, new vertical turbine transfer pumps, piping modifications at the connection to the regional wholesale system, and new control logic via the Human Machine Interface (HMI) system. A startup plan was prepared and included the preparation of disinfection plans for approval from the Florida Department of Environmental Protection (FDEP), operational protocols for startup and testing of the bypass piping and temporary chemical feed system, flow control logic and pH adjustment to the forced draft aerators, pH control of the destruct unit waste stream, startup of the vertical turbine transfer pumps, and tuning of the HMI process control loops.

Miami-Dade Cross Connection Control Plan; Miami-Dade, FL

Operations Specialist. A new Cross Connection Control Plan was prepared for Miami Dade after updates to the Florida Department of Environmental Protection (FDEP) Administrative Code were made to the cross connection control program. FDEP established the minimum requirements for the plan; additional Standard Operating Procedures (SOP's) were also included with the Miami Dade plan. The plan mainly consists of hazard classifications, annual testing/repair, annual inspections, and recordkeeping and notifications. The SOPs identify procedures and flow charts for new and existing installations, inspections, enforcement, water main breaks, water quality complaints, and bacteriological sampling with positive results.

SAWS Brackish Groundwater Desalination Project; San Antonio, TX

Operations Specialist. The San Antonio Water System (SAWS) Brackish Groundwater Desalination plant provides a new water supply for SAWS. The project consists of a new well field; and a new treatment plant which uses reverse osmosis membranes, calcite contactors, degasifiers, a chlorine contact chamber, finished water pumping and concentrate/brine disposal through injection wells. A Preliminary Operations Plan was developed to identify the control features for each of the unit processes and chemical feed systems. The Plan also identifies the control features for abnormal or special operating conditions at the facility.

Robert J Rampetsreiter, P.E., S.E.

Mr. Rampetsreiter, who joined Black & Veatch in 2013, has worked on the structural design of industrial, commercial, educational, retail and specialty metal fabrications for wall panel skin systems. He also provides technical assistance for structural engineering computer programs. Rob has been the engineer of record for many industrial, retail and commercial projects. As a Senior Project Engineer, Rob works directly with the client from schematic design to project close. Preliminary analysis and design results are presented to the client to give the most economical alternative. After preliminary design, Rob continues to be actively involved with the project, leading engineers and CAD technicians to produce clean and accurate construction documents. Rob then performs site visits to confirm that construction is in conformance with the specifications and construction documents.

PROJECT EXPERIENCE

Parkville Water Treatment Plant | Missouri American Water; Parkville, MO

Structural Engineer. Currently serving as project structural engineer for the design of a new water treatment plant in Parkville, Missouri. The existing plant has served the community for over 70 years and has reduced functionality. The new plant will be constructed in accordance with the latest building codes and the requirements of the Missouri Department of Natural Resources. The plant is designed for a maximum raw water design flow of 5.2 mgd with capacity to handle a future flow of 10.4 mgd. Treatment includes lime softening, filtration and disinfection. Structures to support this operation included a single story Operations Building, Process Building (used to house the filters and clearwell structures), solids contact unit basin, equalization basin, lime storage foundation and a generator foundation.

American Airlines | Dallas-Ft. Worth Airport Terminal D - New Stainless Steel Roofing System; Dallas, TX

Structural Engineer. Provided structural engineering for the design of the stainless steel roofing system. The new roofing system covered over 100,000 square feet. Work included coordination with the metal fabricator and engineer of record for the main structure.

US Air | Maintenance Facility; United States

Structural Engineer. Provided structural engineering for building foundations. Large mat foundations were designed to support the large column loads. Work also included the design of site retaining walls and ring walls supporting large tanks.

STRUCTURAL

Office Location
Kansas City, MO

Education
- MS, Structural Engineering, University of Florida - Gainesville, 1988
- BS, Civil Engineering, University of Wisconsin, 1986

Professional Registration
Civil – 62194, FL, 2004
Civil – 2009, AL, 30694
Civil – 2008, UT, 5525733-2203
Civil – 2008, OK , 23249
Civil – 81,005,211, IN, 2008
Civil – 22520, SC, 2006
Civil – 24GE04624800, NJ, 2006
Civil – 33411, MD, 2006
Civil – 16132, NM, 2004
Civil – 108968, TN, 2003
Civil – 11093, ID, 2003
Civil – 57197, PA, 2000
Civil – 13845, KS, 1995
Civil – 25868, MO, 1993
Civil – 28527-006, WI, 1992
Structural – 81.005211, IL, 1997
Structural – 2010, CA, 5490
Structural – 2014, WA, 42730
Structural – 2008, NE 12730
Structural – 179474, NV, 2006
Structural – 12217, HI, 2006

Professional Associations
- American Institute of Steel Construction
- American Society of Civil Engineers
- Structural Engineers Association of Kansas and Missouri
- National Council of Examiners for Engineering & Surveying

Year Career Started
1989

Year Started with B&V
2014

City of San Francisco | San Francisco Oakland Bay Bridge Toll Operations Building; Oakland, CA

Structural Engineer. Designed foundations for a new $20M toll operations building for the San Francisco Oakland Bay Bridge. The project involved a challenging and complex foundations system that incorporated new construction with existing facilities. Part of the existing facility was required to be maintained and have uninterrupted service for the toll operations while simultaneously constructing foundations for the new facility.

Brownsville South Padre Island International Airport | Review of New Hangar; Brownsville, TX

Structural Engineer. Served as owners representative to review structural design and submittals for general conformance with RFP documents for a new 20,000 square foot hangar. Work also included performing site visits to check for conformance with projects documents.

Amtrak | Union Station Facilities Restoration; Chicago, IL

Structural Engineer. Served as project structural engineer to restore Amtrak's Union Station Terminal back to a state of good repair. This design-build project was a fast track project which consisted of facility rehabilitation of five major railroad facilities, trackside utility rehabilitation and several new utility and pedestrian bridges. The $75 million retrofit was the largest construction project Amtrak has constructed to date under the American Recovery and Reinvestment Act.

City of Philadelphia | Philadelphia International Airport Expansion; Philadelphia, PA

Structural Engineer. Design included a steel truss bridge and foundations for a new bag claim building for the airport's new Terminal F expansion and renovation project. The addition of 86,000 square feet of space and renovation of another 37,000 square feet has provided improved safety, security and a higher level of service to passengers.

WMATA | West Falls Church Yard & Shop; West Falls Church, VA

Structural Engineer. Provided design services for a two-track Service and Inspections Shop Annex Building that includes back-shop support and employee welfare facilities. The 30,000 square foot facility includes a partial basement for full access and maintenance of the car hoisting equipment. A second floor is also provided for fire protection and parts storage. In addition, 1,200 foot long Sound Cover Box along the loop of the track was designed to reduce the noise generated by the trains. The project is another phase of the Dulles Metrorail Project.

Richard M. Vaeth, P.E.

Mr. Vaeth is a senior geotechnical design engineer for water, wastewater, hydropower and transportation projects. His assignments have included review of geotechnical reports, preparing specifications and providing input to foundation design and drawing preparation for water treatment and wastewater treatment projects, and heavy civil projects. Mr. Vaeth has experience with designing micropiles, temporary excavation support systems, permanent sheet pile walls, cellular sheet pile structures, and ground improvement, including jet grouting, compaction grouting, low mobility grouting, and permeation grouting. His experience also includes field supervision of geotechnical investigations, resident engineering for dam construction, and 13 years of site design on projects for utilities, industries, and the federal government.

FOUNDATIONS

Office Location
Kansas City, MO

Education
- BS, Civil Engineering, University of Missouri-Rolla, 1973

Professional Registration
PE – 1979, MO, 018610
PE – 1998, TN, 105008

Professional Associations
- American Society of Civil Engineers

Year Career Started
1973

Year Started with B&V
1973

PROJECT EXPERIENCE

South Florida Water Management District | Everglades Agricultural Area (EAA) Reservoir A-1; Palm Beach County, FL

Geotechnical Engineer. Assisting lead embankment designer with the design of the EAA Reservoir A-1, a large above grade storage reservoir planned for the Everglades Agricultural Area. The reservoir has a surface area of approximately 17,000 acres with 22 miles of perimeter embankment. The work includes planning geotechnical investigations, preparing a basis of design report and geotechnical data report for the reservoir embankment and preliminary and final design of the embankment. Associated work includes seepage collection canals, spillways, gate structures, pump stations and pump station modifications. The work completed to date included assisting with design of, and construction supervision of two small temporary earthen embankment reservoirs to provide data for seepage modeling and to evaluate earth and rock for use in the Reservoir A-1 embankment. The design included design of a soil-bentonite foundation cutoff for the embankment beneath one of the temporary reservoirs.

City of Lakeland | Northeast Water Treatment Plant; Lakeland, FL

Geotechnical Engineer. Reviewed report prepared by geotechnical subconsultant, and assisted in the preparation of specifications and drawings for design of new water treatment plant.

Clean Water Coalition | Systems Conveyance and Operations Program (SCOP); Las Vegas, NV

Geotechnical Engineer. Assisted in the development of a geotechnical design memorandum for the foundation design and construction for a pressure reducing/power generating station located near the shore of Lake Mead. The work included evaluating alternative excavation support systems for the 40+ feet excavation required for the deep foundation that will house the turbine generator. The assignment also included developing parameters for design of the excavation support system.

City of Leavenworth | Leavenworth WWTP UV Disinfection Improvements; Leavenworth, KS

Geotechnical Engineer. This assignment involved the design of micropile foundation retrofit to existing basin structure. The micropiles were required to support the additional building loads from the new superstructure. The micropiles were designed to be installed through the existing H-pile supported foundation slab. The design also included design of the micropile to foundation connection. Tasks also included preparing micropile installation and testing specification and micropile details and foundation connection detail. Also, provided part time field observation of micropile testing and production pile installation.

Beaver Creek Wastewater Treatment Plant; Greene County, OH

Geotechnical Engineer. Assisted in design of foundations for a wastewater treatment plant (WWTP) expansion; the work also included assisting in design of a soil-bentonite cutoff wall. The purpose of the cutoff was to provide groundwater control during construction and prevent movement of contaminated groundwater into excavations. A portion of the work included specifying the design of a combination excavation support/groundwater barrier for a construction of a new pumping station on the WWTP site.

City of Phoenix | Lake Pleasant Water Treatment Plant; Phoenix, AZ

Geotechnical Engineer. This project involves providing geotechnical design assistance for design-built contract with the City of Phoenix for a new water treatment plant. Work included review of existing geotechnical reports and assisting with development of geotechnical design memorandum.

Water Services Department, City of Kansas City | Main Street Outfall Replacement; Kansas City, MO

Geotechnical Engineer. This project involved providing geotechnical assistance for the design of the replacement of a damaged 84 inch diameter overflow relief sewer that discharges into the Missouri River. The sewer, which provides overflow sewer relief for a major part of downtown Kansas City, Missouri, was damaged by a slope failure. The preliminary design work included site reconnaissance and the planning of a geotechnical field investigation. The design work included a new sheet pile wall along the riverfront and a specialty grouting program to stabilize and upgrade a deteriorating 85 year old sheet pile wall and protect an adjacent power plant cooling water discharge manhole. The work also included developing demolition, earthwork, grouting, and vibration and movement monitoring specifications.

City of Springfield | Flood Protection Study for Southwest Wastewater Treatment Plant; Springfield, MO

Geotechnical Engineer. Developed concept for flood protection wall along creek that flows through existing wastewater treatment plant site. This assignment included providing input to conceptual cost estimate.

Louis E. Nemeth, R.A., NCARB, LEED AP

Mr. Nemeth is well versed in all phases of architectural services; including building design, construction document production, specification writing and constructability reviews. His experience includes work on water and wastewater treatment facilities as well as participating in value engineering studies.

Mr. Nemeth has served as an architect on projects located in Saudi Arabia, Kuwait and the United Arab Emirates. The international and cultural experience, along with a variety of project types, guarantees the client a successful project.

PROJECT EXPERIENCE

Public Utilities Department | Middle Oconee Water Reclamation Facility LEED Study; Athens-Clarke County, GA

Project Architect. Responsible for the architectural portion of a LEED feasibility study on the existing administration building, including production of the study report that described the LEED process and recommended modifications to achieve LEED for existing buildings certification.

Cobb County Water System | Northwest Cobb WRF Expansion; Kennesaw, GA

Project Architect. Designed an influent pump station, primary sludge pump station, primary screening building, aeration basin blower building, ultra violet disinfection building, switchgear building, and maintenance building. Buildings featured brick veneer with brick accent bands and flat roofs.

City of Durham | Administration Building, Brown Water Treatment Plant; Durham, NC

Architect/LEED Specialist. Facilitated LEED charrette workshop with client staff and design team to determine LEED strategies to best fit the needs of the stakeholders. Continued collaboration through design documents to ensure LEED strategies incorporated into building design.

City of Westminster | Influent Pump Station; Westminster, CO

Project Architect. Currently designing load bearing masonry pump Station. The building exterior will features split face masonry to match existing plant buildings along with a clay tile mansard roof system.

Winston-Salem/Forsyth County Utility Commission | R. A. Thomas Water Treatment Plant LEED Evaluation; Winston-Salem, NC

Architect/LEED Specialist. Collaborated on review of design documents for the new water treatment plant to determine how the 90% complete design compared to the LEED rating system for sustainable/green design and provided recommendations for reasonable additions to the project scope to increase the level of sustainability. Co-authored report documenting findings in terms of LEED point comparison.

ARCHITECTURAL/ LEED BUILDINGS

Office Location
Kansas City, MO

Education
- Master of Regional and Community Planning, Kansas State University, 1986
- Bachelor of Architecture, Kansas State University, 1983
- Associate of General Education, Northampton Community College, 1979

Professional Registration
R.A.- CO, CT, FL, KS, ME, MD, MO, MT, NV, OK, PA, SC, TN, VA

NCARB Certified

LEED Accredited Professional Building Design + Construction

Professional Associations
- USGBC-Central Plains Chapter

Year Career Started
1986

Year Started with B&V
1989

Orange Water and Sewer Authority | I-40 Pumping Station; Durham, NC

Design Architect. Designed a pumping station that was architecturally compatible with adjacent residential neighborhood.

City of Idaho Falls | Booster Pump Station; Idaho Falls, ID

Project Architect. Currently designing a pump station featuring load bearing masonry walls and a flat roof system.

City of Bloomington Utilities | Monroe Water Treatment Plant Improvement; Bloomington, IN

Project Architect. Designed chemical and maintenance buildings. Spaces included chemical storage areas, offices, storage areas, and maintenance shop. The buildings featured limestone veneer which was compatible with local building materials and included a sloped standing seam metal roof and flat roof.

South Adams County Water and Sanitation District | Laboratory Renovation Project; Commerce City, CO

Project Architect. Provided interior design and functional layout for the renovation of an existing laboratory, including material and color selections.

Southern Nevada Water Authority | Mechanic Maintenance Shop, Alfred Merritt Smith Water Treatment Facility; Las Vegas, NV

Project Architect. Provided architectural design and detailing for a 16,000 square foot building that included office area, break room, training room, mechanic and welding shops. The building featured a steel frame structure with precast concrete wall panels and flat roof system.

City of Midwest City | Pollution Control Facility Improvements; Midwest City, OK

Project Architect. Currently designing the following buildings: Headworks, MBBR Blower Building, UV Disinfection, and Biosolids Pumping Complex. The building exteriors will feature masonry veneer to match existing plant buildings. Also, “green materials” will be specified including the use of natural daylighting.

Metro Wastewater Reclamation District | Primary Treatment Improvements; Denver, CO

Project Architect. Provided architectural design and detailing for gravity thickeners building, pump station, and an electrical building. The building exterior featured brick veneer to match existing plant buildings.

City of West Jordan | Biosolids Thermal Drying Project, South Valley Water Reclamation Facility; West Jordan, UT

Project Architect. Provided architectural design and detailing for a new drying building located adjacent to an existing dewatering building. The building features exterior brick veneer to match existing plant buildings, steel frame structure, and a flat roof system.

James D. Sullivan, RA

Mr. Sullivan's responsibilities include developing LEED checklist, architectural design, developing architectural presentations, preparation of contract documents, estimating, project procurement, value engineering, construction administrative, and historical preservation. He interfaces with clients and has experience as project manager, project architect, architectural and engineering coordinator for design/build projects, assistant contract administrator, and assistant construction manager. Mr. Sullivan stays abreast with new revisions to LEED new construction, building codes, military handbooks, and the American's with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines.

Mr. Sullivan has been involved with design/build projects from the conceptual design phase through construction. His responsibilities in construction included estimating, pre-qualifying subcontractors, bidding, contract administration, project procurement, and purchasing.

Mr. Sullivan has been trained to perform preservation analysis by the National Park Service at the National Center for Preservation Technology and Training in Natchitoches, LA. Training covered historical and building pathology, diagnostics methodology, and treatment strategies for preserving historical landmarks. The program was focused on a practical approach to engineering for older and historical buildings. A summary of buildings reviewed for the National Park Service included structures along the Cane River Creole National Historical Park (approximate age of structures: 300 years). His knowledge also includes experience with the National Historical Preservation Act (NHPA) and Historical American Building Survey (HABS).

Mr. Sullivan completed building deficiency assessments and developed new spreadsheets for the National Parks Service for historical fort sites, which included Fort Moultrie and Sumter located in Charleston, SC. In Pensacola, Florida, historical forts and batteries inspected included Fort Pickens, Fort Barrancas, Battery 234, Battery Langdon, Battery Worth, Battery Pensacola, and Battery Van Swearingen. Task included developing methods to document material loss rates that could be recorded onto spreadsheets; define terminology unique to the fort; and listing and breaking down building components into manageable parts based on function that would be used as a tool for estimating repairs. Mr. Sullivan has inspected and reviewed projects for adaptive reuse that included Washington National Monuments and Memorials, Visitor Center in Stehekin, WA., American and British Camp in San Juan Island, WA, and Townsend Hall (Battle Seminar Facility) at Fort Leavenworth, KS.

HISTORIC BUILDINGS PRESERVATION

Office Location
Overland Park, KS

Education
- Bachelor of Architecture, Kansas State University, 1985
- BS, Construction Science, Kansas State University, 1985
- Associate of Architecture Technology, Northampton County Area Community College, 1979

Professional Registration
RA – 1998, KS
RA – 2003, TX
NCARB – 2001

Professional Associations
- National Trust of Historic Preservation

Training
- LEED Training Course
- Physical Protections Systems Training Course by Security Analysis Corporation, Security Engineering by Protection Design Center, USACE Omaha District
- Historic Preservation Training from the National Park Service in Natchitoches, LA (training covered historic and building pathology, and diagnostics methodology and treatment strategies)
- State & Federal Accessibility Course by United Spinal Association (covering ICC ANSI A117.1, ADA/ABA Guidelines, and IBC
- Certificate in Architectural and Mechanical Drafting
- Certificate in Value Engineering

Year Career Started
1985

Year Started with B&V
1989

PROJECT EXPERIENCE

National Park Service | U.S. Department of the Interior | Fort Pickens Historical Preservation Assessment | Pensacola, FL

Architectural Historical Preservationist. Mr. Sullivan is performing a comprehensive historical preservation assessment for the National Park Service (NPS) at Fort Pickens. Fort Pickens is pentagonal United States military fort constructed in 1834 and made of brick. Areas of the fort to be inspected will included the sallyport, quarters, casements, mine battery rooms, mine chambers, powder magazines, scrap walls, bastions, cisterns, reverse arches that support the casement walls, parade grounds, and artillery. All areas of the fort will be inspected, documented, and incorporated into spreadsheets uniquely developed between Black & Veatch and the NPS that will be inputted in a data base. The new data base will include templates specifically designed to allow the NPS to have a uniform system approach to gather preservation information on historical forts throughout the United States.

National Park Service | U.S. Department of the Interior | Fort Moultrie Historical Preservation Assessment | Charleston, SC

Architectural Historical Preservationist. Mr. Sullivan has performed a comprehensive historical preservation assessment for the National Park Service (NPS) at Fort Moultrie, which is on the National Register of Historic Places. Fort Moultrie military site consist of multiple additions that were constructed due to technological improvements in artillery design to protect the United State Coast Line. Additions ranged from 1803 through 1944. A summary of areas assessed included barracks foundation ruins (built: 1809), brick scrap walls (built: 1809-1874), battery additions (built: 1903-1899), gun positions (built: 1874), and ship observation additions (built: 1944). Within each area building materials and artillery were inspected for material loss, physical condition of structural components, and differences between original and replaced materials that "matched in kind." Each portion of the fort was analyzed individually based on its construction date and materials used during that period of time.

National Park Service | U.S. Department of the Interior | Fort Sumter Historical Preservation Assessment | Charleston, SC

Architectural Historical Preservationist. Mr. Sullivan has performed a comprehensive historical preservation assessment for the National Park Service (NPS) at Fort Sumter, which is on the National Register of Historic Places. Fort Sumter military site has gone through many changes since the Revolutionary War. The main structure that exist today was built in 1829 with brick gorge walls, sally port entrance, officer's quarters, eight magazines, and open gun platforms. After the Civil War, Battery Isaac Huger, concrete structure, was built in the center of Fort Sumter. Building materials and artillery were inspected for material loss, physical condition of structural components, and differences between original and replaced materials that "matched in kind."

Keith Chee-A-Tow, P.L.S.

Mr. Chee-A-Tow has over 38 years of land surveying experience. Mr. Chee-A-Tow is experienced in boundary, topographic, hydrographic and GPS surveys, jurisdictional wetlands, aerial mapping and expert witness testimony.

PROJECT EXPERIENCE

Ocean Key House, City of Key West

Prepared submerged land lease survey in accord with the Florida Department of Environmental Protection SLER 0950 Survey Requirements procedure for the resort's "Variable Floating Docks Configuration" comprised of 20,245 square feet of sovereign lands.

Little Palm Island, Hawk Channel

Established boundaries for beach re-nourishment and relinquishing of uplands based on Florida Department of Environmental Protection Disclaimer on lands lost to avulsion. Prepared exhibit to revise the limits of lands to be relinquished to the State of Florida, and to acquire formerly submerged lands to our client based on a historical mean high water line.

Rockland Key, Monroe County

Boundary and topographic survey including establishment of a monumented witness line for mean high water meander line including jurisdictional wetlands mapping to facilitate mitigation on a 34 acre site. The legal description was a complex combination of various parent tracts less-outs and add-ins, with the Project Surveyor providing a review of the title commitment's description and adding encumbrances to the survey.

Summerland Key, Cudjoe Key, Upper and Lower Sugarloaf Key, Ramrod Key, Little Torch Key, Big Pine Key and No Name Key (all right-of-ways)

Aerial mapping and topographic route survey for Florida Keys Aqueduct Authority. Design of sewer and water systems. Easements for excess property submitted to FDOT District 6.

Wisteria Island, Key West

Established witness monuments by use of GPS for mean high water survey; mapped areas of mangrove wetlands; upland topographic survey (1' contours) on a 23 acre island and hydrographic survey of 125 acre submerged land lease (2' contours).

Bahama Village, Key West

Topographic route-of-line survey throughout Bahama Village from Duval Street southerly to Front Street, including the Truman Annex. Elevations were based on NGVD 1929, with benchmarks established at every intersection and mid-point of blocks. Sufficient boundary evidence was recovered to spatially place the right-of-way and platted lot lines within the digital AutoCAD file.

SURVEYING

Avirom & Associates

Office Location
Key West, FL

Education
- BA, Marketing, University of South Florida, 1974

Professional Registration
PLS – FL

Professional Associations
- Florida Society of Professional
- Land Surveyors
- National Society of Professional Land Surveyors
- National Society of Geographic and Land Information Systems

Total Years Experience
38

Monroe County Airport Marathon (MTH)

Establish horizontal coordinates, relative to the North American Datum of 1983 (NAD 83) and vertical elevations, relative to the North American Vertical Datum of 1988 (NAVD 88) at the thresholds of Runway 7 and Runway 25 and also the lens face of the two sets of the Precision Approach Path Indicator (PAPI) lights at both ends of the runways.

Monroe County Watson Boulevard Bridge

Boundary and Topographic route-of-line survey for the restoration of the existing bridge along Watson Boulevard, a County road with drawings submitted and reviewed by FDOT District 6.

Monroe County Animal Shelter

Prepared sketch and descriptions for acquisition of excess lands for submittal to FDOT District 6.

Atlantis, Paradise Island, Bahamas

Bathymetric survey of lagoon, channel, and ocean profiles; topographic survey of Paradise Island Resort (former hotel) for current design of Atlantis. Topographic route-of-line survey throughout Paradise Island, including the Ocean Club, old airport, sewer treatment plant, Club Land'or and Pirates' Cove.

Richard C. Wohlfarth, P.E., B.N.

Mr. Wohlfarth, P.E. is the Director of the Engineering Department which includes professional and technical personnel. He also has overall responsibility for the Special Inspection, Construction Materials Testing and Geotechnical Engineering Divisions where he directs training, quality system review and personnel evaluations. His responsibilities include report review, signing and sealing geotechnical engineering, structural inspection and laboratory testing reports for the company, providing contract negotiation and administration, budget estimating and project management. Mr. Wohlfarth has 28 years of experience (24 with NEF) in various aspects of geotechnical engineering which include determining feasibility of site development, foundation design analysis and recommendations, providing engineering evaluation for bridge and roadway construction, pavement design for roadways, roadway subgrade stabilization by geotextiles and other means, design of shoring systems for utility trenches and other deep excavations, dewatering methodology for trench and other excavations and backfill procedures, setting up and monitoring pile load tests, and providing value engineering for foundations.

GEOTECHNICAL/ TESTING

Nutting Engineering of Florida

Office Location
Florida

Education
- BS, Civil Engineering, University of Florida

Professional Registration
Registered Engineer – 50858, FL
Registered Building Inspector- BN #3580, FL
SBCCI #6528
ACI Level 1 #991175
UBCI

Professional Associations
- Florida Engineering Society *Past Chapter President
- National Society of Professional Engineers

Total Years Experience
28

PROJECT EXPERIENCE

City of Marathon

LaPalma Property: Provided geotechnical exploration on a ~6 acre generally vacant site with a canal approx. 400' long and 50' wide bisecting the southern half of the property. Exploration included evaluating existing stockpiles of soil measuring 12' in height, 200' by 100' on the site, with the top being accessible to truck mounted drilling equipment, to determine is suitable for fill material. Future plans include constructing a 10,000 SF storage/maintenance building.

Reuse Mixing Tank at Marathon Community Park: Provided geotechnical exploration services for a proposed reuse mixing tank to be constructed as part of using effluent for irrigation purposes.

City of Key West Improvement Projects (Five Sites via CH2M Hill)

Square T-Pier: installation of new berthing dolphin at north end of the existing T-pier structure and extension of the existing pier.

Zero Duval Seawall: Construction of new sheet pile wall outside the existing wall.

Ferry Terminal Dock Extension: 121 ft long extension to and existing 180 ft long dock.

Ferry Terminal Floating Docks: 204 ft long floating dock system with 50 ft extension along Trumbo Road.

Tarpon Pier: Replacement of the existing 400 ft long concrete deck pier.

Central Cudjoe Key Regional Wastewater System Extension

Performed/performing geotechnical exploration/engineering services for multiple phases of the wastewater collection system through the Lower Florida

Keys, from Mile Marker MM 17 to MM 33, to provide service to Lower Sugarloaf Key, Upper Sugarloaf Key, Cudjoe Key, Summerland Key, Ramrod Key, Middle Torch Key, Big Torch Key, Little Torch Key, Big Pine Key and No Name Key.

Dozens of Florida Keys Aqueduct Authority projects, not limited to:

Proposed expansion of the Overseas Highway, Key Largo Water Treatment District Basins G and H, Key Largo Pump Station and WWTP, Ocean Reef Distribution System Improvements (Phase II), Vacuum/Pump Station, Regional Waste Water Collection System Improvements/ Upgrades on Cudjoe Key, Summerland Key and Sugarloaf Key

W/WTP projects include:

Key Largo WTP @ MM 105.5, FKAA Robert Dean WTP @ Florida City, Duck Key WTP, North Key Largo Advanced Treatment and Wastewater Reuse project @ Ocean Reed Club, Dania Beach WWTP @ Stirling Road, Deerfield Beach WWTP, Pembroke Pines WTP Improvements @ Johnson Street, Sawgrass WTP @ Sawgrass Corporate Parkway, City of Coral Springs WTP @ 85th

Florida Keys SPCA Building

Performed geotechnical exploration/engineering for proposed 2-story ~24,000 SF building Avenue, Layton WWTP Expansion, Florida City WTP High Service Pump Station

Miami-Dade County, Multiple Departments including: DERM, Public Works, Parks and Recreation, Aviation, Fire Rescue and Water/ Sewer. Projects include but are not limited to:

Miami International Airport North Terminal Development Program, Miami: Performed geotechnical exploration/engineering services for the renovation and addition to existing Terminal (formerly Terminal A), includes Mile Long Terminal and Sky Train. In addition, Nutting Engineers of Florida, Inc. also provided pile load testing, pile installation monitoring and testing of grout, construction material testing of onsite and imported materials, soil density testing, concrete and grout sampling and testing, proctor tests, Limerock Bearing Ratio (LBR) tests, gradation, and special/ threshold inspection services on various aspects of the project.

Joseph Caleb Center Property, Miami: Performed geotechnical exploration/engineering services for the Phased construction of a three level 149,500 SF parking garage and a separate 2-story 38,000 SF courthouse annex building on the approximate 1.44 acre site.

Fire Station #62, Palmetto Bay: Performed geotechnical exploration/engineering services for the future construction of a new one-store, ~10,750 SF Fire Station, 25 space parking area, associated asphalt paved driveways and concrete aprons. Additional testing was performed for the septic tank installation on this site, as well as testing for the temporary ~1,380 SF trailer, concrete sidewalks and canvas awning/canopy on the adjacent site.

Steven King, P.E.

Mr. King received a Bachelor's degree in Chemical Engineering from the University of South Florida in Tampa, Florida, in 1998. Mr. King has gained a variety of experience in Civil Engineering and Project Management since graduating. Projects have included project management, utility investigation, water supply, water and wastewater design, regulatory compliance and permit review.

Mr. King has extensive experience obtaining regulatory approvals for a variety of water and wastewater projects. Prior experience includes working as Permitting Supervisor during a seven year employment with FDEP.

PROJECT EXPERIENCE

Hillsborough County | Nature's Way Pump Station Upgrade; Hillsborough County, FL

Staff Engineer. The project involves the expansion of an existing wastewater pumping station. The expansion will take place while the existing pump station remains in service. Responsibilities include shop drawing review and comment. Additionally, review coordination by other staff members. Also, Request for Information follow-up, research and letter drafting. Schedule and budget follow up with Project Manager.

Tampa Bay Water | Morris Bridge Point of Connection Emergency Pipe Repair; Tampa, FL

Engineering Manager. Responsibilities include civil and mechanical design of an emergency pipe repair/replacement for a vital point of connection from Tampa Bay Water to the City of Tampa. Duties also included all bid phase and construction oversight, including RFI and submittal review. All in a very condensed timeline, based on the emergency nature of the project.

Tampa Bay Water | Desalination Facility Pump Station and Piping Repair (Design-Build); Tampa, FL

Engineering Manager. Responsibilities include civil and mechanical design of a replacement desalination pump station and leading the engineering team's efforts. The project involves new suction, discharge and concentrate piping and a new concentrate splitter box. Duties also have also included leading the permitting efforts, including the Environmental Resource Permitting (ERP), Florida Department of Environmental Protection (FDEP) Potable Water Construction Permitting, Hillsborough County Development Services Site Plan Review and Building Department Permitting, and FDEP Dewatering Notice of Intent.

Hillsborough County | Hamilton Pump Station Upgrade; Hillsborough County, FL

Engineering Manager. Responsibilities include civil-site and mechanical design of a replacement wastewater pump station at the site of an existing station. Also

REGULATORY REVIEW AND PERMITTING

Office Location
Tampa, FL

Education
- BS, Chemical Engineering, University of South Florida, 1998

Professional Registration
PE – 2012, FL, 74954

Professional Associations
- American Water Works Association

Year Career Started
2000

Year Started with B&V
2007

duties include leading all other disciples in the preparation of the contract specifications and drawings. The project involves all an all new wetwell, pumps and appurtenances. Duties also have included specification preparation, client meetings, minutes preparation and budget tracking and permitting.

Hillsborough County | Valrico AWTP UV System; Hillsborough County, FL

Engineering Manager. Responsibilities include civil and mechanical design and construction phase services for a UV disinfection expansion at an existing AWTP. Duties also include construction phase services (RFIs, submittals, site visits, construction oversight). The project involves new UV banks installed in an existing UV system, new automated weir gates, stop logs and temporary chlorine disinfection. Duties also have also included leading the permitting efforts for the project, including ensuring that FDEP Wastewater construction exemption was obtained, Hillsborough County Development Services Site Plan Review and others as needed.

Hillsborough County | Falkenburg AWWTP Backwash Blowers; Hillsborough County, FL

Project Engineer. Responsibilities include civil and mechanical design of replacement wastewater filter backwash pumps and filter control valves at an existing AWWTP. Duties also include construction phase services (RFIs, submittals, site visits, construction oversight). Each of the five filters that are part of the project has five separate pneumatic valves that will require replacement and the two backwash pumps are also being replaced. Duties also included leading the permitting efforts.

Collier County Water-Sewer District | South County Regional Water Treatment Plant Chemical Piping Replacement, Sulfuric Acid Feed System Improvements and Odor Control Blow-Down Disposal; Collier County, FL

Project Engineer/Civil-Site Engineer. Responsibilities include design of three improvement projects at the water plant, including: the replacement of piping associated with the chemicals used by the plant; a sulfuric acid feed system used to control pH in odor control system blow-down; and a new odor control blow-down disposal system. The design included drawing and specification preparation with rapid deadlines. Additionally the duties include coordination of other disciplines and preparation of final documents for submittal.

Lee County Utilities | Ft. Myers Beach WWTP Odor Control System Improvements; Lee County, FL

Project Engineer/Civil-Site Engineer. Responsibilities include design of the civil portion of the proposed odor control improvements at the wastewater treatment plant and coordination of all other disciplines in completing final design. The design includes a biotrickling filter followed by a carbon absorption unit. The design involves the layout of all piping, dampers and equipment on the plant site, including connections to the existing systems.

Tami Ray, GS

Ms. Ray has a wide variety of grant and loan experience with a strong emphasis on federal and state program development and multi-discipline project funding and management. Her experience and knowledge come from a diverse background including working for city and county government, serving design firms as a program development specialist, owning and operating a multifaceted Florida-based corporation, and serving as Director of Program Development for a Design/Build-CM@Risk Firm.

Ms. Ray has proven her ability to provide a comprehensive approach utilizing numerous funding programs to realize the total project potential. Her experience in planning, administration, permitting, engineering, and construction has given her the ability to provide flexibility to local governments working within the boundaries of promulgated rules and requirements.

Over the past three years, Ms. Ray has created financial initiative plans that provide alternative financial resources for programs exceeding $1.6B in Florida. Since 2005, she has secured in excess of $330M from the FDEP SRF program; $176M Energy; $100M USDA; and others. Ms. Ray's services have reached throughout the nation to include 10 states including multiple financial planning programs. Our team expects to receive in excess of $30M in related professional services to programs sold within these states.

PROJECT EXPERIENCE

Malcolm Pirnie | Infrastructure Funding Services Director

Leader of the Malcolm Pirnie Program Development Division located in Tallahassee, Florida. Related duties include coordinating between the various funding agencies and the client; performing historical financial review, preparing supporting documentation, developing a forecast of operating revenues and projected expenditures, and summarizing a five-year cash flow statement in accordance with the applicable funding agency. Coordinates all agency paperwork and hosts various public hearings and County Commission meetings, including drafting ordinances for adoption. Drafts and files Florida Department of Environmental Protection (FDEP) request for information (RFI) applications and funding agreements and files the facilities plan with state clearinghouse. Coordinates with the engineer to identify applicable pledge revenue noted in the capital finance plan, including review of user charges. Processes all funding applications and administers the grant/loan programs on behalf of the client.

FUNDING

Office Location
Tallahassee, FL

Education
- Riley Business College Graduate, 1988

Year Career Started
1988

The Haskell Company | Program Development Director

As Director of Program Development, Ms. Ray oversaw infrastructure improvements during construction and helped communities to meet their funding needs. Haskell is Florida's largest corporately based Design/Build-CM@Risk firm serving Florida for the past 40 years. Haskell currently performs in excess of $600,000,000 a year in Florida.

Eutaw Utilities, Inc. | Owner/President

Eutaw Utilities, Inc. was a private firm with corporate offices in Tallahassee, Florida. As owner of Eutaw Utilities, Ms. Ray served as President of this fast-growing, multi- discipline design firm. She provided comprehensive funding solutions resulting in immediate success. Assisted communities throughout the state in securing grant and low-interest loan funded projects that ranged from $2,000,000 to $23,000,000 in total project cost.

Baskerville-Donovan | Grant Specialist

Baskerville-Donovan a private engineering firm with corporate offices in Pensacola, Florida. While serving as Grants Specialist, Ms. Ray served communities from Brevard County to Escambia County with grantsmanship and comprehensive funding packages. She achieved numerous successes for both Baskerville- Donovan and its municipal client base. As example, the City of Chipley received $28,000,000+ in grant funding from multiple funding agencies. Ms. Ray provided program development services that earned clients in excess of $100,000,000 in grant monies for infrastructure needs.

Richard D. Taylor, P.E.

Mr. Taylor has 32 years of experience in project management, design and implementation of process automation and control systems in water, wastewater, oil and gas, citrus, pulp and paper and petrochemical industries.

ELECTRICAL

Office Location
Tampa, FL

Education
- BS, Electrical Engineering, Georgia Tech, 1976

Professional Registration
PE – 1983, FL, 33376
PE – 1981, GA, 13031

Professional Associations
- National Society of Professional Engineers

Year Career Started
1976

Year Started with B&V
2001

PROJECT EXPERIENCE

City of Hollywood | Energy Efficiency Master Plan; Hollywood, FL

Design Engineer. Led the field evaluation for the development of a high level review of the SCADA system for the City of Hollywood's WTP and SRWWTP, as part of a comprehensive Energy Efficiency Master Plan performed by Black & Veatch. The evaluation included automation and control system improvements related to ECMs as well as longer term SCADA system recommendations for enhanced performance and optimized operations.

City of Lakeland | Wastewater Collection SCADA System; Lakeland, FL

System Integrator. Designed and implemented PLC-based SCADA system for City of Lakeland using microprocessor-based packet-radios operating in a user configurable data repeating configuration to provide 250 sq. miles coverage with 2 watt radios and 20 foot antenna heights. System provides 100% RF coverage in spite of elevation changes of over eighty feet.

City of Lakeland | T. B. Williams WTP and Well Field; Lakeland, FL

Design Engineer. Design of a replacement process automation system for an existing 25 mgd water treatment facility including remote well field pumps and booster pump stations. The project includes updating the process control strategies coupled with fiber optic communications network to remote well fields and booster pump stations. Prepared specifications and drawings, review of contractor submittals, supervision of contractor-performed construction and system integration services.

Tampa Bay Water | System Enhancements, Regional Water Supply Facilities; Tampa, FL

Design Engineer. Water treatment facility modifications to electrical equipment, controls and automation. The project included the design of diesel fueled engine-generators, medium voltage electrical switchgear modifications, conversion of an existing 2000 hp high service pump from fixed speed to variable frequency speed control, a water booster pump system, aqua ammonia chemical feed system, PLC-based process controls for additional process and electrical systems and expansion of Tampa Bay Water's SCADA system to accommodate facility improvements. Prepared specifications and drawings, review of contractor submittals, supervision of contractor-performed installation and system integration services.

City of Lakeland | Wayne Combee Water Treatment Plant and Well Field; Lakeland, FL

Design Engineer. New water treatment facility including remote well field pumps and pipeline, lime softening pre-treatment, filter basins, chemical disinfection, 5 MG storage tank, and high service pump facilities. The project included the design of distributed control system, electrical and instrumentation systems for entire facility (diesel fueled engine-generators, electrical switchgear, variable frequency speed controlled high service pumps, fluoride, dry polymer, and lime chemical feed systems, and fiber optic communications network to remote well field. Prepared specifications and drawings, review of contractor submittals, supervision of contractor-performed construction and system integration services.

City of St. Petersburg | Process and Electrical Improvements to Water Pumping Stations, Oberly Pump Station and Washington Terrace Pump Station; St. Petersburg, FL

Design Engineer. Water distribution pump station facility upgrades to electrical equipment, pump controls, emergency power systems and process automation. The project included the development of basis of design documents for replacement diesel fueled engine-generators, medium voltage electrical switchgear replacement, conversion of existing high service pumps from fixed speed to variable frequency speed control, PLC-based controls for additional electrical systems and modifications to City of St. Petersburg Water SCADA system to accommodate facility improvements. Performed research of existing facility conditions and equipment capabilities, prepared preliminary budget of engineering and construction costs, developed basis of design report for facility improvements.

Orange County Utilities | Eastern Regional WTP; Orlando, FL

System Integrator. Water treatment facility controls and automation. The project included the design of PLC-based process controls for wells, transfer pumps, chemical feed system (CO2, chlorine, NaOH) and High Service Pump operation. Supervised design of computer-based operator interface system for facility, performed field start-up and system tuning, prepared conformed to construction records, and developed O&M manuals.

Design Engineer. Water treatment facility electrical, controls and automation expansion. The project includes the plant expansion including PLC-based process controls for additional wells, transfer pumps, expanded and new chemical feed systems and High Service Pump operations. Prepared specifications and drawings, performed contractor bid and submittal reviews, and performed field construction services.

Lawrence Brouillette, P.E.

Mr. Brouillette is a senior I&C engineer responsible for the process design and development of various wastewater, reclamation, and potable water, facilities. He has participated in a wide range of project activities including feasibility studies, alternative technologies review, design, construction services, final commissioning and training.

INSTRUMENTATION & CONTROLS

Office Location
Orlando, FL

Education
- BS, Electrical Engineering, University of Central Florida, 1990

Professional Registration
PE – 2002, FL, 57973

Professional Associations
- International Society of Automation
- Water Environmental Federation

Year Career Started
1983

Year Started with B&V
2007

PROJECT EXPERIENCE

Florida Keys Aqueduct Authority | Cudjoe Key Advanced Wastewater Treatment Plant; Cudjoe Key, FL

Design Engineer. Supplied design services in the development of contract drawings and specifications for the Cudjoe Key Advanced Wastewater Treatment Plant. The project included P&ID development, the design of PLC-based process controls systems and a fiber optic communications network,

Orange County Utilities | Master Waste Water Pump Station Improvements Group A; Orlando, FL

Design Engineer. Supplied design services in the development of contract drawings and specifications for the Master Waste Water Pump Station Improvements, Group A. The project included P&ID development, the design of PLC-based process controls utilizing Siemens PLCs and implementation of communications over a MAS radio system.

City of Lakeland | English Oaks Accommodations Phase II; Lakeland, FL

Design Engineer. Supplied design services in the development of contract drawings and specifications for the English Oaks Accommodations Phase II SCADA system. The project included P&ID development, the design of PLC-based process controls utilizing Modicon Quantum PLCs and implementation of communications over a fiber optic WAN with radio as backup.

Hillsborough County Water Resource Services | South County Reclaimed Pump Station; Tampa, FL

Communications Troubleshooting . Supplied troubleshooting services for communications problems with the PLC radio network. Captured and analyzed network communications to resolve communications errors.

Hillsborough County Water Resource Services | Falkenburg Reclaimed Pump Station; Tampa, FL

PLC Programming. Supplied programming services for reprogramming of the existing PLC to correct deficiencies in the original program.

City of Tallahassee | Well 26/28 Upgrade; Tallahassee, FL | 2006

System Integrator. The project included the design of PLC-based process controls for wells, design review, submittal production, PLC programming and communications protocol conversion.

Kissimmee Water Resources Department | North Bermuda Water Plant SCADA System Project; Kissimmee, FL

Instrumentation and Controls Engineer. Performed design review in the development of contract drawings and specifications for the plant control system of the City's 7-MGD water plant. Provided support for start-up and site testing of the Allen Bradley PLC/PC based control system. Debugged PLC control strategies, and facilitated problem resolutions with the City's systems integrator.

Kissimmee Water Resources Department | Lift Station and Imperial Rapid Infiltration Basin; Kissimmee, FL

Instrumentation and Controls Engineer. Performed instrumentation and controls assessment and supplied design services in the development of design modifications to the existing control system of the City's effluent pump station and remote ponds. This modification supported the remote control of these sites. Designed, fabricated, installed and tested the interface panel for the RTUs at the pump station and remote sites. Coordinated the upgrade of the old technology central RTU to an upgraded RTU for the lift station monitoring system. Performed display screen integration, report generation, local area network setup, and installed and integrated the alarm dial out software to allow paging of operators during off-hours.

Public Services Department | GTL WWTP Control System Upgrade; Fort Lauderdale, FL

Design Engineer. Performed a control system needs/requirements assessment and supplied design services in the development of contract drawings and specifications for the Public Services Department's control system upgrade. The control system incorporates elements of a SCADA system, as well as upgrades to both plant control systems at the G. T. Lohmeyer Regional Wastewater and Fiveash Regional Water Plants. Performed a needs assessment and supplied design/construction services in the development of contract drawings and specifications for an Interim SCADA System for the City's 70-MGD Water Plant Well Field. This project utilizes PC based, non-proprietary system that utilizes a PLC/Spread Spectrum RTU and an open architecture. Performed an assessment of the City's sewage and stormwater pump stations. This assessment documented the individual control elementary diagrams and provided a tabulated list of deficient items affecting the installation of the new SCADA system.

Utilities Commission of New Smyrna Beach | Water Facilities Improvements; New Smyrna Beach, FL

Design Engineer. Supplied design services in the development of contract drawings and specifications for the Water Facilities Improvements project. The project included P&ID development, the design of PLC-based process controls systems for two pump stations, a 3 mile long fiber optic network between the plants and construction services in the commissioning of both facilities.

Michele F. Roth, P.E.

Ms. Roth has experience in the design and task leadership of various mechanical systems, including heating, ventilating, and air conditioning (HVAC), odor control, plumbing, and dehumidification systems for many water and wastewater treatment, distribution, and collection facilities as well as dam, tunnel and substation facilities.

Her diverse experience covers the application of these systems for administration buildings, laboratories, maintenance facilities, chemical areas, pumping stations, process areas, battery rooms, tunnels, and substation control buildings. She is currently the department sustainable design/LEED specialist. She has been involved in studies, designs, building energy models, and reports for existing treatment plants and associated facilities including LEED studies. She is currently the LEED administrator for a project in design pursuing LEED certification.

PROJECT EXPERIENCE

City of Lakeland |Disinfection Facilities Upgrade; Lakeland, FL

Mechanical Engineer/Discipline Lead. Responsible for mechanical building systems project management. Collaborated on mechanical design and responsible for detailed HVAC design, drawings and specifications for the building ventilation and emergency chlorine gas treatment system upgrades at the three plants in the project.

City of Lakeland | Drane Field Pump Station, English Oaks Accommodation Project; Lakeland, FL

Mechanical Engineer/Discipline Lead. Collaborated on mechanical design, responsible for detailed HVAC system design, specifications and drawings for new wastewater pumping station.

Grand Valley Regional Biosolids Authority | GVRBA Segment 4 – Grand Rapids Dewatering Facilities; Grand Rapids, MI

LEED Specialist. Provided consulting services to the design team of the LEED registered project on requirements for LEED certification of the Dewatering Building.

Winston-Salem/Forsyth County Utility Commission | R. A. Thomas Water Treatment Plant LEED Evaluation; Winston-Salem, NC

Mechanical Engineer/LEED Specialist. Collaborated on review of design documents for the new water treatment plant to determine how the 90% complete design compared to the LEED rating system for sustainable/green design and provided recommendations for reasonable additions to the project scope to increase the level of sustainability. Authored report documenting findings in terms of LEED point comparison.

BUILDING MECHANICAL

Office Location
Kansas City, MO

Education
BS, Mechanical Engineering, Brigham Young University, 1981

Professional Registration
PE – MO, 022032
PE – AZ, 57931
PE – MD, 33747
PE – MT, 19472
PE – NC, 037687
PE – NV, 021217
PE – RI, 8807
PE – SC, 28925
PE – VA, 0402054146

LEED Accredited Professional with Specialty, BD+C, 2006

Professional Associations
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

Year Career Started
1981

Year Started with B&V
1999

Athens-Clarke County Public Utilities Department | Middle Oconee Water Reclamation Facility LEED Study; Athens-Clarke County, GA

Mechanical Engineer/LEED Specialist. – Responsible for the mechanical portion of a LEED feasibility study on the existing administration building, including production of the study report that described the LEED process and recommended modifications to achieve "LEED for Existing Buildings" certification.

City of Fargo | Fargo Membrane Water Treatment Plant and Improvements; Fargo, ND

Mechanical Engineer/Discipline Lead. Responsible for mechanical building systems discipline project management. Collaborated on mechanical design and responsible for conceptual HVAC design for the membrane water treatment plant addition to the existing facility.

City of Sioux City |Southbridge Regional Water Treatment Plant; Sioux City, IA

Mechanical Engineer/Discipline Lead. Responsible for mechanical building systems discipline project management. Collaborated on mechanical design and responsible for conceptual HVAC design and Quality Control review for the new 10 MGD Water Treatment plant. The plant includes a flocculation and sedimentation basin building with membrane feed pump station, an operations building with membrane filters, chemical storage and feed and high service pumping station.

San Francisco Public Utilities Commission | Alameda Siphon No. 4; Alameda County, CA

Mechanical Engineer/Discipline Lead. Responsible for mechanical building systems project management. Responsible for detailed HVAC design, drawings and specifications for the Coast Range Tunnel ventilation system replacement. The system design included requirements for redundancy, reversibility and explosion hazard. The ventilation system is used during inspection and repair of the 25 mile long water conveyance tunnel.

El Dorado Irrigation District | Folsom Lake Raw Water Pump Station Expansion - Phase 1A; Placerville CA

Mechanical Engineer/Discipline Lead. Responsible for mechanical building systems project management. Responsible for detailed HVAC design, drawings and specifications for the facility modifications providing increased capacity at the existing raw water pump station.

City of Lawrence | Wakarusa WWTP; Lawrence, KS

Mechanical Engineer/Discipline Lead. Responsible for mechanical building systems project management. Collaborated on mechanical design and responsible for conceptual HVAC design for the new WWTP, and detailed HVAC design drawings and specifications for the new Maintenance and UV Disinfection Buildings.

Steven Scott

PROCESS
MECHANICAL

Office Locations
Orlando, FL (Current)
Kansas City, MO (2013-2015)

Education
B.S., Mechanical Engineering, University of Central Florida - Orlando, 2013

Year Career Started
2013

Year Started with B&V
2013

Steven is a mechanical engineer in the Black & Veatch water business. He specializes in the design and specifications of mechanical process systems. Steven's experience includes the design of pumping, digester gas, blower, compressed air, and engine-generator systems as well as pipe stress, hydraulic, and pump system transient analysis. He has designed the mechanical systems for new and existing water and wastewater treatment plants, pumping stations, and hydropower stations.

PROJECT EXPERIENCE

SFWMD | Golden Gate Weir Replacement, Collier County, FL

Design Engineer. Currently designing the liquid propane standby generator system for the new water control structure. The new generator will provide backup power to the structure's two automated roller gates and new control building..

Orange County | South WRF Phase V Improvements; Orlando, FL

Design Engineer. Designed a blower system including four 800 horsepower single-stage centrifugal blowers. Designed new and modified existing aeration piping for the blowers and the aeration basins. Major efforts included blower sizing, blower and pipe layout and design, pipe stress analysis, and structural support design.

JEA | Buckman Street WWTP; Jacksonville, FL

Design Engineer. Performed a review on and provided recommendations for the blower system at Buckman Street Wastewater Treatment Plant which includes four 700 horsepower high speed gearless turbo blowers. The blowers, the aeration system, electrical equipment, controls, and the environment were inspected to determine the cause for the faulting blowers. Numerous recommendations were provided as solutions.

San Francisco Public Utilities Commission | SEP Energy Recovery Facility; San Francisco, CA

Design Engineer. Responsible for the design of the high pressure compressors and a 5,000kW turbine. The compressors compress either natural gas or biogas and are responsible for feeding the turbine. The turbine's primary purpose is to produce hot exhaust which will be used by the Heat Recovery Exhaust Generator and its second purpose is to produce as much electrical power as possible. Other aspects of the design include pipe stress analysis, air compressors, and operation controls.

Coastal Water Authority | Capers Ridge Pump Station; Houston, TX

Design Engineer. Took part in the design of a 500 mgd pump station responsible for maintaining the water level of Lake Houston ultimately supplying Houston with water. Main design efforts include a hydraulic analysis

of the system, pump sizing and selections, transient analysis on the dual 96" pipelines, locating and sizing air valves, pump bay design and dimensioning per HI, and pump bay intake flushing line design.

Sacramento Regional County Sanitation District | New WWTP; Sacramento, CA

Design Engineer. Took part in the design of the $2B wastewater upgrade. Designed the pipe layout and performed the pipe stress analysis for the six new 3,000 hp integrally geared single stage centrifugal blowers for BNR aeration, and one gearless turbo blower for channel aeration. Responsible for the review of the blower and aeration submittals and modifications required to incorporate the equipment.

City of Springfield| Blower Upgrade, Southwest WWTP; Springfield, MO

Design Engineer. Designing the blower system which includes four 300 horsepower high speed gearless turbo blowers which are to replace the existing system in an effort to increase process efficiency. The major efforts have included a blower life cycle cost analysis, blower sizing and selections, blower and pipe layout and design, and a pipe stress analysis.

Grand Strand Water & Sewer Authority | Myrtle Beach Surface WTP; Myrtle Beach, SC

Design Engineer. Responsible for the design and submittal review of the Liquid Oxygen Supply system, the Ozone distribution system, and the Ozone Generation system.

Winston-Salem/Forsyth County Utility Commission | Muddy Creek WWTP Upgrade; Winston-Salem, NC

Design Engineer. Took part in the design of the digester gas system upgrade. Designed the high pressure digester gas compressor system. The design included compressor sizing, compressor and pipe layout, and system integration and controls.

Metropolitan Water District of Southern California | Greg Avenue Pump Station; CA

Design Engineer. Performed the hydraulic analysis and pump design for the replacement of two in-series 1,250hp horizontal bottom suction pumps paralleled with a new 2,250hp bottom suction pump. The second pump in series was to double as a hydraulic turbine during reverse flow.

New York City Department of Environmental Protection North River WWTP; New York, NY

Design Engineer. Designed the pipe layout and performed the pipe stress analysis for the new blower system consisting of nine 350 hp gearless turbo blowers for wastewater aeration.

Kevin Cevallos, E.I.

Mr. Cevallos is a Design Engineer with experience and knowledge of water and wastewater systems. Mr. Cevallos has served as Design Engineer on a number of Civil engineering projects including water and wastewater treatment plant facilities design.

CONSTRUCTION INSPECTION MANAGEMENT

Office Location
Coral Springs, FL

Education
- Masters, Environmental Engineering, Water, Wastewater, and Stormwater, University of Florida, 2019
- Bachelor of Engineering, Civil Engineering, Water, University of Florida, 2014

Professional Associations
- American Water Works Association

Year Career Started
2014

Year Started with B&V
2014

PROJECT EXPERIENCE

Broward County Water and Wastewater Services | Wetwell Refurbishment at Pump Stations 452, 458, and 460; Broward County, FL

Resident Engineer. As part of the implementation of the General Engineering Services for wastewater, Mr. Cevallos has participated on the design and construction phase services as a resident engineer during the construction of the Wetwell Refurbishment at Pump Stations 452, 458, and 460. The work included daily construction inspections and reporting, safety coordination including confined space training, management of submittals/RFIs, client construction meetings and possible change order requests.

Mount Pleasant Waterworks | Rifle Range Road WWTP Rehabilitation and Expansion; South Carolina

Design Engineer. The project consisted of improvements to Rifle Range Road Wastewater Treatment Plant (RRRWWTP) expand the treatment capacity from 6.6 mgd MM to 9.2 mgd MM. The upgrade included the following facility improvements: Construction of a new headworks facility, New influent force main piping to new headworks facility New blower building and multistage blowers with the capacity to meet the maximum month airflow requirement with one blower out of service and renovate the existing dewatering facility to alleviate existing issues with ancillary mechanical and electrical services and to house a new 2.5-meter belt filter press. Mr. Cevallos served as a design engineer in helping develop the hydraulic profile for the entire upgrade and the basis of design report for the dewatering process.

South Florida Water Management District | Golden Gate 4; West Palm Beach, FL

Design Engineer. Mr. Cevallos is currently assisting the design of a new water control structure with two automated roller gates, an overflow weir structure and a new control building to replace an existing weir structure with smaller manual gates.

Brown County Water and Wastewater Services | Improvement Projects; Broward County, FL

Design Engineer. As part of the implementation of the General Engineering Services for wastewater, Mr. Cevallos has participated on the design and construction phase services for multiple improvements projects at the North Regional WWTP including replacement of pump pads for the effluent pumps

and improvements to the aeration basins, shorting contactors panels replacement at the outfall pump station and clarifiers rehabilitation. In addition, Mr. Cevallos assisted in the design of clarifier rehabilitation and the replacement of transformer number 1. He also provided construction phase services for the painting at master lift stations 226 and 452 and design services for the wetwell refurbishment at pump stations 452, 458, and 460.

Broward County Water and Wastewater Services | A3 Clarifier Rehabilitation; Broward County, FL

Resident Engineer. As part of the implementation of the General Engineering Services for wastewater, Mr. Cevallos has participated on the design and construction phase services as a resident engineer during the construction of the A3 clarifier at Broward County Water and Wastewater Service's North Regional Wastewater Treatment Plant. The work included daily construction inspections and reporting, management of submittals/RFIs, safety coordination including confined space training, and client construction meetings.

District of Columbia Water | Blue Plains Advanced Water Treatment Facility Combined Heat and Power Project; Washington, DC

Construction Submittal Support. Provided construction phase services for new combined heat and power project that produces up to 100,000 pph of steam for use in the Cambi process as well as up to 15 MW of electricity for use in the Blue Plains AWTF. Facilities included gas blowers, siloxane removal equipment, gas compressors, combustion turbines, heat recovery steam generators, and other ancillary facilities. The project is being delivered through a Design-Build-Operate contract arrangement.

Miami-Dade Water and Sewer Department | Water Service Improvement to Non-Residential Properties; Miami, FL

Design Engineer. Mr. Cevallos assisted the Miami-Dade Water & Sewer Department (MDWASD) with developing a plan, including planning level cost estimates and project schedules for the improvements of water infrastructure to non-residential zoned properties within MDWASD's service area currently under-sized to bolster commercial re-development. Once the project is implemented, over 15,000 parcels sites will have improved water service.

South Florida Water Management District | IT Shelter Replacement Construction Project; West Palm Beach and Hendry Counties, FL

Design Engineer/Construction Submittal Support. Mr. Cevallos assisted in the construction management of four (4) IT shelters in Palm Beach and Hendry County for the South Florida Water Management District. The project includes management of submittals/RFIs.

Violet V. Vanatta, CAD/PW Coordinator

Ms. Vanatta has 19 years of experience in the water, wastewater and stormwater drafting/engineering field.

PROJECT EXPERIENCE

City of Newport News, Virginia Department of Public Utilities (Waterworks) | Contract #95: Skiffe's Creek Traveling Screen; Newport News, VA

Project CAD Coordinator and Drafter. Provided CAD coordination and support for the production of construction drawings. Responsible for producing the civil details.

City of Newport News, Virginia Department of Public Utilities (Waterworks) | Contract #93: Pipeline & Structural Repairs at Water Crossings; Newport News, VA

Project CAD Coordinator and Drafter. Provided CAD coordination and support for the production of pipeline water crossing repair drawings. Responsible for producing the civil details.

Orange County Utilities | Master Wastewater Pump Stations Improvements - Group A1; Orange County, FL

Designer and CAD Drafter. Coordinated the production of drawings for improvements to two existing pump stations. Provided design tasks including CAD drafting of construction drawings, coordination of survey data and sub-consultant design information.

Orange County Utilities | Master Wastewater Pump Stations Improvements - Group A2; Orange County, FL

Designer and CAD Drafter - . Coordinated the production of drawings for improvements to three existing pump stations. Provided design tasks including CAD drafting of construction drawings, coordination of survey data and sub-consultant design information.

Orange County Utilities | Northwest Water Reclamation Facility Phase 3 Expansion; Orange County, FL

Designer and CAD Drafter. Coordinated the preliminary design report drawings for expansion of existing facility.

Broward County Water and Wastewater Services | Pump Stations No. 452, 458 and 460, Wetwell Refurbishment; Broward County, FL

Project CAD Coordinator and Drafter. Provided CAD coordination and support between regional offices and sub-consultant for the production of construction drawings. Responsible for producing the civil details.

City of Orlando | Lift Station 143, Odor Control Improvements; Orange County, FL

Project CAD Coordinator and Drafter. Provided CAD coordination and

GIS/CAD DESIGN

Office Location
Orlando, FL

Education
- Associate in Applied Science, Computer Aided Drafting Technology, ITT Technical Inst Maitland, 1996, United States

Total Years of Experience
20

Years of Experience with B&V
20

support between regional offices and sub-consultant for the production of construction drawings. Responsible for producing the civil and mechanical details.

Broward County Water and Wastewater Services | NRWWTP Ocean outfall Panel Design, Shorting Contactors Replacement; Broward County, FL

Project CAD Coordinator. Provided CAD coordination and support between regional offices and sub-consultant for the production of construction drawings.

Orange County Utilities | Meadow Woods Water Supply Facility Modifications; Orange County, FL

CAD Drafter. Production of construction drawings for well pump houses.

City of Ocala | Old City Yard DRA Expansion Phase II; Marion County, FL

Designer and CAD Drafter. Performed multiple design tasks, coordinated the production of drawings for additional stormwater retention pond.

Utilities Commission City of New Smyrna Beach | Water Facility Improvements, Glencoe Water Treatment Plant and Smith Street Pumping Station; Volusia County, FL

Designer and CAD Drafter. Performed multiple design tasks, coordinated the production of drawings for facility improvements including adding flow meters, providing a new pump station, replacing existing pumps, and developing site stormwater, grading and paving plans.

Utilities Commission City of New Smyrna Beach | Water Facility Improvements, 20-inch Potable Water Transmission Main; Volusia County, FL

Project CAD Coordinator. Provided CAD coordination between regional offices for the production of construction drawings for pipeline plan and profile drawings and civil detail drawings.

City of Ocala | Old City Yard DRA Expansion Phase I; Marion County, FL

Designer and CAD Drafter. Performed multiple design tasks, coordinated the production of drawings for stormwater retention pond and sand filtration.

City of Lakeland | Drane Field Booster Pump Station; Polk County, FL

Designer and CAD Drafter. Performed miscellaneous design tasks, CAD drafted construction drawings, field data surveying, and construction cost estimating.

JEA | Oakwood Villa Septic Tank Phase Out; Jacksonville, FL

Designer and CAD Drafter. Performed multiple design tasks, generation of Plan and Profile drawings for several Phases of work including gravity sewer lines and vacuum sewer lines, construction cost estimating.

Paul G. Ginther, GISP

Mr. Ginther manages the Geographic Information System/Information Management (GIS/IM) Department that supports Black & Veatch's Water and Energy Divisions. He has 30 years of project management, consulting and implementation experience on projects for engineering, pipeline, utilities and government agencies. He specializes in defining user requirements, system specifications, economic feasibility options, and workflow processes. He has supported a variety of asset management integrations, master plan developments, demand analysis, and information solutions.

He was responsible for the GIS-based SharePoint Web Portal for Black & Veatch: the internal web portal development for spatial analysis of cell tower sites & projects.

GIS/CAD DESIGN

Office Location
Kansas City, MO

Education
- MS, Geology, Washington State University, 1981
- BS, Geology, State University of New York at Albany, 1978

Professional Registration
GISP (Certified GIS Professional by the GIS Certification Institute)

Year Career Started
1981

Year Started with B&V
2006

PROJECT EXPERIENCE

Suwannee River Water Management District | GIS-based Suitability Analysis for Wellfields, FL

Used environmental and land use data to perform a GIS-based suitability analysis for the location of well fields for the freshwater supply for 12 towns.

Puerto Rico Electric Power Authority | Dam Failure & Flood Inundation Study at Carite & Lago Coamo Dams; Puerto Rico

GIS support on hydraulic & hydrologic analysis of potential dam failures.

San Antonio Water System (SAWS) | Program Management Services on Gonzales County Carrizo Aquifer Project; San Antonio, TX

Primary GIS Consultant to develop overall information management strategy including GIS development plan, defining database design/data delivery standards, etc. Related task included analysis of potential pipeline routes for proximity to archeological sites, environmental hazards, electric transmission, number of parcels affected, etc.

Woodruff-Roebuck Water District | GIS-Based Reservoir Siting Assessment; Spartanburg County, SC

Primary GIS Consultant evaluating potential raw water storage reservoir alternatives within a 5-mile radius of the treatment plant. Assessed over 2,600 potential catchment basins for: catchment basin size and depth; proximity and relative elevation compared to the plant; presence and number of major highways, buildings, wetlands, land parcels, etc.

City of Santa Ana| Sanitary Sewer & Water Financial Plan; Santa Ana, CA

Primary GIS Consultant on GIS-based asset management, comprehensive capital improvement plan and master plan for the City's sewer & water systems. Identify at-risk assets for Probability and Consequence of Failure, and Business Risk scores.

City of Baltimore | Sewershed Improvements; Baltimore, MD

Assisted in development of a GIS to manage stormwater/sewer applications to provide spatial analysis ability and decision support through use of a centralized geodatabase. GIS will provide the City with the ability to display all collection system components, maintain a continuously-updated inventory, track inspections and rehabilitation, and maintain monitoring data to increase collection system capacity, eliminate overflow structures, and complete sewer system upgrades.

Union County, NC | Water Master Plan; Union County, NC

Worked with team to develop distribution system geometric networks, topology, and network datasets using GIS water main data with skeletalized hydraulic model nodes. Manipulated features and attributes to create connectivity for network tracing throughout an all-pipes model, but to limited skeletal model nodes. Allocated consumption data to the skeletal model nodes.

City of Bloomington | Water Master Plan; Bloomington, MN

Team updated data for proposed water master plan including: population distribution studies, maximum day usage (MDU) studies, consumption demand, and design demand for customer categories, service zones, and TAZ boundaries. Constructed a nearly all-pipes model using the GIS mainline data with the skeletal model nodes using error correction routines to confirm connectivity. Created workflow to allocate average day demands from geo-referenced metered sales data to updated skeletal model nodes. Allocated future annual average demands to the associated model nodes deemed to be demand nodes. Developed CIP Master Plan diagrams.

BC Transmission Corporation | Enterprise GIS Improvement; Vancouver, BC Canada

GIS Manager and Lead Consultant for tasks including GIS database and data migration planning; ESRI/Smallworld system integration and architecture planning; data management specifications best practices; web-based application planning.

Clark County Water Reclamation District | Paradise-Whitney Sewer Interceptor; Las Vegas, NV

GIS support for the design/construction of 11 miles of 48-inch and 2 miles of 15-18-inch relief sewer lines through a congested part of Las Vegas. Tasks include: establishing a GIS repository, route selection/optimization, alignment sheet generation, parcel map sheet generation, ongoing support for land acquisition, permitting, hydraulic modeling, etc.

PASSIVE PARK AT 4230 NW 74TH ST.
COCONUT CREEK, FLORIDA

INDEX OF DRAWINGS

NOTE:

GOVERNING STANDARDS AND SPECIFICATIONS:
FLORIDA DEPARTMENT OF TRANSPORTATION,
DESIGN STANDARDS DATED 2014,
AS AMENDED BY CONTRACT DOCUMENTS

ALL MATERIALS USED AND INSTALLATIONS WITHIN THE PUBLIC RIGHT OF WAY OR EASEMENTS SHALL BE IN ACCORDANCE WITH CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA, AND SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMD).

LOCATION MAP
N.T.S.

Prepared By:

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 – Fax. (954) 239-4333

MAY, 2014

CITY COMMISSIONERS

MAYOR	LISA ARONSON
VICE-MAYOR	BECKY TOOLEY
COMMISSIONER	LOU SARBONE
COMMISSIONER	MIKKIE BELVEDERE
COMMISSIONER	SANDRA WELCH
PROJECT MANAGER	BRIAN ROSEN

ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN ALTERED IN SIZE BY REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.

ENGINEER'S CERTIFICATION
I HEREBY CERTIFY THAT THE ATTACHED PLANS AND DESIGN ARE IN SUBSTANTIAL COMPLIANCE WITH THE DESIGN STANDARDS AND CRITERIA IN EFFECT ON THIS DATE FOR BROWARD COUNTY.

DATE: MAY, 16 2014 PROFESSIONAL ENGINEER # 52626

MARC A. FERMANIAN, P.E.

REQUIRES APPROVAL OF GOVERNMENTAL AGENCIES

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PROJECT QUANTITIES

LINE NO.	ITEM NO.	DESCRIPTION	UNIT	QUANTITY	C.O.	FINAL
1		MOBILIZATION	LS	1		
2		EROSION CONTROL (SILT FENCE)	LF	1,100		
3		CLEARING & GRUBBING (EARTHWORK)	AC	1.5		
4		ON-SITE EXCAVATION (EX. ENTRANCE BERMS, PR. SWK. & PR. PARKING LOT; USE MAT'L FOR PR. BERMS WHERE APPLICABLE)	CY	360		
5		ON-SITE BORROW (BERM CONST. FROM EX. STOCKPILE SOURCE)	CY	700		
6		OFF-SITE BORROW (CITY STOCKPILE AVAILABLE E. OF US441 ON S. SIDE OF WILES RD.)	CY	0		
7		ROUGH SITE GRADING FOR BERMS AND FIELD AREA	SY	8,200		
8		FINISH SITE GRADING FOR BERMS AND FIELD AREA (INCL. DISPOSAL OF SPOIL MATERIALS NOT UTILIZED FOR BERMS AND FIELD)	SY	6,810		
9		PR. PARKING - 6" STABILIZED SUBGRADE LAYER	SY	371		
10		PR. PARKING - 18" COURSE ROCK AGGREGATE LAYER (FDOT #57 STONE)	CY	186		
11		PR. PARKING - 6" PERVIOUS CONCRETE LAYER	CY	62		
12		PR. SIDEWALK - 4" STABILIZED SUBGRADE LAYER	SY	90		
13		PR. SIDEWALK - 4" COURSE ROCK AGGREGATE LAYER (FDOT #57 STONE)	CY	15		
14		PR. SIDEWALK - 2" RUBBER LAYER TO MA"CH EXISITNG PATH (BY OTHERS)	SY	90		
15		PR. PARKING LOT STRIPING - 4-INCH WHITE PAVEMENT PAINTING (REFLECTIVE BEADS TYPE I)	LF	200		
16		PR. PARKING LOT STRIPING -4-INCH ADA BLUE PAVEMENT PAINTING (REFLECTIVE BEADS TYPE I)	LF	40		
17		24-INCH WHITE STOP BAR PAVEMENT PAINTING (REFLECTIVE BEADS TYPE III)	EA	1		
18		HANDICAP SYMBOL PAINTED MARKING- 4.5 SF (FDOT INDEX 17346)	EA	1		
19		SIGNAGE- HANDICAP SIGN (FTP-26) ASSEMBLY (ON-SITE)	EA	1		
20		SIGNAGE- STOP SIGN (R1-1) ASSEMBLY (ON-SITE)	EA	1		
21		FDOT CONCRETE TIRE STOP/BUMPER	EA	7		
22		GRISWOLD C. PUMP MODEL: R2GM- 6 7/8" IMPELLER WITH A 10 HP ELECTRICAL MOTOR - 230/3PH- WITH FIBERGLASS COVES	EA	1		
23		ESP SITE RAINBIRD CONTROLLER AND RAINFALL GAUGE	EA	1		
24		RAINBIRD PESBR SOLENOID VALVES SIZE AS PER PLAN	EA	7		
25		4" WELL - 250 GPM-120 FEET	EA	1		
26		RAINBIRD 6504 FALCON ROTOR #: NOZZLE SIZE	EA	30		
27		1806 SAM PRS RAINBIRD SPRAY HEADS-#: NOZZLE RADIUS	EA	38		
28		TORO 500 FLOOD BUBBLER HEADS	EA	24		
29		GATE VALVE NIBCO - T113 THREADED	EA	3		
		AIR RELEASE VALVE -2" (BRAND: VENT-O-MAT, MODEL: 050RPS1621)	EA	1		
30		3" MAIN LINE	LF	190		
31		2.5" MAINLINE	LF	940		
32		SCHD 40 IRRIGATION LINES	LF	3,320		
33		SLEEVES	LF	20		
34		F.P.L. ELECTRICAL INSTALLATION	LS	1		
35		TREES- QUERCUS VIRGINIANA- DAB 6-8" FL #1 RATED (LIVE OAK)	EA	10		
36		TREES- DELONIX REGIA-DAB 6-8" FL #1 RATED (ROYAL POINCIANA)	EA	2		
37		LANDSCAPING- 3 GAL. HAMELIA PATENS (FIREBUSH)	EA	63		
38		LANDSCAPING- 3 GAL. ZAMIA FLORIDANA (ZAMIA FLORIDANA)	EA	7		
39		MULCHING	SF	600		
40		3FT PVC FENCE INSTALLATION	LF	160		
40		SODDING (ST. AUGUSTINE)	SY	8,200		
41		EXERCISE EQUIPMENT AREAS (TO BE INSTALLED BY OTHERS)	LS	1		

GENERAL NOTES:

WITH THE POSSIBILITY OF UNINTENDED ERRORS OR OMISSIONS, THE CITY OF COCONUT CREEK RESERVES THE RIGHT TO CORRECT SAID ERRORS OR OMISSIONS DURING SUBSEQUENT ENGINEERING REVIEWS AND/OR DURING CONSTRUCTION. BE ADVISED THAT CHANGES, ALTERATIONS, AND/OR SITE-SPECIFIC DECISIONS MAY BE NECESSARY TO ENSURE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS.

I. APPLICABLE CODES:

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COCONUT CREEK, BROWARD COUNTY ENVIRONMENTAL PROTECTION DEPARTMENT, FDOT DESIGN STANDARD INDICES (2014)/FDOT SPECIFICATIONS (2014), AND ALL OTHER LOCAL STATE AND NATIONAL CODES WHERE APPLICABLE.

2. ALL CONSTRUCTION SHALL BE DONE IN A SAFE MANNER AND IN STRICT COMPLIANCE WITH ALL THE REQUIREMENTS OF FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, AND ALL STATE AND LOCAL SAFETY AND HEALTH REGULATIONS.

3. ALL ELEVATIONS SHOWN ON THE CONSTRUCTION DRAWINGS ARE BASED ON THE NATIONAL GEODETICAL VERTICAL DATUM OF 1929, (N.G.V.D.), UNLESS OTHERWISE NOTED.

4. WATER & SEWER SERVICES ARE NOT WITHIN THE LIMITS OF CONSTRUCTION.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING IF A DEWATERING PERMIT IS REQUIRED FOR ANY OF THE PROPOSED CONSTRUCTION ACTIVITIES. IF A DEWATERING PERMIT IS REQUIRED, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PREPARE AND SUBMIT A DEWATERING REPORT APPLICATION (PREPARED BY A STATE OF FLORIDA LICENSED ENGINEER OR A REGISTERED PROFESSIONAL GEOLOGIST) TO ALL APPLICABLE AGENCIES FOR PERMIT APPROVAL. THE CLOSE-OUT OF THE DEWATERING PERMIT SHALL RESIDE AS THE CONTRACTOR'S RESPONSIBILITY.

II. PRECONSTRUCTION RESPONSIBILITIES:

1. UPON THE FORMAL WRITTEN RECEIPT OF THE 'NOTICE TO PROCEED', THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD AND THE CITY OF COCONUT CREEK TO ARRANGE A PRE-CONSTRUCTION CONFERENCE. TO INCLUDE ALL INVOLVED GOVERNMENTAL AGENCIES, UTILITY OWNERS, AND ALL DESIGN DISCIPLINES THAT HAVE CREATED THESE CONSTRUCTION DRAWINGS.

2. THE CONTRACTOR SHALL ABIDE BY THE SUNSHINE STATE ONE CALL OF FLORIDA AT LEAST 48 HOURS PRIOR TO BEGINNING ANY EXCAVATION, CALL 811 (www.call811.com)

3. ALL UTILITY EASEMENTS SHALL BE IDENTIFIED AND SECURED PRIOR TO CONSTRUCTION AS REQUIRED BY THE CONTRACTOR'S SURVEYOR.

4. LOCATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON DRAWINGS WERE DRAWN FROM AVAILABLE RECORDS. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE UNDERGROUND UTILITIES OR FOR ANY UNDERGROUND SYSTEMS NOT SHOWN. THE CONTRACTOR SHALL VERIFY THE ELEVATIONS AND LOCATIONS OF EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. IF EXISTING UNDERGROUND UTILITIES ARE FOUND TO CONFLICT WITH THE PROPOSED CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE FIELD ENGINEER SUCH THAT APPROPRIATE MEASURES CAN BE TAKEN TO RESOLVE CONFLICTS.

III. INSPECTIONS:

1. THE CONTRACTOR SHALL NOTIFY THE CITY OF COCONUT CREEK ENGINEERING DEPARTMENT, THE ENGINEER OF RECORD AND ANY OTHER GOVERNMENTAL AGENCIES HAVING JURISDICTION, AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION, AND PRIOR TO THE INSPECTION OF THE FOLLOWING ITEMS AS APPLICABLE:

A. CLEARING & GRUBBING / ALL EARTHWORK / ROUGH GRADING
B. IRRIGATION/WELL SYSTEM
C. SUBGRADE COMPACTION
D. FDOT #57 STONE
E. PERVIOUS CONCRETE PAVEMENT
F. RECYCLED RUBBER SIDEWALK
G. SUBSTANTIAL COMPLETION AND FINAL WALK THROUGH PUNCHLIST

2. THE CONTRACTOR SHALL ADHERE TO CITY OF COCONUT CREEK, BROWARD COUNTY ENVIRONMENTAL PROTECTION DEPARTMENT AND/OR ANY OTHER GOVERNMENT AGENCY STANDARD PROCEDURE(S) FOR REQUIRED INSPECTIONS (I.E., REQUESTS, ATTENDANCE, ETC.). WHERE REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ANY / ALL INSPECTIONS WHERE THE PRESENCE OF THE ENGINEER OF RECORD AND/OR ANY OTHER INDIVIDUAL(S) SPECIFIC PARTICIPATION IS WARRANTED.

IV. SHOP DRAWINGS:

1. PRIOR TO CONSTRUCTION SHOP DRAWINGS SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER OF RECORD AND CITY OF COCONUT CREEK FOR ITEMS DEPICTED WITH THE PLANS, AS AN EXAMPLE, BUT NOT LIMITED TO, THE FOLLOWING ITEMS: SANITARY MANHOLES, STORM DRAIN MANHOLES, CATCH BASINS, FIRE HYDRANTS, PIPING, VALVES AND ALL REQUIRED ACCESSORIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ALL OTHER AGENCY APPROVAL(S) AS REQUIRED PER CONTRACT WITH THE CITY OF COCONUT CREEK.

V. TEMPORARY FACILITIES:

1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ARRANGE FOR THE SUPPLY OF TEMPORARY WATER SERVICE, SANITARY SEWER SERVICE, AND ELECTRICITY. A CONSTRUCTION TRAILER SHALL NOT BE USED ON SITE FOR THIS PROJECT.

2. SAID SERVICES SHALL BE SUPPLIED THROUGHOUT THE DURATION OF THE CONSTRUCTION PERIOD AND ARE THE RESPONSIBILITY OF THE CONTRACTOR.

VI. TRAFFIC REGULATIONS:

1. MAINTENANCE OF TRAFFIC IN THE PUBLIC RIGHTS-OF-WAY SHALL BE IN ACCORDANCE M.U.T.C.D. AND FDOT INDEX 600 (2014). THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING AND PROCESSING A MOT / TCP PLAN THROUGH APPLICABLE AGENCIES. AT ALL TIMES, THE CONTRACTOR SHALL HAVE FDOT CERTIFIED MOT PERSON ON-SITE FOR MONITORING THE MOT / TCP LAYOUT. THE CONTRACTOR SHALL SUPPLY SAID PERSON'S FDOT CERTIFICATION TO BOTH THE CITY OF COCONUT CREEK AND THE FIELD ENGINEER PRIOR TO START OF WORK

2. ALL OPEN TRENCHES AND / OR HOLES ADJACENT TO ROADWAYS, WALKWAYS, SIDEWALKS, BIKE LANES, ETC. SHALL BE PROPERLY MARKED AND BARRICADED TO ASSURE THE SAFETY ON AND ADJACENT TO SITE.

3. NO OPEN TRENCHES AND / OR HOLES ARE TO BE LEFT OPEN DURING NIGHT TIME HOURS WITHOUT EXPRESSED WRITTEN PERMISSION OF THE CITY OF COCONUT CREEK'S ENGINEER.

4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR FOR ANY NECESSARY CONSTRUCTION OF PAVEMENT MARKING AND SIGNAGE TO ACCOMMODATE AN ALTERNATE SAFE VEHICULAR DRIVING, CYCLING AND/ OR WALKING ROUTE FOR THE PROJECT.

VII. PAVING:

A. GENERAL:

1. ALL MUCK AND YIELDING MATERIAL WITHIN THE LIMITS OF CONSTRUCTION SHALL BE REMOVED AND REPLACED WITH APPROPRIATE FILL FROM FDOT SOURCES AND/OR CITY STOCKPILE(S). SAID FILL SHALL BE INSTALLED IN LIFTS, COMPACTED AND GRADED TO CONFORM TO THE REQUIRED CONDITIONS AS SHOWN WITHIN THE PLANS. ALL EARTHWORK SHALL BE COMPACTED TO NOT LESS THAN 98% MAXIMUM DRY DENSITY AS DETERMINED BY MODIFIED PROCTOR TESTING (AASHTO T-180). ALL STABILIZED EARTHWORK TO CONFORM TO A LIMEROCK BEARING RATIO (LBR) OF 40, OR GREATER.

2. ALL UNDERGROUND UTILITIES SHALL BE COMPLETED PRIOR TO THE FIRST LIFT OF LIMEROCK BASE WHERE APPLICABLE AND AS SHOWN IN PLANS

3. ALL EXISTING PAVEMENT, CUT OR DAMAGED DURING CONSTRUCTION SHALL BE PROPERLY RESTORED AT THE CONTRACTOR'S EXPENSE. MINIMUM ONE FULL LANE SHALL BE RESTORED

4. WHERE ANY PROPOSED PAVEMENT IS TO BE CONNECTED TO EXISTING PAVEMENT, THE EXISTING EDGE OF PAVEMENT SHALL HAVE A CLEAN SAW CUT AND TACK APPLIED TO EDGE. ALL FINAL AS-BUILTS ELEVATIONS, INCLUDING RIM ELEVATIONS, VALVE COVERS, ASPHALT GRADES, INVERTS, ETC., SHALL NOT DEVIATE MORE THAN 1 INCH FROM PROPOSED ELEVATIONS. IF CONNECTIONS ARE WARRANTED, IT SHALL BE AT THE CONTRACTORS EXPENSE.

B. MATERIALS:

1. BASE COURSE SHALL BE # 57 STONE TO COMPLY WITH SECTION 901 OF FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (2014 ED.)

2. RUBBER SIDEWALK CONSTRUCTION SHALL BE IN COMPLIANCE WITH EXISTING RUBBER SIDEWALK AS FOUND AT PARK. SIMILAR MANUFACTURER, COLOR, AND CONSTRUCTION TECHNIQUES SHALL BE WARRANTED. GENERAL CONTRACTOR TO COORDINATE WITH CITY.

C. INSTALLATION:

1. ALL SUBGRADE COMPACTION FOR PROPOSED DRIVABLE SURFACES (I.E. CONCRETE OR ASPHALT) SHALL BE COMPACTED TO A MINIMUM OF 92% +/-2% MAXIMUM DRY DENSITY PER MODIFIED PROCTOR TEST RESULTS FROM TESTING LAB (AASHTO T-180). SUBGRADES SHALL HAVE A MINIMUM LIMEROCK BEARING RATIO (LBR) 40 UNLESS OTHERWISE SPECIFIED IN PLANS.

2. WHENEVER APPLICABLE, LIMEROCK BASE COURSE MATERIALS SHALL BE A MINIMUM OF 8" THICK FOR ASPHALT AREAS AND A MINIMUM OF 4" THICK FOR FDOT TYPE 'F' CURB AND GUTTER. LIMEROCK BASE COURSE SHALL BE COMPACTED TO A MINIMUM OF 95% MAXIMUM DRY DENSITY PER MODIFIED PROCTOR TEST RESULTS FROM TESTING LAB (AASHTO T-180) AND SHALL HAVE A MINIMUM LIMEROCK BEARING RATIO (LBR) 100.

3. CONSTRUCTION OF ALL DRIVING SURFACES, BOTH ASPHALT PAVEMENT S-III AND CONCRETE APRON SHALL BE IN ACCORDANCE TO THESE PLANS AND ADHERE TO FDOT DESIGN STANDARD INDICES (2014) / FDOT SPECIFICATIONS (2014), AND ALL OTHER LOCAL STATE AND NATIONAL CODES WHERE APPLICABLE.

D. TESTING:

1. THE FINISHED SURFACE OF THE BASE COURSE AND THE PAVEMENT SURFACE SHALL NOT VARY MORE THAN 1/4" FROM STRAIGHT-EDGE TESTING USING A 12FT STRAIGHT EDGE.

2. FIELD TESTS SHALL BE TAKEN BY AN INDEPENDENT TESTING LABORATORY CERTIFIED BY THE STATE OF FLORIDA, WHERE DIRECTED BY THE ENGINEER. ALL FIELD TESTING SHALL BE A COST PAID BY THE CONTRACTOR. ALL FAILED TEST RESULTS SHALL BE TAKEN AT LEAST 24-HRS AFTER FAILURE DETERMINED, OR UPON CONTRACTOR'S SCHEDULE.

3. DENSITY TESTS ON STABILIZED SUBGRADE SHALL BE SUPPLIED TO THE ENGINEER OF RECORD AND THE CITY OF COCONUT CREEK AND APPROVED BEFORE PROCEEDING TO # 57 STONE WORK.

4. ALL DENSITY TEST RESULTS AND AS-BUILT SURVEY OF THE # 57 STONE BASE SHALL BE PROVIDED TO THE ENGINEER OF RECORD AND APPROVED BEFORE ASPHALT PAVEMENT SHALL COMMENCE.

5. BOTH CONCRETE CYLINDER TESTING AND SOILS TESTING ARE AT THE DISCRETION OF THE FIELD ENGINEER AND/OR CITY OF COCONUT CREEK.

VIII. PAVEMENT MARKING AND SIGNAGE:

1. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH FDOT STANDARD INDEX (2014), THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," (MUTCD) LATEST EDITION; AND BROWARD COUNTY TRAFFIC ENGINEERING STANDARDS (LATEST EDITION).

2. ALL PAVEMENT MARKINGS SHALL BE PAINTED WITH ACRYLIC WATERBORNE PAINT MEETING TTP-1952 E FEDERAL SPECIFICATIONS. GLASS BEADS TYPE 1 SHALL BE IMPLEMENTED WITHIN THE PAINTING APPLICATION. SHOP DRAWING OF PAINT AND GLASS BEADS SHALL BE WARRANTED.

IX. PROJECT CLOSEOUT:

A. CLEANING UP:

1. DURING CONSTRUCTION, THE PROJECT SITE AND ALL ADJACENT AREAS SHALL BE MAINTAINED IN A NEAT AND CLEAN MANNER, AND UPON FINAL CLEAN-UP, THE PROJECT SITE SHALL BE LEFT CLEAR OF ALL SURPLUS MATERIAL OR TRASH. THE PAVED AREAS SHALL BE SWEPT BROOM CLEAN.

2. THE CONTRACTOR SHALL RESTORE OR REPLACE, WHEN AND AS DIRECTED, ANY PUBLIC OR PRIVATE PROPERTY DAMAGED BY HIS WORK, EQUIPMENT, OR EMPLOYEES. TO A CONDITION AT LEAST EQUAL TO THAT EXISTING IMMEDIATELY PRIOR TO THE BEGINNING OF OPERATIONS. TO THAT END, THE CONTRACTOR SHALL DO, AS REQUIRED, ALL NECESSARY HIGHWAY, DRIVEWAY, WALK AND LANDSCAPING WORK. SUITABLE MATERIALS AND METHODS SHALL BE USED FOR SUCH RESTORATION.

3 WHERE MATERIAL OR DEBRIS HAS WASHED OR FLOWED INTO OR HAS BEEN PLACED IN WATER COURSES, DITCHES, DRAINS, CATCH BASINS, OR ELSEWHERE AS A RESULT OF THE CONTRACTOR'S OPERATIONS. SUCH MATERIAL OR DEBRIS SHALL BE REMOVED AND SATISFACTORILY DISPOSED OF DURING THE PROGRESS OF THE WORK, AND THE AREA KEPT IN A CLEAN AND NEAT CONDITION.

4. ALL PROPERTY MONUMENTS OR PERMANENT REFERENCES, REMOVED OR DESTROYED BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE RESTORED BY A STATE OF FLORIDA REGISTERED LAND SURVEYOR AT THE CONTRACTOR'S EXPENSE.

5. ALL UNPAVED SURFACES DISTURBED AS A RESULT OF CONSTRUCTION ACTIVITIES SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED BEFORE THE CONSTRUCTION.

B. PROJECT RECORD DOCUMENTS:

1. DURING THE DAILY PROGRESS OF THE JOB, THE CONTRACTOR SHALL RECORD ON HIS SET OF CONSTRUCTION DRAWINGS THE EXACT LOCATION, LENGTH, MATERIAL AND ELEVATION OF ANY FACILITY NOT BUILT EXACTLY ACCORDING TO PLANS.

2. UPON COMPLETION OF SITE IMPROVEMENTS, THE CONTRACTOR SHALL FURNISH THE ENGINEER OF RECORD "AS-BUILT" PLANS FOR SITE IMPROVEMENTS, SHOWING THE LOCATIONS AND PERTINENT GRADES OF ALL SITE IMPROVEMENTS. "AS-BUILT" SURVEY TO BE CONDUCTED IN 50 FOOT INTERVALS (I.E. GRID) INCLUDING LOCATIONS AND ELEVATIONS OF ALL HIGH AND LOW POINTS. ALL "AS-BUILT" INFORMATION SHALL BE CERTIFIED BY A FLORIDA REGISTERED LAND SURVEYOR.

3. UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT, THE CONTRACTOR SHALL SUBMIT TO THE CITY & ENGINEER OF RECORD ONE COMPLETE SET OF "AS-BUILT" CONTRACT DRAWINGS FOR REVIEW AND APPROVAL. THESE DRAWINGS SHALL SHOW "AS-BUILT" CONSTRUCTION CONDITIONS AS DEMONSTRATED WITHIN PLANS, ANY CHANGES, MODIFICATIONS, DIMENSIONS, LOCATIONS, AND ELEVATIONS OF ALL IMPROVEMENTS.

4. ALL "AS-BUILT" INFORMATION SHALL BE CERTIFIED BY A FLORIDA REGISTERED LAND SURVEYOR.

5. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING ALL SKETCH AND LEGAL DOCUMENTS (PREPARED AND CERTIFIED BY A FLORIDA REGISTERED LAND SURVEYOR) REQUIRED TO RECORD ALL PROPOSED EASEMENTS.

X. NPDES REQUIREMENT:

1. IF NOT PRESENTED WITHIN THE BID DOCUMENTATION, AT LEAST TWO (2) DAYS PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT A FDEP "NOTICE OF INTENT (N.O.I.) TO USE GENERIC PERMIT FOR STORMWATER DISCHARGE FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES" FORM (DEP FORM 62-621.300(4)(b)) TO FDEP NOTICES CENTER. THE CONTRACTOR WLL BE RESPONSIBLE FOR (AT THE CONTRACTORS EXPENSE) (1) ASSISTING THE OWNER(S) WITH PREPARING, COMPLETING, AND FILING THE N.O.I. AND N.O.T. TO FDEP (2) PREPARING A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (REQUIRED PRIOR TO THE NOI SUBMITTAL) (3) IMPLEMENTATION OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) THAT WAS REQUIRED TO BE DEVELOPED PRIOR TO THE NOI SUBMITTAL, AND (4) RETENTION OF RECORDS REQUIRED BY THE PERMIT, INCLUDING RETENTION OF A COPY OF THE SWPPP AT THE CONSTRUCTION SITE FROM THE DATE OF PRO.ECT INITIATION TO THE DATE OF FINAL SITE STABILIZATION. A "NOTICE OF TERMINATION (N.O.T.) OF GENERIC PERMIT COVERAGE" FORM (DEP FORM 62-621.300(6)) MUST BE SUBMITTED TO FDEP TO DISCONTINUE PERMIT COVERAGE, SUBSEQUENT TO COMPLETION OF CONSTRUCTION. FOR ADDITIONAL INFORMATION SEE FDEP WEBSITE: http://www.dep.state.fl.us/water/stormwater/npdes. ENGINEER OF RECORD MAY ASSIST ON PROVIDING THE CONTRACTOR WITH: FDEP APPLICATIONS AND THE SWPPP, WHICH HAS BEEN INCLUDED IN CONSTRUCTION PLANS.

2. NO ACTIVITIES SHALL COMMENCE PRIOR TO PASSING AN INITIAL NPDES INSPECTION. THE CONTRACTOR SHALL INSTALL ALL APPLICABLE BEST MANAGEMENT PRACTICES (BMP'S) AND SHALL BE RESPONSIBLE FOR THEIR MAINTENANCE THROUGHOUT THE PROJECT. THE CONTRACTOR SHALL ADHERE TO ADOPTED CITY OF COCONUT CREEK NPDES STANDARDS.

XI. ENGINEERS AS-BUILT REQUIREMENTS:

1. AS-BUILTS OF WATER LINES SHALL INCLUDE THE FOLLOWING INFORMATION:

A. TOP OF PIPE ELEVATIONS EVERY 50 LF.

B. LOCATIONS AND ELEVATIONS OF ALL FITTINGS INCLUDING BENDS, TEES, GATE VALVES, DOUBLE DETECTOR CHECK VALVES, FIRE HYDRANTS, ETC.

C. ALL TIE INS TO EXISTING LINES SHALL BE AS-BUILT.

D. THE ENDS OF ALL WATER SERVICES AT THE BUILDINGS OR HOMES SHALL BE AS-BUILT OR WHERE THE WATER SERVICE TERMINATES.

2. ACKNOWLEDGEMENT OF AN EXISTING FORCE MAIN ON NW 74, ANY DAMAGE TO FORCE MAIN SHALL BE REPAIRED AT CONTRACTORS EXPENSE.

3. ALL ROCK AS-BUILTS FOR PARKING LOT AREAS SHALL CONSIST OF THE FOLLOWING:

A. ROCK ELEVATIONS AT ALL HIGH AND LOW POINTS, AND AT ENOUGH INTERMEDIATE POINTS TO CONFIRM SLOPE CONSISTENCY.

B. ROCK AS-BUILTS SHALL BE TAKEN AT ALL LOCATIONS WHERE THERE IS A FINISH GRADE ELEVATION SHOWN ON THE DESIGN PLANS.

C. ALL CATCH BASIN AND MANHOLE RIM ELEVATIONS SHALL BE SHOWN.

D. ELEVATIONS AROUND ISLAND AREAS WILL ALSO BE REQUIRED.

E. WHERE CONCRETE IS TO BE USED AS A FINISHED PRODUCT FOR THE ROADWAY OR PARKING LOT ROCK AS-BUILTS WILL BE REQUIRED AS INDICATED ABOVE AS WELL AS AS-BUILTS ON THE FINISHED CONCRETE AT LOCATIONS WHERE THERE IS A FINISH GRADE ELEVATION SHOWN ON THE DESIGN PLANS.

F. AS-BUILTS SHALL BE TAKEN ON ALL PAVED AND UNPAVED SWALES, PRIOR TO PLACEMENT OF ASPHALT OR TOPSOIL/SOD, AT ENOUGH INTERMEDIATE POINTS TO CONFIRM SLOPE CONSISTENCY AND CONFORMANCE TO THE PLAN DETAILS.

4. FINAL DELIVERABLES SHALL INCLUDE AN AUTOCAD-COMPATIBLE DIGITAL FILE CONTAINING ALL PERTINENT AS-BUILT INFORMATION (INCLUDING, WATER, SEWER, PAVING, AND DRAINAGE). FILE TO BE SPATIALLY LOCATED WITHIN STATE PLANE COORDINATES.

REVISIONS

No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST. COCONUT CREEK, FL

SUMMARY OF QUANTITIES AND GENERAL NOTES

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 - Fax. (954) 239-4333

DATE: MAY 16, 2014
PROJECT NO: CNK-1015
DESIGNED BY: R.F.M.
DRAWN BY: R.F.M.
CHECKED BY: M.A.F.

SHEET C-1

GRAPHIC SCALE IN FEET
30 0 30
SCALE 1" = 30'

TRACT 44, BLOCK 83,
P.B. 2, PGS. 45–53, P.B.C.R.

FOUND IRON ROD

5' CHAIN LINK FENCE

N 00°52'10" W 660.03'

FOUND PIPE
4' WOOD FENCE

TREES

RUBBER WALKWAY

ASPHALT ROAD

EXISTING FILL ON SITE

TRACT 51, BLOCK 83,
P.B. 2, PGS. 45–53, P.B.C.R.

S 89°37'57" W 329.98'

6' CHAIN LINK FENCE

TRACT 43, BLOCK 83,
P.B. 2, PGS. 45–53, P.B.C.R.

TRACT 38, BLOCK 83,
P.B. 2, PGS. 45–53, P.B.C.R.

N 89°38'07" E 330.02'

N.W. 74TH STREET

EXISTING BERMS TO BE REMOVED

S 00°51'58" E 660.02'

5' CHAIN LINK FENCE

SET IRON ROD
& CAP
LB#6727

TRACT 42, BLOCK 83,
P.B. 2, PGS. 45–53, P.B.C.R.

N 89°38'07" E 648.51

FND PRM
NORTHWEST CORNER
LOT 1
"CASA PINNELL"
PB. 178, PAGE 11, BCR.

EXISTING SITE SURFACE ROCK FORMATION

THE CONTRACTOR SHALL BE AWARE AND BECOME FAMILIAR WITH THE EXISTING SURFACE ROCK OUTCROPPINGS THROUGHOUT THE SITE PRIOR TO CLEARING AND GRUBBING ACTIVITIES. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL EXPOSE, REMOVE AND BACKFILL ANY ROCK OUTCROPPING REQUIRING REMOVAL FOR THE PURPOSES OF PROJECT CONSTRUCTION AS PER PLANS. THE CITY SHALL HAVE THE RIGHT TO INVESTIGATE THE UNEARTHED ROCK (I.E., DECORATIVE LANDSCAPE USAGE) PRIOR TO THE CONTRACTOR'S EFFORTS TO HAUL OFF SITE. IF CITY CHOOSES TO KEEP ROCK PIECE(S), SAID ROCK SHALL BE SET ASIDE FOR CITY'S DISCRETIONAL USE.

EXISTING FILL ON SITE

AS OF MAY 2014, ADDITIONAL STOCKPILE MATERIAL BROUGHT ONTO SITE

REVISIONS		
No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST.
COCONUT CREEK, FL

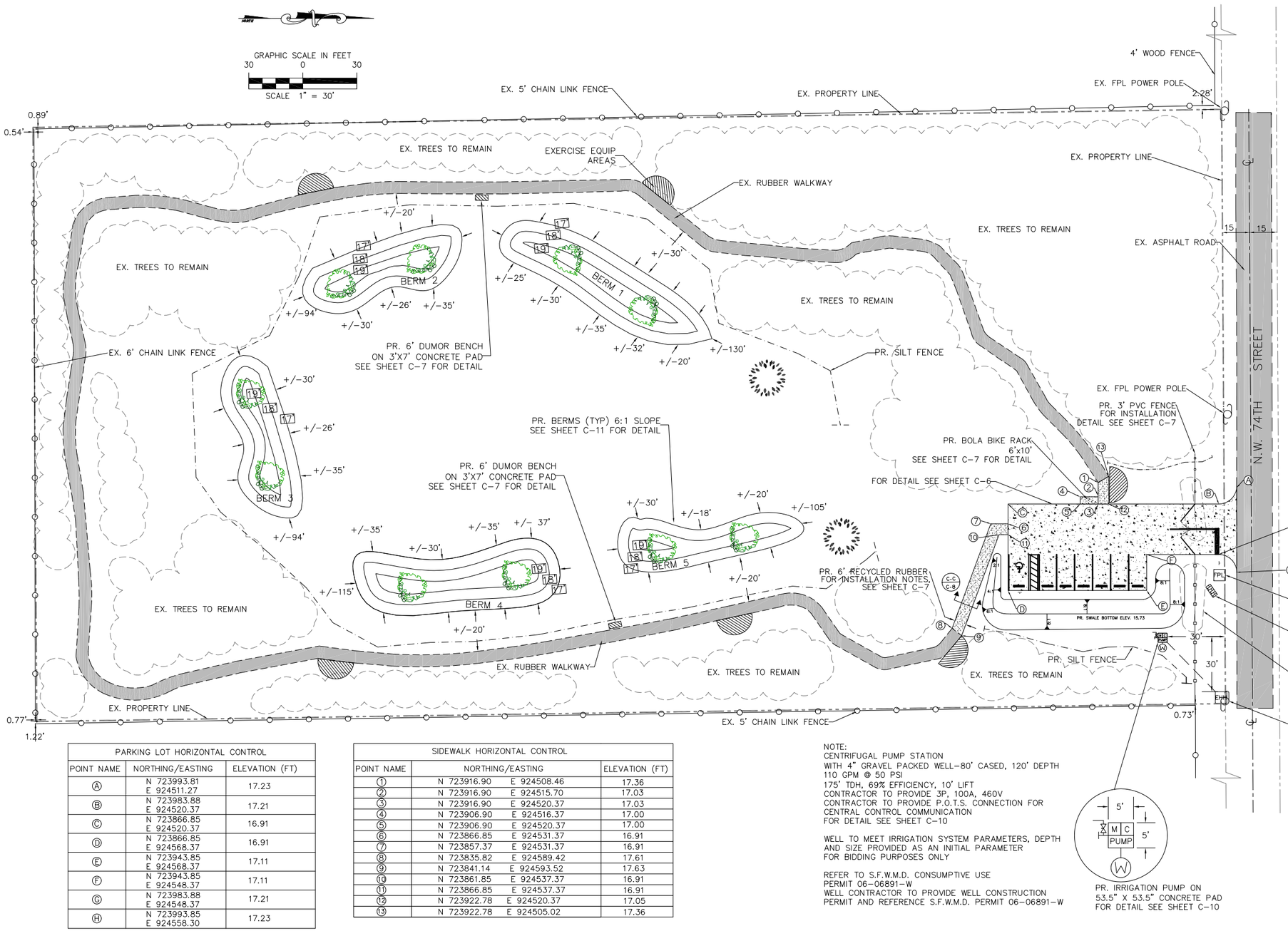
EXISTING SURVEY AND CONDITIONS

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B–201, Ft. Lauderdale, Florida 33312
Tel. (954) 239–4330 – Fax. (954) 239–4331

DATE:	MAY 16, 2014
PROJECT NO:	CNK-1015
DESIGNED BY:	R.F.M.
DRAWN BY:	R.F.M.
CHECKED BY:	M.A.F.

SHEET
C-2



GENERAL LEGEND

- EX. FPL POWER POLE
- EX. FPL UTILITIES BOX
- EX. FPL TRANSFORMER
- EX. PROPERTY LINE
- EX. CHAIN LINK FENCE
- EX. BERM
- EX. RUBBER WALKWAY
- EX. ROADWAY
- EX. ASPHALT
- EX. TREES
- PR. LIVE OAK 6"–8" D.A.B.
- PR. ROYAL POINCIANA 6"–8" D.A.B.
- PR. INSTALLED SIGN
- PR. BERMS
- PR. PERVIOUS CONCRETE
- PR. IRRIGATION WELL
- PR. ELECTRICAL CONDUIT
- PR. IRRIGATION PUMP
- PR. PUMP ELECTRICAL METER
- PR. PUMP CIRCUIT BREAKER
- PR. 3' PVC FENCE
- PR. 6' RECYCLED RUBBER SIDEWALK TO MATCH EXISTING PATH
- PR. SILT FENCE FOR EROSION CONTROL
- EXERCISE EQUIPMENT AREAS ON MULCH BED 10' RADIUS FUTURE EFFORT NOT IN CONTRACT (NIC)

BERM FILL CALCULATIONS

BERM 1	+/– 150 CY
BERM 2	+/– 200 CY
BERM 3	+/– 105 CY
BERM 4	+/– 160 CY
BERM 5	+/– 75 CY
TOTAL FILL	+/– 690 CY

NOTE: ALL BERMS BUILT 6:1 SLOPE

PARKING LOT HORIZONTAL CONTROL		
POINT NAME	NORTHING/EASTING	ELEVATION (FT)
Ⓐ	N 723993.81 E 924511.27	17.23
Ⓑ	N 723983.88 E 924520.37	17.21
Ⓒ	N 723866.85 E 924520.37	16.91
Ⓓ	N 723866.85 E 924568.37	16.91
Ⓔ	N 723943.85 E 924568.37	17.11
Ⓕ	N 723943.85 E 924548.37	17.11
Ⓖ	N 723983.88 E 924548.37	17.21
Ⓗ	N 723993.85 E 924558.30	17.23

SIDEWALK HORIZONTAL CONTROL		
POINT NAME	NORTHING/EASTING	ELEVATION (FT)
①	N 723916.90 E 924508.46	17.36
②	N 723916.90 E 924515.70	17.03
③	N 723916.90 E 924520.37	17.03
④	N 723906.90 E 924516.37	17.00
⑤	N 723906.90 E 924520.37	17.00
⑥	N 723866.85 E 924531.37	16.91
⑦	N 723857.37 E 924531.37	16.91
⑧	N 723835.82 E 924589.42	17.61
⑨	N 723841.14 E 924593.52	17.63
⑩	N 723861.85 E 924537.37	16.91
⑪	N 723866.85 E 924537.37	16.91
⑫	N 723922.78 E 924520.37	17.05
⑬	N 723922.78 E 924505.02	17.36

NOTE:
CENTRIFUGAL PUMP STATION
WITH 4" GRAVEL PACKED WELL–80' CASED, 120' DEPTH
110 GPM @ 50 PSI
175' TDH, 69% EFFICIENCY, 10' LIFT
CONTRACTOR TO PROVIDE 3P, 100A, 460V
CONTRACTOR TO PROVIDE P.O.T.S. CONNECTION FOR CENTRAL CONTROL COMMUNICATION
FOR DETAIL SEE SHEET C–10

WELL TO MEET IRRIGATION SYSTEM PARAMETERS, DEPTH AND SIZE PROVIDED AS AN INITIAL PARAMETER FOR BIDDING PURPOSES ONLY

REFER TO S.F.W.M.D. CONSUMPTIVE USE PERMIT 06–06891–W
WELL CONTRACTOR TO PROVIDE WELL CONSTRUCTION PERMIT AND REFERENCE S.F.W.M.D. PERMIT 06–06891–W

REVISIONS		
No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST. COCONUT CREEK, FL

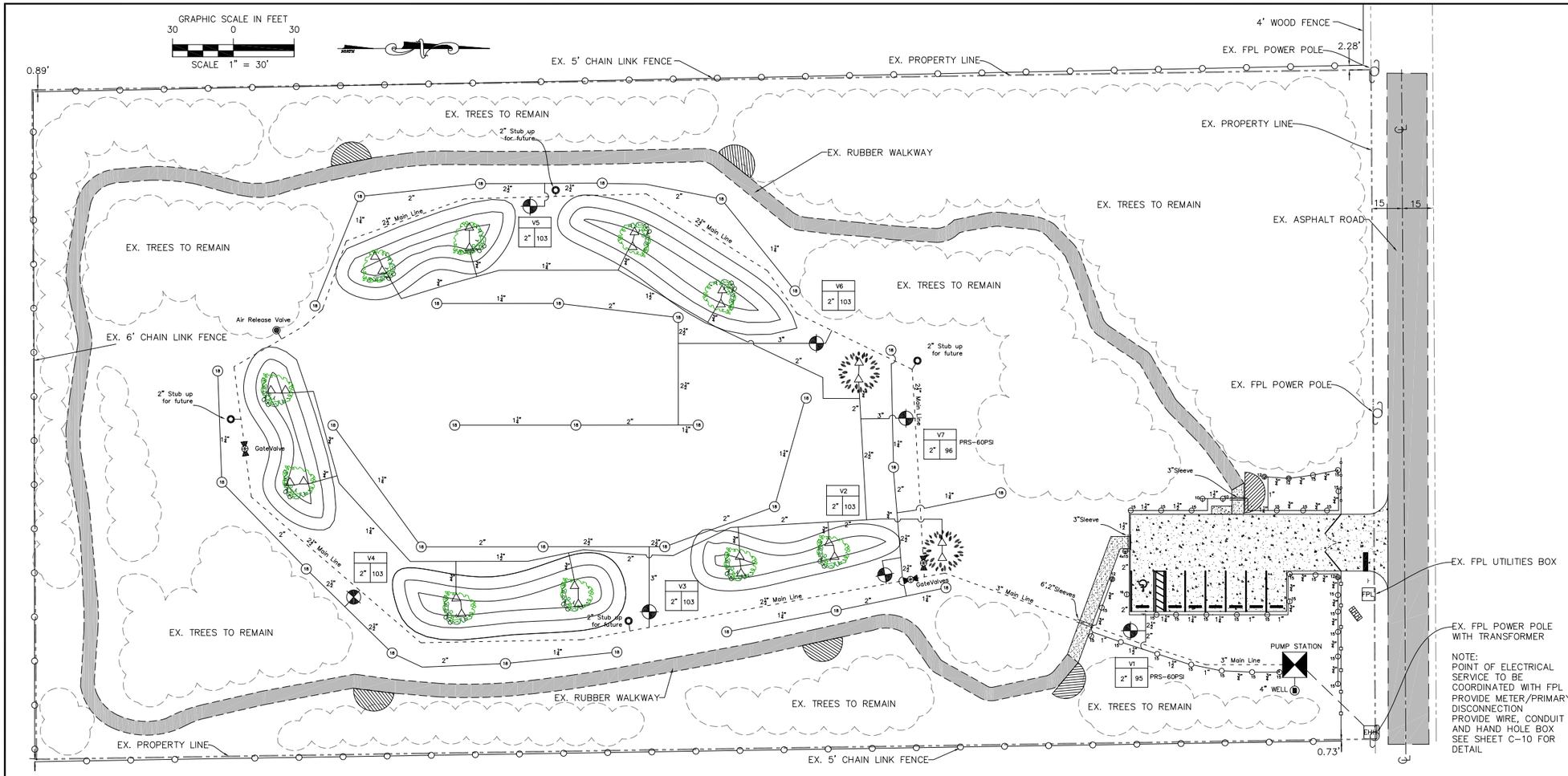
PROPOSED SITE DESIGN

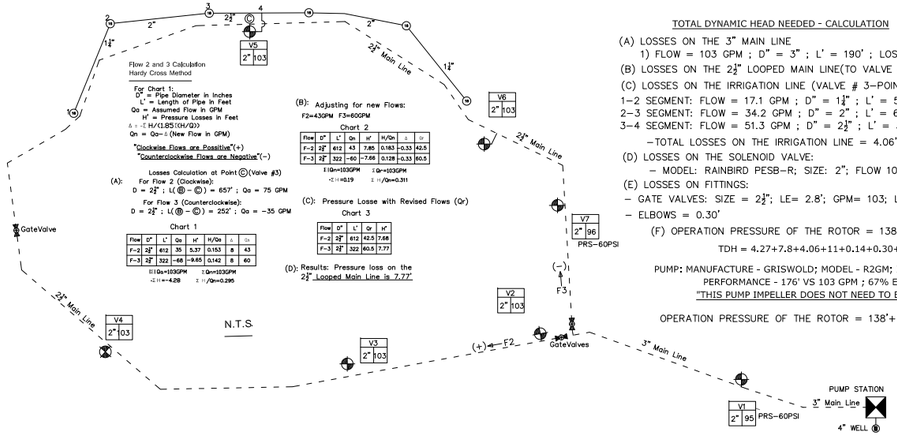
CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B–201, Ft.Lauderdale, Florida 33312
Tel. (954) 239–4330 – Fax. (954) 239–4331

DATE: MAY 16, 2014
PROJECT NO: CNK–1015
DESIGNED BY: R.F.M.
DRAWN BY: R.F.M.
CHECKED BY: M.A.F.

SHEET C-3





TOTAL DYNAMIC HEAD NEEDED - CALCULATION

(A) LOSSES ON THE 3" MAIN LINE
1) FLOW = 103 GPM ; D" = 3" ; L' = 190' ; LOSSES = 4.27'
(B) LOSSES ON THE 2½" LOOPED MAIN LINE(TO VALVE # 3) = 7.8'
(C) LOSSES ON THE IRRIGATION LINE (VALVE # 3-POINT C)
1-2 SEGMENT: FLOW = 17.1 GPM ; D" = 1¼" ; L' = 59' ; LOSSES = 2.29'
2-3 SEGMENT: FLOW = 34.2 GPM ; D" = 2" ; L' = 60' ; LOSSES = 1.20'
3-4 SEGMENT: FLOW = 51.3 GPM ; D" = 2½" ; L' = 32' ; LOSSES = 0.57'
-TOTAL LOSSES ON THE IRRIGATION LINE = 4.06'
(D) LOSSES ON THE SOLENOID VALVE:
- MODEL: RAINBIRD PESB-R; SIZE: 2"; FLOW 103GPM; LOSSES = 11'
(E) LOSSES ON FITTINGS:
- GATE VALVES: SIZE = 2½"; LE= 2.8'; GPM= 103; LOSSES=0.07'X2= 0.14'
- ELBOWS = 0.30'
(F) OPERATION PRESSURE OF THE ROTOR = 138'
TDH = 4.27+7.8+4.06+11+0.14+0.30+138= 166'
PUMP: MANUFACTURE - GRISWOLD; MODEL - R2GM; IMPELLER - 6⅞"; HP - 10
PERFORMANCE - 176' VS 103 GPM ; 67% EFF.; NPSHN - 7.0'
"THIS PUMP IMPELLER DOES NOT NEED TO BE TRIMMED"
OPERATION PRESSURE OF THE ROTOR = 138'+10'=148'(64 PSI)

NOTES:
1) ALL VALVES SHOULD HAVE A PURPLE FLOW CONTROL HANDLE.
a) INSTALL A PRS-DIAL(PRESSURE REGULATING MODULE) ON VALVES 1 AND 7; SET UP THE PRESSURE ON 60 PSI.
-INSTALL THEM IN A PURPLE LID VALVE BOX.
2) FALCON ROTOR HEAD MODELS ARE:
a) FALCON 6504 FC SS NP
b) FALCON 6504 PC SS NP
-NOZZLES AS NOTED ON PLAN AND CHART.
3) SPRAY HEAD MODELS:
a) 1806, 1812-SAM-PRS WITH NPCAP.
-NOZZLE AS NOTED ON PLAN AND CHART.
4) BUBBLER HEAD:
a) TORO 500 Flood Series - MODEL 514-20
5) GATE VALVES:
a) Manufacture : Nibco; Model T113 Threaded; Size 2½"
6) AIR RELEASE VALVE:
a) Manufacture : Vent-O-Mat
b) Model: RPS 2" - 050RPS1621
c) Ph # (410)850-4404
d) Webb: www.ventomat.us
7) WELL:
a) The Well Casing shall be Galvanized Steel Pipe.

IRRIGATION LEGEND

		Qty
	PUMP STATION-GRISWOLD C. PUMP MODEL: R2GM - 6⅞"IMPELLER 110 GPM VS 175' - 69%EFF - 7.5'NPSHN 10 HP ELECTRICAL MOTOR-230/3PH -CLOCK START, LOSS OF PRIME, NO FLOW, SURGE PROTECTION, FLOW SENSOR.	1
	ESP SITE RAINBIRD CONTROLLER & RAINFALL GAUGE	1
	RAINBIRD PESBR SOLENOID VALVES SIZE AS PER PLAN	7
	4" WELL - 250 GPM -120 FEET - 80' CASED	1
#	RAINBIRD 6504 FALCON ROTOR #: NOZZLE SIZE PC-SS NP : 17 FC-SS NP : 13	30
○#	1806,1812, SAM PRS RAINBIRD SPRAY HEADS - #: NOZZLE RADIUS	38
▷	TORO 500 FLOOD BUBBLER HEADS	24
	GATE VALVE NIBCO - T113 THREADED	3
	AIR RELEASE VALVE - 2" BRAND: VENT-O-MAT MODEL: 050RPS1621	1
------	3"MAIN LINE-CLASS 200-ORING	190'
------	2½"MAIN LINE	940'
	SLEEVES	20'

SCHD 40 IRRIGATION LINES:

¾"	700'	2"	840'
1"	80'	2½"	360'
1¼"	940'	3"	200'
1½"	200'		

CONTROL WIRES-SINGLE CONDUCTOR-GAUGE 14

COMMON - WHITE COLOR :	1900'
HOT WIRE - COLORED :	6300'

NOZZLES, HEADS AND G.P.M. CHART

Head Type	Rotor FC	Rotor PC	Spray 15F	Spray 15H	Spray 15Q	Spray 12F	Spray 12H	Spray 12Q	Spray 10H	EST 4#15	Bubbler Head		
Nozzle	18	18	○	⊖	◔	◎	⊜	◍	◑	◐	▷	Total Heads	GPM
V-1	—	—	5	23	3	0	3	1	2	1	—	38	95
V-2	1	5	—	—	—	—	—	—	—	—	—	6	103
V-3	6	—	—	—	—	—	—	—	—	—	—	6	103
V-4	—	6	—	—	—	—	—	—	—	—	—	6	103
V-5	—	6	—	—	—	—	—	—	—	—	—	6	103
V-6	6	—	—	—	—	—	—	—	—	—	—	6	103
V-7	—	—	—	—	—	—	—	—	—	—	—	24	24	96

WATERING SCHEDULE

Total Water Usage Per Month: 167,820.0 GPM

Valve	GPM	Valve Type	Precipitation Inch/Hour	Precipitation Rate/Week(")	WateringTime Per Week(Minutes)	GPM Per Week	GPM Per Month
V-1	95	Sprays	1.58	1.0	38	3610	14440
V-2	103	Rotor	0.90	1.0	67	6901	27604
V-3	103	Rotor	0.90	1.0	67	6901	27604
V-4	103	Rotor	0.90	1.0	67	6901	27604
V-5	103	Rotor	0.90	1.0	67	6901	27604
V-6	103	Rotor	0.90	1.0	67	6901	27604
V-7	96	Bubbler	4GPM	8GPM/Tree	40	3840	15360

REVISIONS

No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST. COCONUT CREEK, FL

PROPOSED IRRIGATION SYSTEM LAYOUT

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 - Fax. (954) 239-4333

DATE: MAY 16, 2014
PROJECT NO: CNK-1015
DESIGNED BY: R.F.M.
DRAWN BY: R.F.M.
CHECKED BY: M.A.F.

SHEET C-4

IRRIGATION NOTES & SPECIFICATIONS

IRRIGATION PLAN HAS BEEN DESIGNED TO CONFORM ALL APPLICABLE CODES. CODES SHALL PREVAIL IF ANY CONFLICT EXIST.
OWNER/CONTRACTOR TO ENSURE THE SYSTEM INSTALLATION IS ACCORDING TO APPLICABLE LAWS, RULES AND REGULATIONS.

IRRIGATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS.

THE WORK:
THE WORK CONSISTS OF FURNISHING, INSTALLING AND TESTING A FULLY FUNCTIONAL AUTOMATIC LANDSCAPE IRRIGATION SYSTEM, THAT COMPLIES WITH THE IRRIGATION PLANS, SPECIFICATIONS, NOTES AND DETAILS UNDER ALL REGULATIONS CODES AND ORDINANCES. SHOULD BE INCLUDED BUT NOT LIMITED TO, PROVIDING MATERIAL, EQUIPMENTS, LAYOUT, PROTECTION YO THE PUBLIC, EXCAVATION, INSTALLATION, BACKFILLING, COMPACTING, REPAIR OF ROAD SURFACES, PUMP, WELL, CONTROLLER, LOW VOLTAGE WIRES, CLEANUP, GUARANTEE AND AS-BUILT PLANS.

ALL IRRIGATED AREAS TO PROVIDE 100% COVERAGE WITH A RAIN SHUT OFF DEVICE. ALL WATERING SHALL CONFORM LOCAL CODES AS WELL AS THE REGIONAL WATER MANAGEMENT DISTRICT, RESTRICTIONS AND REGULATIONS.

PLANS HAS BEEN DESIGNED TO SATISFY/EXCEED THE FLORIDA BUILDING CODE (FBC) APPENDIX F AND THE FLORIDA SOCIETY STANDARDS AND SPECIFICATIONS FOR TURF AND LANDSCAPE IRRIGATION SYSTEMS.

CONTRACTOR SHALL VERIFY ALL UNDERGROUND UTILITIES 72 HOURS PRIOR TO COMMENCEMENT OF WORK; IT IS HIS RESPONSIBILITY TO REPAIR OR REPLACE ALL ITEMS DAMAGED BY THEIR WORK. IRRIGATION CONTRACTOR SHALL COORDINATE THEIR WORK WITH OTHER CONTRACTORS.

IT IS THE IRRIGATION CONTRACTOR RESPONSIBILITY TO FAMILIARIZE WITH ACTUAL CONDITIONS OF THE SITE.

POINT OF CONNECTION (P.O.C):
THE (P.O.C.) IS A PROPOSED 10 HP PUMP AND A PROPOSED 4" WELL AS THE WATER SOURCE. PUMP MUST BE CAPABLE OF DELIVERING 110 GPM VS 75 PSI DOWNSTREAM OF DISCHARGE AND SHOULD NOT WORK WITH LESS THAN 65% OF EFFICIENCY. WELL SHALL BE CAPABLE TO DELIVER NO LESS THAN 250 GPM WITH A MAXIMUM DROP OF ONE FOOT OF THE WATER TABLE ON DYNAMIC CONDITIONS.

CONTRACTOR TO VERIFY THESE MINIMUM CONDITIONS CAN BE MET PRIOR TO ORDERING OF EQUIPMENTS AND MATERIALS. IF THE CONDITIONS CAN NOT BE MET, CONTRACTOR MUST NOTIFY THE DESIGNER PRIOR TO PROCEEDING WITH THE WORK. IF THE CONTRACTOR DOES NOT DO SO, THEM IT WILL BE RESPONSIBLE FOR ANY FUTURE WORK REQUIRED TO MAKE THE SYSTEM PERFORM AS REQUIRED.

THE PIPE:
PIPE LOCATION ON THE PLAN IS SCHEMATIC AND SHALL BE ADJUSTED ON SITE CONDITIONS.

IF IT IS NECESSARY TO HAVE PIPING UNDER HARDSCAPES, SUCH AS ROADS, WALKS ETC, THE PIPE MUST BE SLEEVED, USING SCHD-40 PVC WITH SLEEVE DIAMETER BEING TWICE THE SIZE OF THE PIPE IT IS CARRYING. MINIMUM SLEEVE SIZE IS 2".

PIPE SIZE SHALL BE AS SHOWN ON PLANS. NO SUBSTITUTIONS OF SMALLER PIPE SIZE WILL BE PERMITTED; SUBSTITUTIONS OF LARGER SIZES MAY BE APPROVED.

MAIN LINE SHALL BE 3" AND 2-1/2" CLASS 200, GASKETED WHITE PVC WITH HARCO DUCTILE IRON FITTINGS. LATERALS SHALL BE SCHD-40 BELL END PVC PIPE SOLVENT WELDED.

MAIN LINE PIPING SHALL BE PROPERLY RESTRAINED USING MECHANICAL RESTRAINING AS PER MANUFACTURERS RECOMMENDATIONS.

PVC BELL ENDED PIPE SHALL BE WELDED USING A HEAVY DUTY, SLOW DRYING GRAY CEMENT AND A PURPLE PRIMER COMPATIBLE WITH CEMENT.

STUB UPS SHALL BE CAPPED AND PLACED IN A VALVE BOX.

ELECTRICAL POWER SUPPLY:
ELECTRICAL SUPPLY FOR PUMP AND CONTROLLERS TO BE PROVIDED BY THE IRRIGATION CONTRACTOR. CONTRACTOR TO COORDINATE WITH LOCAL UTILITIES COMPANIES (F.P.L.) TO COORDINATE INSTALLATION AND CONNECTION TO THE SITE AVAILABLE SUPPLIES SERVICES.

ALL ELECTRICAL TO COMPLY WITH THE NATIONAL ELECTRICAL CODE AND ANY OTHER APPLICABLE CODES, LAWS AND REGULATIONS.

A LICENSED ELECTRICIAN SHALL PERFORM ALL ELECTRICAL HOOK-UPS.

POWER TO CONTROLLER 120 VOLTS, 15 AMPS. POWER TO PUMP SHALL BE 240 VOLTS, PH 3, 50 AMPS., TO BE CONFIRMED FOR PUMP'S MANUFACTURER AND AVAILABLE POWER ON SITE.

WIRING:
IRRIGATION CONTROL WIRES SHALL BE THERMOPLASTIC SOLID COPPER, SINGLE CONDUCTOR AND LOW VOLTAGE WIRE. SUITABLE FOR DIRECT BURIAL.

TAPE AND BUNDLE CONTROL WIRES EVERY 10' AND RUN THEM ALONGSIDE THE MAINLINE. MAKE 2' COIL OF WIRE AT ALL TURNS IN DIRECTION. MAKE A COIL AT ALL VALVE BOXES. ALL ELECTRICAL CONNECTIONS SHALL BE DONE WITH WATERPROOF CONNECTORS.

WIRE SIZE AND COLOR, AS FOLLOWS:
1) COMMON: WHITE , #14.
2) SPARE FOR COMMON: BLACK, #14.
3) HOT WIRE: COLORED, #14.
4) SPARE FOR HOT WIRE: YELLOW, #14.

SPARE WIRES:
FROM CONTROLLER, RUN THREE SPARE WIRES IN BOTH DIRECTIONS OF THE LOOPED MAINLINE(SIX TOTAL), UP TO EACH STUB UP ON THE MAIN LINE. INSTALL ONE COMMON AND ONE HOT WIRES AS SPARES, UP TO EACH STUB UPS. MAKE A COIL OF ALL SPARE WIRES IN EACH VALVE BOX.

GROUNDING:
A $\frac{5}{8}$"X10' COPPER CLAD GROUNDING ROD SHALL BE INSTALLED AT EACH POINT OF CONNECTION(PUMP, CONTROLLER AND CONTROL PANEL), USING A #6 BARE COPPER WIRE TO MAKE CONNECTIONS. THE EARTH TO GROUND RESISTANCE SHOULD NOT EXCEED 10 OHMS. EACH COMPONENT MUST HAVE ITS OWN SEPARATE GROUNDING GRID.

LAYOUT:
LAY OUT THE IRRIGATION SYSTEM MAKING NECESSARY ADJUSTMENT AND MODIFICATIONS TAKING IN CONSIDERATION SITE CONDITIONS. CONTRACTOR TO ENSURE 100% COVERAGE.

LOCATE VALVES PROVIDING EASY ACCESS AND WITH OUT ANY INTERFERENCE WITH PHYSICAL STRUCTURES, PLANTS, TREES, POLES ETC.

VALVES:
ADJUST FLOW CONTROL TO ENSURE SHUT OFF IN 10 SECONDS AFTER DEACTIVATION BY THE IRRIGATION CONTROLLER.
CONTROL VALVES SHALL BE INSTALLED IN 12" SQUARE VALVE BOX WITH A PURPLE LID. LID LEVEL SHALL BE 1" ABOVE GROUND.

SPRAYS:
SPRAYS SHALL BE RAINBIRD MODEL 1806 (SIX INCHES POP UP); INSTALLED ON 18" LONG FLEXIBLE SWING PIPE. NOZZLES MUST BE MPR AS CALLED ON PLAN (NO SUBSTITUTION WILL BE ALLOWABLE).

BUBBLER:
BUBBLERS SHALL BE TORO 500 FLOOD AND SHOULD BE INSTALLED AS DETAIL ON PLANS. (NO SUBSTITUTION WILL BE ALLOWABLE).

ROTOR:
ROTOR HEAD SHALL BE RAINBIRD FALCON 6504 (PC/FC) MODEL, USING NOZZLE # AS PER PLANS (NO SUBSTITUTION WILL BE ALLOWABLE).

ALL HEADS SHALL USE SCREENS TO AVOID DEBRIS GETTING TO NOZZLES.

TRENCHING:
EXCAVATE STRAIGHT AND VERTICAL TRENCHES WITH SMOOTH FLAT BOTTOMS. TRENCH WIDTH AND DEPTH SHOULD BE SUFFICIENT TO ALLOW PROPER INSTALLATION OF PIPES AS SHOWN ON THE DETAIL SHEET.

PROTECT EXISTING LANDSCAPED AREAS. REPLACE ANY DAMAGED MATERIAL. FINAL DETERMINATION AS TO WHAT NEEDS TO BE REPLACED AND THE ACCEPTABILITY OF THE REPLACEMENT MATERIAL SHALL BE SOLELY UP TO THE OWNER.

INSTALLATION:

SOLVENT WELD PIPE:
CUT PIPE SQUARE AND DEBURR. CLEAN PIPE AND FITTINGS OF FOREIGN MATERIAL, THEN APPLY SMALL AMOUNT OF PRIMER, ENSURE ANY EXCESS IS WIPED OFF IMMEDIATELY; THEN APPLY A THIN COAT OF PVC CEMENT, FIRST APPLY IT TO THE FITTING, AFTER TO THE PIPE; INSERT PIPE INTO THE FITTING, INSURE THAT THE PIPE IS INSERTED TO THE BOTTOM OF THE FITTING, THEN TURN THE PIPE A $\frac{1}{4}$ TURN AND HOLD IT FOR 10 SECONDS. MAKE SURE THE PIPE DOES NOT RECEDE FROM THE FITTING.

PIPE MUST CURE A MINIMUM OF 30 MINUTES PRIOR TO HANDLING AND PLACING INTO TRENCHES. PIPE MUST CURE AT LEAST 24 HRS PRIOR TO FILLING WITH WATER. REFER TO MANUFACTURER'S RECOMMENDATION.

GASKETED PIPE:
CUT PIPE SQUARE, DEBURR AND PLACE BEVELED EDGE ON MALE PORTION OF PIPE, IF NOT USING A PIECE WITH A FACTORY BEVEL; CLEAN PIPE AND FITTING OF FOREIGN MATERIAL, APPLY SMALL AMOUNT OF GREASE TO THE RUBBER GASKET ON THE FEMALE END; FULLY INSERT THE MALE END OF THE PIPE INTO THE FEMALE END, UNTIL THE BEVEL IS FULLY SEATED INTO THE BELL.
ALL GASKETED PIPE SHALL BE RESTRAINED AS PER RECOMMENDATION AND SPECIFICATIONS.

BACK FILL:
MAIN LINE, BACK FILL 3" BELOW AND 3" ABOVE WITH A CLEAN SAND, ANYTHING BEYOND THAT IN THE TRENCH CAN BE NATIVE MATERIAL BUT NOTHING LARGER THAN 2" IN DIAMETER. DEPTH SHALL BE 24" AT VEHICULAR CROSSINGS AND HARDSCAPE AREAS; 18" AT LANDSCAPING AREAS.

LATERAL LINE, SHALL HAVE A 2" OF CLEAN SAND BED ON ANY AREA WHERE ROCKY BED IS FOUND ON THE TRENCH, ANY OTHER PLACE CAN BE FILLED OF NATIVE MATERIAL BUT NOTHING LARGER THAN 2". DEPTH SHALL BE 24" ON VEHICULAR AND HARDSCAPE CROSSINGS AND 12" ON LANDSCAPING AREAS.

ALL PIPE SHALL BE BACKFILL PRIOR TO PERFORMING ANY PRESSURE TEST. WITH THE EXCEPTION OF 2' ON EACH SIDE OF EVERY JOINT. ALL JOINTS SHALL BE BACKFILLED UNTIL PRESSURE TEST HAS BEEN SATISFACTORILY PASSED.

FLUSHING:
PRIOR THE INSTALLATION OF ALL VALVES, FLUSH MAIN LINE FOR AT LEAST 10 MINUTES OR AS NECESSARY UNTIL IS COMPLETELY CLEAN OF DEBRIS.

FLUSH LATERALS SAME AS MAIN LINE, BEFORE INSTALLING HEADS.

TESTING:
MAINLINE: CAP ALL TEE OFF TO VALVE CONNECTIONS ON THE SCHD80 NIPPLE. FILL MAIN LINE WITH WATER AND PRESSURE THE SYSTEM TO 125 PSI; INSTALL 2 GAUGES, ONE AT THE BEGINNING OF THE MAINLINE AND THE OTHER AT MIDWAY ON THE LOOPED MAINLINE. PIPING NETWORK SHALL LOSE NO MORE WATER THEN THE ALLOWED PER THE FOLLOWING FORMULA:

L=NDP/7400

L: ALLOWABLE LEAKAGE IN GALLONS PER HOUR.
N: NUMBER OF JOINTS IN PIPE TESTED.
D: NOMINAL DIAMETER OF PIPE(INCHES)
P: AVERAGE TEST PRESSURE (PSI)

IF L(TEST) IS BIGGER THAN L(FORMULA), THEN THE TEST FAILS; MAIN SHOULD BE REPAIRED AND FOLLOW SAME PROCEDURE UNTIL MAINLINE PASSES THE TEST.

LATERAL LINES, MUST BE FULLY FILLED OF WATER TO OPERATIONAL PRESSURE AND VISUALLY CHECKED FOR LEAKS. ANY LEAKS DETECTED MUST BE REPAIRED.

OPERATIONAL TEST: ONCE MAIN LINE AND LATERALS HAVE PASSED THEIR RESPECTIVE TESTS, AND THE SYSTEM IS FULLY OPERATIONAL; A COVERAGE TEST AND DEMONSTRATION OF THE SYSTEM IS REQUIRED. CONTRACTOR SHALL SHOW THE OWNER THAT PROPER COVERAGE IS OBTAINED AND THE SYSTEM WORKS AUTOMATICALLY FROM THE CONTROLLER. DETERMINATION OF PROPER COVERAGE AND FUNCTION IS AT THE SOLE DISCRETION OF THE OWNER.

SUBMITTALS:
PRIOR TO INSTALLATION, CONTRACTOR MUST SUBMIT FOR WRITTEN APPROVAL, COPIES OF THE MANUFACTURE'S CUT SHEETS AND SPECIFICATIONS FOR ALL COMPONENTS TO BE USED IN THE IRRIGATION SYSTEM.

FINAL ACCEPTANCE:
CONTRACTOR SHALL PROVIDE THE OWNER AS A CONDITION OF FINAL ACCEPTANCE WITH THE FOLLOWING:

1) AS BUILTS – THREE ACCURATE AND LEGIBLE SETS OF HARDCOPY AS-BUILT DRAWINGS. ADDITIONAL DIGITAL COPY IN PDF FORMAT SHALL BE DELIVERED TO THE OWNER ON COMPACT DISK. AS-BUILTS MUST IDENTIFY ALL REMOTE CONTROL VALVES, GATE VALVES, SPLICE BOXES, PUMP, CONTROLLER, ETC.

INSPECTIONS AND COORDINATION MEETINGS REQUIRED:
CONTRACTOR IS REQUIRED TO SCHEDULE, PERFORM, ATTEND AND DEMONSTRATE TO THE OWNER TO THEIR SATISFACTION, AS FOLLOWS:

1) PRE-CONSTRUCTION MEETING, DESIGNER AND CONTRACTOR TO REVIEW ENTIRE INSTALLATION PROCESS AND SCHEDULE WITH OWNER/GENERAL CONTRACTOR.

2) MAINLINE MUST BE INSPECTED FOR PROPER PIPE, FITTINGS, DEPTH OF COVERAGE, BACKFILL AND INSTALLATION METHODS.

3) MAIN LINE SHALL BE PRESSURE TESTED ACCORDING TO THIS DESIGNS REQUIREMENTS.

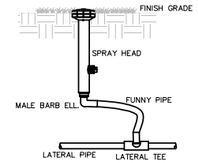
4) COVERAGE AND OPERATIONAL TEST.

5) FINAL TEST.

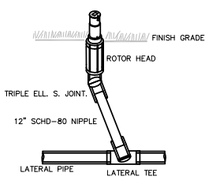
6) PUNCH LIST INSPECTION.

FINAL PAYMENT WILL NOT BE RELEASED UNTIL ALL THESE CONDITIONS ARE SATISFIED.

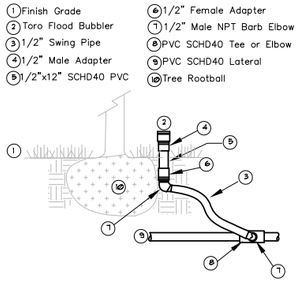
GUARANTEE:
THE IRRIGATION SYSTEM SHALL BE GUARANTEED FOR A MINIMUM OF ONE YEAR FROM THE TIME OF THE FINAL ACCEPTANCE.



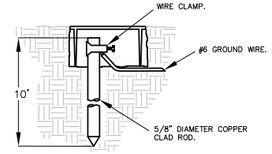
A SPRAY HEAD
NOT TO SCALE



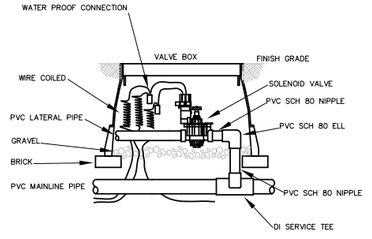
B ROTOR HEAD
NOT TO SCALE



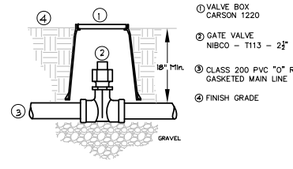
C BUBBLER HEAD
NOT TO SCALE



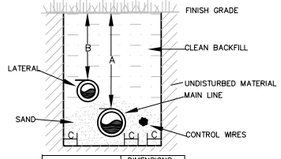
D GROUNDING RODE INSTALLATION
NOT TO SCALE



E SOLENOID VALVE
NOT TO SCALE

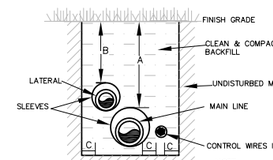


F GATE VALVE
NOT TO SCALE



PIPE SIZE	DIMENSIONS A	B	C
3/4" TO 2"	18"	12"	4"
21/2" and 3"	18"	18"	4"
4" and Larger	24"		4"

G TRENCHING DETAIL (NTS)
NON TRAFFIC AREAS



PIPE SIZE	DIMENSIONS A	B	C
11/2" TO 2"	24"	18"	4"
3" AND 4"	30"	24"	4"
6" AND LARGER	36"	30"	4"

NOTE
SLEEVES SHALL BE SCH040 AND TWICE THE DIAMETER OF PIPE OR WIRE BUNDLE CARRIED

H TRENCHING DETAIL (NTS)
TRAFFIC AREAS

REVISIONS		
No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST. COCONUT CREEK, FL

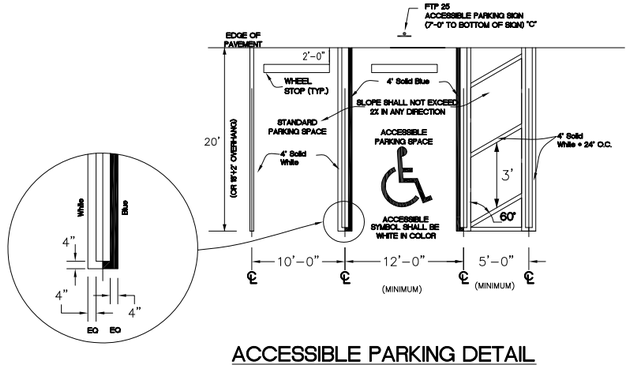
IRRIGATION SYSTEM DETAILS

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

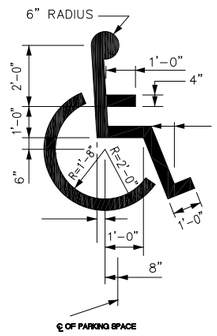
CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 – Fax. (954) 239-4331

DATE:	MAY 16, 2014
PROJECT NO:	CNK-1015
DESIGNED BY:	R.F.M.
DRAWN BY:	R.F.M.
CHECKED BY:	M.A.F.

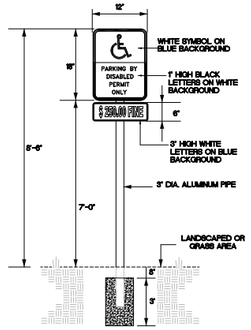
SHEET
C-5



ACCESSIBLE PARKING DETAIL

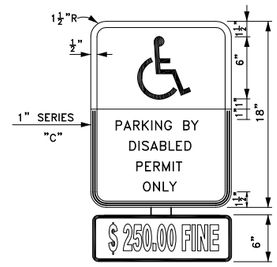


ACCESSIBLE SYMBOL



HANDICAP SIGN INSTALLATION DETAIL

NOTES:
1) SIGN MUST BE POSTED AND THE BOTTOM OF THE SIGN MUST BE AT LEAST 7'-0" ABOVE FINISHED GRADE
2) LOCATE SIGN ± CENTERLINE AND HEAD OF EACH HANDICAP STALL WHERE APPLICABLE
3) SIGNS IN CONCRETE AREAS ARE TO BE EMBEDDED FOR A DEPTH OF 3'

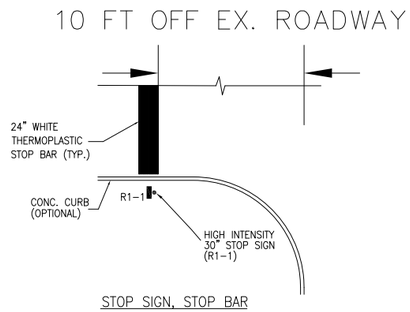


NOTES:
1. TOP PORTION OF FTP 25 SHALL HAVE A REFLECTIVE BLUE BACKGROUND WITH WHITE REFLECTIVE SYMBOL AND BORDER.
2. BOTTOM PORTION SHALL HAVE A REFLECTIVE WHITE BACKGROUND WITH BLACK OPAQUE LEGEND AND BORDER.
3. FTP 26 MAY BE FABRICATED ON ONE PANEL OR TWO.
4. FTP 25 IS FOR USE IN AREAS WHERE SPACE IS LIMITED.

HANDICAP SIGN

F.D.O.T. INDEX NO. 17355

INSTALL SIGN IN FRONT OF HANDICAP SPACE



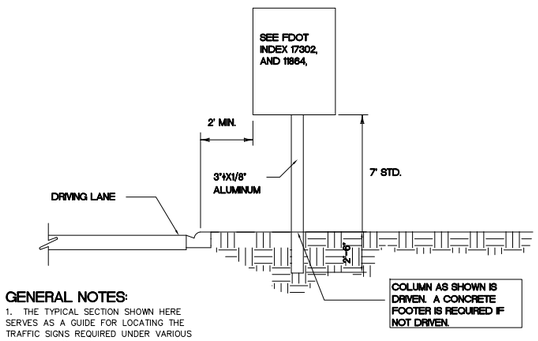
STOP SIGN, STOP BAR

GENERAL NOTES:

1. ALL PAVEMENT MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE "MANUAL ON UNIFORM CONTROL DEVICES FOR STREET AND HIGHWAYS," UNLESS SPECIFIED OTHERWISE.

STOP BAR MARKING DETAIL NTS

SOURCE: BROWARD COUNTY PUBLIC WORKS ENGINEERING DIVISION MINIMUM STANDARDS, APRIL 1995



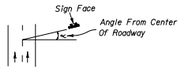
GENERAL NOTES:

1. THE TYPICAL SECTION SHOWN HERE SERVES AS A GUIDE FOR LOCATING THE TRAFFIC SIGNS REQUIRED UNDER VARIOUS ROADSIDE CONDITIONS. FOR SIZE AND DETAILS OF SIGN CONSTRUCTION AND FOOTING, REFER TO THE APPROPRIATE FDOT STANDARD INDEX DRAWING FOR ROADSIDE SIGN.

2. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY THE LENGTH OF SIGN SUPPORTS IN THE FIELD PRIOR TO FABRICATION

COUNTERCLOCKWISE AND MEDIAN MOUNTED SIGNS MAY BE REDUCED TO 3' MINIMUM FROM THE DRIVING LANE. IF REQUIRED FOR VISIBILITY IN BUSINESS OR RESIDENTIAL SECTIONS WITH NO CURB AND SPEEDS OF 30 MPH OR LESS.

ANGLE OF 1 TO 4 DEGREES AWAY FROM THE TRAFFIC FLOW (SEE ILLUSTRATION).



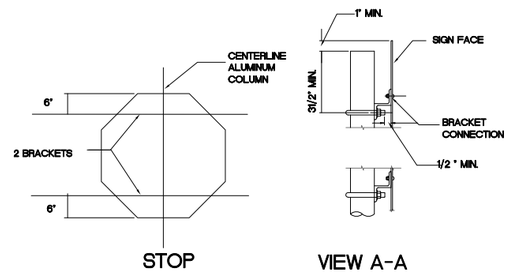
5. THE MOUNTING HEIGHTS ARE MEASURED FROM THE BOTTOM OF THE SIGN PANEL TO A HORIZONTAL LINE EXTENDED FROM THE EDGE OF THE DRIVING LANE. IF THE STANDARD HEIGHTS CANNOT BE MET, THE MINIMUM HEIGHTS ARE AS FOLLOWS:

EXPRESSWAY & FREEWAY SYSTEMS	7'
OTHER ROADWAY SYSTEMS	5'
RURAL URBAN (INCLUDING RESIDENTIAL WITH PARKING AND/OR PEDESTRIAN ACTIVITY)	7'

IF A SECONDARY SIGN IS MOUNTED BELOW THE MAJOR SIGN, THE MAJOR SIGN SHALL BE AT LEAST 8' AND THE SECONDARY SIGN AT LEAST 5' FOR EXPRESSWAY & FREEWAY SYSTEMS AND FOR OTHER SYSTEMS THE HEIGHT TO THE SECONDARY SIGN SHALL BE AT LEAST 4' FOR RURAL AND 6' FOR URBAN SECTIONS.

6. SIGN SUPPORTS SHOULD NEVER BE PLACED IN DITCHES WHERE EROSION MIGHT AFFECT THE PROPER OPERATION OF THE BREAKAWAY FEATURE. IT IS ALSO POSSIBLE THAT A VEHICLE ENTERING THE DITCH MIGHT BE GUIDED INTO THE SUPPORT.

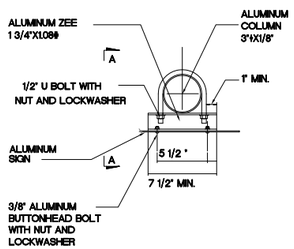
TYPICAL ROADSIDE SIGN PLACEMENT DETAIL



STOP VIEW A-A

30"X30"

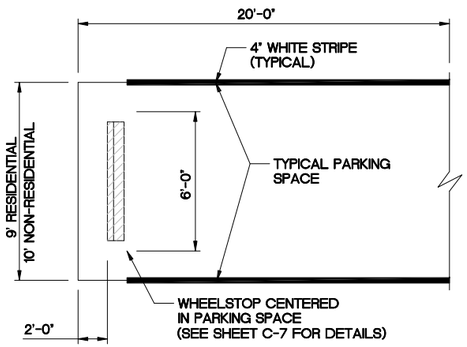
R1-1



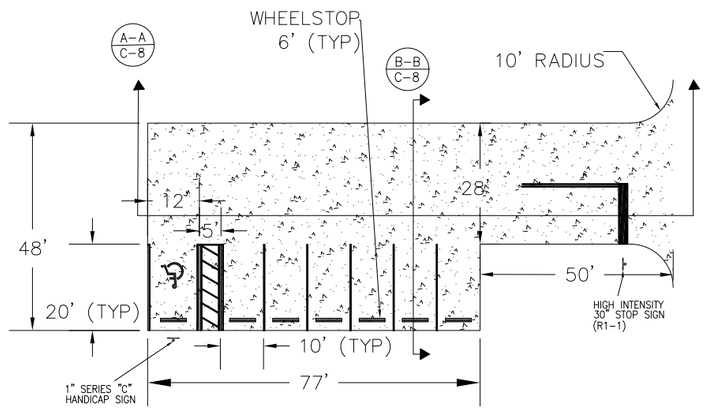
TYPE I BRACKET

NOTES:
1. STOP SIGNS SHALL HAVE REFLECTIVE RED BACKGROUND AND WHITE LETTERING.
2. ALL SIGNS SHALL BE ACCORDING TO MUTCD. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

STOP SIGN/ TYPICAL SIGN BRACKET DETAIL



TYPICAL PARKING SPACE



PROPOSED PARKING LOT DETAIL

NOTES:

1. ACCESSIBLE PARKING SPACES SHALL COMPLY WITH THE FLORIDA BUILDING CODE, ADAAG, AND CITY OF COCONUT CREEK ORDINANCES.

REVISIONS		
No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST. COCONUT CREEK, FL

PROPOSED PARKING LOT DETAILS

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 – Fax. (954) 239-4331

DATE:	MAY 16, 2014
PROJECT NO:	CNK-1015
DESIGNED BY:	R.F.M.
DRAWN BY:	R.F.M.
CHECKED BY:	M.A.F.

SHEET C-6

KBI FLEXI-PAVE HD-2000 RUBBER PATH INSTALLATION

I. PREP WORK INCLUDES:

CUTTING OUT PATH & MAKE GRADE, EXCAVATION, #57 STONE, WEED BARRIER, DENSITY TESTING FOR FILL, & WATER TRUCK AND APPLICATION.

II. INSTALLATION:

KBI FLEXI-PAVE CAN BE INSTALLED FROM 45°F DEGREE TO 95°F DEGREE TEMPERATURES. IMPORTANT: WHEN CURING, THE TEMPERATURE SHOULD NOT FALL BELOW 35°F.

III. QUALIFIED INSTALLATION:

KBI FLEXI-PAVE CAN BE INSTALLED BY K.B. INDUSTRIES, CERTIFIED INSTALLERS HAVING THE KBI CERTIFICATION NUMBER (THIS NUMBER CAN BE REQUESTED AT ANY TIME FROM K.B. INDUSTRIES, INC. FOR VERIFICATION.)

IV. RECOMMENDED SUBSTRATE:

HD2000 IS INSTALLED OVER A MINIMUM OF 4" (10QMM) OF COMPACTED CRUSHED CONCRETE OR SIMILAR AGGREGATE TO A DENSITY OF 95% MINIMUM. THE SIZING OF THE STONE AND BASE SOIL WILL DIRECTLY REPRESENT THE DESIRED "CURVE NUMBER" (PERCOLATION RATE) REQUIRED. HD1000 IS DESIGNED TO BE INSTALLED OVER EXISTING ENGINEERED PAVEMENTS (I.E. CONCRETE OR ASPHALT). THIS PROCESS IS CALLED AN "OVER-POUR" INSTALLATION. (THE POROSITY RATE OF HD2000 AND HD1000 MATERIAL THICKNESS IS 4000 INCHES PER HOUR OR 100 METERS PER HOUR.)

V. MATERIAL SAFETY INFORMATION:

MSDS INFORMATION IS AVAILABLE UPON REQUEST. KBI FLEXI-PROCESS PRODUCTS ARE MANUFACTURED BY KB INDUSTRIES, INC. DATA IS BASED ON FACTS THAT WE BELIEVE TO BE ACCURATE BUT ALL RECOMMENDATIONS ARE MADE WITHOUT WARRANTY SINCE CONDITIONS OF USE ARE BEYOND KB INDUSTRIES, INC. CONTROL. WE DO NOT ASSUME ANY LIABILITY EXCEPT WHAT IS EXPRESSLY NOTED IN WARRANTY CERTIFICATE IF CERTIFIED TECHNICIANS INSTALL THE PRODUCTS. WE DO NOT ASSUME ANY LIABILITY FROM INJURY RESULTING FROM USE. LIABILITY, IF ANY, IS LIMITED TO REPLACEMENT OF PRODUCTS.

VI. USAGE GUIDELINES:

ALL KBI FLEXI-PAVE HD PRODUCTS ARE DESIGNED TOR VEHICULAR TRAFFIC. ANY IMPLIED WARRANTY IS VOIDED BY IMPROPER USE. NO TRACK VEHICLES (METAL OR RUBBER), FORKLIFTS (WAREHOUSE-VAR REACH), MAN LIFTS (BOOMS OR SCISSORS), DUMPSTER OR ROLL-OFF CONTAINERS.

NOTES:

PART 1: GENERAL:

1.1 SCOPE
- A. THIS SPECIFICATION PROVIDES REQUIREMENTS FOR THE CONSTRUCTION OF FLEXIBLE PERVIOUS PAVING.
- B. IN CASE THE REQUIREMENTS OF THIS SPECIFICATION CONFLICT WITH THE CONTRACT DOCUMENTS, THIS DOCUMENT SHALL GOVERN.

1.2 RELATED SECTIONS
- A. DIVISION 32 SECTION "POROUS FLEXIBLE PAVING"

1.4 REFERENCED STANDARDS
- A. ASTM STANDARDS:
  1. ASTM C 666/C 666M-03, "STANDARD TEST METHOD FUR RESISTANCE OF CONCRETE TO FREEZING AND THAWING, PROCEDURE A — FREEZING AND THAWING IN WATER." SAMPLES SHALL INDICATE ONLY MINIMAL MASS CHANGE RESULTS AFTER 300 NOMINAL FREEZE-THAW CYCLES, AND VISUAL EXAMINATION OF THE TEST SPECIMENS SHALL INDICATE NO CRACKS OR BREAKS.
     - A. D 3385-03 STANDARD TEST METHOD FOR INFILTRATION RATE OF SOILS IN FIELD USING DOUBLE-RING INFILTROMETER.
     - B. D 3665-06 STANDARD PRACTICE FOR RANDOM SAMPLING OF CONSTRUCTION MATERIALS E 329-06A SPECIFICATION FOR AGENCIES ENGAGED IN CONSTRUCTION INSPECTION AND/OR TESTING.

1.5 QUALITY ASSURANCE
- A. INSTALLER QUALIFICATIONS:
  1. FLEXIBLE PERVIOUS PAVING INSTALLER SHALL BE CURRENTLY CERTIFIED BY THE MANUFACTURER AND HAVE SUCCESSFULLY INSTALLED A MINIMUM OF 2,000 SQUARE FEET.
  2. FLEXIBLE PERVIOUS PAVING INSTALLER SHALL EMPLOY NO LESS THAN THREE MANUFACTURER-CERTIFIED FLEXIBLE PERVIOUS PAVING TECHNICIANS ON STAFF WHO DIRECTLY OVERSEE AND PERFORM THE INSTALLATIONS DURING ALL FLEXIBLE PERVIOUS PAVING PLACEMENT, UNLESS OTHERWISE SPECIFIED.

1.6 SUBMITTALS
- A. QUALIFICATION DATA
  1. FOR PERVIOUS PAVING INSTALLER:
     - a. PROVIDE A LIST OF SUCCESSFULLY INSTALLED FLEXIBLE PERVIOUS PAVING PROJECTS,AS REQUIRED HEREIN, INCLUDING THE ADDRESS, SQUARE FOOTAGE, AND PHOTOGRAPHS FOR EACH PROJECT.
     - b. MANUFACTURER'S CERTIFICATIONS.
- B. PROPOSED MIX DESIGN.
- C. SAMPLES FOR VERIFICATION: PROVIDE TWO 6" DIAMETER SAMPLES, FULL THICKNESS.

1.7 PROJECT CONDITIONS
- A. TRAFFIC CONTROL: MAINTAIN ACCESS FOR PEDESTRIAN TRAFFIC AS REQUIRED FOR OTHER CONSTRUCTION ACTIVITIES.
- B. SCHEDULE PLACEMENTS TO MINIMIZE EXPOSURE TO WIND AND HEAT BEFORE CURING MATERIALS ARE APPLIED

PART 2: FORMS

- A. MAKE FORMS WITH STEEL, WOOD, OR OTHER MATERIAL THAT IS SUFFICIENTLY RIGID TO MAINTAIN SPECIFIED TOLERANCES, AND CAPABLE OF SUPPORTING CONCRETE AND MECHANICAL CONCRETE PLACING EQUIPMENT.
- B. FORMS SHALL BE CLEAN AND FREE OF DEBRIS OF ANY KIND, RUST, AND HARDENED CONCRETE.
- C. FORM RELEASE: BIO-DIESEL OR VEGETABLE OIL COATING.

PART 3: EXECUTION

3.1 SUBGRADE PREPARATION
- A. PREPARE SUBGRADE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
- B. CONSTRUCT SUBGRADE TO ENSURE THAT THE REQUIRED PAVING THICKNESS IS OBTAINED IN ALL LOCATIONS.
- C. KEEP ALL TRAFFIC OFF OF THE SUBGRADE DURING CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICAL.REGRADE SUBGRADE DISTURBED BY DELIVERY VEHICLES OR OTHER CONSTRUCTION TRAFFIC, AS NEEDED.
- D. COMPACT THE MATERIAL ADDED TO OBTAIN FINAL SUBGRADE ELEVATION.
- E. DETERMINE SUBGRADE PERMEABILITY IN ACCORDANCE WITH ASTM D3385 BEFORE PERVIOUS PAVING PLACEMENT. CONFIRM THAT SUBGRADE PERMEABILITY MEETS REQUIREMENTS OF CONTRACT DOCUMENTS.

3.2 SUBBASE
- A. PREPARE SUB-BASE IN ACCORDANCE WITH CONTRACT DOCUMENTS.

3.3 SETTING FORMWORK
- A. SET, ALIGN, AND BRACE FORMS SO THAT THE HARDENED PAVING MEETS THE TOLERANCES SPECIFIED HEREIN.
- B. APPLY FORM RELEASE AGENT TO THE FORM FACE WHICH WILL BE IN CONTACT WITH PERVIOUS PAVING, IMMEDIATELY BEFORE PLACING PAVING.
- C. THE VERTICAL FACE OF PREVIOUSLY PLACED CONCRETE MAY BE NEED AS A FORM.
  1. PROTECT PREVIOUSLY PLACED PAVING FROM DAMAGE.
  2. DO NOT APPLY FORM RELEASE AGENT TO PREVIOUSLY PLACED CONCRETE.
  3. APPLY LIQUID URETHANE BONDING AGENT TO FACE OF SURFACES WHEN ADHESION IS DESIRED
- D. PLACEMENT WIDTH SHALL BE AS SPECIFIED IN CONTRACT DOCUMENTS.

3.4 BATCHING, MIXING, AND DELIVERY
- A. BATCH AND MIX ON SITE IN COMPLIANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS, EXCEPT THAT DISCHARGE SHALL BE COMPLETED WITHIN 5 MINUTES OF THE INTRODUCTION OF URETHANE TO THE DRY PRODUCTS.

3.5 PLACING AND FINISHING PAVING
- A. DO NOT PLACE PERVIOUS PAVING ON FROZEN OR WET SUB-GRADE OR SUB-BASE
- B. DEPOSIT PERVIOUS PAVING EITHER DIRECTLY ONTO THE SUB-GRADE OR SUB-BASE BY WHEELBARROW OR BY MATERIAL HANDLER ONTO THE SUB-GRADE OR SUB-BASE, UNLESS OTHERWISE SPECIFIED.
- C. DEPOSIT PERVIOUS PAVING BETWEEN THE FORMS TO AN APPROXIMATELY UNIFORM HEIGHT.
- D. SPREAD THE PERVIOUS PAVING USING A COME-ALONG, SHORT-HANDLE, SQUARE-ENDED SHOVEL OR RAKE. E. USE STEEL TROWELS TO FINISH TO THE ELEVATIONS AND THICKNESS SPECIFIED IN CONTRACT DOCUMENTS.

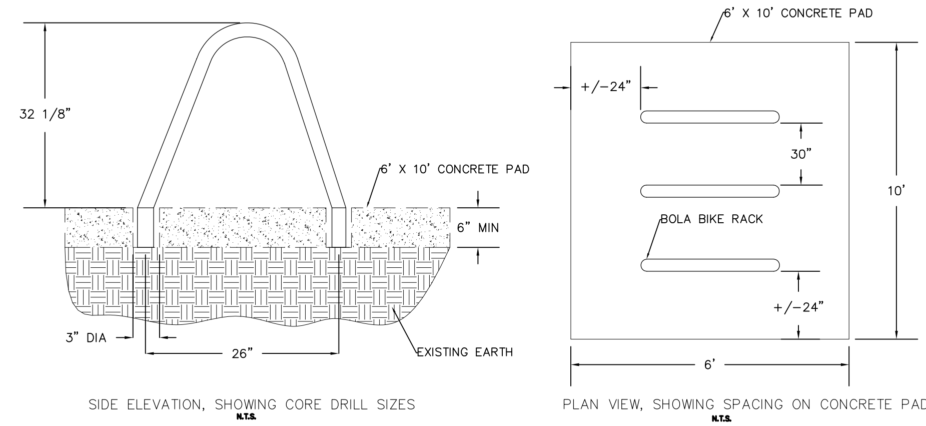
3.6 FINAL SURFACE TEXTURE
- A. FINAL SURFACE OF PERVIOUS PAVING SHALL BE SMOOTHED WITH BULL FLOAT AND MAGNESIUM TROWELS.

3.7 EDGING
- A. WHEN FORMS ARE NOT USED, BEVEL THE EDGE OF THE TOP SURFACE TO A 45° SLOPE

3.8 CURING
- A. BEGIN CURING WITHIN 20 MINUTES OF PAVING DISCHARGE, UNLESS LONGER WORKING TIME IS ACCEPTED BY THE MANUFACTURER.
- B. COMPLETELY COVER THE PAVING SURFACE WITH A MINIMUM 4 MIL THICK POLYETHYLENE SHEET ONLY IF RAIN OR SPRINKLERS ARE IMMINENT WITHIN 20 MINUTES. CUT SHEETING TO A MINIMUM OF A FULL PLACEMENT WIDTH.
  1. COVER ALL EXPOSED EDGES OF PAVING WITH POLYETHYLENE SHEET.
  2. SECURE CURING COVER MATERIAL WITHOUT USING DIRT.
- C. CURE PAVING FOR A MINIMUM OF 24 UNINTERRUPTED HOURS, UNLESS OTHERWISE SPECIFIED

3.9 HOT-AND COLD-WEATHER CONSTRUCTION
- A. WHEN HOT WEATHER IS ANTICIPATED UP TO 95 DEGREES FAHRENHEIT, NO SPECIAL PROCEDURES ARE NECESSARY.
- B. IN COLD WEATHER WHEN TEMPERATURES MAY FALL BELOW FREEZING JUST AFTER AN INSTALLATION, UTILIZE A FAN TO MAINTAIN AIRFLOW OVER PERVIOUS PAVING DURING THE CURING PROCESS.

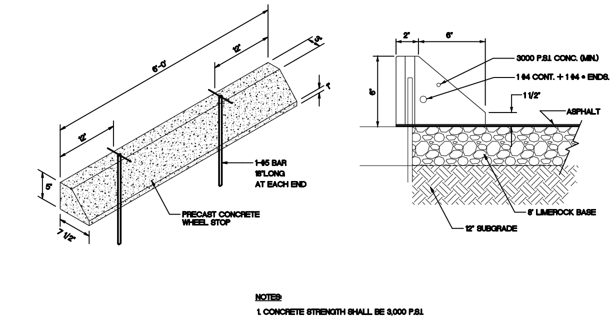
3.10 OPENING TO TRAFFIC
- A. DO NOT OPEN THE PAVING TO LIGHT VEHICULAR TRAFFIC UNTIL THE PERVIOUS PAVING BAS CURED FOR AT LEAST 24 HOURS DURING WARM WEATHER, AND 48 HOURS DURING VERY COLD TEMPERATURES AT OR NEAR FREEZING AND NOT UNTIL THE PERVIOUS PAVING IS ACCEPTED BY THE OWNER FOR OPENING TO TRAFFIC.



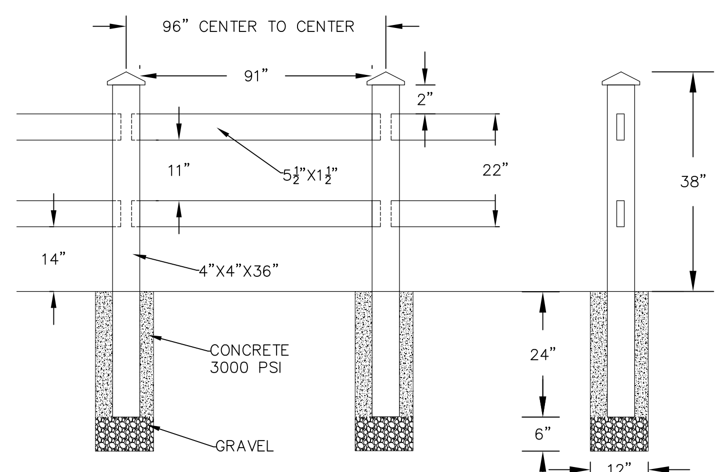
BOLA BIKE RACK DETAIL
N.T.S.

INSTALLATION:

1. CORE DRILL 3" DIAMETER HOLES 6" DEEP
2. PREPARE THE HOLES FOR OUTDOOR ANCHORING CEMENT SUCH AS KWIXSET OR SUPER POR-ROK. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR BLOWING OUT DUST, FILLING WITH WATER, SCRUBBING, AND REMOVING EXCESS WATER.
3. PLACE THE BIKE RACK BACK INTO POSITION AND FILL THE HOLES WITH ANCHORING CEMENT.

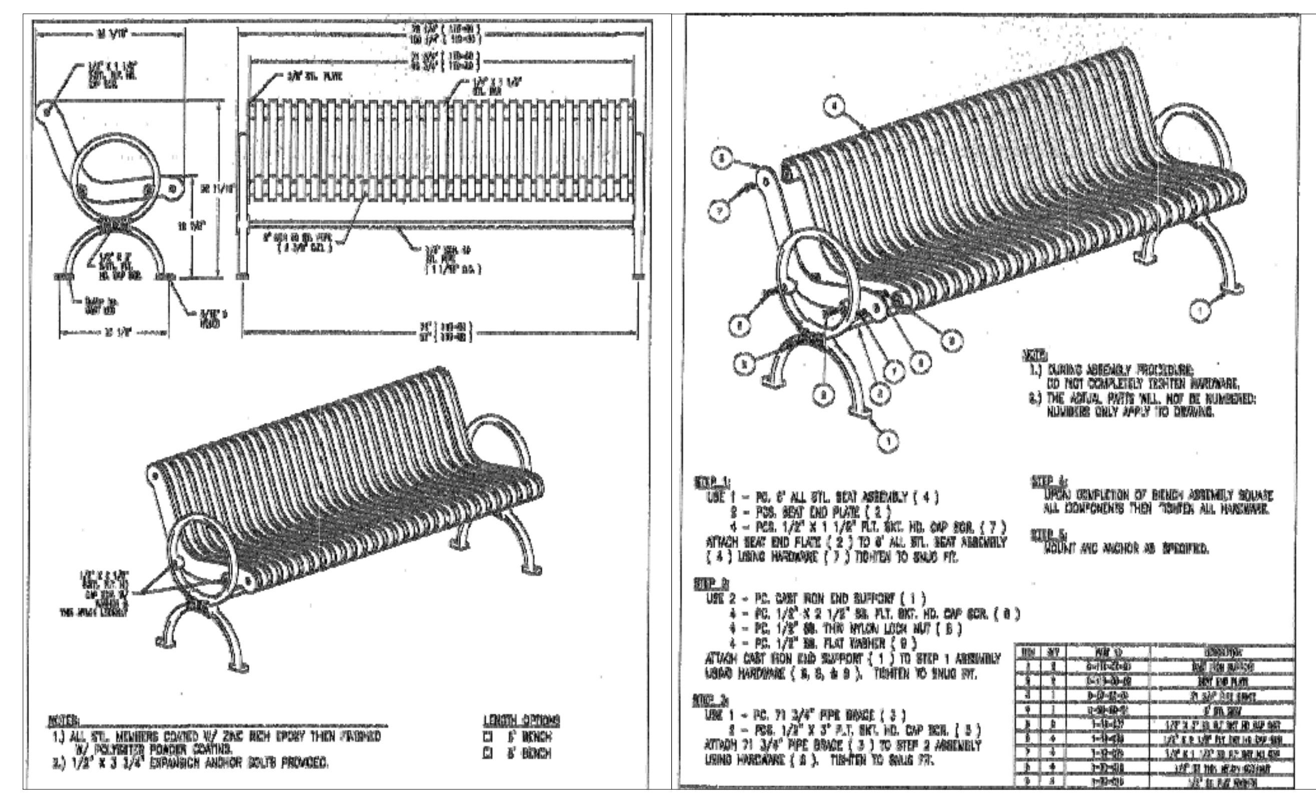


WHEEL STOP DETAIL
N.T.S.



PVC FENCE INSTALLATION DETAIL
NTS

NOTES:
1. USE BARRETTE VINYL FENCE RANCH RAIL STYLE (2-RAIL) OR EQUIVALENT.
2. USE MODEL NUMBERS: 73061401S/73063901/73048501/73048601/73048701



BENCH DETAIL
N.T.S.

REVISIONS		
No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST.
COCONUT CREEK, FL

ADDITIONAL DETAILS

Coconut Creek — Butterfly Capital of the World

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 – Fax. (954) 239-4331

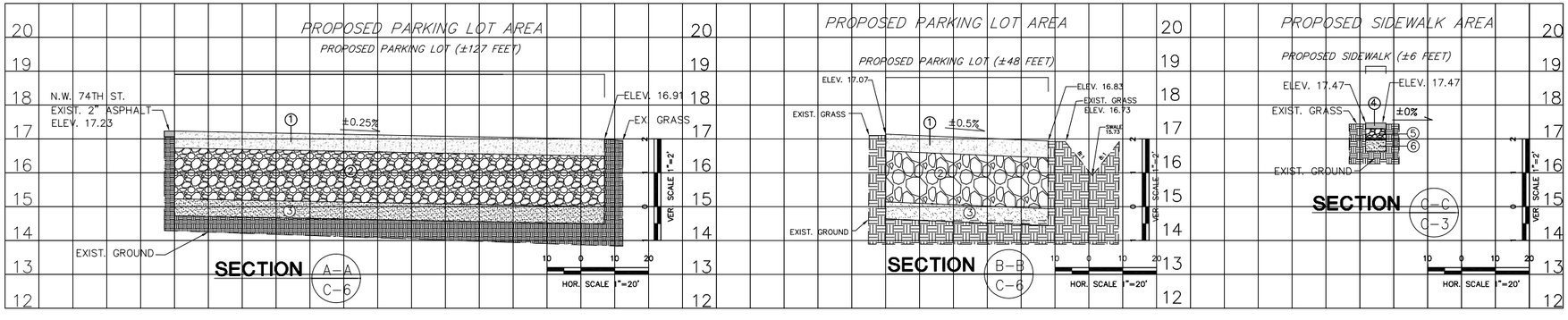
DATE:	MAY 16, 2014
PROJECT NO:	CNK-1015
DESIGNED BY:	R.F.M.
DRAWN BY:	R.F.M.
CHECKED BY:	M.A.F.

SHEET C-7

PERVIOUS CONCRETE DETAILS AND SPECS

GENERAL NOTES:

1. CONTRACTOR QUALIFICATIONS: AT A MINIMUM, CONTRACTOR TO MEET THE NRMCA CONTRACTOR CERTIFICATION REQUIREMENTS OR TO BE PRE-APPROVED BY THE ENGINEER.
2. PRE-PLACEMENT MEETING: AN ON-SITE PRE-PLACEMENT MEETING BETWEEN THE OWNER OR AGENT, DESIGNERS, MATERIAL SUPPLIERS, INSPECTORS, LANDSCAPE, IRRIGATION, CONCRETE CONTRACTOR, ETC. IS REQUIRED
3. MATERIALS:
   - A.) CEMENT: PORTLAND CEMENT TYPE I OR II CONFORMING TO ASTM C 150 OR PORTLAND CEMENT TYPE IP OR IS CONFORMING TO ASTM C 595.
   - B.) AGGREGATE (PERVIOUS MIXTURE): USE FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) NO. 8 COARSE AGGREGATE (⅜" TO NO. 16) PER ASTM C 33 OR NO. 89 COARSE AGGREGATE (⅜" TO NO. 50) PER ASTM D 448. IF OTHER GRADATION OF AGGREGATE IS TO BE USED, SUBMIT DATA ON PROPOSED MATERIAL TO OWNER OR AGENT FOR APPROVAL.
   - C.) AGGREGATE (RESERVOIR): CLEAN, OPEN-GRADED AGGREGATE OR NO. 57 COARSE AGGREGATE (1" TO NO. 4) PER ASTM C 33.
   - D.) ADMIXTURES: TYPE A WATER REDUCING ADMIXTURES – ASTM C 494.
     TYPE B RETARDING – ASTM C 494.
     TYPE D WATER REDUCING/RETARDING – ASTM C 494.
   - E.) WATER: POTABLE OR SHALL COMPLY WITH FDOT STANDARD SPECIFICATIONS, SECTION 923.
   - F.) NON-WOVEN GEOTEXTILE FILTER FABRIC: GEOTEXTILE FABRIC SHALL COMPLY WITH AASHTO M 288 BASED ON APPLICATION AND INSTALLATION CONDITIONS. VERIFY COMPATIBILITY BETWEEN GEOTEXTILE AND ADJACENT SOILS FOR FILTRATION, CLOGGING AND PERMEABILITY AND FOLLOW MANUFACTURER RECOMMENDATIONS FOR USE AS SEPARATION LAYER BETWEEN SUBGRADE SOILS AND THE AGGREGATE RESERVOIR LAYER.
4. AGGREGATE RESERVOIR MATERIAL: THE AGGREGATE SHALL BE A CLEAN, OPEN-GRADED CRUSHED STONE, OR RECYCLED CRUSHED CONCRETE, OR NO. 57 STONE AS APPROVED BY THE ENGINEER. PROOF ROLL THE AGGREGATE RESERVOIR LAYER TO ENSURE THAT THE REQUIRED PAVEMENT THICKNESS IS OBTAINED IN ALL LOCATIONS. REGRADE ANY DISTURBED AGGREGATE RESERVOIR, AS NEEDED.
5. NON-WOVEN GEOTEXTILE FABRIC: A NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED ON TOP OF THE SUBGRADE WHEN AN AGGREGATE RESERVOIR LAYER IS PRESENT. THE FABRIC SHALL BE WRAPPED AROUND THE SIDE AND OVER THE TOP OF THE AGGREGATE RESERVOIR EXTENDING A MINIMUM OF 12 IN. FROM THE EDGE AT THE TOP. A ZERO (0%) SLOPE IS RECOMMENDED AND A MAXIMUM 0.3% SLOPE IS ALLOWED FOR THE TOP OF SUBGRADE/BOTTOM OF THE AGGREGATE RESERVOIR. A NON-WOVEN GEOTEXTILE FABRIC IS RECOMMENDED AS A SEPARATION LAYER TO REDUCE THE EROSION POTENTIAL OF SEDIMENT OF THE SUBGRADE SOILS.
6. SUBGRADE MATERIAL: THE TOP SIX (6) INCHES SHALL BE COMPOSED OF GRANULAR OR GRAVEL-LIKE SOIL THAT IS PREDOMINANTLY SANDY WITH NO MORE THAN A MODERATE AMOUNT OF SILT OR CLAY
7. SUBGRADE PERMEABILITY: THE ENGINEER MAY REQUEST, PRIOR TO PLACEMENT OF PORTLAND CEMENT PERVIOUS PAVEMENT, THAT THE SUBGRADE BE TESTED FOR RATE OF PERMEABILITY BY DOUBLE RING INFILTROMETER IN ACCORDANCE WITH ASTM D 3385, OR OTHER PRE-APPROVED TEST METHOD FOR SUBGRADE SOIL PERMEABILITY. THE TESTED PERMEABILITY MUST REASONABLY COMPARE TO THE DESIGN PERMEABILITY. SOIL PERMEABILITY SHALL BE NO LESS THAN HALF (1/2) INCH PER HOUR.
8. SUBGRADE SUPPORT:
   - A.) THE SUBGRADE SHALL BE COMPACTED BY A MECHANICAL VIBRATORY COMPACTOR TO A MAXIMUM DENSITY OF 92% ± 2% OF A MAXIMUM DRY DENSITY AS ESTABLISHED BY AASHTO T 180 (MODIFIED PROCTOR TEST). SUBGRADE STABILIZATION SHALL NOT BE PERMITTED.
   - B.) IF FILL MATERIAL (EMBANKMENT) IS REQUIRED TO BRING THE SUBGRADE TO FINAL ELEVATION, IT SHALL BE CLEAN AND FREE OF DELETERIOUS MATERIALS. IT SHALL BE PLACED IN SIX (6) INCH MAXIMUM LAYERS, AND COMPACTED BY A MECHANICAL VIBRATORY COMPACTOR TO A MAXIMUM DENSITY OF 92% ± 2% OF A MAXIMUM DRY DENSITY AS ESTABLISHED BY ASTM D 1557 OR AASHTO T 180.
   - C.) CONSTRUCT THE SUBGRADE TO ENSURE THAT THE REQUIRED PAVEMENT THICKNESS IS OBTAINED IN ALL LOCATIONS. KEEP ALL TRAFFIC OFF OF THE PREPARED SUBGRADE DURING CONSTRUCTION TO THE MAXIMUM EXTENT PRACTICAL. SCARIFY, REGRADE AND RECOMPACT DISTURBED SUBGRADE PRIOR TO PLACEMENT, THE SUBGRADE SHALL BE IN A MOIST CONDITION (WITHIN +3% OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD COMPACTION TEST AASHTO T 180).
9. FORMS: FORMS MAY BE OF WOOD OR STEEL AND SHALL BE THE DEPTH OF THE PAVEMENT. FORMS SHALL BE OF SUFFICIENT STRENGTH AND STABILITY TO SUPPORT MECHANICAL EQUIPMENT WITHOUT DEFORMATION OF PLAN PROFILES FOLLOWING SPREADING, STRIKE-OFF AND COMPACTION OPERATIONS.
10. MIX TIME: TRUCK MIXERS SHALL BE OPERATED AT THE SPEED DESIGNATED AS MIXING SPEED BY THE MANUFACTURER FOR SEVENTY FIVE (75) TO ONE HUNDRED (100) REVOLUTIONS OF THE DRUM.
11. TRANSPORTATION: THE PORTLAND CEMENT PERVIOUS MIXTURE MAY BE TRANSPORTED OR MIXED ON SITE AND SHOULD BE USED WITHIN ONE (1) HOUR OF THE INTRODUCTION OF MIX WATER, UNLESS OTHERWISE APPROVED BY AN ENGINEER. THIS TIME CAN BE INCREASED TO NINETY (90) MINUTES WHEN USING AN EXTENDED SET CONTROL ADMIXTURE SPECIFIED IN SECTION 2.1.(4).
12. DISCHARGE: EACH MIXER TRUCK WILL BE INSPECTED FOR APPEARANCE OF CONCRETE UNIFORMITY ACCORDING TO SECTION 3.4. WATER MAY BE ADDED BY THE CONTRACTOR TO OBTAIN THE REQUIRED MIX CONSISTENCY. A MINIMUM OF TWENTY-FIVE (25) REVOLUTIONS AT THE MANUFACTURER'S DESIGNATED MIXING SPEED SHALL BE REQUIRED FOLLOWING ANY ADDITION OF WATER TO THE MIX. CONCRETE SHALL BE DEPOSITED AS CLOSE TO ITS FINAL POSITION AS PRACTICABLE AND SUCH THAT FRESH CONCRETE ENTERS THE MASS OF PREVIOUSLY PLACED CONCRETE. THE PRACTICE OF DISCHARGING ONTO THE AGGREGATE RESERVOIR/SUBGRADE AND PULLING OR SHOVELING TO FINAL PLACEMENT IS NOT ALLOWED. SPREAD THE CONCRETE USING A SHORT-HANDLE, SQUARE-ENDED SHOVEL OR RAKE. MOISTEN THE AGGREGATE RESERVOIR/ SUBGRADE PRIOR TO PLACEMENT. DO NOT ALLOW FOOT TRAFFIC ON THE FRESH CONCRETE
13. PLACING AND FINISHING EQUIPMENT: UNLESS OTHERWISE APPROVED BY THE ENGINEER IN WRITING, THE CONTRACTOR SHALL PROVIDE MECHANICAL STRIKE-OFF EQUIPMENT OF EITHER SLIPFORM OR FORM RIDING WITH A FOLLOWING COMPACTIVE UNIT THAT WILL PROVIDE A MINIMUM OF FORTY (40) POUND PER FOOT VERTICAL FORCE. THE PERVIOUS CONCRETE PAVEMENT WILL BE PLACED TO THE REQUIRED ELEVATION AND SHALL NOT DEVIATE MORE THAN +3/8 INCH IN TEN (10) FEET FROM PROFILE GRADE. IF PLACING EQUIPMENT DOES NOT PROVIDE THE MINIMUM SPECIFIED VERTICAL FORCE, A FULL WIDTH ROLLER OR OTHER FULL WIDTH COMPACTION DEVICE THAT PROVIDES SUFFICIENT COMPACTIVE EFFORT SHALL BE USED IMMEDIATELY FOLLOWING THE STRIKE-OFF OPERATION. COMPACT FRESH CONCRETE TO STAY WITHIN THE REQUIREMENTS OF 5.5. AFTER MECHANICAL OR OTHER APPROVED STRIKE-OFF AND COMPACTION OPERATION, NO OTHER FINISHING OPERATION WILL BE ALLOWED. DO NOT USE STEEL TROWELS OR POWER FINISHING EQUIPMENT. IF SURFACE VIBRATION IS USED, IT SHALL BE SET AT THE LOWEST FREQUENCY DURING PLACEMENT AND IT SHALL BE SHUT OFF IMMEDIATELY WHEN FORWARD PROGRESS IS HALTED FOR ANY REASON. THE CONTRACTOR WILL BE RESTRICTED TO PAVEMENT PLACEMENT WIDTHS OF A MAXIMUM OF TWENTY (20) FEET UNLESS THE CONTRACTOR CAN DEMONSTRATE COMPETENCE TO PROVIDE PAVEMENT PLACEMENT WIDTHS GREATER THAN THE MAXIMUM SPECIFIED TO THE SATISFACTION OF THE ENGINEER. PERVIOUS CONCRETE SHALL BE BORDERED BY CURBING OR HEADER CURB, ESPECIALLY WHEN IT ABUTS AN ASPHALTIC PAVEMENT.
14. CURING: CURING PROCEDURES SHALL BEGIN IMMEDIATELY OR NO MORE THAN TWENTY (20) MINUTES OF CONCRETE DISCHARGE UNLESS LONGER WORKING TIME IS ACCEPTED BY THE ENGINEER. THE PAVEMENT SURFACE SHALL BE COMPLETELY COVERED WITH A MINIMUM SIX (6) MIL THICK POLYETHYLENE SHEET OR OTHER APPROVED COVERING MATERIAL. CUT SHEET TO A MINIMUM OF 6 IN. WIDER THAN THE FULL PLACEMENT WIDTH. THE COVER SHALL OVERLAP ALL EXPOSED EDGES AND SHALL BE SECURED (WITHOUT USING DIRT OR STONE) TO PREVENT DISLOCATION DUE TO WINDS OR ADJACENT TRAFFIC CONDITIONS. PRIOR TO COVERING, A FOG OR LIGHT MIST IS ALLOWED TO BE SPRAYED ABOVE THE SURFACE WHEN REQUIRED DUE TO AMBIENT CONDITIONS (TEMPERATURE, WIND, AND HUMIDITY). COVER THE PERVIOUS CONCRETE AND EQUIPMENT WHEN DELIVERY IS DELAYED FOR 20 MINUTES OR MORE.
15. CURE TIME:
   - A.) PORTLAND CEMENT TYPE I, II, OR IS – 7 UNINTERRUPTED DAYS MINIMUM.
   - B.) PORTLAND CEMENT TYPE I OR II WITH CLASS F FLY ASH (AS PART OF THE 550 LBS/CYD MINIMUM CEMENTITIOUS) OR TYPE IP– 10 UNINTERRUPTED DAYS MINIMUM.
   - C.) NO TRUCK TRAFFIC SHALL BE ALLOWED FOR 10 DAYS (NO PASSENGER CAR/LIGHT TRUCKS FOR 7 DAYS).
16. JOINTING: PRIOR TO CONSTRUCTION, THE ENGINEER MAY PROVIDE A JOINT LAYOUT PLAN OR REQUIRED THE CONTRACTOR TO SUBMIT FOR APPROVAL A PLAN VIEW OF THE PARKING LOT SHOWING THE LOCATION OF ALL PROPOSED JOINTS. CONTROL (CONTRACTION) JOINTS SHALL BE INSTALLED AT A MAXIMUM OF TWENTY (20) FOOT INTERVALS. SMALLER JOINT SPACING IS RECOMMENDED. THEY SHALL BE INSTALLED TO A DEPTH OF ONE QUARTER (¼) OF THE THICKNESS OF THE PAVEMENT. THESE JOINTS WILL BE INSTALLED IN THE PLASTIC CONCRETE. ISOLATION (EXPANSION) JOINTS WILL NOT BE NECESSARY WHEN PERVIOUS CONCRETE IS ABUTTING HARDENED CONCRETE OR STRUCTURES.
17. LABORATORY TESTING:
    THE OWNER WILL RETAIN AN INDEPENDENT TESTING LABORATORY THAT SHOULD UNDERSTAND THE PROPERTIES OF PERVIOUS CONCRETE. THE TESTING LABORATORY SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF ASTM E 329 "STANDARD RECOMMENDED PRACTICE FOR INSPECTION AND TESTING AGENCIES FOR CONCRETE, STEEL, AND BITUMINOUS MATERIALS AS USED IN CONSTRUCTION" AND ASTM C 1077 "STANDARD PRACTICE FOR TESTING CONCRETE AND CONCRETE AGGREGATES FOR USE IN CONSTRUCTION, AND CRITERIA FOR LABORATORY EVALUATION" AND SHALL BE INSPECTED AND ACCREDITED BY THE CONSTRUCTION MATERIALS ENGINEERING COUNCIL, INC., OR BY AN EQUIVALENT RECOGNIZED NATIONAL AUTHORITY.
18. THE AGENT OF THE TESTING LABORATORY PERFORMING FIELD SAMPLING AND TESTING OF CONCRETE SHALL BE CERTIFIED BY THE AMERICAN CONCRETE INSTITUTE AS A CONCRETE FIELD TESTING TECHNICIAN GRADE I, OR BY A RECOGNIZED STATE OR NATIONAL AUTHORITY FOR AN EQUIVALENT LEVEL OF COMPETENCE.
19. FRESH DENSITY:
    1. DETERMINE DENSITY USING A MINIMUM 0.25 FT3 CYLINDRICAL METAL MEASURE. FILL AND COMPACT THE MEASURE IN ACCORDANCE WITH ASTM C 1688.
    2. FRESH DENSITY SHALL BE WITHIN + 5 PCF OF THE DESIGNED DENSITY
20. IN-PLACE INFILTRATION:
    1. DETERMINE THE IN-PLACE INFILTRATION IN ACCORDANCE WITH ASTM C 1701.
21. CORE HOLES LEFT FROM SAMPLES TAKEN SHALL BE FILLED WITH PERVIOUS, CONVENTIONAL CONCRETE OR PRE-BLENDED GROUT.
22. PERVIOUS CONCRETE PAVEMENT SHALL NOT BE USED WHERE HEAVY TRAFFIC LOADS ARE ANTICIPATED (E.G. AVERAGE DAILY TRUCK TRAFFIC IS GREATER THAN TWO (2) VEHICLES PER DAY WITH TRUCK GROSS WEIGHT EQUAL TO OR GREATER THAN 80,000 LBS.).
23. PERVIOUS CONCRETE PAVEMENT SHALL NOT BE USED WITHIN A MINIMUM OF TEN (10) FEET IN FRONT OF ANY SOLID WASTE DUMPSTERS. A CONVENTIONAL CONCRETE SLAB IS RECOMMENDED.
24. PERVIOUS CONCRETE PAVEMENT SHALL NOT BE USED IN AN AREA WHERE EXCESSIVE FINE MATERIALS WILL BE DEPOSITED ON THE SURFACE OF THE PERVIOUS CONCRETE PAVEMENT FROM SOURCES SUCH AS ROOF OR LANDSCAPING RUNOFF, OR IN AREAS ADJACENT TO UNPAVED AREAS WITHIN THE PATH OF TRAFFIC. ADJACENT UNPAVED AREAS SHALL BE GRADED BELOW AND SLOPING AWAY FROM CURB OR PERVIOUS CONCRETE PAVEMENT. (LANDSCAPING CAN BE GRADED BELOW AND AWAY FROM PERVIOUS CONCRETE PAVEMENT.)
25. DIRECT ALL RUNOFF FROM IMPERVIOUS AREAS, LANDSCAPING, ROOFTOP, SIDEWALK, ETC. AWAY FROM PERVIOUS CONCRETE SYSTEM OR PROVIDE ALTERNATE DESIGN THAT SHOWS ADEQUATE STORAGE CAPACITY AND CONTROL OF SEDIMENT TO ENSURE PROPER FUNCTIONING OF THE PERVIOUS CONCRETE SYSTEM FOR PRE-APPROVAL BY THE ENGINEER.
26. A MINIMUM SEPARATION OF TWO (2) FEET IS REQUIRED BETWEEN THE ESTIMATED SEASONALLY HIGH WATER TABLE AND THE BOTTOM OF THE PERVIOUS CONCRETE SYSTEM, WHEN THE SYSTEM IS DESIGNED TO STORE AND INFILTRATE STORMWATER INTO THE SOILS.
27. AN ACCEPTABLE FORM OF CONVENTIONAL CONCRETE CURBING (FDOT TYPE "D") SHALL BE CONSTRUCTED TO A MINIMUM DEPTH OF SIX (6) INCHES BENEATH THE BOTTOM OF THE PERVIOUS CONCRETE SLAB IN ORDER TO PROTECT THE EDGES OF THE SLAB FROM POTENTIAL EROSION AND TO PROMOTE FLOW DOWNWARD.
28. A NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED ON TOP OF THE SUBGRADE WHEN AN AGGREGATE RESERVOIR LAYER IS PRESENT. THE FABRIC SHALL BE WRAPPED AROUND THE SIDE AND OVER THE TOP OF THE AGGREGATE RESERVOIR EXTENDING A MINIMUM OF 12 IN. FROM THE EDGE AT THE TOP.
29. PERVIOUS CONCRETE PAVEMENT DESIGN SHALL, AT A MINIMUM, HAVE A THICKNESS OF SIX (6) INCHES IN CROSS SECTION.
30. PERVIOUS CONCRETE AREAS SHALL BE CLEARLY IDENTIFIED WITH SIGNS AT EACH ENTRANCE TO THE PROPERTY OR AS APPROVED BY THE ENGINEER.
31. MAINTENANCE OF NEW PAVEMENT: A DRY, MECHANICAL SWEEPING AND VACUUMING OF THE SURFACE IS RECOMMENDED WITHIN 6 MONTHS AFTER PLACEMENT.
32. IN-SERVICE PAVEMENT: AN ANNUAL DRY, MECHANICAL SWEEPING AND VACUUMING OF THE SURFACE OR OTHER ACCEPTABLE METHOD APPROVED BY THE ENGINEER OR PERFORM AN IN-PLACE INFILTRATION TEST IN ACCORDANCE TO ASTM C 1701 TO DETERMINE THE NEED FOR MAINTENANCE.



LEGEND:

1. 6" PERVIOUS CONCRETE FOR PARKING LOT
2. 18" #57 BALLAST STONE ROCK @ 95% MAX. DENSITY
3. 6" STABILIZED SUBGRADE @ 92% ± 2% MAX. DENSITY
4. +/– 2" KBI FLEXIPAVE HD-2000 REDWOOD RECY. RUBBER
5. 4" #57 BALLAST STONE ROCK @ 95% MAX. DENSITY
6. 4" STABILIZED SUBGRADE @ 98% MAX. DENSITY

NOTE:
CONTRACTOR TO COMPLY WITH THE FDOT INDICES OF THE "ROADWAY AND TRAFFIC DESIGN STANDARDS", JANUARY 2014 EDITION.

REVISIONS		
No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST.
COCONUT CREEK, FL

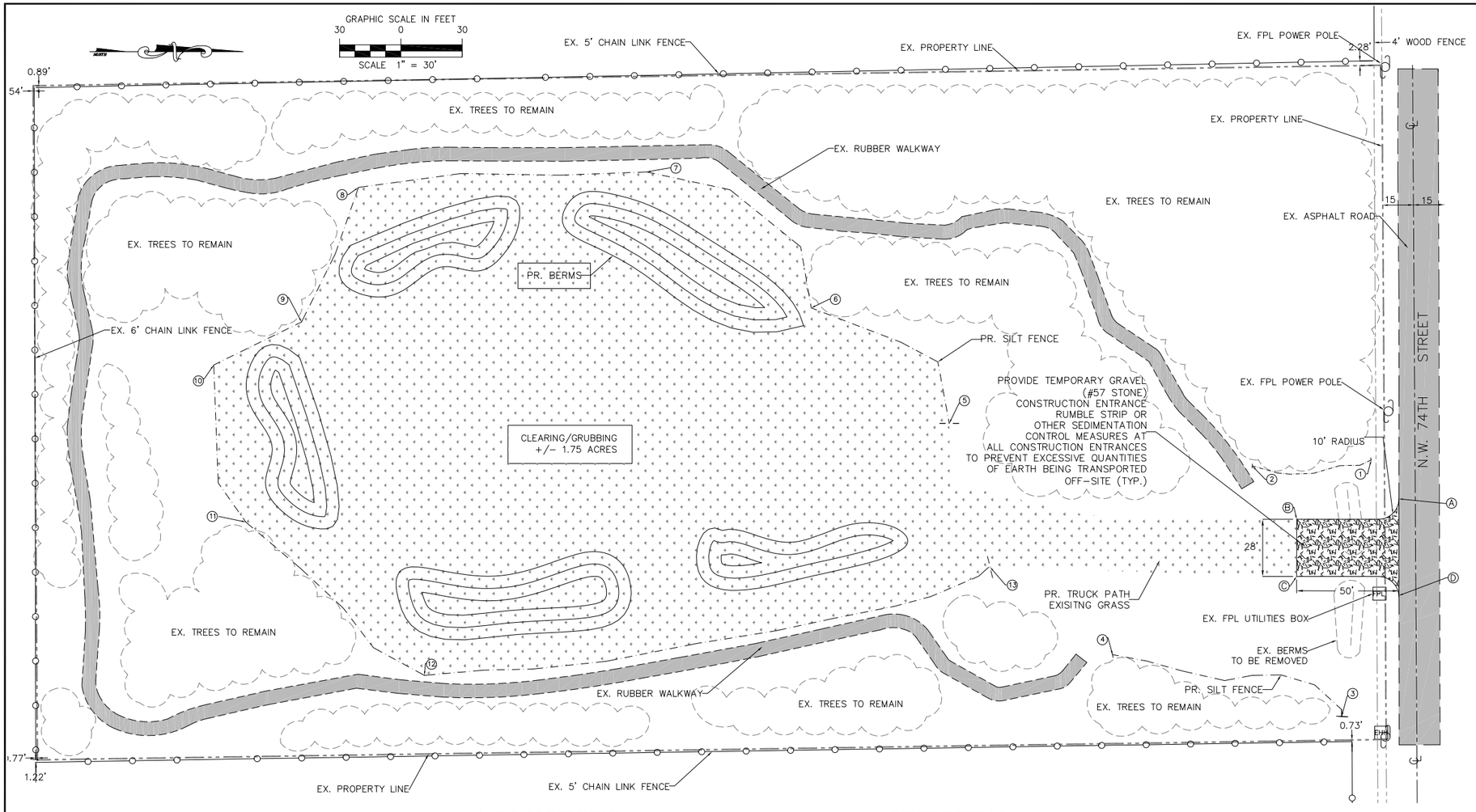
CROSS SECTION DETAILS

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

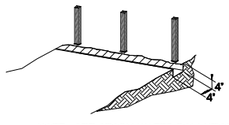
CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 – Fax. (954) 239-4331

DATE: MAY 16, 2014
PROJECT NO: CNK-1015
DESIGNED BY: R.F.M.
DRAWN BY: R.F.M.
CHECKED BY: M.A.F.

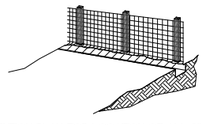
SHEET C-8



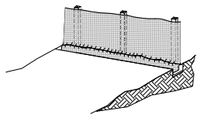
1. SET POSTS AND EXCAVATE A 4"x4" TRENCH UPSLOPE ALONG THE LINE OF POSTS.



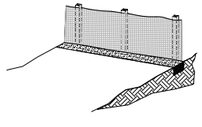
2. STAPLE WIRE FENCING TO THE POSTS.



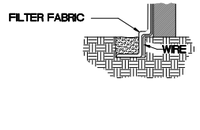
3. ATTACH THE FILTER FABRIC TO THE WIRE FENCE AND EXTEND IT INTO THE TRENCH.



4. BACK FILL AND COMPACT THE EXCAVATED SOIL.



EXTENSION OF FABRIC AND WIRE INTO THE TRENCH.



NOTE: SEE STORM WATER POLLUTION PREVENTION PLAN FOR LOCATION OF ALL SILT FENCE.

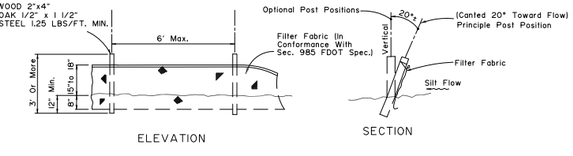
SILT FENCE CONSTRUCTION DETAILS

NTS

GRAVEL ENTRANCE HORIZONTAL CONTROL	
POINT NAME	NORTHING/EASTING
Ⓐ	N 723993.81 E 924511.27
Ⓑ	N 723943.86 E 924520.37
Ⓒ	N 723943.86 E 924548.37
Ⓓ	N 723993.85 E 924558.30

SILT FENCE HORIZONTAL CONTROL		
POINT NAME	NORTHING/EASTING	
①	N 723980.26	E 924494.53
②	N 723922.07	E 924497.33
③	N 723965.81	E 924619.94
④	N 723853.66	E 924589.67
⑤	N 723773.79	E 924476.49
⑥	N 723768.23	E 924446.40
⑦	N 723625.75	E 924353.42
⑧	N 723484.73	E 924360.97
⑨	N 723456.87	E 924426.87
⑩	N 723413.93	E 924447.89
⑪	N 723429.58	E 924524.77
⑫	N 723516.99	E 924599.82
⑬	N 723793.75	E 924546.80

POST OPTIONS: WOOD 2"x4" OAK 1/2" x 1 1/2" STEEL 1.25 LBS/FT. MIN.



NOTE: SILT FENCE TO BE PAID FOR UNDER THE CONTRACT UNIT PRICE FOR STAKED SILT FENCE (LF).

FDOT TYPE III SILT FENCE

N.T.S.

SILT FENCE NOTES

1. SILT FENCE SHALL BE IN PLACE PRIOR TO GRADING.
2. SILT FENCE AND FILTER FABRIC MUST BE ENTRENCHED.
3. POSTS FOR SILT FENCES SHALL BE EITHER 2 X 4 INCH DIAMETER WOOD OR 1.25 POUNDS PER LINEAR FOOT STEEL WITH A MINIMUM LENGTH OF 5 FEET. STEEL POSTS SHALL HAVE PROJECTIONS FOR FASTENING WIRE TO THEM.
4. WIRE FENCE REINFORCEMENT FOR SILT FENCES USING STANDARD STRENGTH FILTER CLOTH SHALL BE A MINIMUM OF 42 INCHES IN HEIGHT, A MINIMUM OF 14 GAUGE AND SHALL HAVE A MAXIMUM MESH SPACING OF 6 INCHES.
5. POSTS SHALL BE SPACED A MAXIMUM OF 10 FEET APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND (MIN. OF 12 INCHES) WHEN EXTRA STRENGTH FABRIC IS USED. WITHOUT THE WIRE SUPPORT FENCE, POSTS SHALL NOT EXCEED 8 FEET.
6. WHEN EXTRA STRENGTH FILTER FABRIC AND CLOSER POST SPACINGS ARE USED, THE WIRE MESH SUPPORT FENCE MAY BE ELIMINATED. IN SUCH A CASE, THE FILTER FABRIC IS STAPLED OR WIRED DIRECTLY TO THE POST.
7. SEDIMENT MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
8. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE PROPOSED AND EXISTING GRADES, PREPARED AND SEEDED OR SODDED.
9. UNDER NO CIRCUMSTANCES SHALL SILT FENCE BE CONSTRUCTED IN LIVE STREAMS.
10. SILT FENCE SHALL BE REMOVED UPON COMPLETION OF THE PROJECT OR AT A TIME DIRECTED BY THE OWNER. IF THE OWNER FEELS IT IS NECESSARY FOR THE SILT FENCE TO REMAIN IN PLACE FOR SOME GIVEN TIME AFTER CONSTRUCTION IS COMPLETE, THE CONTRACTOR SHALL LEAVE IT IN PLACE, IN THE PROPERLY INSTALLED WAY, AND WILL AT THE DIRECTION OF THE OWNER, REMOVE IT AT NO ADDITIONAL COST TO THE OWNER WHEN THE OWNER DEEMS IT APPROPRIATE.

1. EROSION AND SEDIMENT CONTROL SYSTEM
   A.) DURING CONSTRUCTION, THE CONTRACTOR WILL PROVIDE TEMPORARY SEEDING AND/OR MULCHING FOR AREAS WHICH HAVE BEEN CLEARED AND NOT REWORKED WITHIN FOURTEEN (14) CALENDAR DAYS. THE ENTIRE DISTURBED AREAS WILL BE GRADED, SODDED AND/OR SEEDED UPON COMPLETION. THE COST OF TEMPORARY SEEDING, WATERING AND MULCHING WILL BE PAID UNDER THE SODDING PAY ITEM NUMBER.
   B.) FENCING SHALL BE USED THROUGHOUT THE PROJECT'S LENGTH; SILT FENCING LOCATION WILL BE VERIFIED BY THE PROJECT ENGINEER.
   C.) TEMPORARY EROSION CONTROL DEVICES ARE SHOWN WITHIN THE PLANS AND ARE QUANTIFIED BELOW:
   STAKED SILT FENCE (LF) = +/- 1150 LF (SEE C-2)
   THE DEVICES ITEMIZED ABOVE WILL BE IMPLEMENTED ACCORDING TO THIS NARRATIVE, THE TECHNICAL SPECIFICATIONS, AND THE PLANS.
   D.) ADDITIONAL SEDIMENTATION AND EROSION CONTROL DEVICES MAY BE UTILIZED AS DEEMED NECESSARY BY THE FIELD ENGINEER. ADDITIONAL DEVICES WILL BE AN INCIDENTAL COST INCURRED BY THE CONTRACTOR.
2. OTHER CONTROLS
   A.) WASTE DISPOSAL: THE CONTRACTOR SHALL PROVIDE LITTER CONTROL AND COLLECTION WITHIN THE CONSTRUCTION BOUNDARIES DURING THE DURATION OF CONSTRUCTION ACTIVITY. ALL FERTILIZER, HYDROCARBONS, OR OTHER HAZARDOUS MATERIALS UTILIZED DURING CONSTRUCTION SHALL BE DISPOSED OF BY THE CONTRACTOR ACCORDING TO LOCAL, STATE AND FEDERAL (EPA) STANDARD PRACTICES AS DETAILED BY THE MANUFACTURER.
   B.) SANITARY WASTE: THIS PROJECT CAN BE CLASSIFIED AS BEING A "RURAL" AREA. THE CONTRACTOR'S FIELD OFFICE WILL REQUIRE PERMITS FOR SEWAGE TREATMENT IN ACCORDANCE WITH FAC 64E-6, "STANDARDS FOR ON-SITE SEWAGE DISPOSAL SYSTEMS." PORTABLE UNITS PROVIDED BY THE CONTRACTOR WILL BE SERVICED BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR A MINIMUM OF THREE TIMES PER WEEK.
   C.) NON-STORMWATER CONTAMINANTS: IF CONTAMINATED SOILS AND/OR GROUNDWATER IS ENCOUNTERED DURING EXCAVATION, THE CONTRACTOR WILL NOTIFY THE FIELD ENGINEER IMMEDIATELY.
3. MAINTENANCE OF EROSION AND SEDIMENT CONTROLS
   A.) THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAILY INSPECTION AND MAINTENANCE OF ALL CONTROL DEVICES THROUGHOUT THE CONSTRUCTION PHASING. MAINTENANCE SHALL BE CONDUCTED IN ACCORDANCE WITH "FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (2014)" SECTION 104, AND "FDOT ROADWAY AND TRAFFIC DESIGN STANDARDS (2014 OR LATEST EDITION)" STANDARD INDICES 100 - 106.
   B.) ALL DEVICES WILL BE MAINTAINED IN GOOD WORKING ORDER; IF REPAIR IS NECESSARY, IT WILL BE COMPLETED WITHIN 24 HOURS OF REPORT.
   C.) BUILT UP SEDIMENT SHALL BE REMOVED FROM THE STAKED SILT FENCE AND HAY BALES WHEN IT REACHES ONE-THIRD THE FENCE HEIGHT.
   D.) STAKED SILT FENCING WILL BE INSPECTED FOR DEPTH OF SEDIMENT, TEARS IN FABRIC, TO DETERMINE IF FABRIC IS SECURELY ATTACHED TO THE FENCE POSTS, AND TO DETERMINE IF THE FENCE POSTS ARE HAMMERED FIRMLY INTO THE GROUND.
4. INSPECTION
   THE FIELD ENGINEER SHALL BE RESPONSIBLE FOR COMPLETING THE WEEKLY INSPECTION REPORTS AND SUBMISSION OF THE REPORTS TO THE DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) ON A MONTHLY BASIS. INSPECTION WILL BE CONDUCTED AND RECORDED AFTER RAINFALL EVENTS GREATER THAN 0.25 INCHES.
5. PERMITS
   -SFWMD CONSUMPTIVE WATER USE PERMIT NO. 06-06891-W
   -BROWARD COUNTY ERP PERMIT NO. 06-0055I-S
   -BROWARD COUNTY SURFACE WATER MANAGEMENT LICENSE NO. GL2014-016
6. CONTRACTOR SHALL BE THE RESPONSIBLE ENTITY ON SITE TO MAINTAIN THE CONDITIONS OF EROSION CONTROL AS PER THE PLANS AND FDEP NOTICE OF INTENT (NOI) NO. FLRIONS63

REVISIONS		
No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST. COCONUT CREEK, FL

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 - Fax. (954) 239-4331

DATE: MAY 16, 2014
PROJECT NO: CNK-1015
DESIGNED BY: R.F.M.
DRAWN BY: R.F.M.
CHECKED BY: M.A.F.

SHEET C-9

CITY OF COCONUT CREEK PASSIVE PARK SPECIFICATIONS

SINGLE CENTRIFUGAL PUMP SYSTEM
CLOCK START

PURPOSE:
TO PROVIDE A COMPLETE PREFABRICATED SKID MOUNTED CLOCK START CENTRIFUGAL PUMP SYSTEM FROM A SOLE SOURCE COMPANY, HEREIN AFTER REFERRED TO AS THE "MANUFACTURER", WHOSE PRIMARY BUSINESS IS THE MANUFACTURE OF PREFABRICATED PUMP SYSTEMS.
THE MANUFACTURER WILL MANUFACTURE, FLOW TEST, INSTALL AND WARRANT THE SYSTEM TO MEET ALL SPECIFIED OPERATING REQUIREMENTS DESCRIBED BELOW AND IN THE SYSTEM DETAIL.
THE SYSTEM SHALL BE A MODEL HCF-10CS-230/3-D,E-12,W,Z AS MANUFACTURED BY HOOVER PUMPING SYSTEMS OF POMPANO BEACH, FLORIDA USA 954-971-7350 SPECIFIED BELOW AND SHOWN ON THE PLAN DETAILS. THIS SPECIFICATION DESCRIBES THE GENERAL COMPONENTS AND MINIMAL OPERATING REQUIREMENTS AND SHALL NOT BE CONSTRUED AS A MANUFACTURING GUIDE OR COMPLETE LIST OF REQUIRED SYSTEM COMPONENTS AND APPURTENANCES.
THE CONTRACTOR SHALL SUBMIT SEVEN (7) COMPLETE COPIES OF THE SHOP DRAWINGS TO THE DESIGNER FOR APPROVAL, PRIOR TO SYSTEM ORDER PLACEMENT. THE SUBMITTAL SHALL CONTAIN CUT SHEETS FOR ALL SYSTEM COMPONENTS. TO BE CONSIDERED AN EQUAL, THE CONTRACTOR MUST SUBMIT THE FOLLOWING 12 DAYS PRIOR TO BID OPENING: MANUFACTURER BROCHURE SHOWING PREFABRICATED PUMP SYSTEMS MANUFACTURING IS THE PRIMARY BUSINESS OF THE MANUFACTURER OR DIVISION PROPOSED TO MANUFACTURE THE SYSTEM, WRITTEN SPECIFICATIONS, DIMENSIONED LAYOUT DETAIL, ELECTRICAL SCHEMATIC, PRODUCT SHEETS FOR ALL MAIN COMPONENTS, UNDERWRITERS LABORATORIES, INC. 508A "INDUSTRIAL CONTROL PANELS" AND QCZJ "PACKAGED PUMPING SYSTEMS" MANUFACTURER'S CERTIFICATION NUMBERS, LIST OF 6 PROJECTS WITH SIMILAR OPERATING SYSTEMS WITH CURRENT NAME AND PHONE NUMBER OF PERSON RESPONSIBLE FOR SYSTEM OPERATION, MANUFACTURER'S INSURANCE CERTIFICATE FOR GENERAL LIABILITY SHOWING MINIMUM COVERAGE OF $1 MILLION, AND WRITTEN CERTIFICATION FROM THE MANUFACTURER STATING THE PROPOSED SYSTEM MEETS ALL REQUIREMENTS DESCRIBED IN THIS SPECIFICATION, THE DETAIL AND THE BID DOCUMENTS. IF THE DATA SUBMITTED IS DETERMINED TO BE AN EQUAL BY THE DESIGNER THE BIDDER WILL BE NOTIFIED PRIOR TO THE BID DATE.

FIBERGLASS ENCLOSURE:
THE PUMP STATION SHALL BE PROTECTED BY A FIBERGLASS ENCLOSURE WITH CHEMICAL AND ULTRAVIOLET RESISTANT OPEN MOLD RESIN WITH EXTERIOR FINISH THAT IS UNIFORM IN COLOR AND TEXTURE, REINFORCED WITH FIBERGLASS AND STIFFENERS FOR RIGIDITY. THE ENCLOSURE SHALL OPEN CLEAR OF THE EQUIPMENT FOR EASE OF SERVICE WITH THE AID OF GAS FILLED STRUTS, A STAINLESS STEEL HINGE AND LATCHING LOCKABLE HANDLE. THE ENCLOSURE SHALL BE OF DIMENSIONS ADEQUATE TO CONTAIN THE PUMP SYSTEM MOUNTED ON THE SKID AS SHOWN ON THE SYSTEM DETAIL.

MOUNTING ASSEMBLY:
THE PUMP STATION SHALL BE MOUNTED ON A PREFABRICATED ALUMINUM OR HOT DIPPED GALVANIZED SKID. PEDESTALS SHALL BE PROVIDED TO MOUNT THE PUMP MOTOR AND CONTROL PANEL ASSEMBLIES. THE ENTIRE STATION SHALL BE INSTALLED ON A REINFORCED CONCRETE SLAB SIZED AS NOTED ON THE SYSTEM DETAIL.

PUMP AND MOTOR:
THE PUMP SHALL BE A SINGLE-STAGE END-SUCTION CENTRIFUGAL TYPE, WITH THE LIQUID END MOUNTED DIRECTLY TO THE MOTOR ENCLOSURE TO ALLOW REAR PULL OUT OF THE ENTIRE MOTOR. A PRESSURE SENSOR FOR LOSS OF PRIME PROTECTION SHALL BE MOUNTED INTO THE PUMP VOLUTE.
THE SYSTEM WILL BE DESIGNED FOR OPERATION AT 3,450 RPM. THE PUMP DRIVING MOTOR SHALL BE OF THE SQUIRREL CAGE INDUCTION TYPE. THE MOTOR SHALL BE SUITABLE FOR FULL VOLTAGE STARTING AT 60 HZ. THE MOTOR ENCLOSURE SHALL BE TOTALLY ENCLOSED FAN COOLED.
THE MAIN MOTOR SHALL BE RATED AT 10 HP AT 60 HZ. MOTOR WILL NOT EXCEED 10HP WHEN ONLY SINGLE PHASE ELECTRIC SERVICE IS AVAILABLE.

PUMP STATION PERFORMANCE:
THE REQUIRED PUMP PERFORMANCE WITH A MAXIMUM OF 12 FT. OF SUCTION LIFT IS AS FOLLOWS:
A) DISCHARGE PRESSURE OF 65 PSI,
B) MAXIMUM REQUIRED FLOW OF 110 GPM
C) MINIMUM REQUIRED FLOW OF 35 GPM.

IRRIGATION PUMP CONTROL PANEL:
THE CONTROL PANEL ASSEMBLY SHALL BE UNDERWRITERS LABORATORIES LISTED IN ACCORDANCE WITH SECTION 508A FOR "ENCLOSED INDUSTRIAL CONTROL PANELS." ALL CONTROL DEVICES AND ELECTRONIC AUTO-SENSORY CIRCUITRY SHALL BE HOUSED IN A SELF-CONTAINED WEATHER-RESISTANT NEMA 4 OR 4X CONTROL CABINET. AN ELECTRICAL SCHEMATIC SHALL BE PERMANENTLY MOUNTED INSIDE THE CABINET. THE CONTROL CABINET SHALL CONTAIN THE FOLLOWING PROTECTION AND CONTROL EQUIPMENT:

OPERATION:
THE STATION OPERATES AS A CLOCK START, CLOCK RETIREMENT SYSTEM. SYSTEM FEATURES INCLUDE LOSS OF PRIME AND NO FLOW PROTECTION. THE SYSTEM IS EQUIPPED WITH 'LOSS OF PRIMED' AND 'NO FLOW' INDICATOR LIGHTS, AND A 'HAND-OFF/RESET-AUTO' (H-O-A) SELECTOR SWITCH. THE SELF-DIAGNOSTIC CONTROL PANEL ASSEMBLY INCLUDES LED STATUS INDICATOR LIGHTS FOR POWER FAILURE, NO FLOW, LOSS OF PRIME, AND PUMP RUN. PUMP CLOCK START RELAY, AND AUXILIARY CONTACTS ARE PROVIDED.

CLOCK START:
THE PUMP STARTS WHEN THE IRRIGATION CONTROLLER (CLOCK) BEGINS A WATERING SEQUENCE.

CLOCK RETIREMENT:
THE PUMP SHUTS OFF WHEN THE CLOCK COMPLETES A WATERING SEQUENCE.

LOSS OF PRIME PROTECTION:
IF THE PRESSURE IN THE PUMP VOLUTE FALLS BELOW 20 PSI FOR 45 SECONDS DURING PUMP OPERATION, THE PUMP WILL SHUT OFF AND THE 'LOSS OF PRIME' LIGHT WILL TURN ON.
THE SYSTEM WILL REMAIN OFF UNTIL MANUALLY RESET WITH THE H-O-A SELECTOR SWITCH.

NO FLOW PROTECTION:
IF NO FLOW IS DETECTED FOR 60 SECONDS DURING PUMP OPERATION, THE PUMP WILL SHUT OFF AND THE 'NO FLOW' LIGHT WILL TURN ON. THE PUMP WILL REMAIN OFF FOR 12 MINUTES AND THEN WILL RESTART. THE 'NO FLOW' LIGHT WILL REMAIN ON UNTIL MANUALLY RESET WITH THE H-O-A SELECTOR SWITCH TO NOTIFY THE IRRIGATION MAINTENANCE PERSONNEL OF POTENTIAL FIELD VALVE FAILURE.

HAND-OFF/RESET-AUTO SWITCH:
THE STATION IS EQUIPPED WITH AN H-O-A SELECTOR SWITCH, WHICH OPERATES AS FOLLOWS:
POSITION FUNCTION

HAND – MANUAL PUMP START. THIS POSITION OVERRIDES ALL PROTECTIVE FEATURES AND START CONTROLS.
OFF/RESET – PUMP WILL NOT RUN. THIS POSITION RESETS ALL ALARMS.
AUTO – PUMP WILL START AUTOMATICALLY. IN THIS POSITION, ALL START CONTROLS AND PROTECTIVE FEATURES ARE ACTIVE.
PROTECTION EQUIPMENT
- FRONT OPERATED MAIN POWER DISCONNECT
- TIME DELAYED MOTOR STARTER FUSES FOR MOTOR SHORT CIRCUIT PROTECTION
- FULL VOLTAGE CLASS 10 IEC MOTOR STARTER
- METAL OXIDE VARISTORS (MOV) FOR TRANSIENT VOLTAGE SUPPRESSION PER PHASE
- FUSED CONTROL CIRCUITRY WITH BLOWN FUSE LIGHTED INDICATOR FOR EACH CIRCUIT

PENETRATION STANDARD REQUIREMENTS:
ALL CONTROL PANEL PENETRATIONS SHALL BE PERFORMED BY A LICENSED ELECTRICIAN TO MINIMUM NEMA 4X REQUIREMENTS, AND COMPLIANT WITH INTERNATIONAL ELECTROTECHNICAL COMMISSIONS (IEC) IP56 RATING

UNDER ITS IP CODE, TO PROTECT AGAINST DUST INGRESSION AND AGAINST ANY HARMFUL EFFECTS FROM WATER PROJECTED IN POWERFUL JETS FROM ANY DIRECTION AND PROTECTION AGAINST CORROSION.

DISCHARGE PIPE MANIFOLD:
THE PIPE DISCHARGE MANIFOLD SHALL BE CONSTRUCTED OF GALVANIZED STEEL PIPE WITH GALVANIZED ROLL GROOVE FITTINGS. A FLOW-SWITCH, PRESSURE GAUGE AND HOSE BIB WILL BE PROVIDED ON THE STATION DISCHARGE. A WAFER TYPE BUTTERFLY VALVE WILL BE PROVIDED AT PUMP STATION DISCHARGE.

FLOW SENSOR:
THE FLOW SENSOR SHALL BE A DATA INDUSTRIAL MODEL 220B BRASS INSERTION TYPE INSTALLED AS SHOWN IN THE SYSTEM DETAILS. INSTALL FLOW SENSOR 10 PIPE DIAMETERS DOWNSTREAM AND 5 DIAMETERS UPSTREAM OF ANY FITTINGS AND CONNECT TO RAIN BIRD CONTROLLER.

SUCTION LINE:
THE MINIMUM SIZE SUCTION LINE SHALL BE 3" DIAMETER OR LARGER AS REQUIRED FOR A MAXIMUM OF 5 FEET PER SECOND VELOCITY FLOW. IF A REDUCING FITTING IS REQUIRED AT THE PUMP SUCTION, AN ECCENTRIC REDUCER SHALL BE INSTALLED. ANY ABOVE GROUND PIPE AT THE PUMP SYSTEM EXPOSED TO SUNLIGHT SHALL BE SCHEDULE 40 GALVANIZED STEEL WITH GALVANIZED ROLL GROOVE FITTINGS

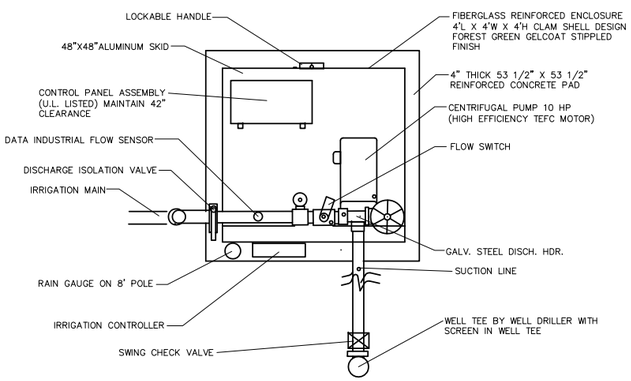
IRRIGATION CONTROLLER:
A RAIN BIRD ESP-SITE-W MODEL 12 STATION IRRIGATION CONTROLLER CONNECTED TO RAIN BIRD RAIN GAUGE, PULSE TRANSMITTER AND FLOW SENSOR. THE CONTROLLER SHALL BE POWERED FROM A FUSE BLOCK IN THE PUMP SYSTEM CONTROL PANEL.

WARRANTIES:
PRIOR TO SHIPPING, THE MANUFACTURER SHALL FLOW TEST THE SYSTEM AND SUBMIT A CERTIFIED REPORT TO THE DESIGNER STATING THE SYSTEM IS WITHIN +/- 1% OF THE SPECIFIED FLOW RATE AND PRESSURE, AND MEETS THE OPERATIONAL REQUIREMENTS.
THE MANUFACTURER OF THE PUMPING STATION SHALL WARRANT ALL COMPONENTS FOR A PERIOD OF ONE (1) YEAR FROM DATE OF MANUFACTURE.
PN12866

NOTE: SUCTION PIPES AND FITTINGS SHALL BE GALVANIZED STEEL. CHECK VALVE 3" AND LARGER SHALL BE SWING TYPE, 2" AND SMALLER SHALL BE POPPET STYLE. ALL EXPOSED SUCTION & DISCHARGE PIPE ADJACENT TO THE PUMP SYSTEM SHALL BE GALVANIZED STEEL. BUTTERFLY OR BALLVALVE PROVIDED AT EACH PUMP. PROVIDE MINIMUM OF 4' CLEARANCE ON ALL SIDES OF PUMP SYSTEMS

* OPTIONAL FEATURES ARE INCLUDED IF MARKED WITH AN "X"
__ PRESSURE CONTROL VALVE
X IRRIGATION CONTROLLER RAIN BIRD ESP SITE-W 12 STATIONS, WITH RAIN BIRD RAIN GAUGE, PULSE TRANSMITTER AND FLOW SENSOR.
__ PRESSURE TANK FOR PRESSURE DEMAND SYSTEMS

SAFETY FEATURES:
CLOCK START:
- -TRANSIENT SURGE
- -LOSS OF PRIME
- -NO FLOW



CITY OF COCONUT CREEK PASSIVE PARK CENTRIFUGAL PUMP SYSTEM DETAIL

NTS

FIBERGLASS ENCLOSED SINGLE WELL SUCTION CLOCK START

HOOVER PUMPING MODEL: HCF-10CS-230/3-D,E-12,W,Z
Pompano Beach, Florida, Tel: 954-971-7350

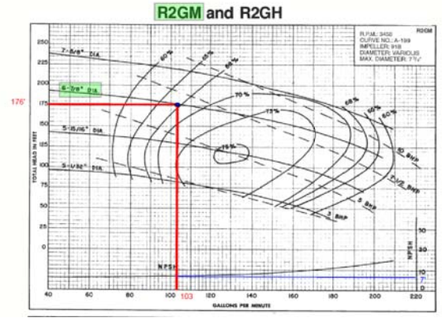
NOTE:
PUMP PERFORMANCE 110 GPM @ 175 TDH
PUMP SHALL BE GRISWOLD MODEL R2GM WITH 6 7/8" DIAMETER BRONZE IMPELLER.

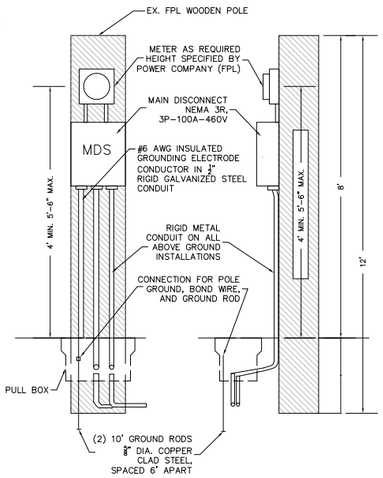
ELECTRIC SERVICE TO BE, IN ORDER OF PREFERENCE:
460V 3-PHASE, 230V CLOSED-DELTA 3-PHASE, 208 WYE 3-PHASE, 230 1-PHASE, 208V 1-PHASE, 230 OPEN-DELTA 3-PHASE.

Griswold Industrial Pumps

CENTRIFUGALS Performance Curve

R2GM and R2GH

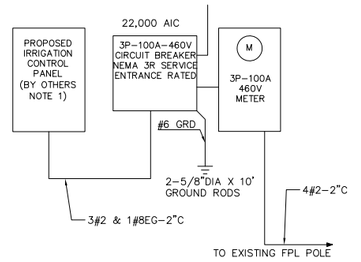




ELECTRICAL EQUIPMENT ELEVATION

NTS

NOTE:
1.) 4' MIN. CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT
2.) ALL MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL.



ELECTRICAL RISER DIAGRAM

NTS

460V, 3 PHASE, 4 WIRE, 60 HERTZ

PUMP DATA

DESCRIPTION	TOTAL HP	TOTAL KVA	TOTAL AMPS
IRRIGATION PUMP	10	15	48.3

CURRENT SERVICE CALCULATION
(48.3A X 1.25) = 60.4A
100A MAIN BREAKER IS ADEQUATE

ELECTRICAL NOTES:

1. CONTRACTOR SHALL COORDINATE EXACT LOCATION OF CONTROL PANEL AND INSTALL CONDUIT AND WIRING AS NECESSARY FOR A COMPLETE WORKING SYSTEM IN PLACE.
2. CONTRACTOR SHALL PROVIDE AND INSTALL CONDUIT AND WIRING AS NECESSARY FOR A COMPLETE WORKING SYSTEM IN PLACE. CONTRACTOR SHALL VISIT THE SITE AND INCLUDE IN BID ALL TRENCHING COST OR DIRECTIONAL BORING, BACKFILL, RESODING, REMOVAL OF SLURRY, ETC. FOR THE INSTALLATION.
3. THE INSTALLATION SHALL BE IN ACCORDANCE WITH THE 2011 NATIONAL ELECTRICAL CODE, 2010 FLORIDA BUILDING CODE AND ALL LOCAL CODES.
4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, INSPECTIONS AND APPROVALS INCLUDING ALL FEES AS PART OF HIS BID IF NOT OTHERWISE NOTED. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH FP&L'S ENGINEER(S) AND OWNER
   FP&L CONTACT: ARNOLD JANSSEN-COLINA (954)956-2028
   Arnoldjanssen.Colina@fpl.com

REVISIONS

No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST.
COCONUT CREEK, FL

HOOVER PUMP DETAILS

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
Consulting Engineers and Planners
Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 – Fax. (954) 239-4331

DATE: MAY 16, 2014
PROJECT NO: CNK-1015
DESIGNED BY: R.F.M.
DRAWN BY: R.F.M.
CHECKED BY: M.A.F.

SHEET C-10

LANDSCAPING NOTES:

1. LANDSCAPE: INSTALLATION OF PLANT MATERIAL SHALL BE PERFORMED BY A CONTRACTOR CERTIFIED BY THE FLORIDA NURSERYMEN, GROWERS AND LANDSCAPE ASSOCIATION (FNGLA) AS A CERTIFIED LANDSCAPE CONTRACTOR. ANY PRUNING ACTIVITIES OF TREES AND/OR PALMS SHALL BE SUPERVISED BY A CERTIFIED ARBORIST, AS CERTIFIED BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA) AND LICENSED IN BROWARD COUNTY.

2. SOIL:
   A.) FOR TREES AND SHRUBS AND GROUNDCOVER BEDS: PROVIDE A MIX CONSISTING OF 50% SAND/40% MUCK/10% PEAT FOR THE PLANTING SOIL MIX.
   B.) FOR PALMS: PROVIDE A CONSISTENT MIX OF 70% SAND/30% MUCK FOR THE PLANTING SOIL.
   C.) FOR SOD AREA: PROVIDE 6" TO 12" VENEER/LAYER OF SOIL CONSISTING OF 70% SAND/30% PEAT MIX.

3. MULCH: A CONSISTENT 3" LAYER OF SHREDDED GRADE A MULCH OR BETTER SHALL BE SPREAD OVER ALL PLANTING BEDS. ALL MULCH BEDS SHALL EXTEND TO BEDLINE SHOWN ON PLANS. CONTRACTOR TO SUBMIT SAMPLE OF MULCH TO CITY FOR ACCEPTANCE.

4. FERTILIZATION:
   A.) ACTOR SHALL PROVIDE A MINIMUM, ONE (1) APPLICATION AT TIME OF PLANTING. A SCHEDULE OF FERTILIZATION BASED UPON THE MANUFACTURERS RECOMMENDED RATES SHALL BE SUBMITTED BY THE CONTRACTOR AT THE PRE-CONSTRUCTION MEETING.
   B.) AT TIME OF PLANTING: FERTILIZE WITH PLANTING TABLETS 20-10-5 PLUS MINORS. DO NOT PLACE TABLETS IN BOTTOM OF HOLE; TABLETS SHALL BE $\frac{1}{3}$ FROM THE BOTTOM OF THE ROOTBALL.
   C.) ESTABLISHMENT PERIOD OF PLANT MATERIAL: FERTILIZER FOR DICOT TREES, SHRUBS AND GROUND COVERS SHALL BE OF 6% NITROGEN, 6% PHOSPHOROUS, 6% POTASSIUM WITH MINOR ELEMENT COMPOSITION ANALYSIS. CONTRACTOR SHALL APPLY GRANULAR FERTILIZER AT THE MANUFACTURERS RECOMMENDED RATES. CONTRACTOR RESERVES THE RIGHT TO MODIFY THE N-P-K RATIO AND SHALL SUBMIT PRODUCT DATA SHEETS FOR REVIEW AND ACCEPTANCE PRIOR TO ANY INSTALLATION OF PLANT MATERIAL CONSISTENT WITH THE ABOVE CRITERIA.

5. WATERING: AT A MINIMUM THE CONTRACTOR SHALL PROVIDE THE FOLLOWING RECOMMENDED WATERING SCHEDULE BEGINNING IMMEDIATELY AFTER INSTALLATION OF PLANT MATERIAL. AT THE CONSTRUCTION MEETING, THE CONTRACTOR SHALL SUBMIT A WATERING SCHEDULE BASED UPON THE FOLLOWING RECOMMENDED RATES: ALL WATERING APPLICATIONS REQUIRED DURING PLANT ESTABLISHMENT PERIOD AND WARRANTY PERIOD AND ITS SOURCE SHALL BE INCLUDED AS PART OF THE UNIT PRICE FOR EACH PLANT MATERIAL. CONTRACTOR SHALL ADJUST WATERING SCHEDULE DURING HEAVY RAIN SEASON UPON APPROVAL BY ENGINEER.

6. WARRANTY: INSTALL, ESTABLISH, AND MAINTAIN LANDSCAPING AS INDICATED IN THE CONSTRUCTION DOCUMENTS. TAKE RESPONSIBILITY FOR THE PROPER MAINTENANCE, SURVIVAL AND CONDITION OF ALL PLANTS FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE IN ACCORDANCE WITH FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION SECTION 580.

7. REPLACEMENT MATERIAL: SHALL BE SUBJECT TO ALL REQUIREMENTS OF THE FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION SECTION 580.

8. MAINTENANCE CARE: EXISTING PLANTS TO REMAIN WITHIN PROJECT LIMITS ARE TO BE MAINTAINED DURING THE CONSTRUCTION PERIOD UNTIL FINAL PROJECT ACCEPTANCE. KEEP EXISTING PLANTS WATERED, FERTILIZED, MULCHED, FREE OF UNDESIRABLE WEEDS, PRUNED, TREATED FOR PESTS AND DISEASES AS NECESSARY TO ASSURE THAT THE EXISTING PLANTS ARE MAINTAINED SO THAT THEY ARE HEALTHY AND VIGOROUS.

9. NO PLANT MATERIAL WILL BE ACCEPTED SHOWING EVIDENCE OF CABLE, CHAIN MARKS, EQUIPMENT SCARS, OR WHEN THE BALL OF EARTH SURROUNDING ITS ROOTS HAS BEEN CRACKED, BROKEN, OR OTHERWISE DAMAGED.

ENVIRONMENTAL GENERAL NOTES:

1. THE CONTRACTOR SHALL REVIEW ENVIRONMENTAL REQUIREMENTS OF ANY PROPOSED STAGING AREAS WITH THE CITY AND SUBMIT TO THE CITY AND SUBMIT TO THE FDOT DISTRICT ENVIRONMENTAL PERMITS COORDINATOR AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO USE.

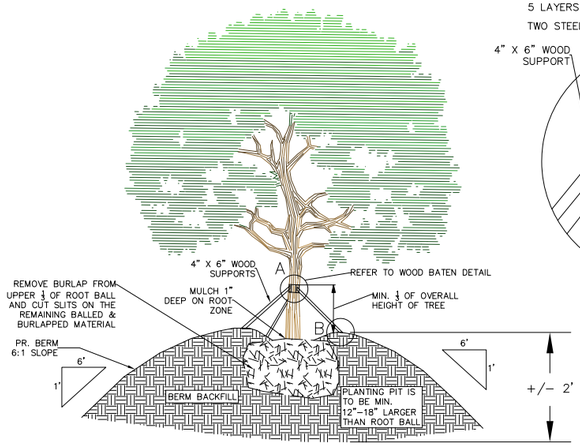
2. CONTRACTOR SHALL SUBMIT TO CITY STORMWATER PREVENTION POLLUTION PROTECTION PLANS (S.W.P.P.P.) TO CITY FOR REVIEW AND SUBMITTAL TO APPROPRIATE AGENCIES WITH COPIES TO FDOT.

3. ANY MATERIAL TO BE STOCKPILED FOR PERIODS GREATER THAN 24 HOURS SHALL BE PROTECTED BY APPROPRIATE EROSION CONTROL DEVICES. NO MATERIAL SHALL BE STOCKPILED BETWEEN SILT FENCES AND WATER BODIES.

4. ALL EXCESS MATERIALS AS DESIGNATED BY THE CITY IS TO BE DISPOSED BY THE CONTRACTOR IN AREAS PROVIDED BY HIM WITHIN 72 HOURS OF BEING DEPOSITED IN THE CONSTRUCTION AREA AND AT THE CONTRACTORS EXPENSE.

5. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING EXISTING AND NEW INLETS CLEAN OF PLANTING SOIL, DEBRIS, ETC. DURING THE CONSTRUCTION AT NO ADDITIONAL COST TO THE CITY. CONTRACTOR SHALL SUBMIT PLAN FOR PROTECTION OF INLETS AND/OR EROSION DURING CONSTRUCTION.

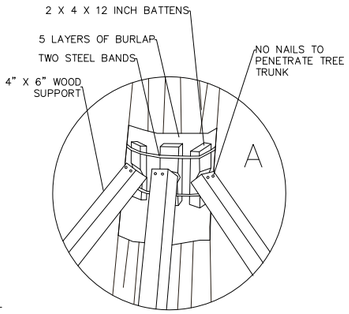
6. IF NECESSARY THE CONTRACTOR SHALL USE A STREET SWEEPER (USING WATER) OR OTHER EQUIPMENT CAPABLE OF CONTROLLING AND REMOVING DIRT OR DUST. APPROVAL OF THE USE OF SUCH EQUIPMENT IS CONTINGENT UPON ITS DEMONSTRATED ABILITY TO DO THE WORK.



TREE PLANTING DETAIL

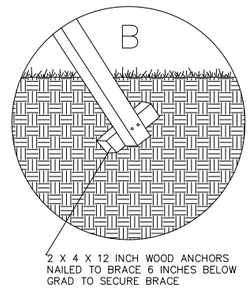
NTS

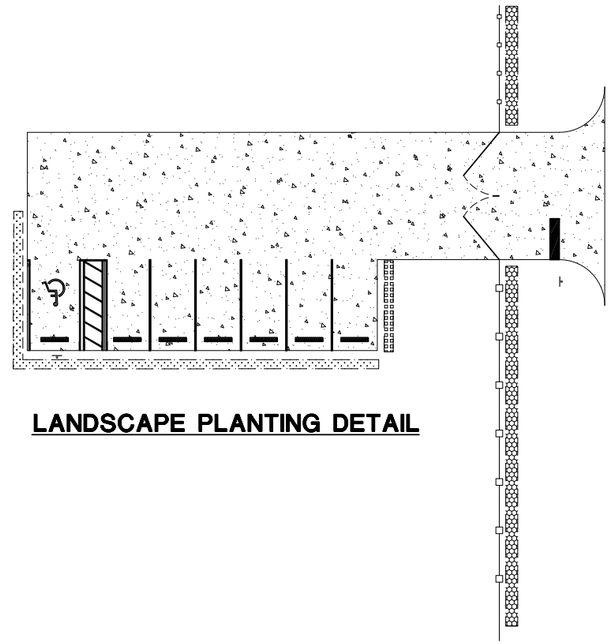
NOTE:
1. SUBMIT SHOP DRAWING OF STAKING/SUPPORT DETAIL.
2. PROVIDE NARRATIVE OF INSTALLATION, STAKING, GUYING CARE OF TREES DURING ESTABLISHMENT PERIOD, AND MAINTENANCE OF TRAFFIC OPERATIONS
3. OPTIONAL TREE ROOTBALL ANCHORING SYSTEM CAN BE SPECIFIED TO SUPPLEMENT BRACING OF TREE.



WOOD BATEN DETAIL

NTS





LANDSCAPE PLANTING DETAIL

3 GAL. FIRE BUSH
2 FT. O.C.
IN MULCH BED

3 GAL. COONTIE
3 FT. O.C.
IN MULCH BED

3 GAL. COCOPLUM
2 FT. O.C.
IN MULCH BED

REVISIONS

No.	Date	Description

PASSIVE PARK AT 4230 NW 74TH ST.
COCONUT CREEK, FL

LANDSCAPE DETAILS

CITY OF COCONUT CREEK, BROWARD COUNTY, FLORIDA

CRJ & Associates, Inc.
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Florida Authorization # 0008245
2699 Stirling Road, Suite B-201, Ft.Lauderdale, Florida 33312
Tel. (954) 239-4330 - Fax. (954) 239-4331

DATE:	MAY 16, 2014
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DRAWN BY:	R.F.M.
CHECKED BY:	M.A.F.

SHEET
C-11