

Mark S. Drummond, P.E., BCEE

President

Education

B.S. – Civil Engineering, Florida
International University, 1996
(Minor in International Relations)

Registration

Professional Engineer: Florida (License
No: 57428)

Professional Engineer: Jamaica
(Registration No: PE/01/0583)

Certified NASSCO PACP, MACP, LACP
Certified SAVE VMA

Mark Drummond is a civil / environmental engineer experienced in water and wastewater treatment process design, water distribution systems, wastewater collection and transmission systems, water reuse systems, hydraulic modeling, water supply projects, horizontal directional drilling design, sanitary sewer evaluation surveys, management consulting, information management systems, and permitting.

MASTERPLANS

Project Engineer, Retail Potable Water and Wastewater Masterplan, Broward County, Florida. This project provided the retail water and wastewater masterplan for Broward County. Mr. Drummond evaluated alternate wastewater treatment and effluent disposal suppliers for certain regions in the County, assisted in the calibration of the water and wastewater hydraulic models, provided growth forecast through the year 2040 to estimate potable water demand and wastewater flows, provided studies to estimate infiltration and inflow, performed a condition assessment for the County's wastewater lift stations, and provided recommendations for future capital improvement and rehabilitation and replacement projects.

Project Engineer, Wastewater Masterplan, Palm Beach County Water Utilities, Florida.

This project provided the wastewater masterplan for Palm Beach County. Mr. Drummond assisted with the analysis of the existing wastewater service area and the evaluation of infiltration and inflow into the wastewater collection system.

Project Engineer, Utility Water and Wastewater Masterplan, City of Riviera Beach, Florida.

This project provided the creation of the initial Water and Wastewater Masterplan for the Riviera Beach Utility District. The Masterplan summarized the existing conditions of the water and wastewater system, created hydraulic models for both the water distribution and wastewater collection systems and prioritized improvements for the water supply, water treatment, water distribution and wastewater collection systems.

Project Engineer, Glades Wastewater Masterplan, Palm Beach County Water Utilities, Florida.

This project provided the creation of the initial Wastewater Masterplan for the municipalities of South Bay, Belle Glade and Pahokee. The Masterplan summarized the existing conditions wastewater system, refined the hydraulic model for wastewater collection systems and prioritized improvements for the wastewater collection and treatment systems. Mr. Drummond assisted in the collection of data for the existing wastewater collection and treatment systems, preparation of sanitary sewer evaluation surveys (SSES), and preparation of the capacity analysis reports for the wastewater treatment plants.

Project Manager, Treasure Cay Water & Wastewater Utility, Abaco, Bahamas. Responsible for the review of existing water, wastewater, and irrigation services and the analysis of the capital improvements needed to bring the utility to an acceptable level of service. This evaluation included hydraulic modeling of the water distribution and wastewater collection

systems, capital and O&M cost analyses, and the preliminary design of a water distribution system, wastewater collection system, and the water and wastewater treatment plants.

WATER SUPPLY

Design Engineer, Winding Bay Water Supply Project, The Abaco Club on Winding Bay, Abaco, Bahamas. This project included the design of a raw water well field, water storage facilities, and hydraulic modeling of the water transmission and distribution system.

Technical Advisor, Value Engineering Floridan Water Supply Wells, Miami Dade Water & Sewer Department, Florida. Mr. Drummond provided value engineering of the Floridan wells, submersible well pumps, piping, and appurtenances for five new Upper Floridan Wells designed by Miami Dade County totaling 4.7 mgd (firm capacity).

Design Engineer, Hobe Sound Polo Club Fire Protection Floridan Water Supply Well, Hobe Sound, Florida. Mr. Drummond provided the design of a Floridan Water Supply Well to supply fire protection for the Hobe Sound Polo Club consisting of polo grounds, horse barns, and large single family homes located on 20-acre lots.

Technical Advisor, 9 MGD Shrimp Farm Seawater Pump Station, Belize Aquaculture Ltd., Belize Central America. Provided technical expertise for the modifications to an existing salt water supply system. The modifications included the upsizing of the existing saltwater pump station, intake structures, and dual 5-mile transmission mains to provide 9 MGD to an inland shrimp farm. The dual 24-inch transmission mains transfer saltwater between the island seawater pump station and two 16-acre reservoirs and includes a 2-mile sub-aqueous saltwater bay crossing of an active waterway.

Project Engineer, Family Islands Water Supply Expansion, The Bahamas Water and Sewerage Corporation, Bahamas. Assisted in the design of water supply wells and distribution systems for the Bahamas Water and Sewer Corporation's potable water system expansion program in the Islands of Abaco, Eleuthera, and Exuma.

WATER TREATMENT

Project Manager, 17.5 MGD Sodium Hypochlorite Disinfection Facility, City of Riviera Beach, Florida. Mr. Drummond is the Engineer of Record for the design of sodium hypochlorite (NaOCl) disinfection facilities for an existing 17.5mgd conventional lime softening Water Treatment Plant. This design entails the conversion of an existing gaseous chlorine disinfection to a sodium hypochlorite and includes new: NaOCl storage and chemical feed facilities; chemical piping, valves and appurtenances; flow meters for measurement of WTP flow and flow pacing of NaOCl chemical injection; re-carbonation system for pH control and new motor control center to consolidate various electrical equipment into the new facility.

Project Manager, 12 MGD Aguadulce Water Treatment Plant, IDAAN, Aguadulce, Panama. This project included the design of a new 12mgd Surface WTP including, surface water intake from the Santa Maria river, raw water transfer pump station, flocculation and coagulation basins, dual media self-backwashing filters, solids handling and backwash recycle water basins, finished water storage and high service pump station to distribute water to remote storage tanks to serve 50 cities/towns through 200km of transmission pipeline.

Project Manager, Packed Tower Aerator Design Evaluation, City of Riviera Beach, Florida.

Mr. Drummond provided the base design criteria required to renovate and provide media replacement of the four packed tower aerators for the 17.5mgd Water Treatment Plant.

Project Manager, WTP Hydraulic Profile Analysis, City of Riviera Beach, Florida.

This project includes the development of a Hydraulic Profile depicting the process flow through the existing WTP and the analysis of the existing WTP hydraulics to identify issues and formulate recommendations for improvements to the existing WTP design and operation.

Project Manager, Preliminary Design of Lime Feed System, City of Riviera Beach, Florida.

This project includes an analysis of the existing lime feed system, recommendations for improvements and the generation of a conceptual lime system improvement plan that defines the design criteria for the recommended improvements.

Project Engineer, West WTP Expansion, Phase II, City of Deerfield, Florida.

Responsible for the design of a 9 MGD blending water treatment train including: lime softening unit, aerators, and associated chemical systems. Other responsibilities included the design of bulk storage tanks, piping, feed pumps, and injection points associated with the chemical systems of a new 10.5 MGD nanofiltration membrane plant.

Design Engineer, Rehabilitation of 16 MGD Water Treatment Plant, City of Lauderhill, Florida.

Responsible for the design of lime sludge systems including vacuum filters, thickeners, and thickened lime transfer pumps; lime chemical feed ejectors; waste lime transfer pumps; and filter backwash pumps. Other responsibilities included the crosscheck of drawings and the writing and editing of specifications for upgrade modifications to the entire treatment plant.

Design Engineer, Preliminary Design for WTP Improvements, City of North Lauderdale, Florida.

Mr. Drummond provided services to prepare a preliminary design for the design-build modifications being provided to the City's 7.5 mgd lime softening water treatment plant.

Project Engineer, Water Supply, Treatment and Distribution System Regulatory Review, City of Riviera Beach, Florida.

This project provided a review of the existing and proposed drinking water regulations as they relate to operation of the City's water treatment and distribution system. A report summarizing existing and proposed drinking water regulations and identifying the City's current and potential near compliance status was provided.

Design Engineer, Evaluation of WTP Disinfection, City of Riviera Beach, Florida.

Mr. Drummond provided the feasibility study to evaluate various alternatives to the existing disinfection system at the City's existing 17.5mgd lime softening water treatment plant.

Design Engineer, 2 MGD Concentrate Pump Station, City of Deerfield Beach, Florida.

Mr. Drummond was responsible for the design of a 12-inch directionally drilled concentrate disposal water main for 2.0-mgd concentrate disposal pump station.

Project Engineer, Norwood-Oeffler Water Treatment Plant Concentrate Deep Injection Well Construction Review Report, City of North Miami Beach, Florida.

This project included the review of technical details for the construction of a concentrate deep injection well and a dual-

zone monitor well. A Construction Review Report was prepared that compared the construction, testing, and performance of the wells to the contract documents.

WATER DISTRIBUTION AND TRANSMISSION SYSTEMS

Project Engineer, Evaluation and Design of Secondary Disinfection Alternatives, City of Riviera Beach, Florida. Provided an evaluation of the existing system conditions and various secondary disinfection alternatives to help alleviate low total chlorine residuals experienced in the remote regions of the City's potable water distribution system and designed a secondary disinfection system at the remote pump stations to enhance the total chlorine residual.

Project Manager, Hillsboro Water Repump Station CaOCl Feed System, City of Coconut Creek, Florida. This project included the design-build of a secondary disinfection system for the City of Coconut Creek's 5 MGD potable water repump station.

Project Manager, Preliminary Hydraulics Evaluation Guaynabo – Gurabo Transmission System, Puerto Rico. This project included the evaluation of existing and proposed water systems for the provision of 40 MGD of water to distributed service areas spanning 40km. The evaluation included hydraulic modeling, surge analysis, site selection, and preliminary design recommendations for storage tanks, a 42-inch 40km transmission main, and rehabilitation and replacement of a 40 MGD pump station.

Design Engineer, Broward County District 2 Potable Water Booster Station, Broward County, Florida. This project included the evaluation of a new in-line 9.7 MGD booster pump station to maintain system pressures. Responsible for the preparation of a technical design memorandum outlining the feasibility of the project, comparing pump station alternatives, and defining the hydraulic design conditions based on the previously performed hydraulic model.

Design Engineer, Repair of 36-inch Water Main, City of Miami Beach, Florida. Responsible for the design of a 450 linear foot directional drill for emergency repair of a 36-inch water main rupture under a major highway.

Technical Advisor, La Placida Fire Flow Review, City of Coral Springs, Florida. Mr. Drummond provided the review of fire flow test calculations and methodologies to show minimum fire flow requirements for the redevelopment of 37 single family homes.

Design Engineer, Downtown Water Main Improvements Phase I City of Dania Beach, Florida. Responsible for the design of a 650 linear foot directional drill of a 14-inch water main under a City canal.

Design Engineer, Military Mains Project, City of Boca Raton, Florida. Responsible for the design of three directionally drilled 16-inch water main crossings totaling approximately 1,100 linear feet.

Design Engineer, Davie Boulevard Water Transmission and Force Main, City of Fort Lauderdale, Florida. Designed 5 miles of 24-inch water main through a highly urbanized and constricted corridor to replace a 75 year old water main and assisted in the design of a 54-inch force main. The design included routing and financial analysis for water mains and existing force mains ranging from 24 to 54-inches, design of a 2,000 foot directional drill

underneath a heavily traveled interstate and waterway, and design of a jack and bore under active railroads.

WASTEWATER TREATMENT

Project Manager, 38 MGD GTL WWTP Influent Bar Screen Rehabilitation Design Build, City of Fort Lauderdale, Florida. Mr. Drummond was the Engineer of Record for the design and permitting of the replacement of influent screening devices at the 38 mgd GTL Wastewater Treatment Plant. The rehabilitation included the design of four (4) new plate screens to replace all existing influent screening devices while keeping the WWTP in continuous operation.

Project Manager, Value Engineering North District Wastewater Treatment Plant Headworks Rehabilitation Project, Miami Dade Water & Sewer Department, Florida. Mr. Drummond provided value engineering for the rehabilitation of the influent screening, primary sludge dewatering, and sludge transfer systems along with the replacement and relocation of the electrical switchgear for the 240-mgd North District Wastewater Treatment Plant.

Design Engineer, 9 MGD Advanced Wastewater Treatment Facility, City of Fort Myers, Florida. Performed the process and hydraulic design of the treatment and pumping systems. This project included the design of a new 9-mgd Advanced Wastewater Treatment Facility (AWWTF) at the City's existing South Wastewater Treatment Plant to enhance the City's reuse water capabilities. The AWWTF included tertiary filtration, disinfection, transfer and high service pump stations, and two 5 MG storage tanks.

Project Manager, Central District WWTP Injection Well Pump Station Surface Facilities Value Engineering, Miami Dade Water & Sewer Department, Florida. Mr. Drummond provided value engineering for the design of the Injection Well Pump Station Surface Facilities for the 143mgd Central District WWTP. The design included the construction of two 19.9mgd Class I Deep Injection Wells and pump station to dispose Leachate from the Virginia Key Landfill and dewatering centrate, digester gas scrubber wastewater and secondary treated effluent from the WWTP.

Design Engineer, Permit Modification North District WWRF, Miami Dade Water & Sewer Department, Florida. Mr. Drummond provided engineering services to prepare and submit a modification to the wastewater operations permit to upgrade the reuse treatment facilities for the North District advanced wastewater treatment facility.

Technical Advisor, WWTP Reform Industrial Park, Lee Young & Partners, Port of Spain, Trinidad. Provided quality review services for all design aspects of the waste water treatment plant (WWTP). This project included the design of sewerage collection system and an activated sludge extended aeration WWTP to serve a 25 lot industrial estate.

Project Engineer, Sawgrass 20-mgd Wastewater Treatment Plant (WWTP), City of Sunrise, Florida Responsibilities included the design of: onsite drainage, lift stations, sodium hypochlorite system, equalization basins and the securing of necessary permits. Assisted in the design of site piping, return activated sludge/waste activated sludge systems, cost estimating, writing and editing specifications, and bid evaluations.

Project Engineer, Springtree 9-mgd Wastewater Treatment Plant (WWTP) Rehabilitation, City of Sunrise, Florida. Assisted in the design and permitting of the 9-mgd Springtree WWTP Rehabilitation.

Project Engineer, Park City Wastewater Treatment Plant (WWTP), City of Sunrise, Florida Responsible for the preparation of the Florida Department of Environmental Protection (FDEP) WWTP permit for the City of Sunrise's Park City WWTP that was located in the Town of Davie.

WASTEWATER COLLECTION AND TRANSMISSION SYSTEMS

Project Manager, LS 10 & 50 Rehabilitation and Replacement, City of Riviera Beach, Florida. Mr. Drummond is the Engineer of Record for the rehabilitation of an existing critical master submersible pump station and the rehabilitation and conversion of an existing 16mgd wet-pit / dry-pit master pump station to an above ground inline booster station.

Project Manager, Preliminary Design of Lift Station No. 47, City of Riviera Beach, Florida. This project includes the generation of a preliminary design report for the rehabilitation and conversion of the existing 9.8mgd submersible master lift station to an above ground inline booster station on constrained project site with limited additional space.

Design Engineer, Master Lift Station 21 Modifications, City of Pompano Beach, Florida. This project included the relocation and design of the City's 6.5 MGD master lift station. Responsible for providing technical expertise on assessing hydraulic design criteria for the master lift station, for the analysis of odor control issues, and for providing overall design quality reviews.

Design Engineer, Wastewater Lift Station Design Upgrades, City of Riviera Beach, Florida. As part of the Utility Water and Wastewater Masterplan, Mr. Drummond performed condition assessments and provided recommendations for the repair and replacement (R&R) of all lift stations within the Utility's service area. As pump replacements are required, Mr. Drummond is re-evaluating hydraulic design conditions to provide new pump selections that increase pump efficiency and reduce O&M issues with the lift stations.

Technical Advisor, Broadview Park Neighborhood Improvement Project, Broward County, Florida. This project included the design of wastewater collection system for a 700 acre mixed-use area. Responsible for training the design team on the use of sanitary sewer hydraulic modeling software, providing technical expertise for both gravity sewer and pump station design, and for the review of all pump station designs in the project area.

Design Engineer, Design of Sanitary Sewer Collection Systems, City of Fort Lauderdale, Florida. As part of the City of Fort Lauderdale's \$250 million wastewater CIP, Mr. Drummond was the design engineer for the design of sanitary sewer collection systems totaling \$32 million in construction cost. This included hydraulic gravity sewer modeling, value engineering, constructability reviews, construction inspections, the preparation and/or review of preliminary design reports, and the layout and sizing of gravity sewers and pump stations.

Design Engineer, Davie Boulevard Water Transmission and Force Main, City of Fort Lauderdale, Florida. Designed 5 miles of 24-inch water main through a highly urbanized and constricted corridor to replace a 75 year old water main and assisted in the design of a 54-inch force main. The design included routing and financial analysis for water mains and existing force mains ranging from 24 to 54-inches, design of a 2,000 foot directional drill underneath a heavily traveled interstate and waterway, and design of a jack and bore under active railroads.

Project Engineer, Park City Force Main, City of Sunrise, Florida. This project included the design of 9 mile force main through a heavily urbanized area. Responsible for designing five 24-inch directionally drilled sub-aqueous crossings totaling 1,800 linear feet and securing the permits from six separate permitting agencies.

OTHER:

Expert Witness, Water Wastewater and Fire Protection Systems, Florida Keys, Florida. Mr. Drummond served as an expert witness for legal proceedings to ascertain an island property's fair market value before and after denial of vehicular access. Mr. Drummond provided expert opinions and reports to assess the feasibility of the provision of potable water, wastewater treatment, and fire protection for the types of redevelopment allowed by the property's zoning.

Design Engineer, Weir Modification and Freshwater Canal Pumping Station, City of Cape Coral, Florida. This project included the modification of fixed weirs and two new Freshwater Canal Transfer Pump Stations. Performed the preliminary and final design required to modify two existing fixed weirs to adjustable weirs and construct two new freshwater canal pumping stations. These improvements will increase wet weather storage within the freshwater canal system and provide an estimated 4.3MGD of additional reuse water in the dry season.

Project Manager, Development of FDOT District IV's Web-based NPDES MS4 Database Management System, FDOT District Four, Florida. This five year \$3.0 million customized web-based database management system application manages FDOT's NPDES program. This web-based distributed application manages work flow for users in multiple departments extended across a 5200 sq. mile area. The application utilizes an Oracle database, .NET, ASP, and Visual Basic forms with integrated GIS functionality utilizing ESRI's ARC IMS, ARC Info, and ARC SDE. Other projects managed for FDOT District Four include the inventory and inspection of storm water systems as well as NPDES annual reports for the permit areas of Fort Lauderdale, Hollywood, Broward County, and Palm Beach County.

Project Manager, Sanitary Sewer Special Assessment Study, City of Fort Lauderdale, Florida. The study included developing a special assessment methodology to provide an equitable distribution of benefits to affected properties, based on allowable property usage, to parallel existing design criteria for the sanitary sewer improvements.

Professional Activities

Water Environment Federation (WEF)

FWEA Chairman of International Committee (2002-2006)

Caribbean Water and Waste Water Association (CWWA)

Florida Engineering Society (FES)

American Water Works Association (AWWA)

Chairman of Distribution Committee (2000-2002)

American Society of Civil Engineers (ASCE)

Inter-American Association of Sanitary Engineering (AIDIS)

Professional History

2005 to Date C Solutions Inc. – Fort Lauderdale, Florida

1996 to 2005 Camp Dresser & McKee Inc. – Fort Lauderdale, Florida

1988 to 1996 Newco Structures, Inc. - Miami, Florida