



STATEMENT OF QUALIFICATIONS

HYDROLOGY · HYDRAULICS · WATER · WASTEWATER · SITE DESIGN · ASSET MANAGEMENT

Firm: 5engineering, llc

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Suite # 210
Houston, TX 77042

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5engineering, llc (**5e**) is a full service Water Resources Engineering firm, with expertise in infrastructure design, including, waterline, water and wastewater facilities, drainage and industrial and commercial site development.

Certifications:

- ◆ State of Texas Comptroller's Office, Historically Underutilized Business (HUB)
- ◆ Small Business Administration (SBA)
- ◆ Economically Disadvantaged Women Owned Small Business (EDWOSB) Federal Set Aside Program
- ◆ Women's Business Enterprise Alliance (WBEA)
- ◆ City of Houston Women Owned Business
- ◆ Texas Unified Certification Program (TUCP)
- ◆ Metro Small Business Certification
- ◆ Port of Houston Small Business Enterprise

5e'sTxDOT Precertifications

- ◆ 10.1.1 Hydrologic Studies
- ◆ 10.2.1 Basic Hydraulic Design
- ◆ 10.3.1 Complex Hydraulic Design
- ◆ 10.4.1 Pump Station-Hydraulics

5engineering, LLC (5e) is a full service Water Resources firm with extensive experience in all aspects of drainage, storm water management, and water and wastewater planning and design. Our drainage and storm water experience includes drainage studies, impact analyses, drainage plan preparation, and Geographic Information Systems (GIS). Our water and wastewater experience includes utility design, sanitary sewer rehabilitation, water facilities and transmission, wastewater treatment facilities, lift station design and rehabilitation, asset management, and water system modeling. Our diverse project history and cutting edge engineering tools lead to the development of cost effective engineering and design solutions.

Engineering Services

- ◆ Site Evaluation
- ◆ Master Planning
- ◆ Facility Design and Layout
- ◆ Permit Planning and Support
- ◆ Working Drawings
- ◆ Specifications
- ◆ Construction Support
- ◆ Construction Management
- ◆ Final Construction Drawings
- ◆ Project Manuals
- ◆ Capital Improvement Programs
- ◆ Impact Analysis
- ◆ Feasibility Studies
- ◆ Preliminary Engineering Reports
- ◆ Asset Management
- ◆ Storm Water Pollution Prevention Plans
- ◆ Spill Control and Countermeasure Plans

Procurement

5engineering, llc is available to manage your capital equipment purchases. We offer expertise in the following procurement services:

- ◆ Source Planning
- ◆ Vendor Evaluation
- ◆ Bid Analysis
- ◆ Asset Management
- ◆ Risk Analysis
- ◆ Contract Negotiation

Construction Management

5e has the ability of manage projects from design into the construction phase. We offer Limited Construction Phase Services from coordination of pre-planning, cost management, quality control, critical path scheduling, project administration and project close-out.

- ◆ Final Construction Drawings
- ◆ Project Manual with scope, specifications, and quantities
- ◆ Facilitate pre-construction meetings
- ◆ Attend construction progress meetings
- ◆ Respond to RFI's
- ◆ Review construction pay estimates
- ◆ Construction submittals



S. KELLY HUMPHRIES, P.E. President/CEO

Ms. Humphries is the co-founder of 5engineering, llc. She is the firm's senior civil engineer with design and management experience in Industrial Site Development, Water Resources & Transportation.

Ms. Humphries is a licensed, professional civil engineer with over 13 years of experience of successfully managing and completing projects while mentoring and training others on the team. Ms. Humphries combines leadership and technical capabilities to successfully execute projects while forging strong internal and external relationships. She also has a demonstrated understanding and implementation of project management principals, as recognized by the Project Management Institute.

Core competencies include:

- Discipline Lead
- Client Relations
- Construction Support
- Permitting Support
- Interface Coordination
- Communication
- Technical Writing
- Project Management
- Regulatory Compliance
- Contract Management

Professional Registrations and Certifications:

Texas Professional Engineer No. 98399
Mississippi Professional Engineer No. 18092
PMI Project Management Professional No. 1277377



Elizabeth Parent, P.E. Vice President

Ms. Parent is the co-founder of 5engineering, llc. She is the firm's senior civil engineer with design and management experience in Water Resources & Transportation. Ms. Parent is a licensed, professional civil engineer with over 12 years of experience of successfully managing and completing projects driven by Hydraulics and Hydrology. Her responsibilities include marketing, proposals, contracts, project management, and development of reports and design plans for Hydrology and Hydraulics projects.

Core competencies include:

- Discipline Lead
- Client Relations
- Permitting Support
- Interface Coordination
- Communication
- Technical Writing
- Project Management
- Regulatory Compliance

Professional Registrations and Certifications:

Professional Engineer, State of Texas #100233
 Certified Floodplain Manager #1344-08N
 Envision Sustainability Professional
 Institute for Sustainable Infrastructure Trainer

Professional Affiliations & Awards

SAME 2007 Young Engineer of the Year Award
 Society of American Military Engineers
 2006/2007 Young Member Chair
 2007/2008 Community Programs Chair
 2011/2012 Director
 2013/2014 Small Business Chair, VP of Programs
 2014/2015 Small Business Chair, President Elect
 2015/2016 President
 Engineer's Week Committee 2004-2015



JENNIFER T. ALMERICO, P.E.

VP Water and Wastewater Services

Ms. Almerico is the manager of the water and wastewater division of 5engineering, llc . She is the firm's senior civil engineer with design and management experience in sanitary sewer rehabilitation, water system improvements, wastewater facility improvements, including lift station and pump station design.

Ms. Almerico is a licensed, professional civil engineer with over 14 years of experience of successfully managing and completing projects in the water and wastewater industry. Having experience at a public agency, she provides strategic vision that integrates into the client's organization to sustain efficient and effective operations while enabling the organization to achieve its objectives.

Core competencies include:

- Discipline Lead
- Client Relations
- Construction Support
- Permitting Support
- Interface Coordination
- Communication
- Technical Writing
- Project Management
- Regulatory Compliance

Professional Registrations and Certifications:

Texas Professional Engineer No. 93742

Professional Affiliations & Awards

Water Environment Association of Texas

2005/2006 President, Houston/Galveston Section

2006-2009 State Section Representative

2007 WEAT Emerging Leader Award

2005, 2009 Texas Water Committee Chair

Member of WEAT and Water Environment Federation (WEF)

Member of Project Management Institute (PMI)

Texas Water Development Board Major Rivers, Water Education Program



Rodrigo Guadarrama, P.E., CFM Principal

Mr. Guadarrama graduated from Texas A&M University in 2007. Rodrigo is experienced in hydraulics and hydrology and is particularly knowledgeable in the design of stormwater systems and site development projects. He is also a skilled modeler with extensive experience in Civil3D and XPSWMM2D and has design-build experience as the drainage lead for design for the Grand Parkway Segment F1 design team.

Core competencies include:

- Impact Analyses
- Permitting Support
- Feasibility Analyses
- Storm Sewer Analysis and Design
- Detention/ Mitigation Storage Analysis and Design
- Regulatory Compliance
- Design Build

Professional Registrations and Certifications:

Texas Professional Engineer No. 111437
Certified Floodplain Manager #2063-11N

Professional Affiliations & Awards

Houston Engineer's Week Committee Website Chair 2012-2015



José De La Peña, P.E., CFM

VP of Stormwater Management

Mr. De La Peña graduated from Rice University in 2001. He has over 14 years of experience in hydrology and hydraulics using traditional and advanced application of HEC-1, HEC-HMS, HEC-RAS (steady and unsteady), HEC-2, XP-SWMM, ICPR, WinStorm, and THYSYS. In addition he is an expert ArcGIS user. Mr. De La Peña has experience with Infoworks software.

Mr. De La Peña's experience includes complex watershed modeling level hydrology and hydraulics floodplain mapping, master plan development, detention analysis and impact analyses.

Core competencies include:

- Master Drainage Plans
- Impact Analyses
- GIS Technology
- Permitting Support
- Bridge Scour Analyses
- Feasibility Analyses
- Culvert and Bridge Crossing Analyses
- Detention/ Mitigation Storage Analysis and Design
- Regulatory Compliance

Professional Registrations and Certifications:

Texas Professional Engineer No. 98301
Certified Floodplain Manager #1848-10N

Professional Affiliations & Awards

Society of Hispanic Professional Engineers
Society of American Military Engineers Small Business Chair, 2015
Houston Engineer's Week Committee Reservations Chair, 2013-2015
SHPE Young Engineer of the Year, 2006



Dedra Ecklund, P.E.

Water / Wastewater Engineer

Ms. Ecklund graduated from Texas A&M University in 2004. She is responsible for managing projects for 5e's water and wastewater services. She has over 11 years of experience in planning, design, and rehabilitation of water, wastewater, and drainage system improvements. She also has extensive experience in capital improvement planning, bond applications, preparation of contract documents, and management of utility districts.

Core competencies include:

- Water and Wastewater Design and Rehabilitation
- CIP Planning
- Bond Applications
- Permitting Support
- Management of Municipal Utility Districts
- Regulatory Compliance

Professional Registrations and Certifications:

Texas Professional Engineer No. 103489

Professional Affiliations

Water Environment Federation

Water Environment Association of Texas

**David Overstreet, P.E., CFM****Stormwater Engineer**

Mr. Overstreet graduated from Louisiana State University and has a Masters in Civil Engineering from the University of Maryland. He has over 29 years of civil engineering experience with an emphasis in hydrology and hydraulics. His project experience includes drainage studies, impact analyses, and design of storm water facilities for both transportation and land development projects. Mr. Overstreet is a skilled modeler in HEC-HMS, HEC-RAS, XPSWMM, EPA-SWMM, and is an advanced ArcGIS user.

Core competencies include:

- Master Drainage Plans
- Permitting Support
- Feasibility Analyses
- Culvert and Bridge Crossing Analyses
- Detention/ Mitigation Storage Analysis and Design
- Regulatory Compliance

Professional Registrations and Certifications:

Texas Professional Engineer No. 96292

Louisiana Professional Engineer No. E-27097

Certified Floodplain Manager #1104-06N

Professional Affiliations & Awards

TFMA

ASCE

Gulfway Terrace Drainage Impact Analysis, Houston, Texas

5e is currently providing services for SWMM modeling of Gulfway Terrace Subdivision. The proposed City of Houston C506-01 Detention Basin is intended to service three current City of Houston projects. These projects include South Freeway Manor (modeling by others) North Freeway Manor, and Gulfway Terrace (modeling by 5e).

The scope of services included an impact analysis for Gulfway Terrace. The area west of the subdivision sheet flows in the direction of the subdivision. The hydrologic modeling includes determining offsite areas, delineating drainage areas to the inlet level, peak flow calculations, and developing hydrographs using the FEMA effective HMS model. The system geometry was developed with as-built drawings and available survey data. Existing conditions outflows were developed for the 2-, 10-, 50- and 100-year events. Existing problem areas were identified. The resulting hydrographs were utilized by the detention design team for their pre-project conditions.

The system geometry was iterated to meet the COH criteria in order to provide a solution with the 2-year HGL below the gutterline and the 100-year HGL within the City's right-of-way. The impacted conditions models determined the flow impacts due to modifying the storm sewer system. The resulting hydrograph was provided to the detention design team for their proposed project conditions.

Related Projects: Freeway Manor North, Arlington Heights

C506-01-00 Mitigation Basin, Houston, Texas

5e is currently providing services for the Hydrologic and Hydraulic modeling of the C506-01 Mitigation Basin. The proposed City of Houston detention basin is intended to service three current City of Houston projects. These projects include North Freeway Manor, South Freeway Manor and Gulfway Terrace.

The scope of services included the modeling efforts required to size the C506-01 Mitigation Basin and define the weir and outfall configuration.

The current effective models from the HCFCD M3 website were used as a basis for establishing existing conditions. The effective drainage areas will be subdivided to isolate the CIPs and the proposed basin. The $T_c + R$ parameters were recalculated for the areas outside the CIP limits. The effective HMS model was updated to include the revised drainage areas

The effective HEC-RAS model was updated to include all of the channel improvements that HCFCD has constructed since the effective models were developed. The channel improvements were added using data obtained from survey, record drawings and reports. A storage-routing relationship was developed using the extended HEC-RAS model and added to the HEC-HMS model.

A HEC-RAS model for C106-10-00 and C106-10-01 to Theta was developed. An

unsteady model was developed using the lateral structures and pond geometries shown on the conceptual plans (C506-01) and as-builts (Shaver Road). The resulting Elevation (SE) –Volume (SV) – Outflows (SQ) was used to develop a diversion relationship suitable for HEC-HMS model.

The source node hydrographs for the three CIPs was updated to include the impacted conditions hydrographs from SWMM. Channel improvements were proposed in the HEC-RAS model to convey the increased flows to C106-00-00.

The proposed mitigation basin is intended to function as an offline pond and filled by volume from the adjacent channel via a side weir. The proposed basin was modeled in SWMM, due to the software's capabilities for modeling detention ponds. A variable tailwater was developed at the outfall of the proposed basin.

Related Projects: C506-02

Kelly Village Community Park, Houston Housing Authority

5e provided civil site design services and construction phase services for the development of Kelley Park in Houston, TX. The park is located at East Freeway I-10 and Gregg Street.

Mr. Guadarrama managed and designed the project. The project included sidewalks, gazebos and shade structures, picnic areas, a workout station, a play area and, a perimeter fence, as well as a soccer field. 5e coordinated with Brave Architecture and Val Glitsch to

incorporate the proposed park components into the overall civil plans, and with Asakura Robinson to accommodate the irrigation system. In addition, 5e coordinated with the MEP to provide park lighting.

The civil portion of the project included a site grading plan, storm sewer calculations, SWPPP, public and private plan sets.

5e provided construction documents and drawings to Brave. Mr. Guadarrama provided private utility coordination with AT&T and Centerpoint in addition to public utility coordination with the City of Houston. The project was permitted through the City of Houston.

During construction 5e provided construction management and response to RFI's. Post-construction, Mr. Guadarrama attended a site visit and provided a substantial completion punch list for the contractor.

- ◆ Coordination with Architect
- ◆ Coordination with Landscape Architect
- ◆ Coordination with Public and Private Utilities
- ◆ Completed on schedule
- ◆ Approximate Construction Cost - \$3M

The Lift Station Rehabilitation for Colonial Lakes and Thompson Ferry

The Lift Station Rehabilitation for Colonial Lakes and Thompson Ferry project was recently awarded to 5e and it consists of the preparation of a Design Report evaluating the condition of the two lift stations, recommendation for the rehabilitation of each lift station, recommendation of mag meter placement, preliminary construction cost estimates, a complete design bid package, assistance during the procurement process, and construction phase services. The project includes rehabilitation of the interior walls, ceiling, piping, valves, and electrical panels. An odor control evaluation and design is included for one lift station and 5e is coordinating with an expert in the odor control field.

Targa Resources - Impact Analysis and Outfall Channel Design

5e was contracted by Optimized Process Designs, a Koch Industries subsidiary, to obtain a development permit from the City of Mont Belvieu for construction of a laydown facility. The laydown facility was used for staging construction activities for the Targa Resources facility expansion.

The project site is located near the mouth of Cedar Bayou. Detention was not required for this site due to its proximity to the mouth of San Jacinto River Basin. A drainage analysis and report was completed to size an outfall channel for the site. The channel was sized using HEC-RAS. Upon report approval by the City, as-built drawings of the laydown area and construction drawings for an expanded laydown area and the

proposed channel were developed and submitted for approval.

Optimized Process Designs - Detention and Pump Station Design

5e was contracted by Optimized Process Designs, a Koch Industries subsidiary, to provide construction drawings, specifications and cost estimates, as well as obtaining a development permit from Harris County. The project scope consisted of a laydown yard expansion, regrading a gravel parking lot and a pumped detention system to mitigate for the increased imperviousness.

The entire site is approximately 20.6 acres, of which 6.5 was developed as part of the expansion. Due to a change in criteria from the previous construction, a small existing pond was expanded to account for existing development in addition to the proposed 6.5 acre expansion. The client preferred to maximize the land available for use as a laydown yard, requiring a pumped detention pond due to limited outfall depth. The allowable outfall rate was determined based on the property frontage length using Harris County criteria. 5e supplied the design basis for the pump to the client.

The final phase deliverables included, complete grading plans and specifications for the laydown area, detention pond and parking lot, along with the pump requisition documents including specifications, preliminary general arrangement diagrams and a refined design basis.

Grand Parkway Proposal Phase

Segments F1, F2 and G of the Grand Parkway is a \$1.04 billion design-build contract through TxDOT. The 38 mile, 4-lane toll road will be an extension of the existing segments D & E. During the proposal phase, 5e worked on the Kiewit-Granite-Sterling Parkway Constructors JV drainage team, modeling all the Grand Parkway crossings over FEMA studied streams. The crossings had been conceptually redesigned from the schematic phase in search of cost savings. HEC-RAS modeling of all the crossings were completed within four weeks, providing the design team with sufficient time to develop 30% plans for the submittal. An example of the hydraulic challenges faced by the team was the crossing of M100-00-00, a FEMA studied stream. The proposed Grand Parkway alignment runs parallel to the stream for a section of the bridge before spanning the creek, and is significantly skewed. The proposed alignment blocks conveyance between the north side of the grand parkway and the stream. Conveyance across the proposed Grand Parkway was replaced with a series of box culverts that act as equalizers through an embankment section. This was a significant cost savings from the planned schematic 13,205' bridge.

Grand Parkway Design-Build Phase

The selected team was the Zachry-Odebrecht Parkway Builders JV. 5e was added to the team after the award in an effort to satisfy the aggressive nine month design schedule. 5e is responsible for providing no-impact reports for the crossings in Segment F1, which will be used by the floodplain administrator,

Harris County Flood Control District and FEMA to approve the final construction drawings. 5e's scope of services includes 3 separate locations at which existing streams cross the Grand Parkway alignment, L112-01-00, L112-00-00 and L100-00-00.

L112-01-00 is an unstudied tributary to L112-00-00, which is a tributary to Little Cypress Creek (L100-00-00) that collects runoff east of Mueschke Road. The HEC-RAS model utilized for this analysis was created utilizing 2008 LiDAR data in HEC-GeoRAS.

The model extended significantly upstream of the Grand Parkway alignment in order to determine the project's effects on the Stone Lakes Subdivision. Six- 10' x 9' RBC were introduced to the model at the Grand Parkway crossing, in accordance with the design plans. These culverts will function with 4 ft of fill in the flowline until future improvements are made to deepen HCFCD's channel to the ultimate 9 ft of depth. Downstream channel improvements include a 20' bottom width channel to provide no impact to the WSE.

Corrected effective models were developed for each stream utilizing survey data at the upstream and downstream faces of the proposed bridge. The overbank data for these cross sections was created using HEC-GeoRAS, and merged into the surveyed channel cross sections. The proposed bridges were input into HEC-RAS taking into account the 30 and 45 degree bridge skew. Channel improvements were added under the bridges to provide a no impact solution. Reports for all three streams were submitted to the prime

provider and the Harris County Flood Control District for approval.

K124-00-00 Seals Gully, Harris County Flood Control District

5e was contracted through Midtown Engineers to provide alternatives analysis for the Harris County Flood Control District (the District) for a maintenance project on Seals Gully. Ms. Parent completed the hydraulic modeling and report for the project. Ms. Humphries Guerra provided management and coordination with HCFCFCD.

In 1974, HCFCFCD constructed channel improvements project along K124-00-00 Seals Gully. As part of the improvements, a drop structure (located at River Station 4871.5/Project STA 17+47) was designed to meet the watershed hydraulic conditions of Seals Gully at that time. Over the last 38 years, the area has experienced a huge development boom (residential and commercial) on both sides of the channel. The original channel bottom elevation difference across the drop structure was originally 5 feet and is now approximately 0.80 feet. The channel banks near the structure have eroded and present a habitual maintenance problem. During recent rain events, the existing drop structure sheet piling was damaged and additional erosion was created. It is evident that the drop structure is not designed to meet the current watershed hydraulic conditions.

The District authorized Midtown Engineers to prepare construction documents to repair erosion along HCFCFCD Unit K124-00-00 from Cypresswood upstream to Haude Road.

As part of HCFCFCD Channel Erosion Repair project K124-00-00-X027, 5e provided an assessment of the impacts of permanently removing the drop structure and proposed channel repair alternatives was conducted. 10 foot, 15 foot and 20 foot bottom width channel improvements were analyzed utilizing a combination of HEC-HMS, to update the flow routing and HEC-RAS to analyze the proposed hydraulics.

While the original scope of services included replacing the drop structure that had washed out, 5e worked diligently to explore alternatives that would save the client on both construction and long term maintenance costs. 5e made a final recommendation to remove the drop structure and implement a 10 foot bottom width channel to provide minimal impacts



due to the lower cost of construction. The project team estimated that the client saved \$150,000 in construction by selecting the alternative that did not require the drop structure to be replaced.

- ◆ Coordination with HCFCFCD
- ◆ Restoring Natural Channel
- ◆ Demonstrated Cost Savings
- ◆ Completed on schedule

Guada Coma, New Braunfels, Texas

78 Guada Coma is a private residence within the floodway and floodplain of the Comal River in New Braunfels, Texas. In order to implement landscape developments including a gravity wall, excavation, and a flagstone patio, the City requires a no-rise/no-impact study. The FEMA effective model was obtained through a public information request. Additional cross sections were added to the existing conditions model at the upstream and downstream cross sections of the property and in the area that will be excavated. The model was updated to include the proposed excavation and wall. The model indicated that no-impact was induced for the 25-year or 100-year frequency events. A report was developed to document the analysis, and modifications to the model.

Chisholm Trail Parkway, Tarrant County, Texas

Section 6 of Chisholm Trail Parkway is a \$181 Million design-build contract by the North Texas Tollway Authority. Granite Construction was selected, and 5e was added to the team in an effort to satisfy the aggressive design schedule. 5e is responsible for providing hydraulic modeling of 4 culvert crossings. HEC-GeoRAS was utilized in conjunction with the project TIN to develop the model geometry. The cross culvert design layout sheets were utilized to input the proposed culverts. Channel improvement transitions were also included. The resulting headwater and tailwater elevations and velocities were documented on the Cross culvert layout sheets. The mainlane culverts provided capacity for a 50-year design flow with 2

feet of freeboard. The remaining culverts met the freeboard requirement of 100-year below the roadway edge of pavement, as required by the road classification.

FY15 Wastewater Force Main Renewal and Replacement, Houston, Texas

This project includes the evaluation and preparation of a preliminary engineering report, final design, and construction phase services for the rehabilitation or replacement of over 15,200 linear feet of force mains for the Eldridge Parkway, Beechnut, West Orem, and Golf Course lift stations. The force mains have diameters between 10 and 20 inches. 5e is currently conducting the evaluation and preparing the Preliminary Engineering Report.

City of Houston Planning Projects

5e has worked on multiple pre-engineering projects for various need areas identified by the City including M-2014-005 with HDR and M-2014-003 and M-2014-015R with Walter P. Moore. The tasks included field reconnaissance to confirm that as-built and GIMS data appear consistent with field conditions, as well as verification of the pavement and drainage infrastructure conditions; analysis of the existing conditions drainage systems for the 2- and 100-year events; data collection; alternative development; selection and opinion of probable construction costs and preparation of a pre-engineering report.

PROJECTS AT PRIOR ENGAGEMENTS – JENNIFER ALMERICO

Asset Management Program, The Woodlands, Texas

Ms. Almerico initiated and developed a multi-year Wastewater Program to develop a comprehensive assessment of the wastewater system, achieve quantifiable reduction in inflow and infiltration to reduce peak flows, implement an asset management program to extend the useful life of the infrastructure, prioritize aging infrastructure for rehabilitation, and implement Program related projects using cost effective project delivery alternatives. She led the Program team to ensure the goals and objectives of the Program were met. She communicated and made presentations to Customer Districts to ensure funding of the Program for future years.

Sanitary Sewer Rehabilitation, The Woodlands, Texas

Ms. Almerico was the project manager for numerous sanitary sewer rehabilitation projects. She managed the design and construction management of major trunk sewer rehabilitation, the majority of which were reinforced concrete pipe lined with cured-in-place pipe. She oversaw point repairs and bypass pumping plans during construction and performed substantial and final completion inspection services. Projects also included the rehabilitation of vitrified clay tile, ductile iron, and PVC trunk sewers, as well as replacement of ductile iron force mains. Some rehabilitation projects utilized sliplining, pipe bursting, and open cut replacement.

Pump Station/ Lift Station Evaluations, The Woodlands, Texas

Ms. Almerico managed the modeling of The Woodlands water system using KYPipe software, and the subsequent transition to Bentley WaterGEMS. Ms. Almerico evaluated the land development planning data for The Woodlands and calculated the projected water demand for each service area, using an application that integrated with GIS. She made recommendations for pump station upgrades and implemented the purchase and installation of new pumps. In the sanitary sewer collection system, she evaluated each lift station service area and performed a condition assessment of the pumps. She performed pump flow monitoring to verify the efficiency of the pumps, and designed replacements where necessary. She worked closely with Operations and Maintenance personnel to achieve optimal results.

Storm Water Pollution Prevention Plan/ Spill Control and Countermeasure Plan, The Woodlands, Texas

Ms. Almerico managed, updated, and performed quality audits on the Storm Water Pollution Prevention Plan and Spill Control and Countermeasure Plan. She performed annual inspections and prepared and presented annual employee training in accordance with the regulations associated with these plans.

Wastewater Treatment Plant Design, City of Grapeland, Texas

The City of Grapeland project included a new wastewater treatment plant designed to handle an average daily flow of 300,000 gallons and a peak 2-hour flow rate of 1.5 million gallons. The treatment processes included screening, grit removal, extended aeration, clarification, disinfection, and post aeration.

Reclaimed Water Pump Station and Sanitary Sewer Lift Station, City of Bryan, Texas

The reclaimed water pump station project included the design and construction of a 525 gpm reclaimed water pump station at the Turkey Creek Wastewater Treatment Plant. The reclaimed water pump station transferred water to a pond on a nearby golf course. This water was ultimately used for irrigation purposes. This project also included a 25.5 mgd sanitary sewer lift station on Jones Road, including an access road off Jones Road to the sanitary lift station. For both the lift station and pump station, hydraulic analyses calculations were performed to size the new pumps. Specifications and bidding documents were prepared for the pump station, lift station and 100 linear feet of 10-inch sanitary force main, 70 linear feet of 42-inch sanitary trunk sewer, and 300 linear feet of 8-inch reclaimed water line.

Construction Phase Services for Sanitary Sewer Rehabilitation, City of Bunker Hill Village, Texas

Construction phase services were performed for the construction of 2,200 linear feet of 12-inch water line and abandonment of an 8-inch water line in the City of Bunker Hill Village. The work included construction site visits, construction reports, pay requests evaluations, contractor's requests for information, change order processing, work change directives, and submittal reviews.

Water System Modeling, San Jacinto River Authority, City of Pearland, City of Galveston, G-M Water Supply Corporation, Galveston County Water Control & Improvement District Number 1

Ms. Almerico built several water system models using KYPipe software. Maps of the existing water lines, well pumping rate records, storage tank and pumping station layouts, and demands for the system were loaded into the model. Current and future conditions were evaluated. Recommendations were made for future pumping system rates, line size upgrades, future water line locations and sizes, storage tank volumes, water wells, and booster pumps to satisfy the demands of the system. The models were calibrated to reflect existing conditions and the recommendations, including maps of the system, were included in a report. Ms. Almerico provided training to clients on the use of the water model.

Surface Water Pump Station, Ground Storage Tank, and Elevated Storage Tank, City of Friendswood, Texas

The purpose of this project was to provide the necessary water system improvements to allow the City of Friendswood to meet a mandated reduction of ground water use to 20% of their annual use. The goal was met by purchasing surface water from the City of Houston. Ms. Almerico managed the design and construction of this project to build an 8,000 gpm pump station, with expansion capabilities up to 12,000 gpm. This project also included the design of a 1 million gallon prestressed concrete ground storage tank that was constructed on the site. The elevated storage tank project involved the design and construction of a new elevated water storage tank on the west side of the City of Friendswood. The proposed tank was a 1.0 million gallon composite concrete and steel elevated tank. Ms. Almerico performed design, bidding, and construction phase services for this project.

Solids Handling Facilities, High Service Pump Station, and Yard Piping, City of Houston Southeast Water Purification Plant, Houston, Texas

This project included preliminary and final design of the solids handling facilities, high service pump station, and yard piping for the City of Houston Southeast Water Purification Plant to increase plant capacity from 120 to 200 mgd. Ms. Almerico prepared recommendations in the preliminary design report, construction cost estimates, equipment selections, and

specifications. This project also included the design of the expansion of the existing Return Flow “A” Pump Station. Calculations were performed to size the thickened sludge distribution chamber, the two thickened sludge truck loading pump stations, the addition of two residual solids thickeners, and the expansion of the High Service Pump Station. A hydraulic analysis of the High Service Pump Station was performed to determine the size of the new pumps, the new layout of the pumps was designed, and a control strategy was provided to the client.

Barry Rose Inflow & Infiltration (I&I) Study, City of Pearland, Texas

Ms. Almerico prepared the “*2nd Annual I&I Report for Barry Rose WWTP Service Area.*” Rainfall data was collected from rain gauges installed at the Barry Rose Wastewater Treatment Plant (WWTP) and the Southwest Environmental Center (SWEC). An exhibit showing the completed I&I reduction projects was prepared and WWTP effluent flow data was analyzed. The results were graphically plotted together with rainfall data and permitted discharge limits to derive the relationships among the parameters. The performance of the Barry Rose WWTP was evaluated related to discharge permit limits. The results and conclusions were presented and recommendations were provided for the next annual reporting period.

Grand Parkway Segment F1, Houston, Texas

Mr. Guadarrama led Dannenbaum Engineering's effort on the Grand Parkway Segment F1 design/build as the drainage design lead. The project was 12 miles long and entailed extensive 1D/2D modeling techniques. The 1D conveyance modeling was done with GeoPak drainage for the internal drainage systems. The bridge and culvert crossings were done in HEC-RAS and the pond detention analysis was done in xpSWMM to satisfy FEMA and Harris County Flood Control of no adverse impacts to the watershed. The planning study involved the simulation of the overflow with a coupled 1d/2d model. Mr. Guadarrama modeled the overflow using an extensive xpSWMM 2D model. The model assisted in defining the magnitude and extent of the overflow, and was used to verify that all existing sheet flow patterns would not be impacted by the proposed improvements.

Sugar Creek Drainage Analysis. City of Sugar Land, Texas

The purpose of this project was to analyze the Sugar Creek subdivision's existing drainage system and propose improvements to enhance the system's performance. The scope of this project included a detailed analysis of the existing Sugar Creek Subdivision drainage system, with the intent of identifying possible causes of flooding. The analysis required studying the entire drainage system, such as combined street, inlet, storm sewer, and lake and outfall channel systems, to quantify existing ponding problems and to determine solutions for eliminating

existing ponding problems in the identified problem areas.

The project had 27 separate systems that needed to be analyzed. A GIS database was created for each system using the City of Sugarland's available data. Individual WinStorm models were created for each of the 27 systems to determine the existing conditions. The alternatives included complex modeling to create a solution to the existing flooding. The more complex systems required an xpSWMM model. The project included a Preliminary Drainage Report, cost estimates, construction drawings and specifications.

Homestead Grade Separation, Houston, Texas

The purpose of this project was to provide engineering design services for a grade separation over the existing Union Pacific Railroad (UPRR) railway tracks, frontage roads to provide access to existing crossroads affected by the grade separation, and a boulevard section to match the existing conditions both north and south of the project limits. The project area is located approximately 1.8 miles east of US 59 and 2.2 miles north of IH 610 and runs along Homestead Road between Ley Road and Leighton Street. The proposed typical section consisted of two 33-foot-wide pavement sections from the face of curb to face of curb with 11-foot-wide lanes, a 12-foot-wide center median with 10-foot shoulders along the east and west right-of-ways, and left-turn storage. Four-foot-wide sidewalks will be offset two feet from the ROW. The recommended section for the bridge over the UPRR tracks consists of four, 12-foot lanes (two

in each direction) separated by an 8-foot median with a 5-foot sidewalk. The drainage components involved using ArcHydro to determine the extent of the sheet flow entering the system under extreme events and accounting for the excess flow in the design. The project also included a pond that was modeled in xpSWMM. The project consisted of a drainage report that was approved by Harris County Flood Control and the City of Houston and construction drawings.

Richmond Avenue Drainage, Water and Sanitary Improvements, Houston, TX

Richmond Avenue between Buffalo Speedway and Kirby Avenue is located in the Upper Kirby Tax Increment Reinvestment Zone (TIRZ) and is prone to frequent street flooding. The Preliminary Engineering Report identified this section of Richmond Avenue as requiring additional storage capacity through the use of a parallel storm sewer under the pavement. Extensive utilities and the planned Metro rail line limit the location of the storm sewer to the middle westbound travel lane. Mr. Guadarrama took the previously approved impact analysis and led the effort in creating plan and profile sheets for construction along with the specifications needed. After approval from the City of Houston, limited construction phase services were approved. Mr. Guadarrama's tasks included approving construction materials, responding to requests from the contractor and keeping Upper Kirby and the City of Houston informed about the construction activities.

Bailey Road Drainage Improvements, Pearland, Texas

Responsible for the hydrologic and hydraulic impact analysis for a new roadway in Brazoria County in a flood prone watershed. Mr. Guadarrama used GeoPak drainage and xpSWMM to analyze the hydrologic impacts of the new roadway and to design inline detention under the proposed roadway improvements. The project consisted of a drainage report that was approved by the City of Pearland and construction drawings.

Addicks Watershed Model Update– Harris County Flood Control District (HCFCD), Houston, Texas

Mr. De La Peña serves as a Project Manager for the Addicks Watershed Model Update which is an ongoing effort to identify changes in the watershed after the creation of effective FEMA floodplains, update the hydrologic and hydraulic behavior of the watershed to reflect the changes to the watershed, and to develop new floodplain maps for the Addicks Reservoir watershed. Mr. De La Peña is managing a team of GIS specialists responsible for processing a large, comprehensive LIDAR data set with the latest state of the art GIS-based hydrologic and hydraulic modeling tools. The result of this analysis will provide the groundwork for the reevaluation of the HEC-HMS and HEC-RAS models needed to analyze the integrated channel network and associated drainage areas. The resulting models and the gathered data will be documented within a geodatabase, which will facilitate the client's management of the large amounts of information associated with the Restudy. The Restudy will help result in updated floodplain map products of the watershed for submittal to HCFCD and FEMA.

Fleetwood Drive Storm Sewer Analysis – City of La Porte, Texas

As the Project Engineer, Mr. De La Peña provided design services to improve the existing storm sewer system serving an area of approximately 100 acres and outfall to a HCFCD Ditch in the Armand Bayou watershed. Design tasks included evaluating the existing storm sewer system, including inlets, storm sewers, overland sheet flow, and providing

recommendations to reduce ponding in adjacent streets and lots. A digital elevation model (DEM) of the existing and proposed roadway surfaces were used to perform a two-dimensional analysis in XP-SWMM.

Sheldon Road Hydraulic Impact Analysis – Harris County Public Infrastructure Department (HCPID), Houston, Texas

Mr. De La Peña served as Project Engineer for this project whose purpose was to revise the effective hydraulic model for Carpenters Bayou (HCFCD Unit # N100-00-00) to reflect the proposed bridge widening of Sheldon Road. The work involved updating the cross sections near the proposed bridge with 2001 LiDAR data, updating the bridge deck elevation with surveyed roadway data, and modifying the bridge details with survey data and proposed record drawings. Water surface elevation impacts resulting from this revised hydraulic model were mitigated by widening the bridge opening in order to meet HCFCD's no-rise requirement.

South Mayde Creek Hydraulic Impact Analysis – Harris County Infrastructure Department (HCPID), Houston, Texas

Mr. De La Peña served as Project Engineer for the preparation of a hydraulic impact analysis of South Mayde Creek (HCFCD Unit # U101-00-00). This hydraulic impact analysis sought to identify the water surface elevation impacts resulting from a proposed bikeway bridge at Heathergold Drive in west Harris County. Using preliminary design drawings, limited

survey, and 2001 LiDAR, the hydraulic model for South Mayde Creek was updated to represent the addition of the bikeway. The resulting water surface elevation impacts were mitigated by concrete-lining the channel side slopes near the bridge.

Wellborn Road Grade Separation – Texas A&M, College Station, Texas

Texas A&M authorized this project to build two vehicular / pedestrian passageways beneath Wellborn Road and the Union Pacific Railroad. Wellborn Road and the railroad create a barrier that hinders the efficient flow of vehicular and pedestrian traffic and divides the campus. Mr. De La Peña performed the hydrologic and hydraulic modeling and analysis of the proposed roadway design, including the proposed storm sewer system. A pump was incorporated into the design and analysis in order to pump collected stormwater from the underpasses to a proposed detention basin tied to an existing storm sewer.

FM 2218 from SH 36 to US 59 Drainage Impact Study – Texas Department of Transportation (TxDOT), Rosenberg, Texas

TxDOT sponsored a drainage impact study for the roadway and drainage improvements associated with the proposed widening of FM 2218 from a rural two-lane roadway with roadside drainage ditches to a four-lane roadway with curb and gutter drainage into a storm sewer system. The project corridor was approximately 4.8 miles in length, and extended from the intersection of FM 2218 and SH 36 to its intersection with US 59, in Fort Bend County, Texas. As

the lead Project Engineer, Mr. De La Peña conducted an investigation of the existing roadway and open ditch systems within the study reach and designed storm sewer trunks, in accordance with applicable TxDOT criteria, to accommodate the contributing flows associated with the proposed roadway widening. He assisted in establishing the existing conditions hydrologic parameters (size, time of concentration, and impervious cover) for the existing drainage areas, and generated the peak flow rates for the 2-, 5-, 10-, 25-, 50-, and 100-year storm frequencies using the Rational Method. Following the existing conditions analysis, he then performed a hydraulic analysis of the proposed storm sewer systems associated with the widening of FM 2218 using WinStorm and estimated cross drainage structures under FM 2218 using unsteady HEC-RAS.

Jane Long Lake Modeling – City of Sugar Land, Texas

Mr. De La Peña served as the Project Engineer in the update of an interconnected system of ponds, pipes, and weirs serving a subdivision in the Sugar Creek watershed. As part of the City's Capital Improvement Project (CIP), a control structure at one of the interconnected ponds was modified to avoid water surface impacts at Jane Long Lake and the overall drainage system. An existing conditions unsteady routing ICPR model was updated to reflect the replacement of the control structure and the impacts associated with the modeling changes.

SH 36 from US 59 to FM 2218 Drainage Impact Analysis – Texas Department of Transportation (TxDOT), Rosenberg, Texas

TxDOT conducted a drainage study for the proposed widening of SH 36 from a rural two-lane roadway with roadside drainage ditches to a four-lane roadway with curb and gutter drainage into a storm sewer system. The project started at the intersection of SH 36 and US 59 and continued to its intersection with FM 2218. Mr. De La Peña, as lead Project Engineer, conducted an investigation of the existing roadway and open ditch systems within the project area. Following TxDOT criteria, Mr. De La Peña designed storm sewer trunks necessary to address the contributing flows associated with the proposed bridge widening. As part of this drainage analysis, Mr. De La Peña created drainage areas based on topographic data and other hydrologic parameters (i.e. time of concentration and impervious cover) to develop peak flow rates for the 2-, 5-, 10-, 25-, 50-, and 100-year storm frequencies using the Rational Method. Following the existing conditions analysis, he performed a hydraulic analysis of the proposed storm sewer systems associated with the widening of SH 36 using WinStorm. The hydraulic behavior of the cross drainage systems was analyzed using a steady-state HEC-RAS model.

Master Drainage Plan – City of Deer Park, Texas

As Project Engineer, Mr. De La Peña assisted in identifying existing drainage issues throughout the City of Deer Park. Hydrologic and hydraulic analyses were performed in order to determine the conveyance and storage capacities of the various drainage channels and ditches. Issues were differentiated between riverine flooding, inadequacies in storm sewers, and street ponding. Record drawings, previous drainage reports, hydrologic and hydraulic analyses, and discussions with city staff were used to create a master list of drainage issues. Topographic data and aerial photographs were used to review the overland sheetflow characteristics and ponding potential in the City. Drainage issues were prioritized based on flooding complaints from residents, repetitive loss information collected from FEMA, and the number of people affected by the drainage issue. Drainage solutions were created for each drainage issue. Using cost data from previous projects and TxDOT's bid prices, Mr. De La Peña estimated construction costs for each drainage solution and presented the findings to the City in a drainage report. Other similar projects: *Master Drainage Plan* (City of Mont Belvieu, February 2009); *Citywide Drainage Plan* (City of La Porte, January 2009); *Master Drainage Plan* (City of Alvin, September 2008); and *Conceptual Master Drainage Plan* (City of Humble, September 2007).

Stormwater Improvements Project – City of Houston, Texas

Mr. De La Peña served as Project Engineer and quality assurance/control (QA/QC) lead. The City of Houston conducted a reevaluation of three major storm sewer systems. As part of these reevaluations, the existing storm sewer system were updated with GIS data from the City, record drawings, previous drainage reports, limited survey, aerial photographs, topographic data, and field visits. Mr. De La Peña created an existing conditions storm sewer model servicing an area of approximately 1,200 acres in GIS and HouStorm (hydraulic software). Drainage areas were delineated with topographic data for Harris County. Land use cover data was created from aerial photographs of the area. Flows were estimated using the Rational Method. Mr. De La Peña reviewed hydrologic and hydraulic inputs and outputs of two other models created by other engineers on the project to confirm that the proper methodology and procedures for the City were followed. The existing conditions hydraulic models were run in order to determine deficiencies in the three storm sewer systems and compared with locations of citizen ponding complaints and FEMA repetitive loss data to validate the models. At least three alternatives were created for each storm sewer system to improve the drainage of the systems. Mr. De La Peña assisted in developing the drainage reports for each storm sewer system and assisted the City in presenting the report findings at their Technical Review Committee (TRC) meetings.

PROJECTS AT PRIOR ENGAGEMENTS – DEDRA ECKLUND

Force Main Replacement and Lift Station Rehabilitation, San Jacinto River Authority, The Woodlands, Texas

Ms. Ecklund managed the design and construction management of a \$1,600,000 combined force main replacement and lift station rehabilitation located in The Woodlands Town Center. The project included replacing a 15-inch sanitary force main and conversion of the lift station to a submersible lift station.

Sanitary Sewer Rehabilitation and Up-sizing, Harris County, Texas

Ms. Ecklund was the design engineer and project manager for a \$1,200,000 sanitary sewer rehabilitation project in Emerald Forest Utility District. This project included the following methods: point repairs, pipe-bursting, and cure in place piping. She has evaluated the sewer systems and provided rehabilitation recommendations for several utility districts in Harris County. She was the instructor for an internal training class at a prior engagement. She spearheaded the effort to standardize how sanitary sewer rehabilitation recommendations were generated. She was the design engineer and project manager for a project to pipe-burst an 18-inch concrete gravity sanitary sewer line to a 24-inch HDPE sewer line.

Lift Station Inspections, San Jacinto River Authority, The Woodlands, Texas

Ms. Ecklund was a member of the lift station inspection team representing Technical Services. She prepared evaluation forms and participated in the

rehabilitation recommendations and ranking of 30 lift stations in The Woodlands.

Waterline Extensions, Harris County, Texas

Ms. Ecklund was the design engineer and project manager for multiple waterline extension projects throughout Harris County. The designs ranged from 8" to 16" waterlines, within Harris County right-of-way, in adjacent easements, crossing Harris County Flood Control channels and roadways.

Ground Storage Tank Addition, San Jacinto River Authority, The Woodlands, Texas

Ms. Ecklund managed the design and construction of a 2 million gallon prestressed concrete ground storage tank addition.

Water Modeling, San Jacinto River Authority, The Woodlands, Texas

Ms. Ecklund managed two design consultants for two projects that developed a Bentley WaterGEMS model to evaluate the water facilities and distribution system in The Woodlands. The project included a workshop by the consultant on utilizing the program to model scenarios requested by the Operations Division.

Mud Gully Detention Basin Drainage Study, Project Development Report, and Phase 1 Design (Construction Documents)

The proposed project is a 1500 acre-feet detention pond near the intersection of Beamer Road and Dixie Farm Road. Developed unsteady HEC-RAS model and used model to assess various alternatives for the overflow weirs. Using the modeling results, developed benefits matrix and used matrix to select the best weir alternative. Incorporated environmental features into basin bottom design and developed plans, specifications, and estimates for the first phase of the project. Project team used AutoCAD Civil 3D for the design.

Farm-to-Market Road 1409 Extension, Chambers County, Texas

The proposed project is a 4-mile extension to an existing roadway. The extension will be a two-lane road with shoulders and open ditch drainage. Delineated drainage areas, calculated existing and proposed conditions peak flows using rational method or regression equations, developed existing conditions HEC-HMS models to establish target flows for the 10- year and 100-year events, calculated proposed conditions peak flows using XP-SWMM and HEC-RAS (impact analysis). Using results from the modeling, determined outfall channel size, detention pond sizes, and restrictor sizes (design of improvements).

SH 99 Grand Parkway Segment F-1, Harris County, Texas

For the L-Basin 4 drainage system, developed XP-SWMM model to assess drainage impacts associated with construction of the roadway. The drainage system includes a large culvert crossing near Mueschke Road, roadside ditches, and a detention pond. Using the results of the modeling, developed sizes for the culverts, ditches, overflow weir and pond outlet structure.

METRO – University Line Corridor SWMM modeling, City of Houston, Texas

Mr. Overstreet was the Project Engineer for the development of dynamic hydraulic models for storm drain systems and overland flow using EPA-SWMM. Improvements to the existing drainage systems (increased pipe sizes) were proposed to meet City of Houston criteria for 100-year water levels. Mitigation measures (increased pipes sizes) were proposed to reduce post-project water levels to pre-project levels.

Detention Facility on Unit B113-00-00, Genoa – Red Bluff Road, City of Pasadena, Texas

Mr. Overstreet was the Project Manager for a Hydraulic analysis and concept level design for detention ponds on both sides of Unit B113-00-0 (Tributary 10.46 to Armand Bayou), including side overflow weirs, return flow outlets, and associated channel improvements. The proposed ponds were sized to account for floodplain fill and increased runoff associated with developing the service area. The analysis showed a net benefit

based on water levels with the detention facility in place and the service area completely developed.

Spring Recreation Area (Skate Park) – Drainage Impact Analysis, City of Houston, Texas

Mr. Overstreet was the Project Engineer for the hydraulic analysis using HEC-RAS to measure impacts associated with developing this 10.2-acre skate park along North Fork Greens Bayou for the Greater Greenspoint Redevelopment Authority

Cypress Preserve Park and Cypress Forest Lakes Commercial Tracts, Harris County, Texas

Mr. Overstreet served as Project Manager for the Hydraulic analysis of stream modifications using HEC-RAS to support a CLOMR application to remove Special Flood Hazard Area from the proposed development area. HEC-RAS models were used compute flood profiles under pre- and post-project conditions along Cypress Creek. A conveyance channel adjacent to Cypress Creek was proposed to compensate for the effects of proposed fill.



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