

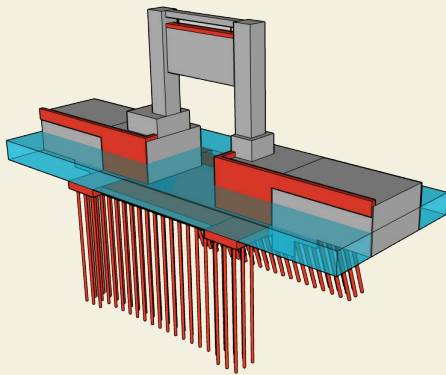
SERVICE AREAS

Structural Engineering

FLOOD PROTECTION

Hydraulic Gates

Design of new hydraulic closure structures and retrofit of existing structures including floating gates, sector gates, vertical lift gates, sluice gates, and closure gates.



Flood Walls and T-Walls

Design of pile founded T-wall structures for flood control.

Drainage Structures

Design of gravity drainage structures and closure mechanisms, which function as part of a levee system.

Railroad Closure Structures

Design of railroad closure structures, Tie-in flood walls, and flood wall transition to earthen levee as part of systemwide flood control system.

BRIDGES AND RETAINING WALLS

New Construction

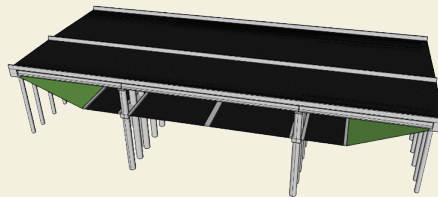
Schematic and final design of new bridges, multi-disciplinary coordination, phased and accelerated construction, bridge class culvert and retaining wall design.

Widening

Bridge widening design including phased construction methods.

Rehabilitation

Load rating, structural assessment,



repair and rehabilitation of existing bridges, rail retrofit design and modification to bridge deck, and bridge class culvert retrofit design.

OTHER STRUCTURES

Special Sewer Structures

Design of special junction boxes as part of a storm sewer system, including mounting elements for specialized mechanical components.

Overhead Sign Bridge

Design of nonstandard overhead sign bridge structure, mounting components for toll equipment, and architectural panel mounting on sign bridge.

Other Engineering Services

General Civil - Development of complex design for civil features including site development, grading, parking lots, ADA compliant pedestrian facilities, pavement design, water and wastewater design of large projects (airport, transit facilities, housing/ community facilities, and multipurpose structures), flood resilient infrastructure.

Buildings & Facilities - Design of new low-rise, mid-rise, and high-rise buildings; addition, alteration, and rehabilitation of existing buildings; transit station design; bus and rail maintenance building design; cut and cover tunnel design and rehabilitation, and rehabilitation of parking structures.

Traffic Engineering and Intelligent Transportation Systems - Design of efficient and safe transportation and traffic systems. Design of traffic control plans during construction of roadways.

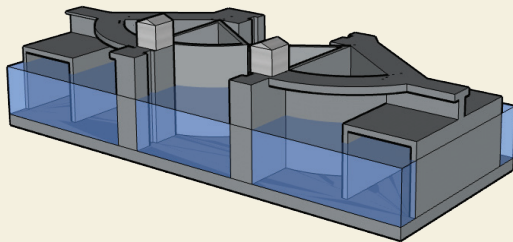
Hydrology and Hydraulics - Drainage analysis for roadway and civil construction of new and existing locations, water distribution and drainage system design; culvert, detention/retention ponds design; storm water management and site development plans; H&H/watershed/ flood plain modeling; erosion control; drought studies; statistical machine learning; future climate simulation.

Environmental Engineering - Quantitative hydrogeology, EIS / NEPA support, subsurface fate and transport evaluation, emerging contaminants and radionuclides evaluation, environmental remediation and restoration, remedy evaluation and optimization, surface water – groundwater interaction, numerical and analytical modeling, computational fluid dynamics, sand scouring / dredging / sediment transport analysis.

RECENT FEDERAL PROJECTS

Cow Bayou Value Engineering Study

infraTECH /Anwar Zahid served as the VE Study- Lead Structural SME for the Cow Bayou Gate Complex. The Cow Bayou Complex consists of two sluice gates, floodwall, levee,



a pump station, three drainage structures, and a 84-ft wide sector gate. To complete the VE study, the infraTECH team reviewed all preliminary concept designs and came up with alternative plans and options for the complex superstructure and foundations to optimize overall construction costs and future O&M. infraTECH served as a sub to Stantec-Jacobs JV.

(Client: USACE Galveston District)

Adams Bayou & Orange County Coastal Storm Risk Management Prevention Project Value Engineering Study

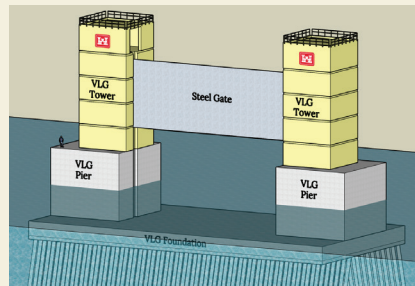
infraTECH /Anwar Zahid served as the VE Study Lead Structural SME for the Adams Bayou Gate Complex and surrounding Orange County Coastal Storm Risk Management Prevention Project. The design elements in this project included a sector gate, a vertical lift gate, five pump stations, concrete T-walls, and levee to protect Orange County during hurricane events. To complete the VE study, the infraTECH team reviewed the

preliminary design submitted and developed alternative design options for the complex. infraTECH served as a sub to Stantec-Jacobs JV.

(Client: USACE Galveston District)

Freeport And Vicinity Coastal Storm Risk Management Project FPV02

This project was originally designed with a sector gate option. infraTECH was initially tasked to compare the vertical lift gate (VLG) alternative with the sector gate option. Goal was to proceed with a gate design which will cost less but at the same time provides the



same level of storm protection across the Dow Barge Canal. infraTECH performed the feasibility studies, preliminary design on VLG and then compared the two gate options based on construction cost. It was concluded that the VLG option will result in a net savings of \$20 million for the Government. As a result, USACE decided to proceed with the VLG option and infraTECH was responsible for the completion of the preliminary design and the relevant sections of the design-build package. infraTECH designed steel gate, concrete piers, towers, and pile founded VLG base slab. infraTECH also coordinated with civil, H&H, MEP

design disciplines to complete the overall gate structure layout, tie-in T-walls and the ancillary structures. infraTECH served as a sub to AECOM-HDR JV.

(Client: USACE Galveston District)

Freeport And Vicinity Coastal Storm Risk Management Project FPV03

infraTECH was responsible for the assessment and the retrofit design of the existing Velasco Memorial Tidal Gate. The tide gate was found to be deficient under the new hydraulic loading conditions, therefore a retrofit design to remedy these issues was developed. The final retrofit design included addition of a steel pipe pile foundation, pier wall modification, and strengthening of the existing gate leaf to withstand increased hydraulic loading.



infraTECH served as a sub to AECOM-HDR JV.

(Client: USACE Galveston District)

Freeport and Vicinity Coastal Storm Risk Management Project FPV04-

As part of the preliminary design, infraTECH is responsible for the assessment of the existing DOW plant A and B sluice gates. Based on analysis, the existing structures



are found to be deficient. To remedy these deficiencies, retrofit designs were developed. The final retrofit design includes addition of a steel HP pile foundation, gate wall modification, upgrade of the equipment platform, and addition of monopile dolphins to protect the gates from barge impact. infraTECH is also responsible

for the final design of seven gravity drainage structures and pump station fronting protection. infraTECH is serving as a sub to AECOM-HDR JV.

(Client: USACE Galveston District)

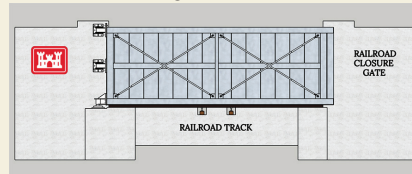
Port Arthur and Vicinity Hurricane Flood Prevention Project PAV03A

infraTECH was responsible for the preliminary design of a new railroad closure structure in Zone 3. The design included a steel HP pile foundation, pilasters, and the steel gate leaf. infraTECH served as a sub to FCC JV.

(Client: USACE Galveston District)

Dallas Floodway Extension (DFE)- Lamar Levee

infraTECH is currently working as the lead engineer for the final



design of two new railroad closure structures and adjacent T-walls.

The final design will include drilled shaft foundations for gate monolith, pilasters, steel gate leaf, and adjacent T-walls. infraTECH is serving as a sub to FCC JV.

(Client: USACE Fort Worth District)

A/E Design Services for Orange County CSRM

infraTECH is spearheading the structural design for key components including sector gates, vertical lift gates, their supporting monoliths, protective dolphins, and cofferdams located at Cow Bayou and Adams Bayou in Orange. We are developing a comprehensive structural design and construction sequence to address challenging environmental load conditions including weak soils, rising sea levels, and increasing storm severity and frequency. Our solutions include standardizing steel pile sizing used across all structural elements and cofferdam dewatering to reduce the required quantity of poured concrete, improving procurement and construction efficiency. infraTECH is serving as a sub to Stantec-Jacobs JV.

(Client: USACE Galveston District)

Hi Anwar,

We were really on some tight timelines while working on the West Closure Complex Pump Station and Seabrook Complex in New Orleans. I'll never forget the day we were headed to the pump station and saw all the barges of piles lined up headed for the site. That is truly a one of a kind mega project and am so glad we got to work that together with you being the structural lead and me being the geotech lead as designers of record for those projects.

I am glad to hear that Dr Ifti, who worked on the Vertical Lift Gate for IHNC-Seabrook has also joined your team. He is a great structural engineer to work with. Looks like you have built a strong team.

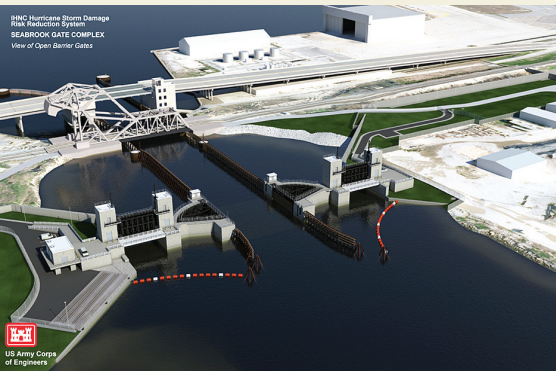
Wishing you continued success.

Tracy L. Hendren, P.E., Chief, Engineering Division, USACE Savannah District

MAJOR PAST PROJECTS EXPERIENCE OF KEY INFRATECH EMPLOYEES

IHNC Seabrook Complex

The Seabrook Complex is a hydraulic floodgate complex located at the junction of Inner Harbor Navigation Canal (IHNC) and Lake Pontchartrain near downtown New Orleans, LA. The



complex features a 95-foot steel sector gate at the center flanked by two 50-foot steel vertical lift gates (VLG) and tie-in T-wall structures that connect to the newly built hurricane protection on the west and east bank of IHNC. This project utilized Early Contractor Involvement (ECI) mechanism. Dr. Anwar Zahid served as the overall Designer of Record (DOR) for the complex and Dr. Ifti Ahmad served as the Lead Structural Engineer for vertical lift gates, T-walls, and the generator building. The Seabrook Gate Complex won the 2012 ENR best projects award for Texas and Louisiana, and also won the ACEC Honor Award in 2013. As the overall DOR for this

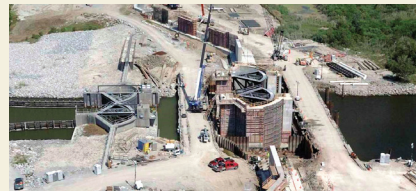


project, Anwar was interviewed by Engineering News Record (ENR). The project was done under Bioengineering-Arcadis JV. Ifti and Anwar served as the respective leads for the respective JV partners.

(Client: USACE New Orleans District)

Bayou Dupre Sector Gate and T-walls

The Bayou Dupre Sector gate is in the St. Bernard Parish, LA. The project included the design of the



56-foot steel sector gate and the adjacent T-walls to tie the gate into the overall flood protection system. The gate had an overall height of 43.5 feet which made it the tallest gate structure in the Hurricane & Storm Damage Risk Reduction System (HSDRRS), and



as such, the adjoining T-walls were the tallest walls. Dr. Anwar Zahid served as the structural Designer of Record (DOR) for the Sector Gate Complex and adjacent T-walls. The project was completed by the Bioengineering-Arcadis JV.

(Client: USACE New Orleans District)

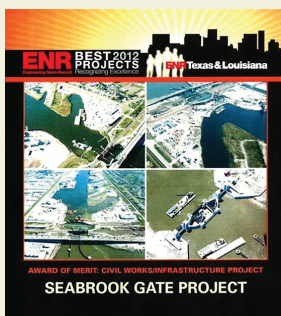
GIWW West Closure Structure Complex

The West Closure Structure Complex consists of a navigable floodgate, a pump station, flood walls, sluice gates, foreshore protection, and an earthen levee. Prior to this PS&E, Anwar served as



the structural lead for the 'Innovation Study' task order exploring different pump types (Horizontal, Vertical, Bow Thruster, Flower Pot) and gate types (Conventional Sector, Float-in Dutch, Sliding Pocket) that were suitable for this complex. This project utilized Early Contractor Involvement (ECI) mechanism. During PS&E, Anwar served as the principal structural engineer for the pump station. The project was completed by the Bioengineering-Arcadis JV.

(Client: USACE New Orleans District)



Rockaway Inlet to East Rockaway Inlet Reformulation Study: Jamaica Bay Analysis

The goal of the Reformulation Study was to reduce the vulnerability of the inlets to major storms over time, in a way that is sustainable over the long-term, both for the natural coastal ecosystem and for communities in the Jamaica Bay region. Dr. Anwar Zahid served as the structural task manager and technical lead for the engineering, ecological, and cost estimation components of the study.

(Client: USACE New York District)

WBV-73 Western Tie-In Highway Crossing, US 90 Bridge

This project involved the production of design document reports and plans and specifications for a new, permanent, four-lane highway bridge. The 2,450-foot bridge has two (2) pairs of traffic lanes going in opposite directions on separate bridge spans. One of the goals was to provide access between flood side and protected side. Aside from the typical highway loading, this bridge was also designed for uplift envisioning possible future storm surge scenario. On this project, Dr. Anwar Zahid served as the structural task manager and primary point of contact with the LADOTD. The project was completed by the Bioengineering-Arcadis JV.

(Client: USACE New Orleans District & LADOTD)

West Bank and Vicinity (WBV-09a) Hero to Oakville Pump Station and Fronting Protection

This hurricane protection project extends from Hero to Oakville in Plaquemine Parish, LA, west of the Algiers Canal and in a part of West Bank and Vicinity segment of the overall master plan of the New Orleans and the vicinity. The project included a pump station, intake basin, discharge tanks, T-wall as fronting protection, T-wall tie-in to earthen levees, sluice gate with box culverts and maintenance building. Dr. Ifti Ahmad worked as the structural lead for Bioengineering.

(Client: USACE New Orleans District)

Lake Pontchartrain and Vicinity (LPV-145) Flood Protection Walls

This hurricane protection project included approximately 8-mile long T-walls from Bayou Bienvenue to Bayou Dupre hydraulic gate structures in St. Bernard Parish, LA. The T-walls in this project ties to the Inner Harbor Navigational Canal T-wall and the LPV 144 Bayou Dupre sector gate. The T-wall height varies from 29 to 32 feet. Dr. Ifti Ahmad acted as a senior structural engineer and led the H-pile founded T-wall design for this project. The project was completed by the Bioengineering-Arcadis JV.

(Client: USACE New Orleans District)

Storm Surge Barrier Nieuwpoort - Alternative Study and Plans and Specifications (P&S)

Dr. Anwar Zahid served as the international expert reviewer (hydraulic gate structures) for the Belgian-Dutch team. The



goal of the project was to design a flood gate in Nieuwpoort, Belgium satisfying the hydraulic requirements and specific criteria set by the local population and



authority. The chosen gate structure is hidden under water during normal condition, it comes out from the bottom of the river to close the river when the surge demands closing of the structure. This is very similar to the Thames Flood Barrier in London, UK. Dr Zahid also gave a talk at the Dutch Ministry of Public Works as the US hydraulic gate design SME.

Rasmussen Valley Mine Environmental Impact Statement (EIS), ID

Dr. Khandaker Ashfaque served as the senior hydrogeologist for environmental impact evaluation of surface and groundwater resources as part of NEPA process because of proposed phosphate mining activities and its compliance with applicable Clean Water Act provisions. Under the leadership of Bureau of Land Management (BLM), multiple agencies (including USACE, USFS, IDEQ, and others)

constructed to assess dewatering requirements, potential impacts to nearby streams, evaluation of long-term recovery as part of mine reclamation, and fate and transport of constituents of concern in groundwater and surface water. These primary potential effects led to identification of alternatives and mitigation measures that would be used to reduce or eliminate impacts to the hydrologic system and other associated resources.

(Client: BLM, USACE, and other Federal and State Agencies in Idaho)

USCG NC Building 75 Thermal Treatment System

The proposed remediation for the United States Coast Guard (USCG) site in North Carolina included thermal enhancements for recovery and remediation of a dissolved 1,1,1-TCA plume. As the primary technical person, Dr. Khandaker Ashfaque developed a 3D numerical flow and thermal transport model to simulate groundwater flow and subsurface heating in the shallow groundwater flow system. The main purpose of the modeling study was to evaluate the simulated temperature distribution after six months to one year of hot water recirculation and extraction in the centroid of the plume. The optimal scenario evaluated with the model includes both injection of hot water and groundwater extraction.

(Client: USCG North Carolina)

Environmental Restoration Services, Picatinny Arsenal, NJ

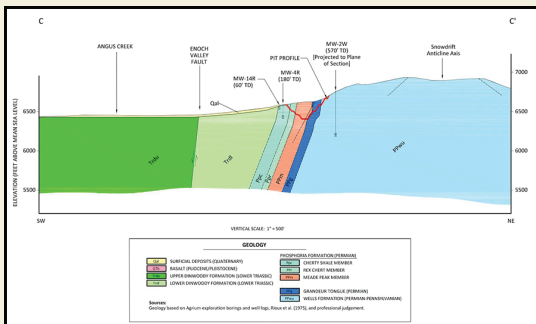
Dr. Khandaker Ashfaque served as the lead developer of a novel and highly complex numerical modeling for the fractured bedrock unit beneath specific site at the Picatinny Arsenal in NJ. Two different modeling approaches were used to simulate groundwater flow and solute transport at the well characterized contaminated fractured bedrock site in support of remediation engineering analyses. The numerical models were used to evaluate site-strategy and remedial timeframes for various remedial alternatives.

(Client: USAEC/USACE Baltimore District)

Lake City Army Ammunition Plant Environmental Remediation, MO

For this US Army superfund site, monitored natural attenuation (MNA) was selected as potential remedy at different contaminated areas addressing various volatile and semi-volatile organic compounds. Dr. Khandaker Ashfaque examined and evaluated the MNA system setup, performance, and effectiveness following US EPA guidelines. Based on the feedback from regulatory bodies, he modified and updated the MNA setup incorporating new monitoring wells in the system.

(Client: USACE)



were involved in the preparation of the EIS. After thorough evaluation of site conceptual model, numerical soil-atmospheric models as well as 3D groundwater flow and solute transport models were

SHORT BIOGRAPHIES OF KEY TEAM MEMBERS



Anwar Zahid, PhD, PE - Dr. Zahid has over 27 years

of experience in the civil/structural engineering field. He has spent significant portion of his career working on federal projects across the country, including several international projects. Dr. Zahid has served as the structural lead, PM and/or Designer of Record (DOR) on multiple major hydraulic structures projects. Dr. Zahid has worked on projects for the New York, New Orleans, Fort Worth and Galveston USACE Districts.



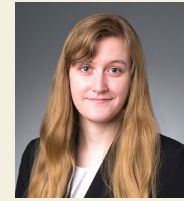
Ifti Ahmad, PhD, PE - Dr. Ahmad has over 28 years

of experience in managing the design and development of construction documents on a variety of civil and structural engineering projects. He has served as the structural lead in many major federal projects. Dr. Ahmad has worked on projects with the New Orleans, Galveston, and Fort Worth USACE districts.



Khandaker Ashfaque, PhD, PE, BCEE, ENV SP - Dr. Ashfaque

has more than 27 years of experience in hydrogeology and water resources working with USACE, USCG, EPA, BLM, DEQs, as well as many commercial clients. He has served as Project Lead and Technical Expert focusing on quantitative hydrogeology, EIS, SW - GW interaction, chemical transport, and remediation in numerous projects across North America and Asia.



Amanda Hollier, PE, ENV SP - Mrs. Hollier is a certified

Envision Sustainability Professional and experience in developing PS&E documents for highways and streets in both urban and rural areas. Mrs. Hollier has a wide range of experience with designing from simple ditches to alleviate complex flooding and ponding conditions along a hilly state highway without compromising driver safety.



William Wiwel, PE - William A. Wiwel, PE has over 12 years

of structural engineering experience, delivering projects for nuclear facilities, and rail transit systems across the US. He has a strong focus on designing steel and reinforced concrete structures. Currently, he supports infraTECH projects for the USACE in Orange, TX and Dallas, TX, where he leads design of floodwalls, monoliths, sector gates, and closure gates.



Akhilesh UL, PE - With nearly a decade of diverse design

experience, Mr. Akhilesh is a seasoned Structural Engineer specializing in the analysis and design of flood protection systems, including Concrete T walls, Culverts, Bridges, and Retaining Walls. He has worked on Freeport CSR, Lamar Levee Dallas, and the Orange County CSR projects for the USACE Galveston and Fort Worth districts with the infraTECH team.



Lane Brister - Mr. Lane is a Civil Engineer whose

expertise encompasses construction design and traffic control for bridges, creating area flood maps, culvert and roadway design, and utility coordination. He has worked on several complex projects in Texas and Louisiana ranging from urban engineering for local subdivisions to traffic control for major US highways.

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- Roadway & Civil
- Structure & Bridge
- Traffic, ITS & Safety
- Water & Environment
- Program & Asset Management
- Sustainability & Green Energy
- Artificial Intelligence

Build on Experience to Better Serve the Community

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