



UNT College of **ENGINEERING**

Senior Design Day 2023



CONSTRUCTION ENGINEERING TECHNOLOGY

Senior Design Day 2023



Denton ARFF Fire Station No.9



Team Members:

Madison Ampoe
Daniel Mojra
Kayla McDonald
Payton Butler
Jorge Baquier

External Sponsors/Mentors:



Mentor: Joshua Huneycutt

Internal Sponsors/Mentors:

Dr. Saman Rashidyan, P.E.
Dr. Aloysius A. Attah, P.E.

Abstract:

Our senior design project is the new construction of the ARFF (Aircraft Rescue Fire Fighting) Fire Station No. 9, located at 4900 Airport Road in Denton, TX 76207. Our project includes the new construction of a 4-bay 14,059 S.F. two-story fire station. The building is divided into three sections, including offices, residential, and an apparatus bay. The first floor includes the apparatus bays, a fitness room, a first aid room, and laundry rooms. The second floor includes living quarters consisting of 7 dorm rooms with an alcove, kitchen, and a day room. The maximum occupancy for the first floor office area is 31 occupants, the apparatus bay is 15 occupants, and the upstairs residential area is 10 occupants for a total of 56 occupants.

ARFF Fire Station No. 9 is constructed inside Denton Municipal Airport to provide better coverage for the airport and reduce strain on nearby stations. The location is relatively empty, however, minor demolition of underground utilities, removal of existing drainage structures, and relocation of site utilities are needed before commencing construction.

Our team has a report for the above project with multiple sections, detailing the project which includes Logistics and Layout, Budget, Schedule, Sustainability, Value Analysis, Risk Assessment, Safety Plan, and Business Plan

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Red Dirt Construction



Team Members:

Joseph Williams
Adam Lerma
Calvin Maeng
Layne Cole
Mario Galvan

External Sponsors/Mentors:

Ben Martin- Archer Western
Sponsor/Mentor
Trey Pearce- Mentor
Zach Wleczyk- Mentor

Internal Sponsors/Mentors:

Dr. Zhenhua Huang, P.E.
Dr. Aloysius A. Attah, P.E.

Abstract:

Dallas Water Utilities has bid out a Project Called the Major Maintenance and Rehabilitation project. It is estimated \$25.4 million and is scheduled to take 2 years from start to finish. The project takes place at three different water treatment plant across Dallas. The main goal of the project is to help keep aging treatment plants moving into the future and capable of handling the constantly increasing demand of water in the metropolitan area. These updates consist of updating I/O equipment, installing new water and fluoride tanks, replacing and repairing various pipelines and rehabbing the sedimentation basins. It's essential projects like these happen and reach completion in a high quality and timely manner, which is what our project group sets out to do. We can achieve this by creating a report covering the topics of Logistics, Business Plans, BIM, Risk and Safety Assessment, Sustainability, Value engineering, Scheduling and budget.



St. Mark Catholic Church

Team Members:

- Arthur Saldaña
- Sarbashree Adhikari
- Brian Rodriguez
- Antonio Salas Lopez
- Cesar Aguirre

External Sponsors/Mentors:

- Dave Clark, Linbeck

Internal Sponsors/Mentors:

- Dr. Cheng Yu, P.E.
- Dr. Aloysius A. Attah, P.E.

Abstract:

Our senior design project is the St. Mark Catholic Church which is a \$25 Million expansion to the existing campus that adds a new Sanctuary as well as a drive that encapsulates the campus. The Sanctuary covers 34,000 SQ FT and has seating for 1,800. This space doubles as both room for Mass and special events relating to those of the church. The project duration is 488 days and start date was Jan 10, 2022.

The Sanctuary contains fine elements that are unique compared to most construction. These elements include scopes like Stained Glass, Statues, Bell Towers, ICF, acoustical work and an Active Campus Navigation.

Linbeck, the general contractor has been selected to build this building due to their expansive experience in the cultural field. North Texas Partners teamed with Linbeck to coordinate various aspects of the project like Schedule, Safety Plan, Risk Assessment, LEAN Principles, Logistic and Layout, Excel Cost Estimation, and use of Construction BIM Software.





Cendana Craig Ranch, Pad C

DESKM Construction

Team Members:

- David Castillo
- Manny Gallegos
- Edwin Hernandez
- Scott Wisker
- Kyler Young

External Sponsors/Mentors:

- Breck Landry, TX Morrow Construction

Internal Sponsors/Mentors:

- Dr. Aloysius Attah, P.E.

Abstract:

Our senior design project group was assigned a Multifamily residential apartment complex. The apartment complex Cendana Craig Ranch Pad C is to be located at 6121 Alma Rd. in McKinney, TX, and is a five-story apartment building housing 299 apartments, with a pre-cast concrete garage in the middle of the structure.

Our team is tasked with designing the exterior lighting for Cendana Craig Ranch, Pad C, and the framing best practices to demonstrate to the management team, subcontractors, and workers. For the Exterior lighting our focus is to illustrate the importance of the building exterior lighting that is visible by the public. Our framing best practices focus is to quantitatively demonstrate what the most efficient ways to complete framing for the residence, as this is one of the most important aspects of construction for an apartment complex. The project value is \$44,609,946 with a construction duration of 27 months.

 The logo for TX-MC, featuring the letters "TX-MC" in white, bold, sans-serif font inside a white rectangular border. The logo for TX-MORROW CONSTRUCTION, featuring the words "TX-MORROW" and "CONSTRUCTION" in white, bold, sans-serif font.



Kaleidoscope Park Bogey Construction

Team Members:

- Superintendent - Alonso Cardenas
- Project Manager - Brock Petty
- Asst. Project Manger - Trevor Remsik
- Safety Coordinator - Osinachi Izuogu
- Asst. Superintendent - Laser Seitz

External Sponsors/Mentors:

- Valentina Valero, Austin Commercial

Internal Sponsors/Mentors:

- Dr. Aloysius A. Attah, P.E.

Abstract:

Frisco, Tx is home to our Senior Design project; Kaleidoscope Park. The objective of this 3.81 acre park is to create a vibrant and dynamic space for the community, aimed at promoting recreational activities, social interaction and overall wellbeing. The project is being executed with great attention to detail and is set to meet the highest standards of quality, safety and sustainability. With this construction project, Frisco will soon have a world-class park that will serve as a testament to the city's commitment to creating a high-quality urban environment. Residents will be able to enjoy beautiful art, a public restroom building, two sports complex/courts, a pavilion/concert stage, dog park and many more. With a Cost plus a fee guaranteed maximum price of \$36.5 Million we have a competitive schedule of completion in the fall of 2024 (16 months).



Downtown Denton Pedestrian Scramble

Prestige Design LLC

Team Members:

Antonio Enriquez
Maggie McGee
Nallah Turner
Kiara Blues
Le Huy

External Sponsors/Mentors:

Kaley Wilson, P.E., Kimley-Horn
Samantha Fries, P.E., Kimley-Horn

Internal Sponsors/Mentors:

Dr. Aloysius A. Attah, P.E.
Dr. Salar Shirkhanloo

Abstract:

Prestige Design LLC has the pleasure to partner with Kimley-Horn, a consulting firm for planning and design in the DFW area with a focus in municipal construction. The City of Denton has hired us to implement the Pedestrian Scramble project in Downtown Denton Square to improve pedestrian safety by allowing them to cross in any direction at the intersections of North Elm St., East Oak St., West Oak St., North Locust St., South Locust St., East Hickory St., and West Hickory St. The total lump sum cost of the design packages, bid documents, and the optional later support are \$95,000.00 not including permitting, application, and similar project fees which will be paid directly to the city. The Pedestrian Scramble project has an estimated duration of 6 months for the design phase and 3 months for the construction phase, all planned to occur beginning the spring of 2023.

Our responsibility at Prestige Design is to create a traffic control plan including all construction signage, pavement markings, and any necessary pedestrian detours. We also assist with the bidding documents and procedures as the City of Denton hires a contractor for this project.

We would like to give a special thanks to Dr. Aloysius and our sponsors at Kimley-Horn for the unmatched guidance and support they have given us. We all look forward to working with them this year as we further our own knowledge and confidence.

Kimley»Horn

Expect More. Experience Better.



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Southeast Denton Neighborhood Area B (SED-B) JICAR Construction

Team Members:

- Riley Paul Brummer
- Collins Peter Karuoya
- Isaiah Craig LaVigne
- Jacob Cleveland Nault
- Paul Austin Schaaf

External Sponsors/Mentors:

- McCarthy Building Companies
- Humberto Lopez

Internal Sponsors/Mentors:

- Dr. Saman Rashidyan, P.E.
- Dr. Aloysius Attah, P.E.

Abstract:

The heavy civil project focuses on full depth street reconstruction of subgrade, concrete curb and gutter, and driveways with new asphalt paving improvements, water line replacement, sanitary line replacement and limited sewer/sidewalk improvements for thirty-one (31) streets. The project is broken down into five work packages including asphalt paving, demolition/earthwork/ subgrade, concrete flatwork, traffic control, and underground utilities. The project involves a Construction Manager at Risk delivery method where the contractor is involved in the preconstruction phase before bidding. The project value is estimated at \$13,500,000 and started in December of 2022. Traffic control, logistics and safety are major areas of focus due to the amount of mobilization required for the geographic area. The proximity to residential and commercial businesses also presents a challenge to providing adequate egress/safety controls for each street section. The project is phased and scheduled through various minor geographic areas to move fluidly through the area. The project is a holistic approach from the city to reconstruct the aging infrastructure that has reached the end of its life cycle.



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We would like to acknowledge and say a special thanks to: McCarthy Building Companies, Humberto Lopez, Dr. Aloysius Attah, Dr. Saman Rashidyan, and the College of Engineering.



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