College of Engineering

R&D Expo

University of North Texas

SENIOR DESIGN

Spring 2025

COLLEGE OF ENGINEERING
Department of Mechanical Engineering

CONSTRUCTION ENGINEERING TECHNOLOGY
Senior Design Abstracts
Spring 2025

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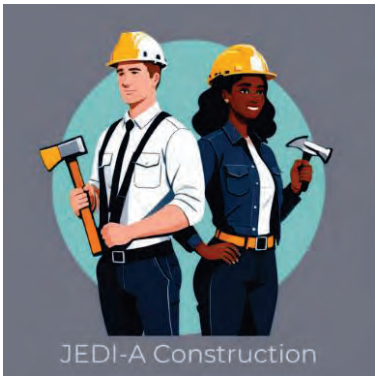

CELINA OWNSBY I
JEDI-A CONSTRUCTION

Team Members

Esther Egbe | John Joiner | Azriel-Selcio Akuete | Isaiah Thompson | Deepu Kuriakose Shaji

External Sponsors/Mentors

TX-Morrow Construction
Breck Landry, APM

Internal Sponsors/Mentors

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

Abstract

Celina Ownsby I is the first of two apartment complexes constructed by TX-Morrow Construction in Celina, Texas. This four-story, wood-framed structure is one of five planned buildings and comprises a total of 367 individual units. Our focus in this project centers on the “framing model,” which serves as the structure system of the building, with JEDI-A Construction as the framing subcontractor for TX-Morrow throughout the project. The scope of our research is to determine best practices for framing, which TX-Morrow can incorporate in future projects.

JEDI-A Construction is tasked with providing a written report detailing the framing process of the project to TX-Morrow. This report will include generated digital and physical models that will go over the general layouts of Celina Ownsby I, while discussing additional subjects such as the contract documents necessary for the framing process, budget, schedule, value engineering and safety practices applied on-site to ensure that the project runs smoothly and without any potential incidents.

Presented by the University of North Texas Mechanical Engineering Dept. Senior Design Program

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MMODS Construction
Irving Central Fire Station

Team Members

Tramel Middlebrook
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Internal Sponsors/Mentors

Professor Aloysius Attah, P.E.
Professor Orlando R. Bagcal, P.E.
Professor Cheng Yu, P.E.

Abstract

Location: Irving, Texas
Project Size: 10,200 sqft
Project Bid Amount: $7.99 Million
Project Duration: 14 Months
This senior design project compares different approaches to improve the construction, efficiency, and cost of the City of Irving's Central Fire Station. It takes into consideration how to improve sustainability and efficiency while remaining within budget. Studies include new design improvements, optimal systems, and following safety codes. Alternative materials are also looked into with regards to durability and cost. The project is planned to include water-saving devices, low-energy lighting, and recycled materials to achieve maximum LEED certification. It also addresses construction problems and uses Building Information Modeling (BIM) for clash detection during design to prevent them during construction.

TCU Athletics Human Performance Center

Team Members

Jori Foote
David Rendon
Saul Leija
Benjamin E. Hammond Narcisso
Cesar Martinez

External Sponsors/Mentors

Linbeck
Jose Cavazos

Internal Sponsors/Mentors

Dr. Aloysius Attah

Abstract

The TCU Athletics Human Performance Center Renovation and Expansion Projects is a $50 million donor-funded project that will include two new facilities and the renovation of two others. The project began in February and is scheduled to be completed in July 2025. The projects, which will support all 515 TCU student-athletes in the 22-sport program, include the renovation of the existing Bob Lilly Performance Center, Development of a Restoration and Wellness Center, Construction of a new state-of-the-art Football Performance Center and expansion of the entryway to the TCU football facilities.

The 10,000-square-foot Restoration and Wellness Center will include a cryo lounge, hydro massage and red-light therapy. The first addition is a new, two-story addition that connects to the Sam Baugh Indoor Practice Facility and Bob Lilly Performance Center (both previously built by Linbeck). The first building addition will include weight rooms, nutrition center, multi-purpose spaces for recruiting, balconies that overlook the indoor practice field, and a tech studio showcasing the latest GPS and analytical data used for elite athletic training. The second addition is the Athletic Restoration and Wellness Center that will connect to the Justin Center and will include equipment storage, a 100+ player spray area, recovery pools, cool rooms, spa-like areas with a nap room, sensory deprivation and infrared therapy areas, as well as a fuel bar. The third component of the HPAC is a renovation to the existing performance center. This space will be modernized to include new flooring, ceilings, lighting, A/V wall, weight room equipment, and branding.

The new Football Performance Center will include 20,000 square feet of strength and conditioning space, conference rooms and technology centers that connect the Sam Baugh Indoor Practice Facility and the Morris Practice Fields.

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