



Beneficial Use Case Study

Apogee Stadium

Coal Combustion Product Type:

Fly ash

Project Location:

Denton, Texas

Project Participants:

HKS Sports & Entertainment Group, HKS DesignGreen, Manhattan Construction Co., HKS Commercial Interiors, Smith Seckman Reid Inc., Aguirre Roden, Jaster-Quintanilla, Rogers Moore Engineering/Walter P Moore, Caye Cook & Associates, Henneman Engineering Inc.

Project Completion Date:

2011

Project Summary:

In 2008, the University of North Texas (UNT) approved a dedicated athletic fee to fund construction of a new stadium to replace Fouts Field, which had housed football operations since 1952. That same year, UNT President Gretchen Bataillon signed the American College and University Presidents' Climate Commitment to eliminate net greenhouse gas emissions from specified campus operations. As part of UNT's climate commitment, all new university facilities were required to attain a minimum of Silver LEED certification. The university spared no expense to make the construction of its new football stadium a model of green building practices.

Project Description:

UNT's sports teams go by the nickname the "Mean Green"—a reference to NFL Hall of Famer Mean Joe Greene, who played football at the university in the 1960s. School administrators and architects HKS Sports and Entertainment Group took that name to heart in developing a sustainable design covering all facets of the new stadium's operations—starting with the specification of green and recycled construction materials.

The design team opted for a steel-reinforced concrete skeleton for the stands. Fly ash was used to replace 6.2 million pounds of portland cement for the concrete portions—for an overall replacement of 35%—resulting in a carbon offset equivalent to the environmental impact of the stadium's electricity production for three years. Twenty percent of the products and materials used in the construction of the stadium featured recycled content and 47% were manufactured locally. Eighty-three percent of construction waste materials (including 6,373 tons of concrete and 188 tons of metal) were diverted from landfills via recycling.

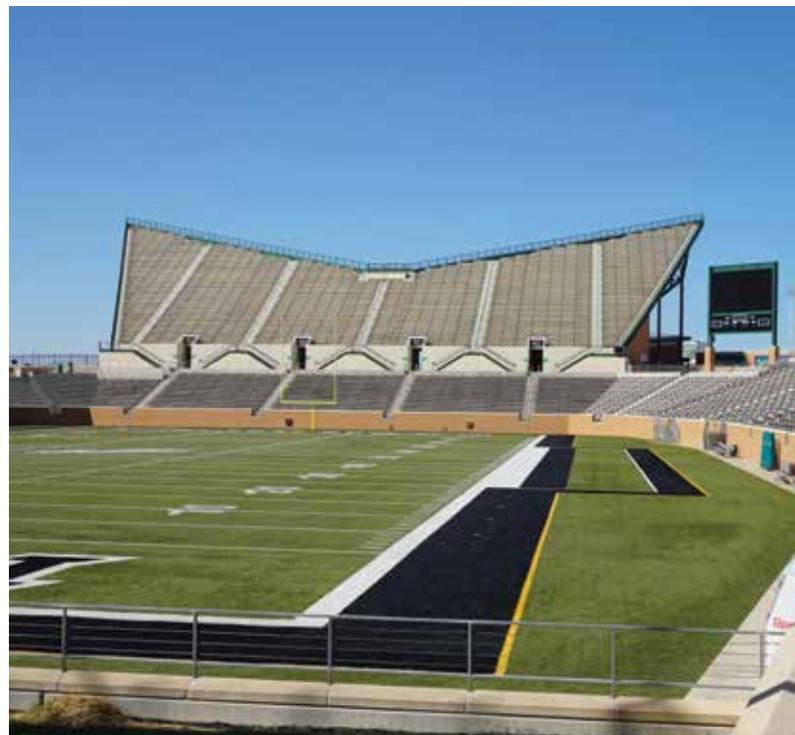
Structural engineers Walter P Moore volunteered to develop an educational outreach program to share with UNT students

information about the sustainable design of the stadium. Engineers ultimately delivered three classroom presentations on the environmental impact of construction materials and the strategies employed to reduce embodied carbon dioxide through material selection, replacement of cement with fly ash, and sustainable sourcing.

Although initially aiming for Silver LEED certification, the design team built in enough sustainable features that the facility qualified for Platinum LEED—the first newly constructed college football stadium in the nation to achieve this highest level of LEED certification awarded by the U.S. Green Building Council. Among those features were:

- Use of low-flow plumbing fixtures to reduce water consumption by over 50%
- Incorporation of native landscaping and permeable pavers to reduce heat absorption and reduce storm water runoff
- Installation of three wind turbines capable of generating a half-million kilowatt hours per year for the university's power grid—eliminating the equivalent of over 300 metric tons of carbon dioxide emissions annually

Apogee Stadium earned a host of awards for its green construction, including being named *Engineering News-Record's* "Best Green Project" in 2012.



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