# Beneficial Use Case Study

ACAA

## Theodore Roosevelt Presidential Library

### Coal Combustion Product Type
Class F Fly Ash

### Project Name
Theodore Roosevelt Presidential Library

### Project Location
Medora, North Dakota

### Project Participants
Snøhetta; JLG Architecture; JE Dunn Construction; Magnusson Klemencic Associates; Dickinson Ready Mix & Concrete Products; Winn Construction; Beton Consulting Engineers LLC; Eco Material Technologies

### Project Completion Date
Scheduled for July 4, 2026

### Project Summary
Inspired by the environmental legacy of President Theodore Roosevelt, the Theodore Roosevelt Presidential Library is designed to set a new benchmark for sustainable construction. The 96,000-square-foot facility—currently under construction near Theodore Roosevelt National Park—aims to exceed LEED Platinum certification and achieve the rigorous Living Building Challenge designation. Designed by Snøhetta with JLG Architecture as architect of record, the library's mission is to embody Roosevelt's spirit of conservation through regenerative design, local sourcing, and low-carbon materials. Recognizing that concrete represents the largest contributor to embodied carbon, the design and construction teams made it a central focus for innovation, incorporating high volumes of fly ash supplied by Eco Material Technologies to achieve major carbon reductions across all concrete elements.

## Project Description
To meet the library's ambitious carbon-neutral goals, Dickinson Ready Mix & Concrete Products worked with Beton Consulting Engineers to develop seven low-carbon concrete mixes for use in the building's foundations, retaining walls, and green roof systems. Each mix utilized a ternary blend of 1L portland cement, Class F fly ash, and Grade 100 slag—replacing 67–73% of the cementitious content with supplementary cementitious materials (SCMs), including 25–28% fly ash. Over 1,000 tons of Class F fly ash, sourced by Eco Material Technologies from the Coal Creek Station Plant in Underwood, North Dakota, were incorporated into the mixes and delivered to Dickinson Ready Mix via local haulers.

"The decision to utilize a ternary blend was made with a couple of factors in mind—primarily the carbon reduction goal, but also the materials available to us played a big role," said Ben Olin, CQTM and Ready Mix Division Manager at Dickinson Ready Mix. "Fly ash was utilized not only with the carbon footprint in mind but also for the positive effect on durability that utilizing fly ash provides."

To maintain performance with such a high replacement rate, the team relied on an admixture package that included a Mapei strength enhancer, a low water-to-cement ratio, and high-range water reducers to improve placement and early strength. "I think that we wouldn't have been nearly as successful if we didn't utilize the admixture package we did," Olin noted. "The use of a strength enhancer was a critical element in all the concrete placed."

Before exterior placements began, Dickinson Ready Mix and concrete contractor Winn Construction collaborated to pour a series of test panels to evaluate finish quality, strength gain, and winter durability. "We worked together with the concrete contractor to pour numerous test panels before the exterior placements on site," Olin said. "The test panels allowed Winn to see how the concrete finishes and see how it held up over the winter."

"There was a learning curve on this project, not only for the concrete contractor but for us as the supplier as well," Olin added. "Neither of us had ever batched or placed concrete with this high a replacement rate. The long-standing relationship with Winn, and the ability to have the space to place test batches, alleviated a lot of apprehension with these mixes. The ability to run test batches and placements gave us and the contractor the opportunity to make any changes needed to achieve the desired results."

By pioneering a high-fly-ash, locally sourced concrete for a project of national significance, the Theodore Roosevelt Presidential Library demonstrates how coal combustion products can advance the construction industry's carbon reduction goals while extending durability and material stewardship—continuing Roosevelt's enduring legacy of environmental responsibility.

*Rendering - Snøhetta Plomp*