

# MIDWEST CONTRACTOR

Iowa DOT Rebuilds East  
System Interchange to  
Improve Interstate for  
Omaha-Council Bluffs



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Construction crews prepare for a concrete pour

# RELIABLE, RESILIENT, ROBUST

## *A Modernized East System Interchange System Mitigates Congestion in Omaha-Council Bluffs*

By Erica Bender

In its aim to provide a 21st century transportation system that is reliable and strong, the Iowa Department of Transportation is in the midst of reconstructing interstate highways 29, 80 and 480 in the Omaha-Council Bluffs metropolitan area. This comprehensive interstate redesign, known as the Council Bluffs Interstate System Improvement Program (the Program), will modernize 18 miles of mainline interstate highway and 15 interchanges to enhance mobility and safety for motorists.

Construction of the \$1.6 billion program started in 2008 and is expected to continue through 2024. The federal government will fund approximately 85 percent of project costs, with the rest coming from the state.

This is one of the largest endeavors in Iowa DOT's current five-year Transportation Improvement Program and involves rebuilding most of the interstate in Council Bluffs, Iowa. Aside from routine maintenance projects completed in the 1980s and 1990s, no significant changes to the Council Bluffs Interstate System have occurred since its original construction in the 1950s and 1960s.

The Program includes the East System Interchange, a \$255 million undertaking designed to address capacity needs, improve safety and correct functional design issues within multiple interchanges.

The East System Interchange system's biggest change will occur on the south side of Council Bluffs, where I-29/I-80 is being rebuilt into a dual-divided freeway designed to improve the overall efficiency of the transportation network. Currently,

the weaving of through traffic and local traffic using the on and off ramps creates congestion, especially during peak traffic hours. The new freeway separates through traffic from local traffic by allowing travelers to use both express and local lanes, eliminating this source of delay.

"In 2019, the westbound dual, divided freeway will open in the spring and an eastbound viaduct will open in the fall," says Wendy Thompson, Public Information Officer for the Program. "Other major project milestones include a detour for I-29 northbound traffic to exit toward South Expressway, which opened in April, as well as minor traffic shifts on the interstate that will occur throughout 2018."

### **Interchange Upgrades Designed to Reduce Congestion, Enhance Safety**

The East System Interchange spans the Iowa Interstate Railroad's Council Bluffs Yard and is located about a mile west of the Mall of the Bluffs, a regional indoor mall. Also nearby in Council Bluffs are the Mid-America Center (an arena/convention center) and the Metro Crossing and Lake Manawa shopping centers, as well as several companies headquartered in Omaha, Nebraska, including TD Ameritrade, Werner Enterprises and the Union Pacific Railroad.

"The corridor, originally designed to handle 32,500 vehicles per day, now carries 75,500 vehicles per day," Thompson says. "By 2030, traffic on I-29/I-80 between the I-29 interchanges is expected to increase to over 130,000 vehicles per day."

The primary project objectives are simple: improve safety for motorists,



## A Snapshot of Construction Materials Used Since 2008

The Program has been active since 2008. Here are some highlights of the magnitude of work completed in the past decade.

- 263,000 cubic yards of concrete
- 13,200 tons of reinforcing steel
- 106 new tower and street lights
- 7.1 million cubic yards of earthwork moved
- 914,000 square yards of concrete paving
- 1.4 million square feet of bridge deck poured
- 32,400 tons of structural steel for bridges
- 39,100 linear feet of pipe
- 51,000 linear feet of conduit
- 6,900 linear feet of retaining wall
- 4,200 linear feet of noise wall
- 7.2 miles of railroad track laid



Bridge construction of the East System Interchange

mitigate congestion and reduce traffic disturbances caused by unplanned events such as vehicular accidents/breakdowns and harsh weather conditions.

The 3.5-mile-long project zone includes the part of I-80 located immediately east of Indian Creek (including the South Expressway interchange) and continues to a point southwest of the Madison Avenue and I-80 interchange. The area also includes I-29 from north of the U.S. 275/IA 92 interchange to Indian Creek.

This multi-year effort commenced con-

struction in July 2014 and is anticipated to be completed by September 2020. Divided into three phases, the project scope involves constructing 11 bridges and straightening I-80 through the interchange, improving efficiency by eliminating left entrances and exits and allowing highway users to move through the area with fewer lane changes. The current South Expressway/IA 92 interchange (a folded-diamond design) is being rebuilt similar to the existing configuration with two loop ramps and two diagonal ramps west of the interchange. Plans also called for

decommissioning the rail line located east of South Expressway in 2016 as part of railroad relocation and consolidation efforts taking place within the project limits.

### Project Progress

Phase I construction of the East System Interchange project was completed in late 2015. It included extending 23rd Avenue and reconstructing 29th Avenue; removing rubble and other materials from a former large industrial park; and starting the groundwork necessary for future lane construction.



Bridge construction in the East System Interchange for I 80 westbound



After nearly two years of construction, Phase II was substantially completed last October thanks to an accelerated schedule and collaboration between multiple contractors and the program staff. Now open, the new westbound I-80/southbound I-29 interchange adds capacity with three new large bridges totaling over 8,200 feet in length and lanes along westbound I-80 and northbound I-29, effectively mitigating congestion and delays during peak travel times. Travelers heading westbound on I-80 can now exit right and cross a new flyover bridge to get to I-29 south.

This project segment improves operations at the South Expressway interchange by consolidating CBEC and BNSF railroad operations into a common corridor that allows BNSF trains to bypass Council Bluffs west of Mosquito Creek, under I-29 and IA 92. This effort greatly reduced the number of roadway and railway conflicts and, additionally, eliminated numerous at-grade rail crossings and the CBEC corridor that bisected Lewis Central High School.

Phase III is currently underway and entails bridge construction, grading and paving work along eastbound I-80 and southbound I-29.

### Innovative Solutions, Streamlined Coordination Bolster Success

When asked what some of the biggest challenges are on the East System Interchange project, Thompson states that poor soil quality and settling issues within the area complicate earthwork and geotechnical activities.

"Settling and hold times are one of the biggest challenges on the accelerated construction schedule. Designers and contractors have to think outside the box to meet schedule demands, while also building a lasting, safe roadway," she says.

"Lightweight foam concrete, wick drains and rigid inclusions were ideal solutions to these obstacles because they allowed us to have better control of the overall schedule," adds Iowa DOT District 4 Engineer Scott Schram,

PE, Ph.D. "Without mitigation, we would have been subject to waiting for long settlement durations for embankments in areas of poor underlying soils. Controlling the schedule with these methods allowed us to keep the current and future related projects on track."

Another project consideration involved construction work above a railyard, requiring careful coordination with railroads and other stakeholders before certain project activities could begin.

Communication, says Schram, was key to helping the project team successfully navigate railroad consolidation and relocation in addition to East System Interchange construction, as advance notice about flagging or crane moves was needed to coordinate railyard activities.

"Early coordination during design occurred years before the letting. Discussions between Iowa DOT, the designers and Iowa Interstate Railroad helped the designers understand the railroad's needs during construction and allowed the railroad to provide feedback during the design phase," he says. "We continue to stress contractor communication with the railroads regarding schedule, construction operations and safety."

"Staging and traffic shifts are another complexity," Thompson adds, "especially when we split up the Phase II projects. This required coordination between the contractors and their schedules to get the new westbound viaduct and roadway opened, which they did ahead of schedule last fall."

### Programmatic Approach Accelerates Program Improvements

To accelerate program improvements and prioritize construction tasks, Iowa DOT has taken on a new programmatic approach that provides sophisticated project controls, proactive budget and schedule management and better consistency across construction packages.

e-Builder, a construction program management solution, is one project control tool that enables team members to manage capi-

## Highlights of CBIS East System Interchange Project

- **Owner:** Iowa DOT
- **Cost:** \$255 million
- **Location:** Council Bluffs, Iowa
- **Project Length:** 3.5 miles
- **Construction Timeline:** July 2014 to September 2020
- **Primary Contractors:** Hawkins Construction Co., United Contractors, and Cramer & Associates
- **Roadway Design:** Iowa DOT and HDR
- **Bridge Design:** HDR, Benesch and WHKS
- **Geotechnical:** Jacobs

tal program costs, schedules and documents.

"This software helps us streamline the review of submittals and RFI (Request for Information) documents, providing for transparency and accountability within the review process," Schram says.

Project officials also conduct monthly contractor schedule reviews to enhance construction efforts. Thompson adds, "We have also implemented program and project reporting and performance measures to gauge the progress of each project."

### Providing a 21st Century Transportation System

To support a modern, intuitive transportation infrastructure system, a variety of smart technologies have been specified to enhance roads and bridges. Examples include new traffic cameras, fiber optic cable, sensors, remote weather information systems and full-color Dynamic Message Signs.

"The color Dynamic Message Signs will be especially useful for messages about the dual, divided freeway; however, they are also a challenge since they are the first in the state of Iowa," Thompson says. This traveler information system can alert drivers to congestion problems and give them opportunities to divert to alternative routes – a major advantage that far outweighs the

learning curve of operating and promoting this Intelligent Transportation System (ITS) technology. Thompson notes that while the signs are not new, the color capabilities are – and they will help improve wayfinding, make urgent messages such as Amber Alerts more noticeable, and more.

Smart work zones are also being incorporated within the project corridor. Components used during construction, such as queue detection and vehicle entering systems, are proven to have a positive impact on traffic and traffic monitoring, affirms Thompson.

Thanks to these and other East System Interchange improvements, a more reliable, resilient and robust infrastructure system is being set into place in Omaha-Council Bluffs, which will mitigate traffic snarls and enhance safety well into the future.

*Photos courtesy of the Iowa Department of Transportation*



I-29 southbound flyover ramp construction