

2007 APPLICATION FORM

(required for each entry)

Job No. J8P0561

Route 160

County Greene

STIP Description (Scoping or Construction, state which STIP)

05-09

06-10

07-11

Original Scope - Grading, paving and replace bridge over Sac River, 0.6 miles E/O Dade County, H-123A

Revised Scope #1 - Grading, paving and guardrail on bridge over Sac River, 0.6 mile E/O Dade Co. H-123A

Revised Scope #2 - Grading, paving, guardrail and replace brg. over Sac River, 0.6 mi. E/O Dade Co. H-123A

Project Manager (could have both)

MoDOT Jim Hartman

Consultant _____

Active core team members as approved by the MoDOT PM (may include consultants)

Joyce Foster, CO, Bridge

Malissa Julien, D8, R/W

John Mehuys, CO, Environmental

Jim Smith, CO, Design

Mark Mais, D8, Utility Engineer

Stacy Reese & Will Walker, D8, De.

John Holmes, CO, Bridge

Johnny Teegardin, D8, Constr.

Derek Olson, D8, Traffic

Dale Ricks, D8, District Engineer

Julie Haden-Stiles, D8, Design

Burt Pitchford, D8, Area Engineer

Aaron Jaeger, D8, Design

Matt Seiler, D8, Ass't. DE

Ron Effland, D8, Design

Mark Stiles, D8, R/W

Project Contacts (will have both for consultant entry)

District Jim Hartman

Consultant \$ _____

STIP budget \$3,533,000

or **Award cost** \$1,995,749

Value Engineering study during design? yes no (if yes) **Project Stage** _____

VE Contact person _____

Construction-stage VE (VECP)? yes no (if yes) **Explain** _____

Total VECP savings \$ _____

VECP Contact Person _____

Why is this entry the "poster" image for MoDOT's practical design philosophy?

This project was originally scoped in July 2000 using traditional design criteria and seemed destined to become a \$4 million, one-mile-long road and bridge replacement "monument." It would have taken two full construction seasons to build. In February 2005, MoDOT designers took another look using the new Practical Design philosophy. Weeks of intense research led these designers to explore innovative solutions and creative techniques that before had been off limits. The result: a streamlined new bridge that saved \$1.5 million met all user expectations for function and safety and was completed in half the time.

Send entries to: MoDOT Design Division, ATTN: Jay Bestgen
1320 Creek Trail Dr.
Jefferson City, Missouri 65109

Costs Cut, Time Saved, Problem Solved: A Practical Design Triumph

A new safer, easier-to-drive bridge spans the Sac River on Route 160 west of Ash Grove and curves approaching the bridge are more gradual with better visibility. That delights residents of western Greene and eastern Dade counties.

The project cost less money than the original new-bridge design would have cost. Work was completed in a shorter-than-normal length of time. All that pleases MoDOT.

The new Practical Design process worked.

The project first was designed several years ago in the traditional way -- to build a new bridge next to the old one and realign the approaching roadway. It turned out that building a new bridge was more cost-effective than widening by only two feet the existing open spandrel concrete arch bridge. The accident history on the curves approaching the bridge showed the project was needed. In addition, the 20-foot wide bridge was narrow by modern standards.

Later, to save money, the project was scaled back by keeping the 1926 vintage bridge, which actually was in very good structural condition. Documented accident data showed few incidents on the bridge itself. It was determined that the bridge could be kept in service and handle the traffic as long as improvements were made to the approaches. This was the first time in the project that the new Practical Design concept was applied.

This keep-the-bridge design was presented at a public hearing in Ash Grove in April 2005. The meeting drew 165 people. A petition with 1,475 signatures was turned in. Written comments totaled 120. In all their statements, residents were polite but firm in opposition. They insisted a new, wider bridge was needed for safety reasons. Many people said they were driving the bridge as a one-lane structure out of fear. They had had their mirrors clipped and other minor damage to their vehicles, few of which were reported to police. They also talked about numerous close calls. The public did not hesitate to remind MoDOT of the earlier commitment for a new bridge. In addition, they pointed out that MoDOT snowplows could clear only one lane across the narrow bridge. When residents asked whether the old bridge could be widened to allow two school buses or large trucks to safely pass one another, they were told it could not be done structurally at an acceptable cost.

After the April hearing, the project was re-scoped. A design was developed to build a new bridge while spending less money than the original design. To accomplish that, however, the bridge would be built in place, requiring the road to be closed during construction. At a second hearing in late May 2005, the public expressed enthusiastic support, accepting the closed road in order to get a new bridge.

Here's how the project developed, again employing Practical Design principles:

Reducing the scope makes project possible.

The original scope involved building a new bridge next to the existing bridge and realigning nearly a mile of roadway. The new two-way bridge would have been 40 feet wide, with 12-foot lanes and 8-foot shoulders, at 738 feet long to span the restricted Zone A7 flood plain. The new mile of roadway would also have been 40 feet wide with 8-foot flat-bottom ditches and 50 mph clear zone. Temporary bypasses would have been built on each end of the project to maintain traffic during the projected 12-month construction phase. A minimum 150-foot right-of-way corridor would have been acquired to accommodate the new highway and bridge.

The final revised scope was to replace the existing bridge in its present location with a structure 32 feet wide and 350 feet long. Analysis showed the new bridge did not need to span the restricted flood plain if built in the same location as the existing bridge and met backwater "no rise" certificate requirements. The bridge's 32-foot width, with 12-foot lanes and 4-foot shoulders, would allow adequate room for vehicles to pass one another while providing a comfortable buffer for drivers.

The project still called for easing the curves and improving visibility on the roadway approaching the bridge.

To further enhance safety, rumble stripes would be placed near the shoulders.

Finding alternatives that work.

New techniques and methods to build the bridge were made possible by a non-traditional design:

- As mentioned earlier, a new bridge built on existing location did not have to span the entire floodway.
- A determination was made that a width of 32 feet, instead of 40 feet, would suffice. So shoulders would be built 4 feet wide instead of the traditional 8 feet.
- Slopes of 3:1 were used instead of a 6:1 clear zone, matching existing slopes along the entire highway. Only the right-of-way width to construct the project was purchased. Right-of-way and grading costs were reduced.
- V-ditches and 4-foot flat-bottom ditches were considered adequate to handle drainage. That allowed for a more economical design than the customary 8-foot flat-bottom ditches.
- Bridge approach slabs and concrete approach pavement were eliminated.
- Earthwork, tributary stream impacts and right-of-way costs were minimized by using 9-foot guardrail posts with 2:1 fill slopes.

During construction:

- Route 160 was closed and traffic detoured, avoiding the traditional practice of building of bypasses. This resulted in minimal work zone exposure for workers and the traveling public. It cut construction time in half.
- The speed limit was lowered on the detour route to avoid weight restrictions for trucks at a bridge along the detour. This allowed for a much shorter detour than would have otherwise been needed.

Bottom-line cost savings.

The initially scoped project had an estimated construction cost of \$3.533 million. The estimated right-of-way cost was \$89,000.

The final project had estimated costs of \$2.466 million for construction and \$39,000 for right-of-way.

The awarded contract cost was \$1.996 million.

Positive public response.

All who attended the second public hearing in Ash Grove in May 2005, after the project was re-scoped, expressed the belief that the project would address all their safety concerns.

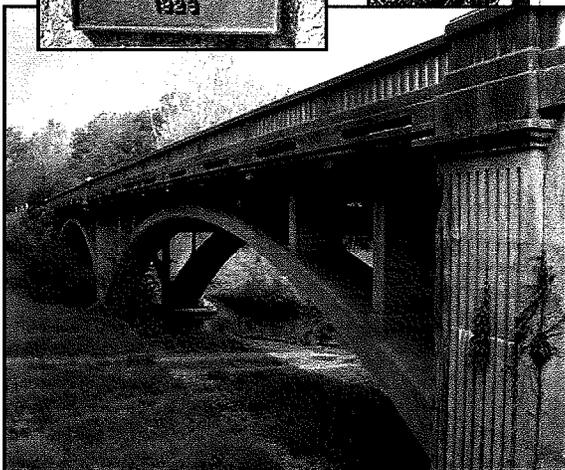
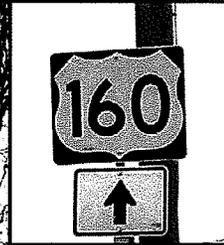
People accepted the need to close the road and detour traffic during construction because it allowed the project to be completed in six months instead of the typical 10 or 12 months. With traffic out of the way, work could be done more efficiently and at less expense.

Public involvement and support were very positive leading up to and during construction. And that was nice to have after such a rocky start. The public has expressed satisfaction with and appreciation for the completed project and that has been fantastic and very gratifying.

The new Sac River bridge on Route 160 is a genuine case of Practical Design scoring a home run with MoDOT and a grand slam for our customers.

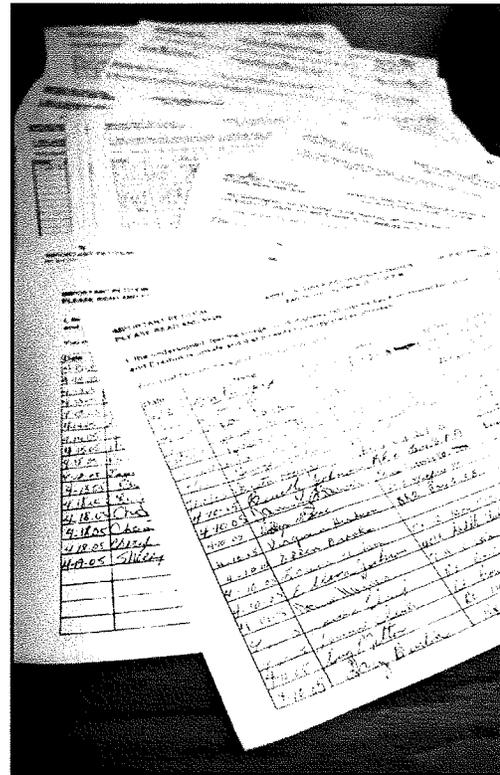
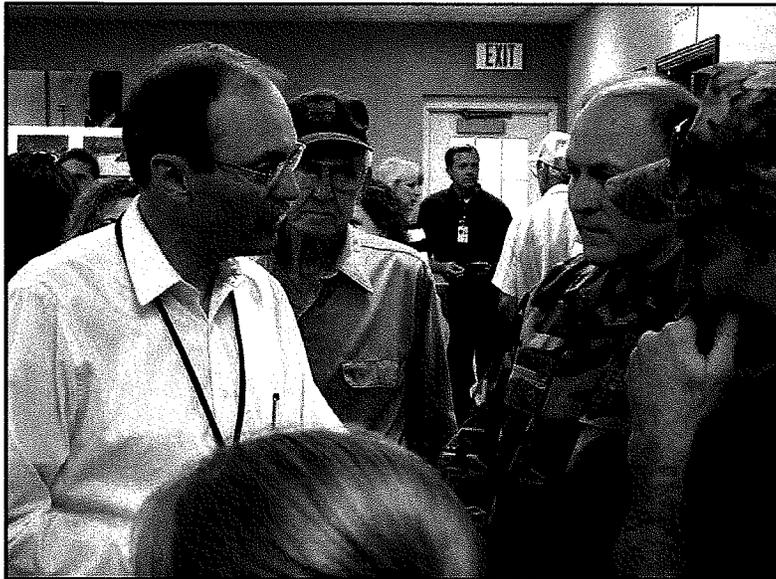
Jim Hartman
Project Manager
District 8/Springfield

Replacing the Sac River Bridge Route 160, West of Ash Grove, Greene County



The original Sac River Bridge was built in 1926 and served well for many years. While the bridge remained in good structural condition, in 2006, it was considered narrow by today's standards. Drivers complained about meeting big trucks and school buses crossing the bridge because of the tendency of the bigger vehicles to crowd or cross the centerline.

Hearing from the Public



Residents of western Greene and eastern Dade counties strongly urged MoDOT to build a new Route 160 bridge. They employed all means of communication, including (clockwise, from top) personal appeals from 165 people attending a public hearing in Ash Grove, in petitions with 1,475 signatures and 120 written comments, emails, newspaper articles and written correspondence, including those from area schools officials.



Everton R-III Schools

211 School Street
Phone: (417) 535-2221

◆ Everton, MO 65646
◆ Fax: (417) 535-4105

*"Home of the
Tigers!"*

April 1, 2005

To: Dale Ricks
MoDOT District Engineer
Springfield, MO 65801

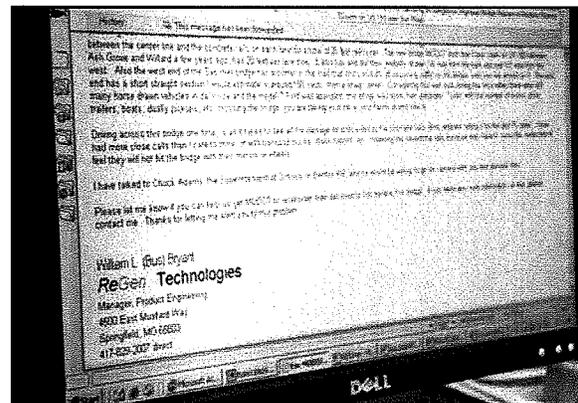
From: Chuck Adams
Superintendent
Everton R-III Schools

Dear Mr. Ricks,

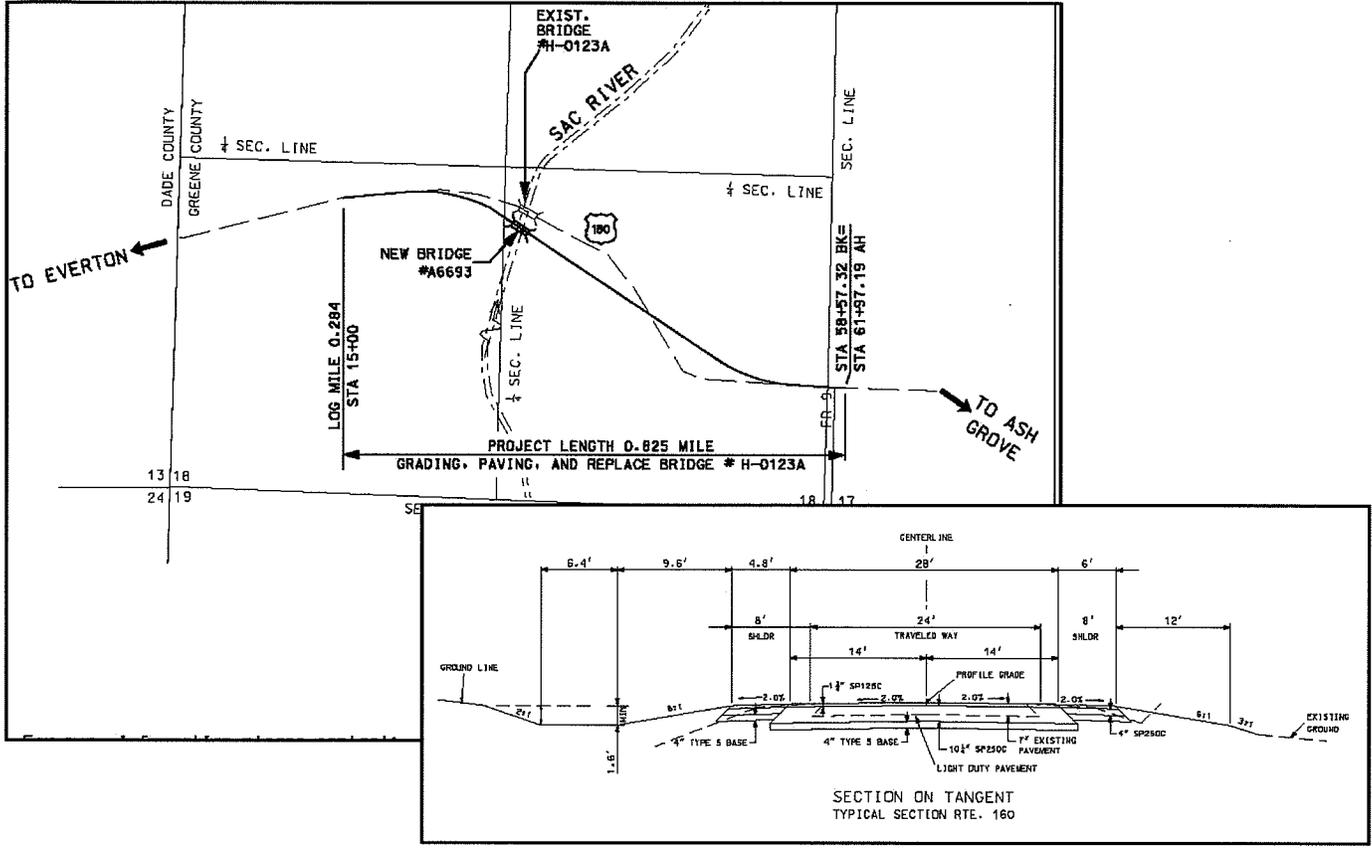
This letter is in reference to ago-old safety concerns about a bridge on U.S. 160 Highway that spans Sac River in Greene County just east of the Dade County line. After years and years of concern and complaint, I understand that this extremely narrow and unsafe bridge was finally to be replaced in 2005 or 2006. On MoDOT's web sight I have found job number 8P0561 with the following description: "Grading, paving and replace bridge over Sac River 0.6 mile east of Dade County. Involves bridge H-123A. Award Date 2006."

I now have renewed concerns. I have been given a copy of an article written by Kevin Keith for the March edition of the MoDOT employee newsletter, *Connections*. The article is titled *Building Cheery Not Cobblecs*. The article discusses cutting costs but not compromising safety or quality, then talks about this dangerous but sound bridge over Sac River, with a decision to straighten the road but leave the bridge! This bridge was built in the late 1920's when its traffic was either early Henry Ford or horse drawn!

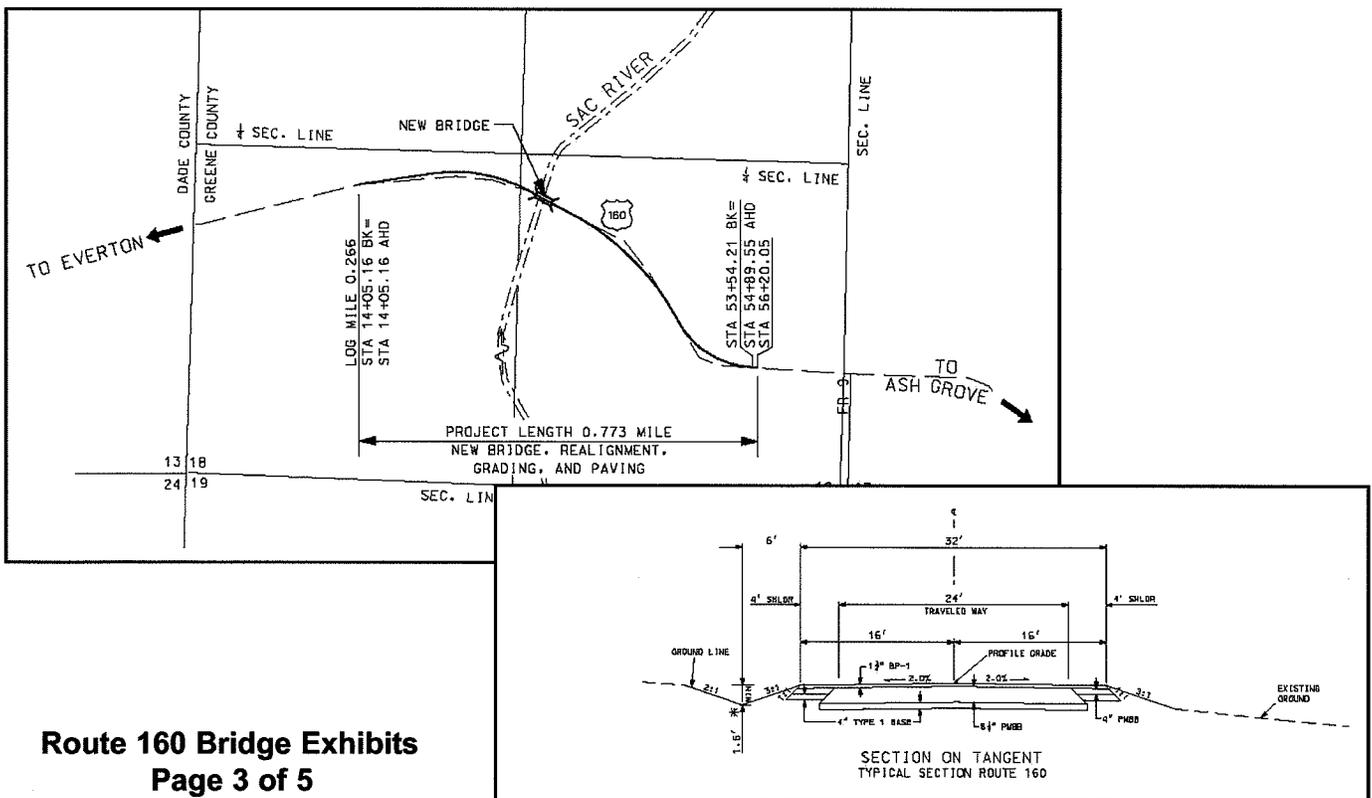
A few years ago, a similar bridge was replaced over Clear Creek also on 160 highway, but ten miles closer to Springfield. The Clear Creek bridge already had a good field of vision both ways (the Sac River bridge has sharp, blind curves on both ends) and is now twice as wide as the Sac River bridge. Most of the delivery trucks that supply us rural folks from Springfield and cross the Clear Creek bridge will also cross the Sac River bridge. Trucks from Pennington Seed in Greenfield constantly make trips to eastbound Wal Marts using 160 highway and crossing these bridges.



Original Design/Original Typical



Practical Design/Practical Typical

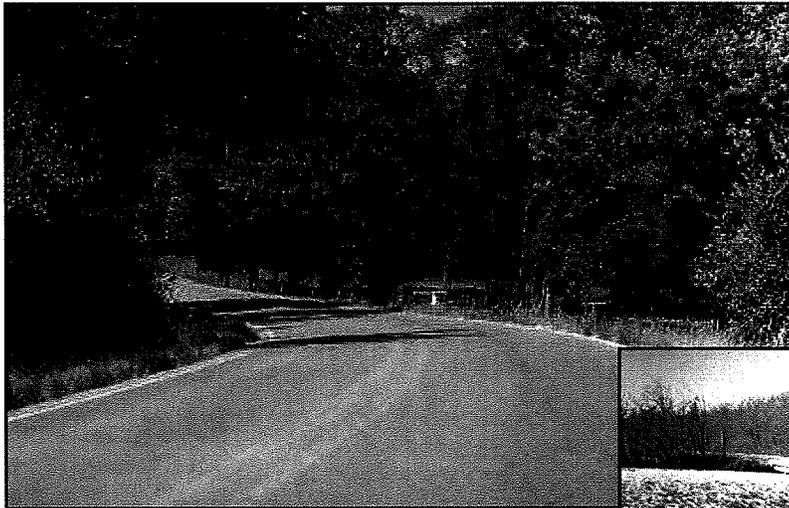


The Befores and Afters



Before construction, looking west from the bridge, a severe curve forced larger vehicles toward the center line as they approached the bridge.

After construction project, the curve to the west of the bridge is eased, making for a safer approach.

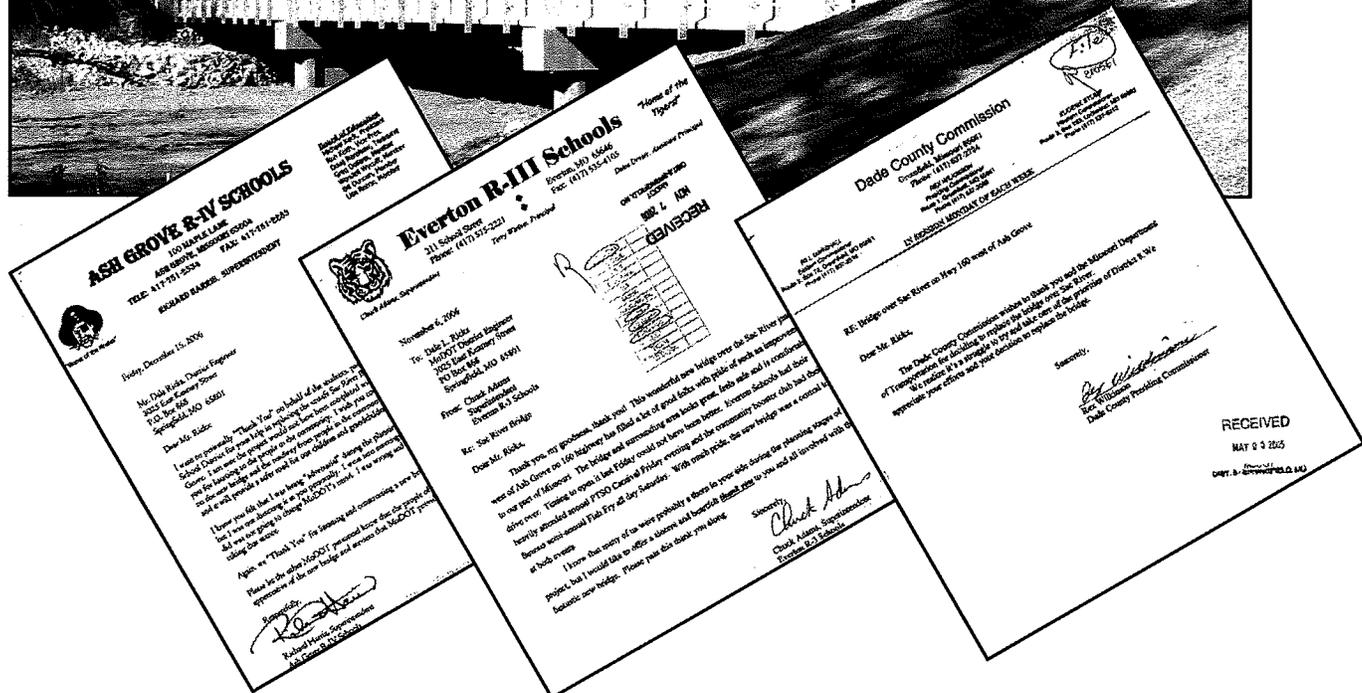


Before construction, approaching the bridge from east, a sharp curve made visibility a challenge.

After construction, the curve on the east approach was widened and visibility improved by the project.



Thanks for a New Bridge



The finished product on Route 160 includes a new bridge speedily built in place while the highway was closed, thus saving construction costs.

School superintendents from Ash Grove and Everton were among the more vocal leaders in the public effort to persuade MoDOT to replace the old bridge. After the project was completed, the superintendents wrote to thank MoDOT for finding a way to build a new bridge that enhances safety for a reasonable price. The Dade County Commission also wrote to express appreciation.

