

**MoDOT PROJECTS
2008 APPLICATION FORM**
(required for each entry)

Job No. JOP0951/JOP0925 **Route** 67 **County** Butler

STIP Description (Scoping or Construction, state which STIP) 2007-2011 STIP

JOP0951-Underseal pavement from 0.5 miles south of Route 160 to Arkansas state line

JOP0925-Resurface with 3³/₄" asphalt from 0.5 miles south of Route 160 to Arkansas state line

Is the submittal for the entire project or just a portion of the project? Please explain: _____

Entire project length

Project Manager (could have both) **MoDOT** Eric Krapf **Consultant** _____

Key core team members as approved by the MoDOT PM (may include consultants) (limit of 9)

John Donahue Lindell Huskey David Blalock

Dennis Bryant Steve Bubanovich Michael Chasteen

Travis Slayton Lynelle Luther Tonya Wells

Project Contacts: **District** Eric Krapf **Consultant** _____

Project Budget:

Conceptual budget \$ 19,953,504 **Initial STIP Budget** \$ 5,028,000 (combined)

Final STIP budget \$ 5,028,000 **Award amount** \$ 3,730,035 (combined)

Other : _____

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

Total VE savings implemented \$ _____ **VE Contact Person** _____

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

Total VECP savings \$ _____ **VECP Contact Person** _____

What would make this entry stand out from the rest of the entries when considering MoDOT's practical design philosophy? (In layman's terms - 100 words or fewer) A tenet of practical design is that we need to move away from

a "more is better" approach. By developing a practical design for this project (over \$16 million savings), we were able to address a need

in a location where the cost of the traditional approach would make programming the work unfeasible. Additionally, practical design has

driven many policy changes recently. In that context, the surface correction provision developed for this project is currently being used on

another project (J0I2153) in District 10 and will be shared statewide for application when utilizing thin overlays.

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

ALL ENTRIES MUST BE RECEIVED NO LATER THAN CLOSE OF BUSINESS ON DECEMBER 15, 2007.



MEMORANDUM

Missouri Department of Transportation

Project Development District 10

TO: Jay Bestgen, P.E.
Assistant State Design Engineer

FROM: Eric Krapf, P.E.
Transportation Project Manager

DATE: November 30, 2007

SUBJECT: 2008 Awards for Excellence in Practical Design

Please find attached District 10's submittal of J0P0951/J0P0925 for consideration in the subject competition. This project addressed a badly deteriorated pavement, which was originally scoped for replacement, by under-sealing the existing pavement, smoothing the surface, and applying a thin overlay.

Project Overview

The existing concrete pavement on Route 67 in Butler County extending 10.5 miles north of the Arkansas state line was over 70 years old. Extensive full depth patching was necessary due to a failure mechanism involving a high water table, pumping, loss of fines, creation of underlying voids and subsequent pavement failures. Photograph 1 depicts the typical condition of the pavement prior to the improvement. MoDOT maintenance forces reported spending nearly \$100,000 per year on materials alone to hold the pavement together.

Both a report prepared by MoDOT's geotechnical section in July 2004 and a pavement type selection report prepared by MoDOT's staff in January 2005 recommended either full depth replacement, unbonded concrete overlay, or rubblization/asphalt overlay. MoDOT's staff estimated the cost of any of these treatments to be in excess of \$20 million, partly due to difficulties in maintaining traffic on Route 67 during construction. Due to the excessive cost associated with this solution, it was unlikely a project of this nature would be added to MoDOT's STIP to address this need.

In an effort to be responsive to our customers, MoDOT staff developed an innovative plan to apply an affordable, alternative treatment to address the need. This treatment had to address the pavement's moisture problems, the movement of the existing slabs, and fit into MoDOT's Better Roads/Brighter Future directive. The practical solution involved undersealing the slabs (depicted in Photograph 2), application of a "surface correction" provision (shown in Photograph 3) to address smoothness prior to the asphalt overlay, and application of the overlay. A photograph of the finished product is shown in Photograph 4.

The public was engaged throughout the life of the project by various means. These included personal contacts with citizens and local entities, news releases, corridor publications and emails. The success of the project is evident upon inspection of comments received from the public through the life of the project. A sampling of public involvement information is shown in Figure 1.

Purpose and Need

Although the original solution of new full depth pavement would provide a longer design life for the pavement that was constructed, the practical solution addressed the need for a smoother pavement and was the correct treatment when the fiscal environment in which we must work is considered.

When the undersealing/overlay alternative solution was originally presented, the core team was focused on a thicker asphalt overlay (approximately 6 inches). Construction personnel expressed the fear that acceptable smoothness could not be obtained in only two lifts of asphalt. The pre-undersealing Profile Index (PI) of the roadway was approximately 60 in/mi and post-undersealing PI was approximately 100 in/mi. This led to the development of the “surface correction” provision. This provision required the contractor to obtain a level of smoothness before application of the overlay. The method for obtaining smoothness was left up to the contractor. This provision provided for a smoother product with a thinner overlay (3-3/4 inches). The average finished PI of this roadway was 22 in/mi. Figure 2 contains this provision along with a surface tolerance provision and a provision with profilograph information which, according to the contractor, aided in preparation of bids and “saved MoDOT money.”

Several design items were tailored to reduce cost. First, the design team developed a plan to eliminate the need for pavement edge treatment for the overlay. In order to prevent using a more expensive mix on shoulders, the mix designs for mainline pavement and shoulder pavement weren't the same. Therefore, the possibility for an edge drop off in excess of 4 inches existed. The typical section required the contractor to build a 3:1 slope at the driving lane/shoulder interface to mitigate this issue. Similarly, the cross slope of the shoulders were increased (still within acceptable limits as defined by AASHTO) to minimize thickness at the shoulders' edge, thus preventing the need for grading operations at this location. The typical section is shown in Figure 4. Finally, the method of undersealing was an alternate bid item. Hot Asphalt and Polyurethane were both considered acceptable methods in hopes to increase competition and drive down prices.

Safety elements described in MoDOT's Direction and Expectations for Missouri's Major and Minor Roads, including edgeline and centerline rumblestrips, were included in the project and have enhanced the safety of this highway facility.

Cost Savings

As stated previously, the original corrective action suggested by MoDOT's geotechnical section and the pavement selection team was estimated at \$19,953,504. The total of the award amounts for J0P0951 and J0P0925 is \$3,730,035, an apparent savings of \$16,223,469. The conceptual estimate and bid award totals from MoDOT's website are shown in Figures 3 and 4, respectively. The only element in the original estimate that was not addressed by the practical solution was \$981,007.50 worth of bridge work. The chosen solution will not preclude this bridge work from happening in the future.

During the development of the project, the Area Engineer provided documentation showing nearly \$100,000 each year was being spent on materials alone to perform the needed full depth patching of the pavement. This work is no longer necessary since the completion of the project.

No right of way or utility impacts were anticipated for the original corrective action. The practical solution required no right of way acquisition or utility relocation.

Roadway User Expectations

The project team re-invigorated the use of the Pilot Car in order to minimize traffic delays during construction. Feedback received from MoDOT's construction staff was very positive regarding the use of the Pilot Car. For instance, the Pilot Car helped increase the efficiency and safety of traffic flow through the work zone by driving at higher speeds in areas absent from workers and at slower speeds in areas adjacent to the mobile operations. A new sign urging motorists to “Wait for Pilot Car in Your Direction” was developed and used at intersections within the work zone, helping to mitigate the need for flaggers at several locations. A copy of this element of the traffic control plan is shown in Figure 5.

As documented in Figure 1, the feedback received from the public indicates we have accomplished our mission of delighting our customers.

Designed To Speed Construction

To what lies in Route 67 south has been done before the first construction contract ever gets underway. In addition to surveying, staking where to build the lanes, getting the necessary permits, and designing a safe roadway, there's also purchasing the needed land and removing anything on it.

With a 50-mile improvement area, there aren't that many clear spots along Route 67. The roadway is lined with trees, homes, businesses, utilities the power lines, and much. MoDOT's project team had two big challenges before it: money and time.

"We don't have unlimited funding to make these improvements," says Transportation Project Designer David Wyman. "We have a portion of money in our construction program and money from partners such as the Route 67 Corporation. We're working to make the best and most needed improvements with what money is available."

MoDOT had also considered to having the improvements completed by 2012. With an already tight deadline, the project team knew it would have to take steps to ensure the project had the resources and the best bids for each one.

"Using contractors to work some clear of trees, buildings and utilities helps get the best bids and expedite the grading and getting the work," says Transportation Project Designer James Williams.

The answer was to award clearing and demolition contracts in advance of the grading and paving work. That's not really anything new for MoDOT, but the team was awarding these contracts before all the right of way was purchased by a new bid.

"It isn't the usual way of doing things, but with the cooperation of our design, environmental and cultural, right of way, construction, and maintenance departments, we've found a way to make it work with two of these clearing contracts already awarded," Williams says.

The idea is that contractors can begin work on each portion of land once MoDOT rights of way department and property owners come to an agreement. Instead of waiting for many miles of land to be purchased and a contract awarded, the contractor has already been awarded a contract and can get the work done as soon as the land is bought.

"It is imperative that utilities are relocated and structures demolished in a timely manner to keep construction on track," says MoDOT Construction Engineer Tracie Lusher. "These contracts have enabled us to offer a clean work area before a construction contract is ever awarded, thus bringing in lower bids and saving time."

Path To A Smoother 67

If you'll pardon the pun, it has been a long road for the improvement on Route 67 south of Poplar Bluff. The highway has been plagued by recent potholes, undersealing concrete, making repair patching a daily occurrence. And, that's plagued motorists with frequent potholes and the necessary safety work zones necessary to fix them here.

Drivers have recently gotten use to the work zones as a two-phase project to make repairs from one-half mile south of Route 160 to Adams has been underway. Last fall, work began on the first step to underseal the pavement to stop the water problems. The success of the project was less than celebrated.

"We were so happy that we'd found something to take care of the water problem," says Project Manager Eric Krug. "But, it often left people on their hands to install signs that say you must be this fast to take this ride." Krug says the honor doesn't diminish the very happy ride the undersealing brought those who travel the route. "It was rough," he continues, "but we know it would be, but it was a little surprising that the road was that rough."

After the undersealing was complete, the road was to be milled and repaired, with milling taking care of any uneven pavement and new asphalt providing a smooth surface. The resurfacing contract was awarded and milling has been completed. Paving is currently underway. Krug says the improvements are already being noticed. "I drive over the southbound lanes after the milling," he says. "It was much improved, but I didn't realize quite how much until I came back on the northbound lanes that hadn't been ground yet."

Hopefully, as an improvement program has already started on it.

"Road work is always an inconvenience, and we're very thankful to those who travel the route for their patience and especially their caution with traveling through the work zones," says Krug. "Route 67 drivers have shared the road for many months with orange cones, however, the work is expected to be completed by this fall, leaving smoother travel and work zone free lanes for drivers."

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Getting the pavement to prepare for resurfacing.

Publications

- Progress reported in the last three issues of the Route 67 News with a mailing list of more than 3,200 people.
- Updates given to stakeholders in the July '06, Jan. '07, and July '07 Butler County Talkin' Transportation newsletters with a distribution list of nearly 200.

News Releases

- September 2006—Commission Awards Undersealing Contract
- October 2006—Undersealing Work Starts
- March 2007—Commission Awards Resurfacing Contract
- June 2006—Milling Begins
- July 2007—Paving Begins

Extra, Extra: Latest On Greenville Park

Approval was recently given for the 60 construction document for the Greenville City Park. Re-opens of the Route 67 four-lane improvements, the park will need to be relocated. However, because it was originally built with federal funds, the replacement park had to be approved by the Department of National Resources and the U.S. Park Service boundaries.

All who needed to sign off on the new park here. Now, MoDOT can reimburse the City the cost for the relocation, and Greenville can begin construction of its new city park.

MoDOT
 2775 N. Main St., P.O. Box 100
 Jefferson, MO 64501
 488-6646/6607 (1-888-276-6630)
 248-2600/2646/2647
 Return Service Requested

South 0/18
 Springing Trip-Up
 What's Next?
 Message Drive

Correspondence

- Tracked concerns received through MoDOT's website (as in examples below) and updated those motorists at each milestone during the course of the project.

"I think it is ridiculous that so much time and tax dollars have been spent on Hwy 67 South. The entire road could have been repaved for what has been spent on cutting out concrete squares. The last effort at repair has resulted in a road that is like riding on a roller coaster just to drive down it. I've learned to NOT fill the coffee mug too full or you'll be sorry!"

--Kim Hager, Neelyville School Nurse, Dec. 1, 2006

"Great improvement! The highway is so much better and the drive to work every day literally goes so 'smooth.' I actually get to enjoy my coffee instead of wearing it!"

--Kim Hager, Neelyville School Nurse, Dec. 5, 2007

"It feels like a roller coaster ride. My two children complain of getting sick (car sick). I meet cars at night and the headlights are bouncing up and down."

--LaMonica Moore, Neelyville School, Nov. 20, 2006

"I am so pleased with the final construction of the road/highway. It's great for traveling and I hope it stays in great shape for a long time. Thanks again for your promise which was kept."

--LaMonica Moore, Neelyville School, Dec. 5, 2007

"Hwy 67 South from the 160 and 158 junction to Neelyville. This stretch of highway is full of potholes and has been for some time."

--Sharon Reece, Neelyville School, Dec. 1, 2006

"Things run a lot smoother instead of bouncing. Thanks again."

--Jerry Rich, Neelyville School, Dec. 5, 2007

"I am very thankful the highway was resurfaced. It has made my daily commute much better."

--Brad Hagood, Neelyville School Superintendent, Dec. 6, 2007

FIGURE 1 - PUBLIC INVOLVEMENT

XX. SURFACE CORRECTION

- 1.0 Description. This work shall consist of the contractor obtaining a specified PI number as outline in this provision.
- 2.0 Construction Requirements. The contractor shall obtain a maximum PI of 45in/mi and all bumps/dips shall be corrected to no greater than 0.4" in 25', prior to placing the 2" of plant mix bituminous base and the 1 ¾" plant mix bituminous pavement.
- 2.1 If a bituminous pavement product is used, Sec 401 shall apply.
- 2.2 If grinding, portland cement concrete pavement patching or undersealing is used to meet the requirements of the provision, all applicable Standard Specifications shall apply.
- 3.0 Method of Measurement. Measurement of the leveling will be made to the nearest 0.1 SQ YD. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity.
- 4.0 Basis of Payment. All costs incurred to comply with this provision shall be paid for at the contract prices of "Surface Correction, Item No. 622-99.05".

XX. SURFACE TOLERANCE FOR FINAL SURFACE

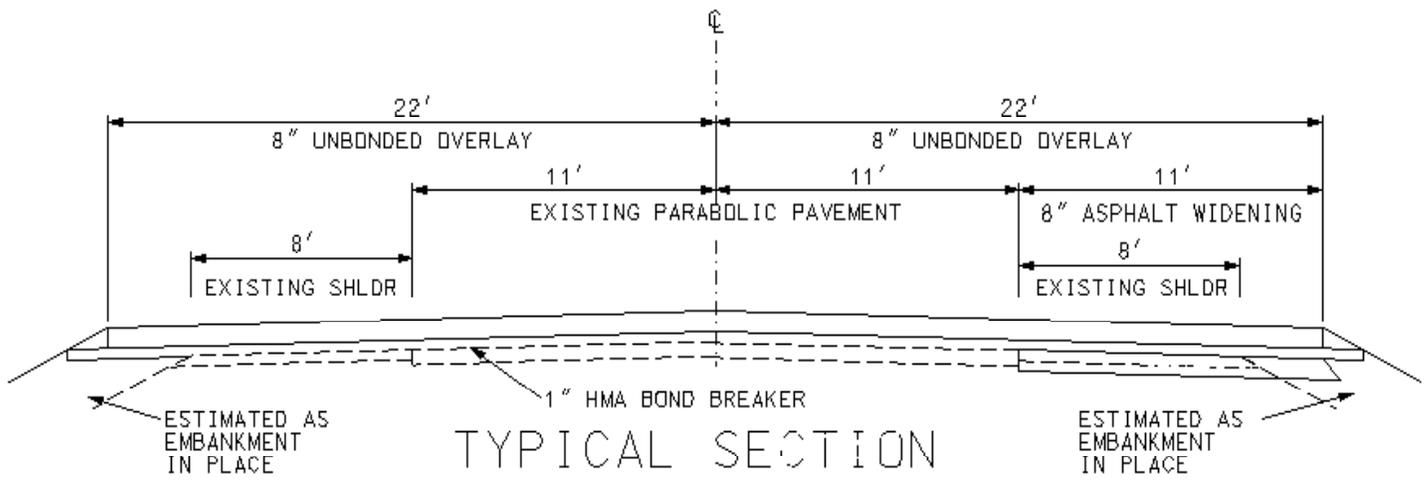
Sect 403.20 shall apply to the final surface of plant mix bituminous pavement.

XX. PROFILOGRAPH AND PROFILE OF EXISTING PAVEMENT

The actual trace of the project, as taken by MoDOT's profilograph, is located at its Sikeston office and is available for inspection by all potential bidders. MoDOT does not possess the technology to electronically reproduce or plot the trace but it can be photocopied manually at a cost of \$25 per hour. Allow five days for shipment of trace. Contact the project contact for the actual trace.

The trace is not warranted to be accurate nor a true reflection of conditions present at any time or at any point along the project. What the trace represents is the raw data MoDOT and MHTC used to determine the necessity for the project and for the requirement of staged measurement to ensure final product quality. The trace is being made available to all potential bidders and the information it reflects is to be used only for the purposes solely determined by each bidder and no other.

FIGURE 2 - PROVISIONS INCLUDED TO ENSURE SMOOTHNESS



Grading and Drainage

	Quantity		Price		Cost
Embankment in Place					
2 cy/ft X 10.5 mi X 5280 ft/mi =	110880 cy	X	\$8.00 =		\$887,040.00
Culver Extensions = 33					
Flared End Section	66 ea	X	\$2,450.00 =		\$161,700.00
36" Pipe	330 ft	X	\$900.00 =		\$297,000.00
Type A Collar	66 ea	X	\$2,550.00 =		\$168,300.00
Pipe Aggr Pavement Edge Drains	110880 ft	X	\$9.00 =		\$997,920.00
Outlet Pipe and Splash Pad	222 ea	X	\$397.00 =		\$88,134.00
			TOTAL G&D =		\$2,600,094.00

Base and Surface

Shoulder Widening	30120 tons	X	\$45.00 =		\$1,355,400.00
1" HMA Bondbreaker	289520 sy	X	\$3.50 =		\$1,013,320.00
8" Unbonded Overlay	271040 sy	X	\$40.00 =		\$10,841,600.00
			TOTAL B&S =		\$13,210,320.00

Misc

20% of G&D plus B&S

TOTAL MISC = \$3,162,082.80

Bridge

3 Bridges(60', 66', 88')

add 10% to length
width

= 235.4 ft
= 44 ft

10340 sf x \$ 75.00 = \$ 775,500.00
10% Staged Construction = \$ 853,050.00
15% Seismic = \$ 981,007.50

TOTAL BRIDGE COST = \$981,007.50

TOTAL COST = \$19,953,504.30

FIGURE 3 - PRE-PRACTICAL DESIGN CONCEPTUAL ESTIMATE

SUMMARY OF BID AMOUNT FROM MODOT WEBSITE

CALL X04 BUTLER ROUTE 67 PROJECT J0P0951 - August 25, 2006 Letting

Missouri Petroleum Products Company, L	St. Louis, MO	\$796,035.00	Low Bidder
Urettek USA, Inc.	Clinton, MO	\$1,146,694.00	

CALL X03 BUTLER ROUTE 67 PROJECT J0P0925 - February 23, 2007 Letting

Pace Construction Company, LLC	St. Louis, MO	\$2,934,000.00	Low Bidder
Chester Gross Const. Co./C.B. Equipment Inc.	Hannibal, MO	\$3,180,890.92	
APAC-Missouri, Inc.	Columbia, MO	\$3,456,946.63	

Total Award Amount	\$3,730,035.00
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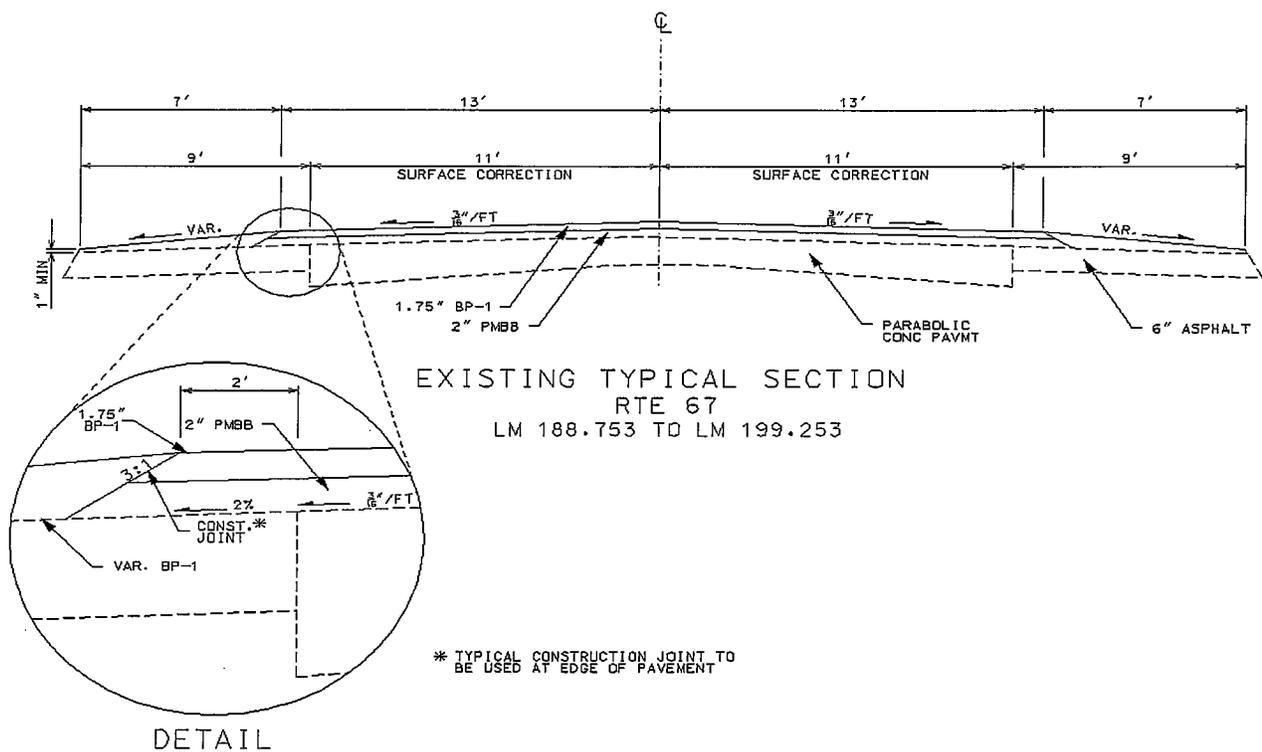


FIGURE 4 - PROJECT COST & TYPICAL SECTION



Photograph 1. Pavement Condition Prior to Project



Photograph 2. Pavement Undersealing Operation



Photograph 3. Coldmilling Concrete for Smoothness



Photograph 4. Pavement Condition After Project