



# MEMORANDUM

## Missouri Department of Transportation Project Development District 10

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**TO:** Joe Jones, P.E.  
Engineering Policy Administrator

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

**DATE:** December 1, 2008

**SUBJECT:** 2009 Awards for Excellence in Practical Design

Please find enclosed District 10's submittal of JOP0826B for consideration in the subject competition. This project addressed a badly deteriorated pavement by widening, resurfacing, and providing paved shoulders.

### **Project Overview**

This project addressed Route 53 from a northern terminus of Qulin in Butler County to a southern terminus of Campbell in Dunklin County. Photograph A demonstrates the pre-construction conditions within the project limits. There were various existing typical sections in regard to lane and shoulder width and existing pavement thickness.

The project team determined 11' driving lanes and 6' shoulders were appropriate for the proposed typical section. After consultation with the pavement team, the project team decided to include asphalt recycling as a contractor option in an effort to increase bidding competition. To achieve the desired lane widths, various depths of recycling and lift thicknesses were prescribed. Figures 1 and 2 are typical section sheets from the contract plans and detail the work that was done by the paving contractor.

The winning bidder chose cold in place recycling as the method for which to address the "leveling" course of the overlay project. Photographs B and C show the recycling train and the recycled roadway surface. This surface was subjected to traffic for approximately two months before the final lift of asphalt was placed. Overall, the recycled mix performed well.

Safety elements described in MoDOT's Direction and Expectations for Missouri's Major and Minor Roads, including edgeline and centerline rumblestripes, were included in the project and have enhanced the safety of this highway facility. Photographs D and E show the finished product. Feedback from the public has indicated a successful project.

### **Cost Savings**

It is difficult to capture the exact savings as we do not know what the bid would have been without providing a competitive product to the traditional rehabilitation method, which likely increased the number of bidders and required each bidder to fully consider how to provide their most economical pricing. However, when we compare the bids received to the programming estimate developed with the traditional rehabilitation methods in mind, it can be determined that a savings of at least \$1,283,722.10, which is 25% of the original scoping estimate. Documentation of programmed estimate and award cost are shown in Figures 3 and 4, respectively.

The cost savings of the practical solution are further identified by the submitted bids. All five of the bids submitted utilized the innovative recycle solution. This demonstrates the savings generated by providing the contractors options when developing and submitting the bid.

No right of way or utility impacts were anticipated for the original corrective action. Our practical solution created no need for additional right of way or utility impacts.

# 2009 APPLICATION FORM

(required for each entry)

Complete this section for (check one):  **Small Project**  **Large Project**  
 **Post-Design Solution**  **Off System Project**

Job No. J0P0826B Route 53 County Butler/Dunklin

Description Widen and resurface existing pavement and provide paved shoulders from Qulin to Campbell

Complete this section for: **Process Improvement**

Process or Product \_\_\_\_\_

Description (attach separate sheet if necessary) \_\_\_\_\_

Project Leader Eric Krapf, Transportation Project Manager D-10

Key Team Members (include key personnel irrespective of employer-nine individuals maximum)

<u>Mike Harris</u>	<u>Tonya Wells</u>	<u>Brian Holt</u>
<u>David Wyman</u>	<u>Llans Taylor</u>	<u>Lynn Smith</u>
<u>David Blalock</u>	<u>John Donahue</u>	<u>Jason Williams</u>

Project Budget:

Initial Cost / Estimate \$ 5,063,000.00 Award \$ 3,779,277.90

**What would make this entry stand out from the rest of the entries when considering MoDOT's practical design philosophy?** This project was MoDOT's first in which asphalt recycling was bid head to head against a traditional pavement rehabilitation technique. Considerable savings were realized as a result of the contractor choosing to utilize cold in place recycling for the first course of the overlay instead of a lift of new asphalt pavement. By being the first project of its kind in Missouri, this project demonstrated the viability of placing recycling techniques into a competitive environment with traditional paving methods, resulting in several other projects following our lead and employing this opportunity for savings. In addition, practical design was, displayed in this project by utilizing existing bituminous widening placed by MoDOT maintenance forces in lieu of removal of all existing material and then placement of new base widening by contract. Although large variations in thickness and compactive effort were associated with this widening, investigation demonstrated the feasibility of the materials use and collaboration within the core team led to a decision to use this material in place, thus yielding further savings to the contract.

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

**ALL ENTRIES MUST BE RECEIVED NO LATER THAN CLOSE OF BUSINESS ON DECEMBER 1, 2008**

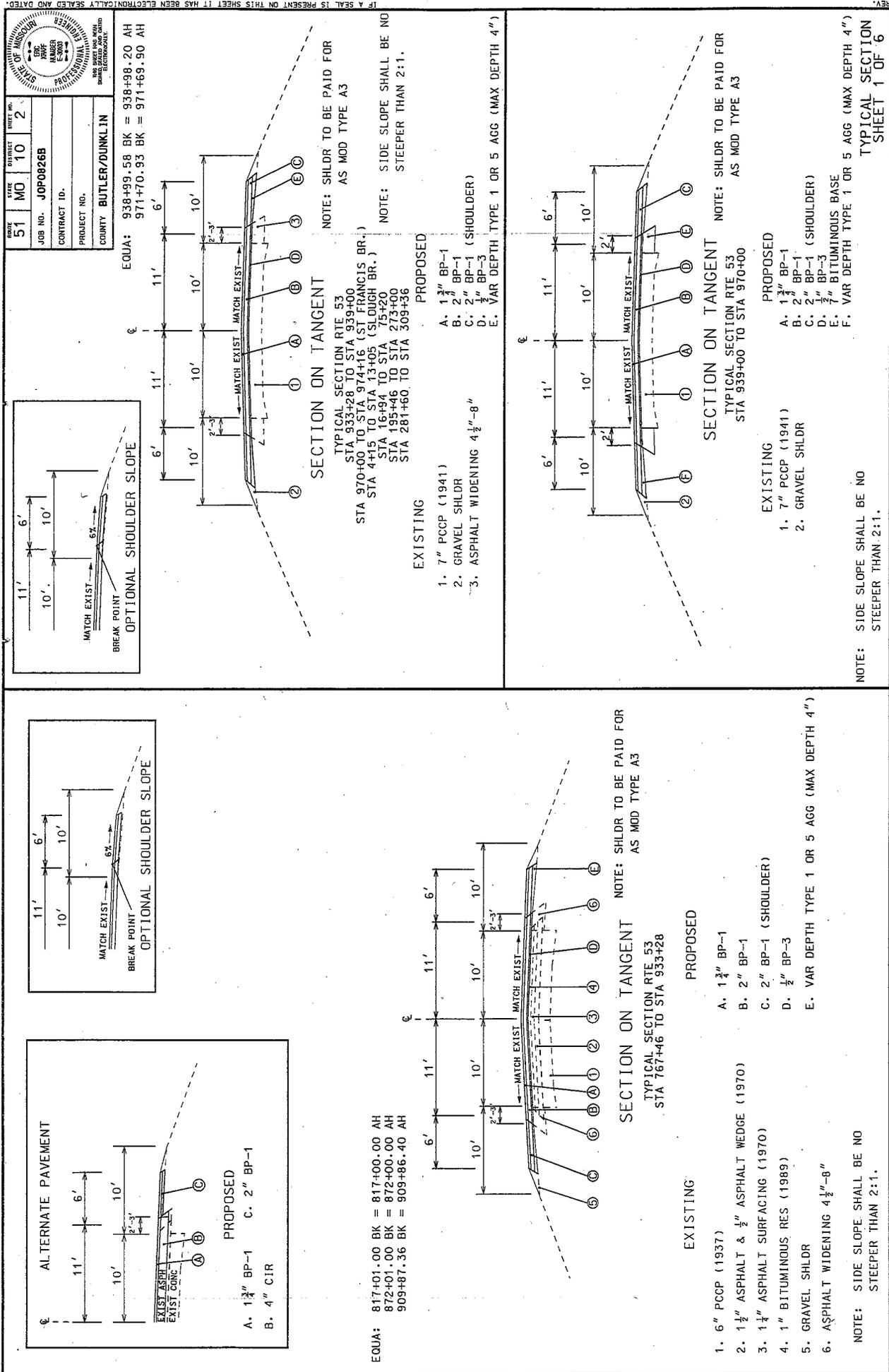
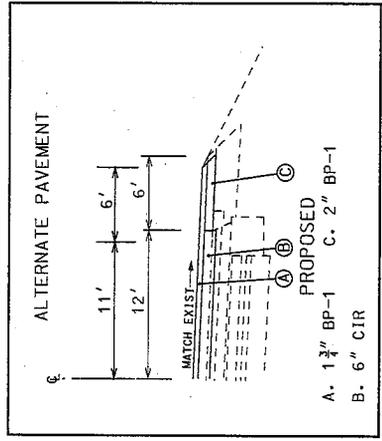
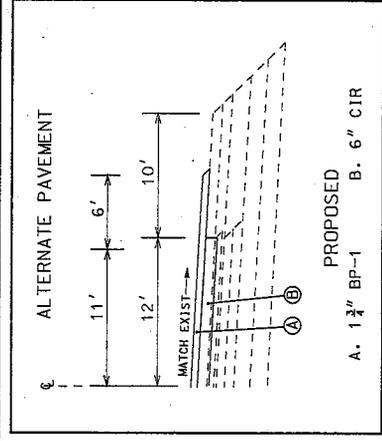
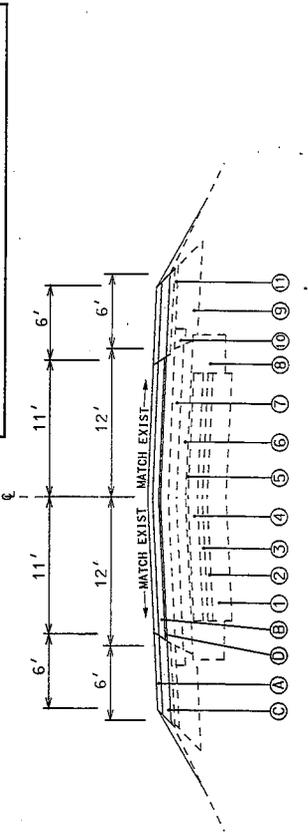


Figure 1 - Typical Sections

ROUTE	STATE	DISTRICT	SHEET NO.
51	MO	10	2
JOB NO. JOP08288			
CONTRACT ID.			
PROJECT NO.			
COUNTY BUTLER/DUNKLIN			



EQUA: 105+00.00 BK = 122+96.00 AH

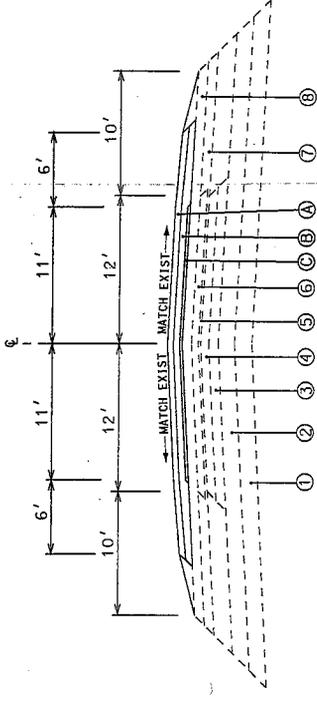
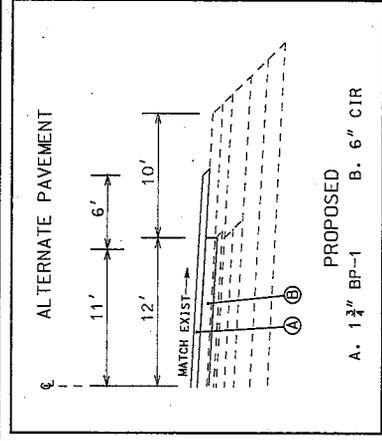


NOTE: SHLDR ACCOUNTED FOR IN ASPHALT QUANTITIES

TYPICAL SECTION RTE 53 STA 75+20 TO STA 125+75 STA 141+00 TO STA 143+00

- EXISTING
- 9" GRAVEL
  - 1" BIT MAT
  - 1" BIT MAT
  - 2" TYPE C ASPH CONC
  - 1/2" MIN LEVELING COURSE
  - 1 3/4" TYPE B ASPH CONC
  - 1 1/4" TYPE C ASPH CONC
  - 10" PLANT MIX BIT BASE COURSE
  - 6" TYPE 1 OR 2 AGGR
  - 2' X 2" TYPE C ASPH CONC
  - 1 3/4" BIT MAT
- PROPOSED
- 1 3/4" BP-1
  - 3" BITUMINOUS BASE
  - 3 1/2" BITUMINOUS BASE
  - 1/2" BP-3

NOTE: SIDE SLOPE SHALL BE NO STEEPER THAN 2:1.



NOTE: SHLDR ACCOUNTED FOR IN ASPHALT QUANTITIES

TYPICAL SECTION RTE 53 STA 125+75 TO STA 141+00

- EXISTING
- 4" TYPE 2 AGGR
  - 4" TYPE B ASPH CONC BASE
  - 1 3/4" TYPE B ASPH CONC
  - 1 1/4" TYPE C ASPH CONC
  - 1/2" MIN LEVELING COURSE
  - 1 1/4" TYPE C ASPH CONC
  - TYPE B ASPH (VAR. THICKNESS)
  - 1 3/4" TYPE C ASPH CONC
  - 1 3/4" BIT MAT
- PROPOSED
- 1 3/4" BP-1
  - 3" BITUMINOUS BASE
  - 1/2" BP-3

TYPICAL SECTION SHEET 2 OF 6

Figure 2 - Typical Sections



**Toolbar** Save Calculate Navigate To...

Job Number: 0P0826B    District: 10    County: BUTLER    Route: MO 53 S  
 Project Description: Widen existing pavement and stabilize shoulders from Qulin to Campbell.

Grading/Drain. 491	Base Surface 3887	Bridge Est. 0	Misc. 685	Contract Est. 5063
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**Remaining Cost Estimate Breakdown**

<input type="checkbox"/> Constr. Conting. <input checked="" type="checkbox"/> Auto 101	Const. Est. 5164
Utilities 0	
Other 0	Const. Cost 5164
R/W Acquisition 0	
Other Incidental 0	R/W Incidental 0
Prelim. Engr. 0	Constr. Engr. <input checked="" type="checkbox"/> Auto 354
	Ttl. Incidental 354
	Incentive 0

**Yearly Breakdown of Project Cost**

	Prog. Est. Ttl. 5518	Project Est. Ttl. 5628								
	Prior To 2009	2009	2010	2011	2012	2013	2014	Future	Program Total	Project Total
R/W Acquisition by Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Preliminary Engineering	110	0	0	0	0	0	0	0	0	110
R/W Acquisition	0	0	0	0	0	0	0	0	0	0
Construction Cost	5164	0	0	0	0	0	0	0	0	5164
FT D10	4-SAFE-DIS	180	0	0	0	0	0	0	0	180

Figure 3 - Project Budget from MoDOT SIMS

MISSOURI DEPARTMENT OF TRANSPORTATION  
LETTING AWARD SUMMARY BY PROJECT

LETTING : 071130  
DATE OF LETTING : 11/30/07

CALL ORDER	CONTRACT ID	AWARD DATE	WINNING VENDOR NAME CITY & STATE	AWARDED AMOUNT
901	071130-901	12/12/07	APAC-Missouri, Inc. Columbia MO PROJECT #: J9L0700L ROUTE: 34 COUNTY(S) REYNOLDS	1776501.34
X01	071130-X01	12/12/07	Lake Asphalt Paving & Construction, LLC Osage Beach MO PROJECT #: J0P0826B ROUTE: 53 COUNTY(S) BUTLER AND DUNKLIN	3779277.90
X02	071130-X02	12/12/07	Progressive Contractors Incorporated St. Michael MN PROJECT #: J0P0930 ROUTE: 67 COUNTY(S) WAYNE AND BUTLER	15781795.05
21 NUMBER OF BIDS				\$ 86728440.81

Figure 4 - Bid Award Summary from MoDOT website



### **Photograph A. Pre-Construction Typical Section of Route 53**

(Note the widening placed by MoDOT maintenance forces to mitigate edge drop off conditions associated with aggregate shoulders. Also, note the deteriorated condition of the pavement. Joints in the underlying concrete pavement have reflected up through the existing asphalt overlay.)



**Photograph B. Recycling/Paving Train**

(Note how the recycling has eliminated the joint between the driving lanes and the widening placed by MoDOT maintenance. The train consists of a Rotomill Profiler, Pugmill Mixer, Lime Mixer, Windrow Elevator, Asphalt Paver and two Rollers.)



### **Photograph C. Recycled Roadway Surface**

(Traffic utilized this roadway surface for nearly two months before the final lift of new Asphalt Pavement was placed.)



**Photograph D. Post-Construction Typical Section of Route 53**



**Photograph E. Post-Construction Typical Section of Route 53**