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January 26, 2007

Jay Bestgen
MoDOT Design Division
1320 Creek Trail Drive
Jefferson City, Missouri 65109

RE: 2007 Awards for Excellence in Practical Design, Project J4I1709A

Dear Mr. Bestgen,

This project on Route 9 is a perfect example of why practical design thinking should be applied to every project. Through a collaborated effort between, MoDOT staff, TranSystems and the City of Riverside, we were able to reduce the estimated construction costs as well as the utility adjustment costs and the right-of-way costs.

The improvements to Route 9 are necessary due to the development of Southern Platte County, and specifically the Horizons development in Riverside, Missouri. The volume of traffic, particularly truck traffic, is projected to grow significantly in the next 20 years. The Horizons development is a 900-acre business park nestled between I-635, Route 9, and the Missouri River. The area will be home to many light industrial businesses which will add several thousand jobs in Missouri. The Route 9 project is helping this economic development project to become a reality.

Route 9 is located literally between a rock and a hard place. To the north, towers the almost vertical Missouri River rock bluff, and to the south is a busy industrial business park. Currently Route 9 has two lanes in each direction and some relatively short turn lanes at the intersections. The projected traffic will overwhelm the current roadway. As such, improvements were necessary to meet MoDOT standards for level of service.

Prior to application of the practical design philosophy, the proposed improvements consisted of three westbound through lanes, two westbound left-turn lanes, a median, three eastbound through lanes and standard width shoulders. Consequently, the impact of the improvements to adjacent properties and utilities was driving up the cost of the project. The project at that time required significant retaining walls, two major utility adjustments and right-of-way taking from a manufacturing site. (See enclosed graphic.)

Through the application of practical design, in a collaborative process with MoDOT District 4 staff, the project costs and impacts to adjacent properties and utilities was greatly reduced. The first step in our practical design effort was to revisit our traffic projections with a more recent land use plan for Riverside's Horizons development. With these 900 acres being mostly industrial rather than a mixture of land uses, as once proposed, the projected traffic volumes decreased. MoDOT reviewed and agreed with the new volumes and lane configuration concepts. This allowed our team to eliminate one of the westbound through lanes.

Other practical design discussions with MoDOT staff during a practical design workshop produced further savings. We reduced lane width to 11 feet, shoulders to eight feet, median curb width to two feet, and changed our fill slope from a 3:1 with some retaining walls to a 2:1 rock fill. These changes pulled in the

project footprint and eliminated the need for new right-of-way, eliminated the need to relocate two utilities, and reduced the roadway construction costs as well. (See enclosed graphic and cost estimates.)

It is important to note that good ideas came from all parties involved. Typically an idea was presented by one person and then carried forward and refined by another and sometimes a third. This workshop approach brought out the experiences and suggestions from each person. MoDOT's staff was fully engaged in saving money, while maintaining a safe design and fulfilling the project needs.

The improvements will still meet the purpose and need of the project because the number of lanes needed will still be provided, safety was not compromised, and the rock fill is appropriate given an adjacent industrial land use. The shoulder width was reduced to eight feet from ten feet, but not to six feet because of the lack of turnoffs for the westbound lanes and the need for a guardrail for the eastbound lanes. The team believed we needed a minimum of eight foot wide shoulders for errant vehicles and vehicle breakdowns.

The rock fill embankment, which is not commonly used, was a critical part of our practical design results. The rock for the 2:1 fill is available from a quarry about two miles from the Route 9 project. The exterior of the embankment will be the exposed fill rock, which may not be suitable necessarily for some adjacent land uses, but fits this industrial development well.

Enclosed are copies of our pre-practical design and post-practical design cost estimates. The total savings is $2,690,589.75. This can be broken down into savings of $2,016,789.75 for the actual Route 9 construction and $673,800.00 for the elimination of the utility adjustments. In addition to these savings there were two other less tangible savings: the need for new right-of-way was eliminated which saved several hundred thousand dollars, if not millions; and the project may be bid a year earlier since we have eliminated the need to purchase right-of-way.

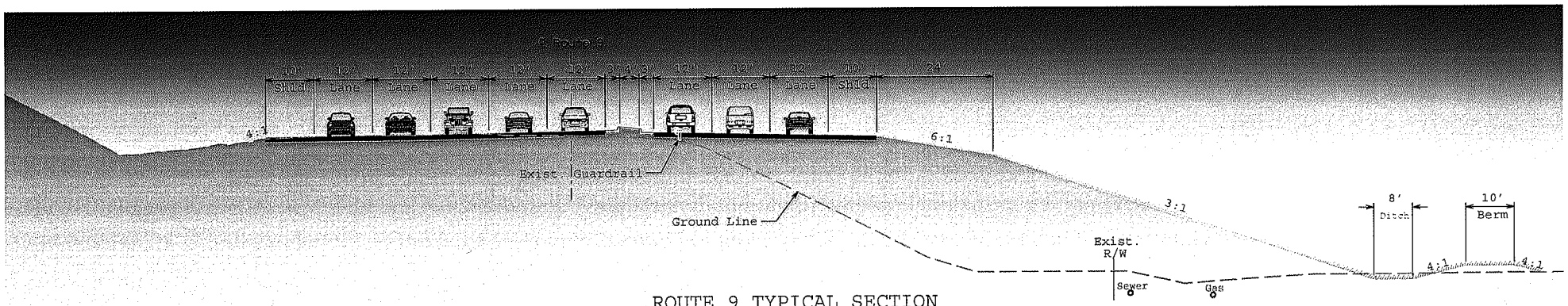
The design team from TranSystems and MoDOT considered other practical design ideas. Some were eliminated due to concerns with additional maintenance, or concerns that the roadway would be less safe. In the end, we all believed we had truly optimized the project design. This segment of Route 9 serves an area that is developing rapidly. This segment will, in the near future, complete its transition from a rural highway to an urban highway similar to the characteristics further west in Parkville. Our design will accommodate Route 9 through this transition as well as serve the roadway user for the next 20 to 30 years.

Thank you for consideration of the Route 9 improvements for an Excellence in Practical Design Award. The savings on this project are certainly worthy of recognition.

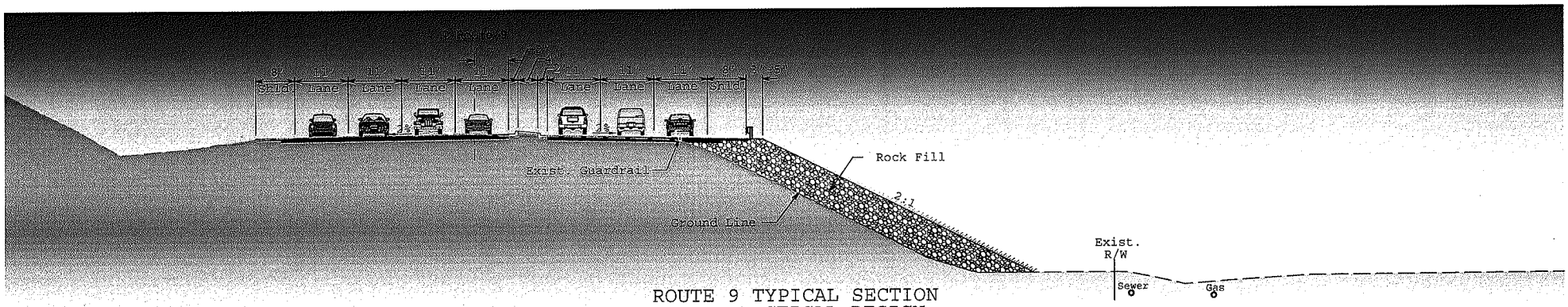
Sincerely,

Frank Weatherford

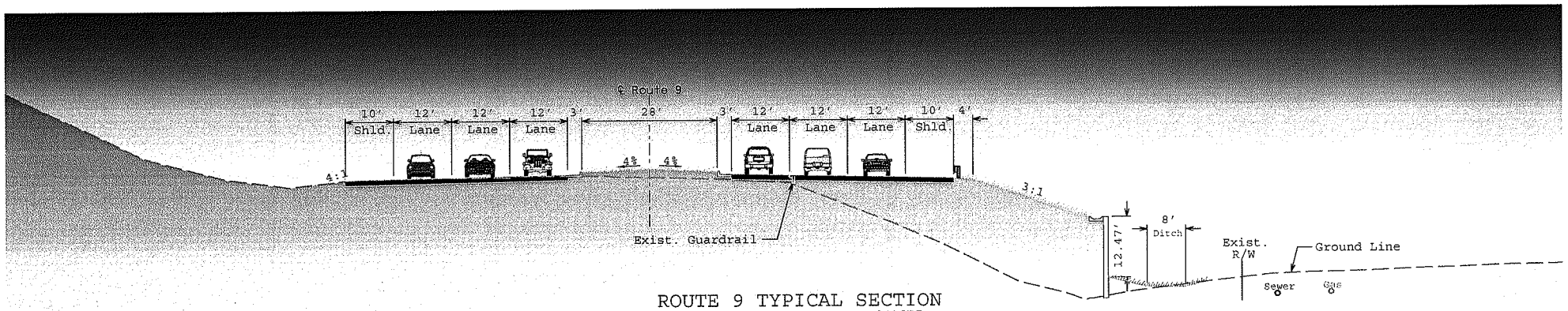
Frank Weatherford, PE
Vice President/Principal



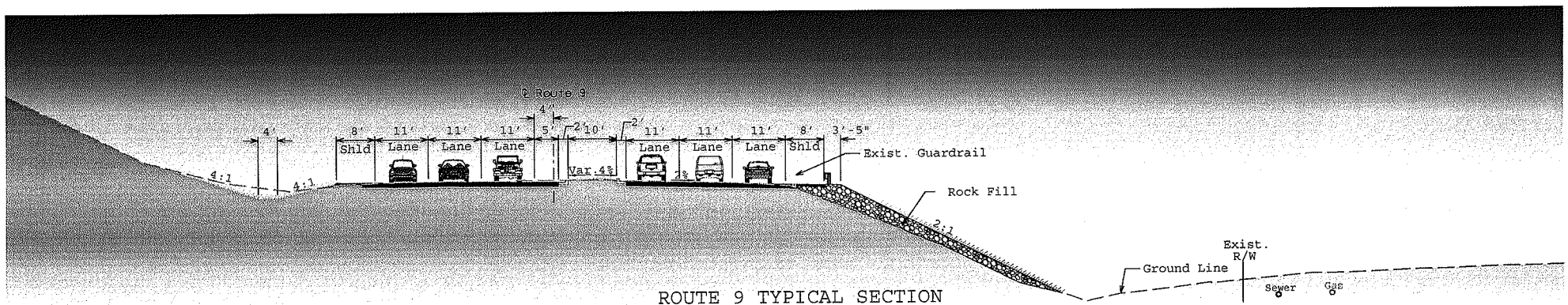
ROUTE 9 TYPICAL SECTION
PRE PRACTICAL DESIGN
(SECTION A-A)



ROUTE 9 TYPICAL SECTION
POST PRACTICAL DESIGN
(SECTION A-A)



ROUTE 9 TYPICAL SECTION
PRE PRACTICAL DESIGN
(SECTION B-B)



ROUTE 9 TYPICAL SECTION
POST PRACTICAL DESIGN
(SECTION B-B)

Route 9 - From Mattox Road to I-635 Interchange (Pre Practical Design)

Preliminary Phase
City of Riverside, Missouri
TranSystems Project Number P101020298
OPINION OF PROBABLE COST (2007 $)

2/3/2006

ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT COST	ESTIMATED QUANTITY	TOTAL COST
Items that use MoDOT Specifications (Route 9) - MoDOT Portion of Construction Costs					
1	Removal of Improvements	LS	$ 551,000.00	1	$ 551,000.00
2	Class A Excavation	CY	$ 5.10	13411	$ 68,396.10
3	Embankment In Place	CY	$ 12.59	144298	$ 1,816,711.82
4	Compacting Embankment	CY	$ 1.03	11399	$ 11,740.97
5	Stabilized Permeable Base (4in. Thick)	SY	$ 9.06	48463	$ 439,074.78
6	Type 1 Aggregate for Base (4in. Thick)	SY	$ 7.28	48463	$ 352,810.64
7	Bituminous Pavement Mixture PG64-22, (Base)	TON	$ 60.05	348	$ 20,897.40
8	Asphaltic Concrete Mix. PG64-22 (SP125 Mix)	TON	$ 96.41	572	$ 55,146.52
9	14" Asphaltic Concrete Pavement - SP125C	SY	$ 60.22	42069	$ 2,533,395.18
10	Roadside Guard Cable 3-Strand (16' Post Sp.)	LF	$ 23.23	699	$ 16,237.77
11	Concrete Median	SY	$ 52.09	8548	$ 445,265.32
12	Concrete Sidewalk, 4 in.	SY	$ 50.00	723	$ 36,150.00
13	Concrete Gutter Type A	LF	$ 36.06	830	$ 29,929.80
14	Curb and Gutter Type A	LF	$ 21.30	75	$ 1,597.50
15	Curb and Gutter Type B	LF	$ 17.51	8840	$ 154,788.40
16	Curb and Gutter Type CG-1	LF	$ 28.94	329	$ 9,521.26
17	Construction Traffic Control	LS	$ 250,000.00	1	$ 250,000.00
18	Mobilization (3%)	LS	$ 237,746.04	1	$ 237,746.04
19	Permanent Traffic Control (Marking and Signing)	LS	$ 90,000.00	1	$ 90,000.00
20	Cold Milling Bitum. Pavmn't (3in. Thick or Less)	SY.	$ 2.35	2611	$ 6,135.85
21	Mechanically Stabilized Earth Wall Systems	SF	$ 52.50	10729	$ 563,272.50
22	15 in. Class III Reinforced Concrete Pipe Culvert	LF	$ 64.83	520	$ 33,711.60
23	24 in. Class III Reinforced Concrete Pipe Culvert	LF	$ 103.73	61	$ 6,327.53
24	42 in. Class III Reinforced Concrete Pipe Culvert	LF	$ 117.59	100	$ 11,759.00
25	48 in. Class III Reinforced Concrete Pipe Culvert	LF	$ 133.47	86	$ 11,478.42
26	Precast Concrete Manhole - 48 in.	FT	$ 311.17	12	$ 3,734.04
27	Precast Concrete Drop Inlet 4 ft x 2 ft	FT	$ 466.58	33	$ 15,397.14
28	15" (450 mm) Precast Concrete Flared End Sect.	EA	$ 548.28	2	$ 1,096.56
29	42" (1050 mm) Precast Concrete Flared End Sect.	EA	$ 1,537.49	1	$ 1,537.49
30	48" (1200 mm) Precast Concrete Flared End Sect.	EA	$ 1,754.57	1	$ 1,754.57
31	Traffic Signals	EA	$ 193,000.00	2	$ 386,000.00
					$ -
				Construction Subtotal:	$8,162,614.20
				10% Contingency:	$816,261.42
				Construction Total:	**$8,978,875.63**

1	Utility Relocation-Water	LS	$ -	1	$ -
2	Utility Relocation-Gas	LS	$ 455,000.00	1	$ 455,000.00
3	Utility Relocation-Jet Fuel	LS	$ -	1	$ -
4	Utility Relocation-Electric	LS	$ -	1	$ -
4	Utility Relocation-Force Main	LS	$ 310,000.00	1	$ 310,000.00
				Utility Relocation Subtotal:	$765,000.00
				10% Contingency:	$76,500.00
				Utility Relocation Total:	**$841,500.00**

Route 9 Grand Total: $9,820,375.63

NOTE: This Opinion of Probable Costs DOES NOT include costs for Right of Way, Landscaping, Engineering and. Construction Services.

Route 9 - From Mattox Road to I-635 Interchange (Post Practical Design)

Conceptual
City of Riverside, Missouri
TranSystems Project Number P101020298
OPINION OF PROBABLE COST

12/12/2006

ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT COST	ESTIMATED QUANTITY	TOTAL COST
1	Removal Of Improvements	LS	$ 551,000.00	1	$ 551,000.00
2	Class A Excavation	CY	$ 5.10	18994	$ 96,869.40
3	Embankment In Place	CY	$ 12.59	3548	$ 44,669.32
4	Compacting Embankment	CY	$ 1.03	19602	$ 20,190.06
5	Compacting In Cut	STA	$ 750.80	55.0	$ 41,294.00
6	Class 3 Excavation	CY	$ 13.95	508	$ 7,086.60
7	Furnishing Rock Fill	CY	$ 16.89	23587	$ 398,384.43
8	Placing Rock Fill	CY	$ 7.64	23587	$ 180,204.68
9	Type 1 Aggregate For Base (4in. Thick)	SY	$ 7.28	38607	$ 281,058.96
10	Type A2 Shoulder	SY	$ 34.43	3785	$ 130,317.55
11	Bituminous Pavement Mixture PG64-22, (BP-1)	TON	$ 111.43	250	$ 27,857.50
12	Bituminous Pavement Mixture PG64-22 (Base)	TON	$ 60.05	564	$ 33,892.22
13	Asphaltic Concrete Mixture PG 70-22 (SP125C Mix)	TON	$ 96.47	1708	$ 164,722.53
14	14 Inches, Asphaltic Concrete Pavement SP125C	SY	$ 60.22	29170	$ 1,756,617.40
15	Tack Coat	GAL	$ 1.16	890	$ 1,032.40
16	Guardrail Type A	LF	$ 23.23	2813	$ 65,345.99
17	Type A Crashworthy End Terminal	EA	$ 3,065.87	1	$ 3,065.87
18	End Anchor	EA	$ 810.86	1	$ 810.86
19	Concrete Median	SY	$ 52.09	6130	$ 319,311.70
20	Type CG-1 Curb & Gutter	LF	$ 28.94	7964	$ 230,478.16
21	Grate And Bearing Plate (4ft x 2ft)	EA	$ 992.25	4	$ 3,969.00
22	Mobilization	LS	$ 267,800.00	1	$ 267,800.00
23	Traffic Control	LS	$ 251,500.00	1	$ 251,500.00
24	Coldmill. Bitum. Pavmnt For Removal Of Surf. (3" Thick Or Less)	SY	$ 1.60	17830	$ 28,528.00
25	Other Miscellaneous (30% Contingency)	LS	$ 1,606,000.00	1	$ 1,606,000.00
26	30in. Corr. Or Specified Equival. Smooth Interior Pipe Group B	LF	$ 53.03	66	$ 3,499.98
27	15in. Class III Reinforced Concrete Pipe Culvert	LF	$ 64.83	355	$ 23,014.65
28	42in. Class III Reinforced Concrete Pipe Culvert	LF	$ 117.59	16	$ 1,881.44
29	48in. Class III Reinforced Concrete Pipe Culvert	LF	$ 133.47	35	$ 4,671.45
30	Precast Concrete Drop Inlet 4ft x 2ft	FT	$ 466.58	26	$ 12,131.08
31	30in. Or Allowed Substitute Group B Flared End Section	EA	$ 505.25	2	$ 1,010.50
32	42in. Precast Concrete Flared End Section	EA	$ 1,537.49	1	$ 1,537.49
33	48in. Precast Concrete Flared End Section	EA	$ 1,754.57	1	$ 1,754.57
34	Seeding - Cool Season Mixtures	ACRE	$ 1,715.07	8.5	$ 14,578.10
35	Traffic Signals	LS	$ 386,000.00	1	$ 386,000.00
				Construction Subtotal:	$6,962,085.88

1	Utility Relocation - Water	LS	$ -		$ -
2	Utility - 8" Gas (Casings Around Existing Line - 200')	LS	$ 55,000.00	1	$ 55,000.00
3	Utility - 12" Force Main (Casings Around Existing Line - 200')	LS	$ 74,000.00	1	$ 74,000.00
4	Utility Relocation - Jet Fuel	LS	$ -		$ -
5	Utility Relocation - Electric	LS	$ -		$ -

Route 9 - From Mattox Road to I-635 Interchange (Post Practical Design)

Conceptual
City of Riverside, Missouri
TranSystems Project Number P101020298
OPINION OF PROBABLE COST

12/12/2006

ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT COST	ESTIMATED QUANTITY	TOTAL COST
6	Utility Relocation - Telephone	LS	$ -		$ -
7	Utility Relocation - Railroad Communications	LS	$ -		$ -
				Utility Relocation Subtotal:	$129,000.00
				30% Contingency:	$38,700.00
				Utility Relocation Total:	**$167,700.00**

Route 9 (From Mattox to I-635) Grand Total: **$7,129,785.88**

Other Miscellaneous (30%) includes Permanent Signing, Permanent Pavement Markings, Erosion Control, and other Misc. Items.

NOTE: This Opinion of Probable Costs DOES NOT include costs for Right of Way, Landscaping, Engineering or Construction Services.

C:\Documents and Settings\ajlines\My Documents\Practical Design Awards for Excellence\[Post Practical Design.xls]Concept - Practical Design Est.

2007 APPLICATION FORM

(required for each entry)

Job No. J4I1709A **Route** 9 **County** Platte

STIP Description (Scoping or Construction, state which STIP) 05-09 ☐ 06-10 ☐ 07-11 ☒

Add lanes to reduce congestion east of Mattox Road to I-635 and Route 9 interchange. The Innovative Finance Program will pay 50% of the construction cost up to $3,000,000. The City of Riverside to pay the remainder.

Project Manager (could have both)

MoDOT Randy Johnson **Consultant** TranSystems - Mike Meyers

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

Lisa Stupps - MoDOT	Scott Thurston - MoDOT	Kevin Manning - MoDOT
John Vanwinkle - MoDOT	Burce Harvel - MoDOT	Dave Scrivens - MoDOT
Joe Donner - MoDOT	Ed Nichols - MoDOT	Mike Stelzeni - MoDOT
Ron Temme - MoDOT	Laura Ruman - MoDOT	Justin Adams - TranSystems

Project Contacts (will have both for consultant entry)

District 4-Randy Johnson **Consultant** $ Frank Weatherford

STIP budget $ 7,052,000 (MoDOT and City) or **Award cost** $ $7,129,785.88 (2007)

Value Engineering study during design? yes ☐ no ☒ (if yes) **Project Stage** N/A

VE Contact person N/A

Construction-stage VE (VECP)? yes ☐ no ☒ (if yes) **Explain** N/A

Total VECP savings $ N/A **VECP Contact Person** N/A

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

(In layman's terms - 100 words or fewer – attach additional sheet if necessary)

This project on Route 9 is a perfect example of why practical design thinking should be applied to every project. Through a collaborative effort between MoDOT staff, TranSystems, and the City of Riverside, we were able to reduce the estimated construction costs as well as the utility adjustment costs and the right-of-way costs.