

**Project Value Engineering
Preliminary Draft Interim Report**

***The Kennedy Interchange
Ohio River Bridges***

**First VE Session: March 26 – 30, 2007
Evaluate Traffic Issues**

**Second VE Session: May 29 – June 8, 2007
Review Construction Components**

**Third VE Session: July 30 – August 3, 2007
Constructability Review**

**Based on Documents Prepared By:
Kentucky Transportation Associates**

**Prepared for:
THE KENTUCKY TRANSPORTATION CABINET**

**By:
VE Group, LLC
Quincy, Florida**

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INTRODUCTION

This Value Engineering report summarizes the results of the Value Engineering Study performed by VE Group and the Kentucky Transportation Cabinet. The study was performed during the weeks of:

First VE Session: March 26-30, 2007

Second VE Session: May 29-June 8, 2007

Third VE Session: July 30-August 3, 2007

The subject of the study was:

**The Kennedy Interchange
Ohio River Bridges
Louisville, Kentucky**

RESULTS – AREAS OF FOCUS – FIRST VE SESSION

The following areas of focus were analyzed by the Value Engineering team and from these areas the following Value Engineering alternatives were developed and are recommended for Implementation:

A. RAMP NUMBER 42***Recommendation Number 1 Value Engineering Alternative A.2:***

The Value Engineering Team recommends that Value Engineering Alternative A.2 be implemented which proposes to:

Replace Ramp Number 42 at 2nd Street with an eastbound “on” ramp from River Road to EB I-64 and River Road northbound. Move eastbound exists for Ramp Numbers 21 & 22 to the same location.

If this recommendation can be implemented, there is a possible savings of: ***\$ 54,533,198.***

B. RAMP NUMBERS 3 AND 5***Recommendation Number 2 Value Enhancement Alternative B.2:***

The Value Engineering Team recommends that Value Enhancement Alternative B.2 be implemented which proposes to:

Relocate Ramp Number 5 from Ramp Number 4 to the south to provide a direct connection to northbound I 65 from Ramp Number 3.

If this recommendation can be implemented, there is a possible savings of: ***\$ 3,718,412.***

C. RAMP NUMBER 32 EXIT

The Value Engineering Team considered Value Engineering Alternative C.2 which proposes to:

Eliminate the separate Ramp Number 32 structure over Frankfort Avenue and add an auxiliary lane to the mainline structure over Frankfort Avenue.

NOTES: DROPPED DURING THE DEVELOPMENT PHASE BECAUSE THE DIVERSION POINTS WERE LESS THAN 800’ APART AND COULD NOT MEET MINIMUM REQUIREMENTS.

RESULTS – AREAS OF FOCUS – FIRST VE SESSION

D. RAMP NUMBER 26 EXIT*Recommendation Number 3 Value Engineering Alternative D.2:*

The Value Engineering Team recommends that the Value Engineering Alternative D.2 be implemented which proposes to:

Reduce I-64 approach lanes for 5 lanes to 3 lanes to split to a 2 – 2 Split with Ramp Number 26.

If this recommendation can be implemented, there is a possible savings of: **\$ 4,506,000.**

E. RAMP NUMBER 26B TERMINUS

The Value Engineering Team considered Value Engineering Alternative E.2 which proposes to:

Construct a roundabout for the intersection of Ramp Number 26B and River Road.

If this recommendation could be implemented, there is a possible savings of: **\$ 7,000.**

F. EASTERN I-64 PROJECT LIMITS*Recommendation Number 4 Value Enhancement Alternative F.2:*

The Value Engineering Team recommends that the Value Enhancement Alternative F.2 be implemented which proposes to:

Construct 6 – lanes from the Grinstedt Interchange to the west.

If this recommendation can be implemented, there is a possible increase in cost of: **\$ 1,297,200.**

RESULTS – AREAS OF FOCUS– FIRST VE SESSION

G. PEDESTRIAN/ BIKE PATH***Recommendation Number 5 Value Engineering Alternative G.2:***

The Value Engineering Team recommends that the Value Engineering Alternative G.2 be implemented proposes to:

Eliminate the proposed Pedestrian/Bike Path.

If this recommendation can be implemented, there is a possible savings of: ***\$ 40,640,621.***

Recommendation Number 5 Value Engineering Alternative G.3:

If Value Engineering Alternative G.2 cannot be implemented, then the Value Engineering team recommends Value Engineering Alternative G.3 which proposes to:

Utilize the railroad bridge to provide the pedestrian/bike path.

If this recommendation can be implemented, there is a possible savings of: ***\$ 34,451,501.***

TOTAL POSSIBLE SAVINGS IF A.2, B.2, D.2 AND G.2 CAN BE IMPLEMENTED IS: \$ 102,898,231

APPROACH TO LARGE PROJECT VALUE ENGINEERING

The Kentucky Transportation Cabinet in combination with the VE Group, L.L.C., is utilizing a different approach to the value engineering of large construction projects. These large projects differ from normal projects because of their complexity, size and integration with other projects.

The value engineering effort encompasses several workshop sessions rather than the normal one week effort. A value engineering schedule, shown below, is established for the different workshop sessions to ensure that the effort is integrated into the Project Development process.

First VE Session: March 26 – 30, 2007

Evaluate Traffic Issues

- A. Geometric Functions
- B. Interchange Layout
- C. System to System Access
- D. Local Access
- E. Right of Way

Second VE Session: May 29 – June 8, 2007

Review Construction Components

- A. Bridges
- B. Retaining Walls
- C. Pavement
- D. Earthwork
- E. Landscaping
- F. Drainage
- G. Utilities, Etc.

Third VE Session: July 30 – August 3, 2007

Constructability Review

- A. Contract Packaging
- B. Construction Staging
- C. Maintenance of Traffic
- D. Construction Time
- E. ITS
- F. Constructability
- G. Lighting
- H. Materials Availability
- I. Contractor Work Hours

APPROACH TO LARGE PROJECT VALUE ENGINEERING *(continued)*

Also different from a normal value engineering study is that the design team is an extension of the value engineering team. During each session the value engineering team identifies alternatives that are later reviewed/developed by the design team prior to the next session.

The value engineering process is used to refine the concepts and alternatives for the project and to gain early consensus on the project functions.

The goals of the Kentucky Transportation Cabinet Large Project value engineering process is to maintain consistency, minimize overall project impacts, maintain the project schedule and develop a project that can be implemented.

3.1 PROJECT PRESENTATION

Representatives from the Kentucky Transportation Cabinet and the Design Team presented an overview of the project to the Value Engineering Study Team on March 26, 2007. The purpose of this meeting was to acquaint the Value Engineering Team with the overall project. In addition, the meetings afforded the Design Team the opportunity to highlight in greater detail, those areas of the project requiring additional or special attention, and gave the Value Engineering Team the opportunity to ask questions. The Value Engineering Team members were selected to provide the specific expertise required by the unique project elements involved. Team members consisted of a multi-disciplined group with professional design experience and a working knowledge of value methodology procedures. The study team included the following experts:

TABLE 3.1-1
VALUE ENGINEERING TEAM MEMBERS
March 26, 2007

Team Members	Affiliation/Telephone	Function/Expertise
William F. Ventry, P.E.,C.V.S.	VE Group, 850/627-3900	VE Team Leader
Thomas A Hartley, P.E., C.V.S.	VE Group, 850/627-3900	Roadway
Duncan Silver	VE Group, 850/627-3900	Traffic
Dickey Forrester	VE Group, 850/627-3900	Construction
John Ledbetter	VE Group, 850/627-3900	Structures

**TABLE 3.1-2
VALUE ENGINEERING
STUDY BRIEFING
MARCH 26, 2007**

NAME	AFFILIATION	PHONE
William F. Ventry	VE Group	850/627-3900
Jadie Tomlinson	KYTC	502/564-0319
Glen Kelly	KTA	502/585-2222
Siamak Shafaghi	KYTC	502/564-9900
Stephen Hoefler	CTS	502/394-3254
Dickey Forrester	VE Group	850/627-3900
John Ledbetter	VE Group	850/627-3900
Dan Byers	KTA	859/299-5226
Thomas Hartley	VE Group	850/627-3900
Duncan Silver	VE Group	850/627-3900
Robert Semones	KYTC	502/564-4555
John Sacksteder	CTS	502/394-3847

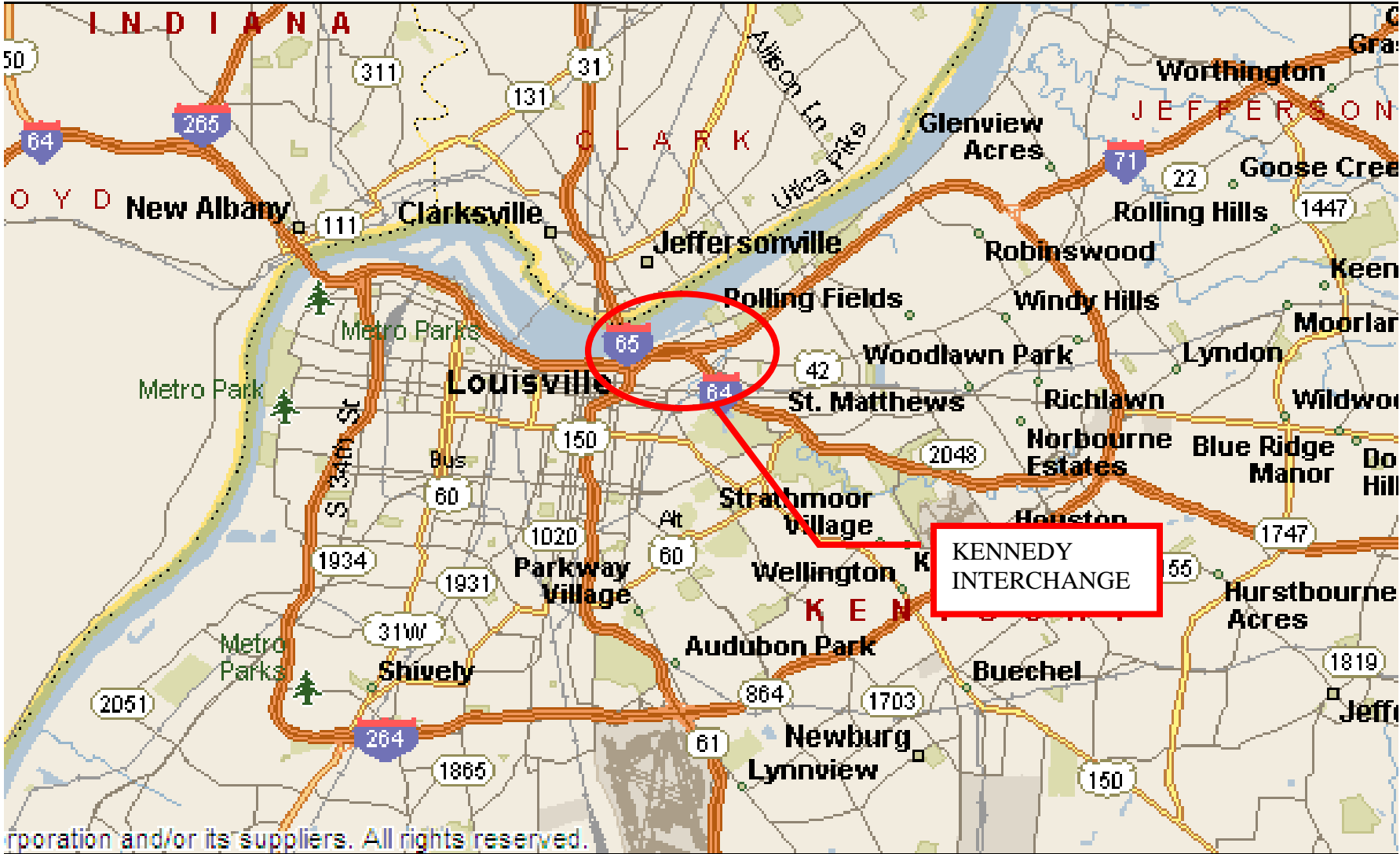
**TABLE 3.1-3
VALUE ENGINEERING STUDY
DESIGN TEAM
MARCH 26, 2007**

NAME	AFFILIATION	PHONE
Jadie Tomlinson	KYTC	502/564-0319
Glen Kelly	QK4	502/585-2222
Stephen Hoefler	HMB	502/394-3254
Dan Byers	WMB	859/299-5226
John Sacksteder	HMB	502/394-3847

**TABLE 3.1-4
VALUE ENGINEERING
STUDY RESOURCES
MARCH 26-30, 2007**

NAME	AFFILIATION	PHONE
James Napier	KTA	859/299-5226
Tom Baker	KTA	859/299-5226
Glen Kelly	KTA	502/585-2222
Brian Aldridge	KTA	502/213-7564
Brad Robson	KTA	502/382-8080
Dan Byers	KTA	859/299-5226
Tim Rountree	Ralph Whitehead	919/791-0108
JB Williams	Michael Baker	502/339-3557
Andrew Gilley	KTA	502/992-2914

3.1-5 LOCATION OF PROJECT



The Study Team developed the following project Functional Analysis and Cost Model of the “initial” cost estimate that includes the major construction elements estimate of “Worth” and the Cost/Worth Indices to identify the high cost areas and provide an overview of the project. The Function Analysis and Cost Model indicate the approximate overall project cost and worth. It includes an estimate of each major project element “Costs” and “Worth” (sorted in descending order of cost. The Functional Analysis and Cost Model are used as a means of identifying high cost areas that may have opportunities for cost avoidance. As can be expected, judgments at this stage of the Study are based on experience and intuition rather than facts, which may not be uncovered until later in the study. The Cost Model utilizes the Design Team's available quantities and unit costs. If utilized, the Study Team realizes this is an estimate, but has assumed that it is relatively complete with minimal omissions, incompleteness, assumptions and “lump sum” items. Sufficient information and detail has been available to permit a proper value analysis.

TABLE 4.1-1 – FUNCTIONAL ANALYSIS AND COST MODEL OF ORIGINAL DESIGN

FUNCTIONAL ANALYSIS/COST MODEL WORKSHEET, INVESTIGATION PHASE

**PROJECT: THE KENNEDY INTERCHANGE
OHIO RIVER BRIDGES**

DATE: MARCH 26-30, 2007

ITEM	FUNCT. VERB	FUNCT. NOUN	* TYPE	Bridge Cost	Pavement Cost	Other Roadway Cost	Construction Elements	Total Construction Cost	WORTH	VALUE INDEX
Accelerated Section	Expedite	Construction	S	\$22,429,000	\$2,451,182	\$1,039,431	\$11,859,565	\$37,779,178	\$37,779,178	1.00
I-64 Mainline	Increase	Capacity	B	\$75,710,800	\$8,553,864	\$2,816,377	\$23,804,114	\$110,885,155	\$112,000,000	
I-65 Mainline	Increase	Capacity	B	\$49,938,167	\$872,916	\$406,272	\$3,433,826	\$54,651,180	\$54,651,180	1.00
I-65 Northbound	Increase	Capacity	B	\$2,462,167	\$188,694	\$397,729	\$3,361,619	\$6,410,209	\$6,410,209	1.00
I-65 Southbound	Increase	Capacity	B	\$17,812,667	\$105,600	\$458,290	\$3,873,484	\$22,250,040	\$22,250,040	1.00
I-71 Mainline	Increase	Capacity	B	\$10,395,000	\$3,522,486	\$949,234	\$8,022,957	\$22,889,677	\$22,889,677	1.00
Ramp No. 2	Access	I-64 I-71 Story Ave.	B	\$10,945,000	\$97,614	\$369,252	\$3,120,930	\$14,532,796	\$14,532,796	1.00
Ramp No. 3	Access	Ramp 4,Ramp 5	B	\$7,480,000	\$455,664	\$493,981	\$4,175,147	\$12,604,792	\$12,604,792	1.00
Ramp No. 4	Access	Ramp 5 Ramp 7 Ramp 4A	B	\$17,762,250	\$53,658	\$658,768	\$5,567,932	\$24,042,609	\$24,042,609	1.00
Ramp No. 4A	Access	CD 1	B	\$13,673,000	\$398,178	\$311,349	\$2,631,530	\$17,014,057	\$17,014,057	1.00
Ramp No. 5	Access	I-65 NB	B	\$4,309,250	\$17,358	\$123,400	\$1,042,984	\$5,492,993	\$1,000,000	5.49
Ramp No. 6	Access	CD 1	B	\$18,260,000	\$13,134	\$441,773	\$3,733,884	\$22,448,792	\$22,448,792	1.00
Ramp No. 7	Access	I-64 EB	B	\$22,297,000		\$776,473	\$6,562,779	\$29,636,252	\$29,636,252	1.00
Ramp No. 8	Access	I-64 WB	B	\$12,809,500		\$290,655	\$2,456,629	\$15,556,785	\$15,556,785	1.00
Ramp No. 9	Access	CD 2	B	\$27,936,700	\$85,866	\$612,636	\$5,178,017	\$33,813,218	\$33,813,218	1.00
Ramp No. 10	Access	Ramp 11	B	\$5,775,000	\$142,296	\$502,145	\$4,244,144	\$10,663,585	\$10,663,585	1.00
Ramp No. 11	Access	Jefferson Street	B		\$257,202	\$178,456	\$1,508,316	\$1,943,974	\$1,943,974	1.00
Ramp No. 12	Access	I-65 SB	B		\$182,688	\$168,014	\$1,420,063	\$1,770,766	\$1,770,766	1.00
Ramp No. 21	Access	Ramp 26	B	\$24,180,750		\$722,177	\$6,103,866	\$31,006,793	\$ 29,374,857	1.10
Ramp No. 22	Access	Ramp 42	B		\$52,734	\$190,226	\$1,607,801	\$1,850,761	\$4,063,547	0.45
Ramp No. 23	Access	CD 1	B		\$376,398	\$386,338	\$3,265,344	\$4,028,080	\$4,028,080	1.00
Ramp No. 24	Access	I-64 EB	B		\$161,238	\$145,612	\$1,230,722	\$1,537,572	\$1,537,572	1.00
Ramp No. 25	Access	Mellwood Ave	B		\$253,044	\$224,019	\$1,893,418	\$2,370,481	\$2,370,481	1.00
Ramp No. 26	Access	Ramp 12	B	\$27,865,750	\$1,770,054	\$1,668,563	\$14,102,754	\$45,407,121	\$ 40,000,000	
Ramp No. 26B	Access	River Road	B	\$7,128,000	\$687,720	\$599,536	\$5,067,300	\$13,482,556	\$13,482,556	1.00

continued below

continued from above

Ramp No. 31	Access	Frankfort Ave	B		\$327,624	\$273,379	\$2,310,612	\$2,911,615	\$2,911,615	1.00
Ramp No. 32	Access	I-65 NB	B	\$11,539,000	\$865,392	\$1,072,255	\$9,062,732	\$22,539,379	\$22,539,379	1.00
Ramp No. 33	Access	Ramp 26	B	\$6,886,000	\$976,470	\$771,158	\$6,517,850	\$15,151,478	\$15,151,478	1.00
Ramp No. 34	Access	Ramp 34A Ramp 26B	B	\$5,247,000	\$1,417,746	\$893,799	\$7,554,416	\$15,112,961	\$15,112,961	1.00
Ramp No. 34A	Access	I-64 WB	B	\$2,145,000	\$314,754	\$369,252	\$3,120,930	\$5,949,936	\$5,949,936	1.00
Ramp No. 35	Access	Frankfort Ave	B		\$390,258	\$232,752	\$1,967,229	\$2,590,239	\$2,590,239	1.00
Ramp No. 42	Access	Ramp 43 Ramp 44 CD 1	B	\$38,186,500	\$161,040	\$1,578,006	\$13,337,364	\$53,262,910	0	
Ramp No. 43	Access	I-65 NB	B	\$13,200,000		\$373,808	\$3,159,441	\$16,733,249	\$16,733,249	1.00
Ramp No. 44	Access	CD 2	B	\$5,412,000	\$18,414	\$329,954	\$2,788,780	\$8,549,148	0	
Ramp No. 51	Access	Ramp 26	B		\$211,398	\$164,977	\$1,394,390	\$1,770,765	\$1,770,765	1.00
Ramp No. 51A	Access	Ramp 32	B	\$9,273,000	\$143,220	\$175,798	\$1,485,852	\$11,077,870	\$11,077,870	1.00
Ramp No. 52	Access	I-64 WB	B	\$2,002,000	\$391,512	\$407,981	\$3,448,267	\$6,249,760	\$6,249,760	1.00
Ramp No. 62	Access	Story Ave	B		\$211,332	\$220,982	\$1,867,744	\$2,300,058	\$2,300,058	1.00
BL No. 1					\$108,570	\$99,290	\$839,201	\$1,047,061	\$1,047,061	1.00
BL No. 2					\$83,688	\$77,647	\$656,278	\$817,613	\$817,613	1.00
BL No. 3				\$869,000	\$114,576	\$147,131	\$1,243,558	\$2,374,266	\$2,374,266	1.00
CD No. 1	Access	I-71 NB	B	\$9,009,000	\$1,032,504	\$729,961	\$6,169,654	\$16,941,119	\$16,941,119	1.00
CD No. 2	Access	Ramp 62 I-64 EB	B	\$4,004,000	\$1,348,908	\$511,257	\$4,321,165	\$10,185,330	\$10,185,330	1.00
Bingham Way	Local	Access	B		\$148,566	\$267,684	\$2,262,474	\$2,678,724	\$2,678,724	1.00
North Campbell St.	Local	Access	B		\$242,154	\$207,692	\$1,755,423	\$2,205,269	\$2,205,269	1.00
North Clay St.	Local	Access	B		\$844,206	\$379,694	\$3,209,183	\$4,433,082	\$4,433,082	1.00
Frankfort Ave.	Local	Access	B		\$748,836	\$358,810	\$3,032,678	\$4,140,324	\$4,140,324	1.00
Hancock St.	Local	Access	B		\$47,586	\$64,168	\$542,352	\$654,106	\$654,106	1.00
South Jackson St.	Local	Access	B		\$115,434	\$82,773	\$699,602	\$897,809	\$897,809	1.00
East Jefferson St.	Local	Access	B		\$340,956	\$151,877	\$1,283,673	\$1,776,507	\$1,776,507	1.00
East Liberty St.	Local	Access	B		\$77,088	\$101,568	\$858,456	\$1,037,112	\$1,037,112	1.00
East Main St.	Local	Access	B		\$180,246	\$78,786	\$665,905	\$924,938	\$924,938	1.00
East Market St.	Local	Access	B		\$210,144	\$94,923	\$802,296	\$1,107,363	\$1,107,363	1.00
Mellwood Ave.	Local	Access	B		\$174,834	\$109,162	\$922,640	\$1,206,636	\$1,206,636	1.00
Pedestrian/Bike Path	Access	Indiana	S	\$2,354,000	\$104,082	\$319,512	\$2,700,527	\$5,478,121	0	
South Preston St.	Local	Access	B		\$119,460	\$91,126	\$770,204	\$980,790	\$980,790	1.00
River Road	Local	Access	B		\$443,982	\$220,222	\$1,861,326	\$2,525,530	\$2,525,530	1.00
Story Avenue	Local	Access	B		\$145,134	\$104,416	\$882,525	\$1,132,075	\$1,132,075	1.00
East Witherspoon St.	Local	Access	B		\$2,989,074	\$1,282,605	\$10,840,620	\$15,112,298	\$15,112,298	1.00
West River Road	Local	Access	B		\$162,228	\$147,701	\$1,248,372	\$1,558,301	\$1,558,301	1.00
PROJECT TOTAL					\$489,296,500	\$35,911,004	\$27,422,815	\$234,852,845	\$787,483,163	

*B – Basic S – Secondary

** Note: This worksheet is a tool of the Value Engineering process and is only used for determining the areas that the Value Engineering team should focus on for possible alternatives. The column for COST indicates the approximate amount of the cost as shown in the cost estimate. The column for WORTH is an estimated cost for the lowest possible alternative that would provide the FUNCTION shown. Many times the lowest cost alternatives cannot be implemented, but are used only to establish a worth for a function. A value index greater or less than 1.00 indicates the Value Engineering team intends to focus on this area of the project.

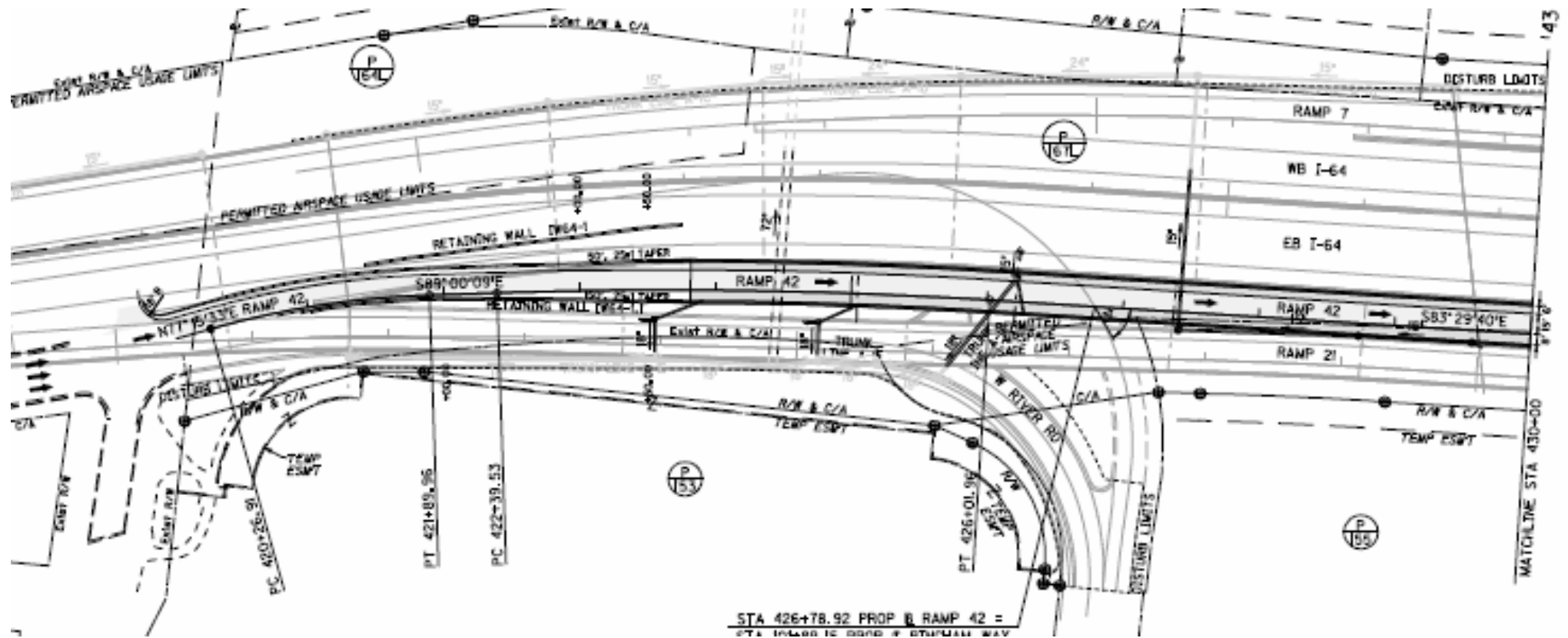
Following the design team presentation and the completion of the Functional Worksheet, the Study Team developed the following alternatives for the areas of focus identified in the Functional Analysis.

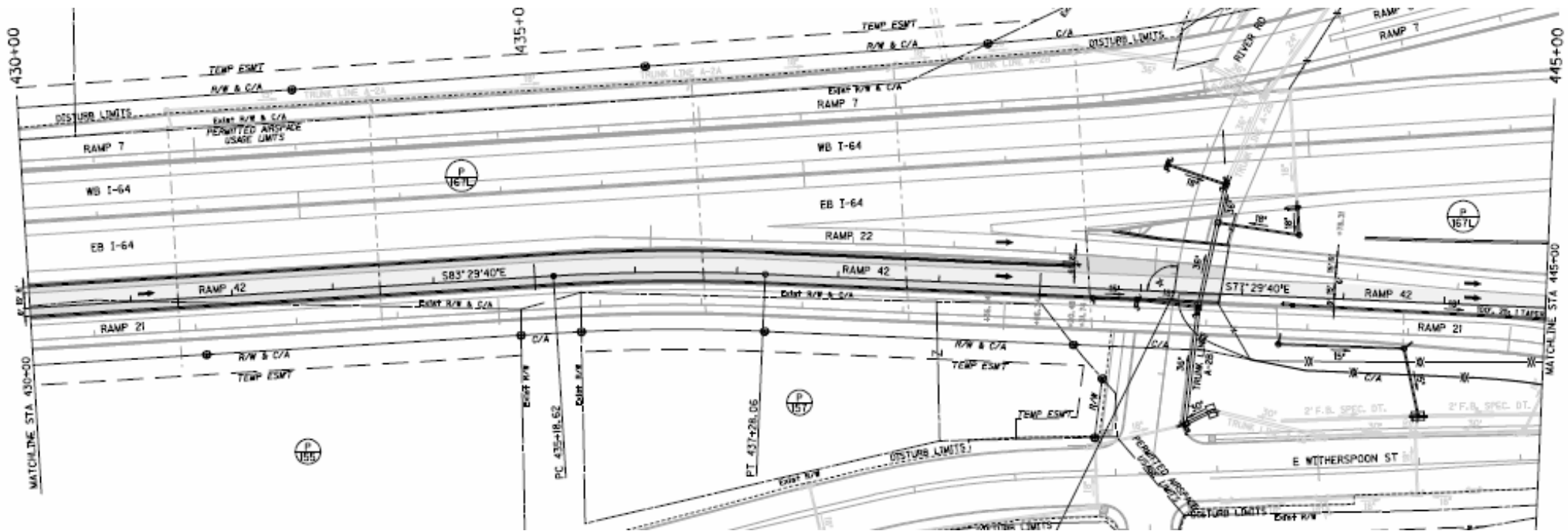
A. RAMP NUMBER 42

AS PROPOSED ALTERNATIVE A.1:

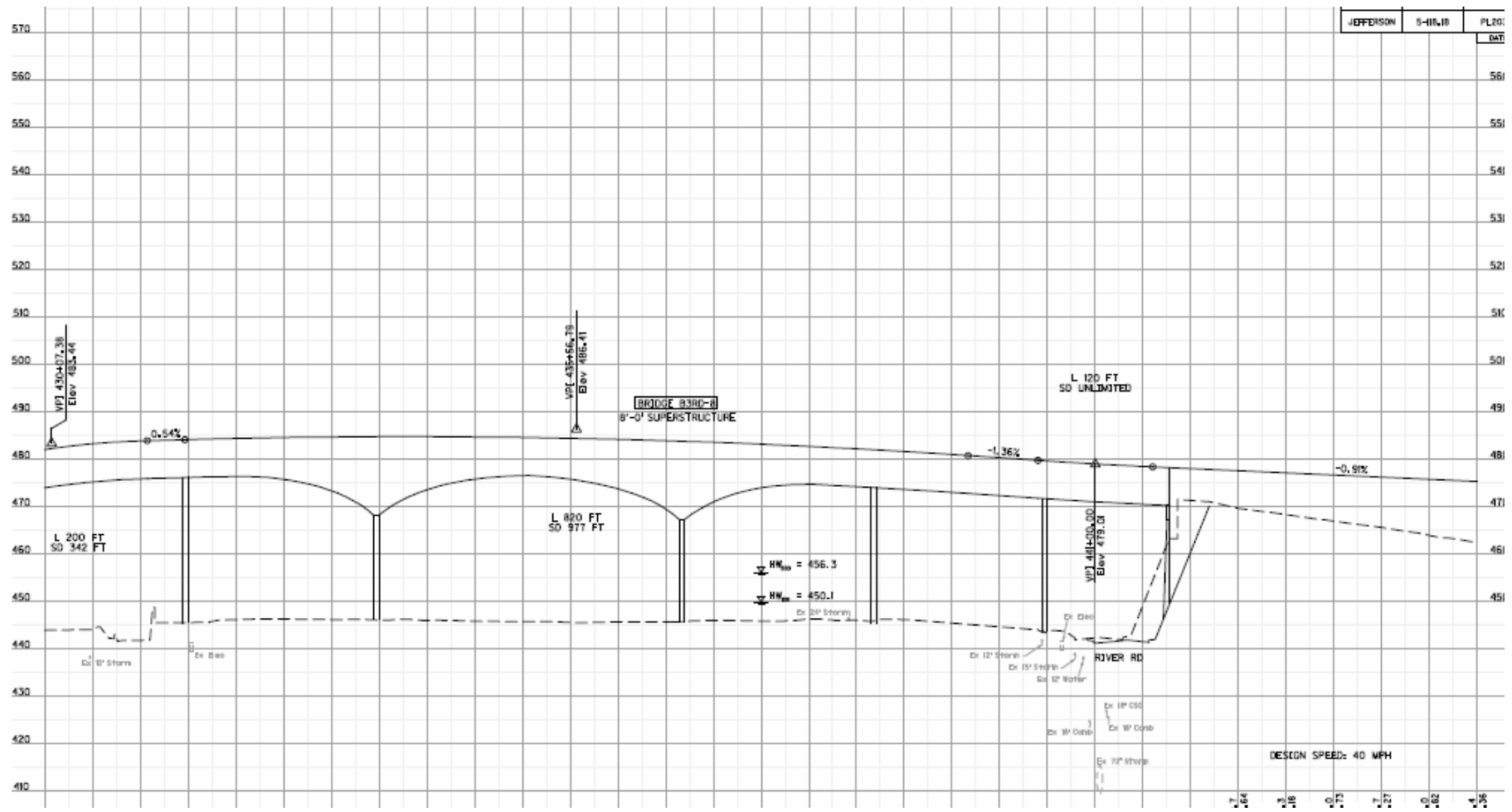
Ramp 42's primary function is access for the local downtown traffic to Interstate 64 northbound, Interstate 71 northbound, and 65 northbound Systems. Ramp 42 also provides a route to the Story Road off ramp. The traffic projects for this ramp is estimated to be 2000 AADT with 50 VPH for the AM Peak and 650 VPH for the PM Peak.

Ramp 42 is approximately 8,312' long and varies from 1 to 2 lanes in width. The majority of the ramp is on structure (6,700' +/-) as shown on the following Plan & Profile Sheets.

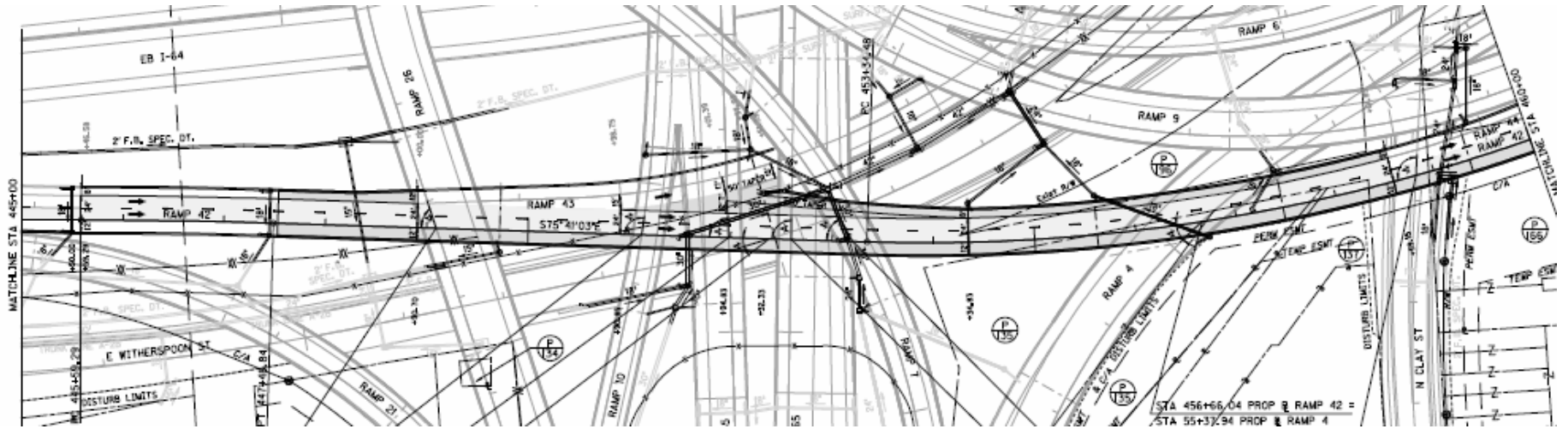




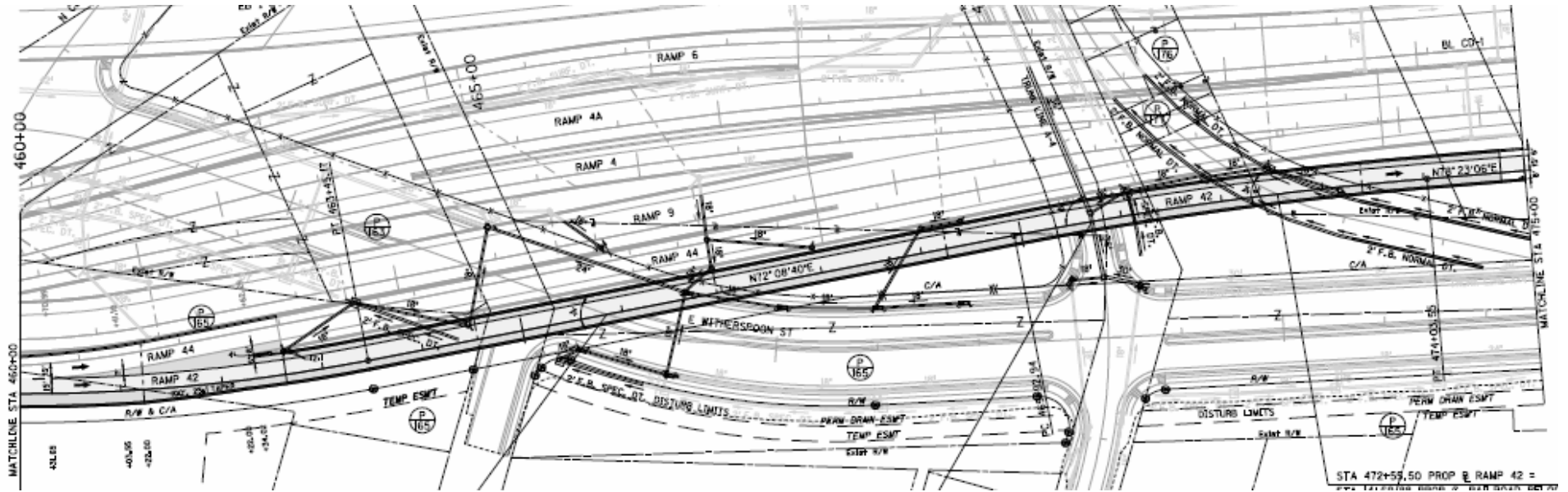
Alternatives 4
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)



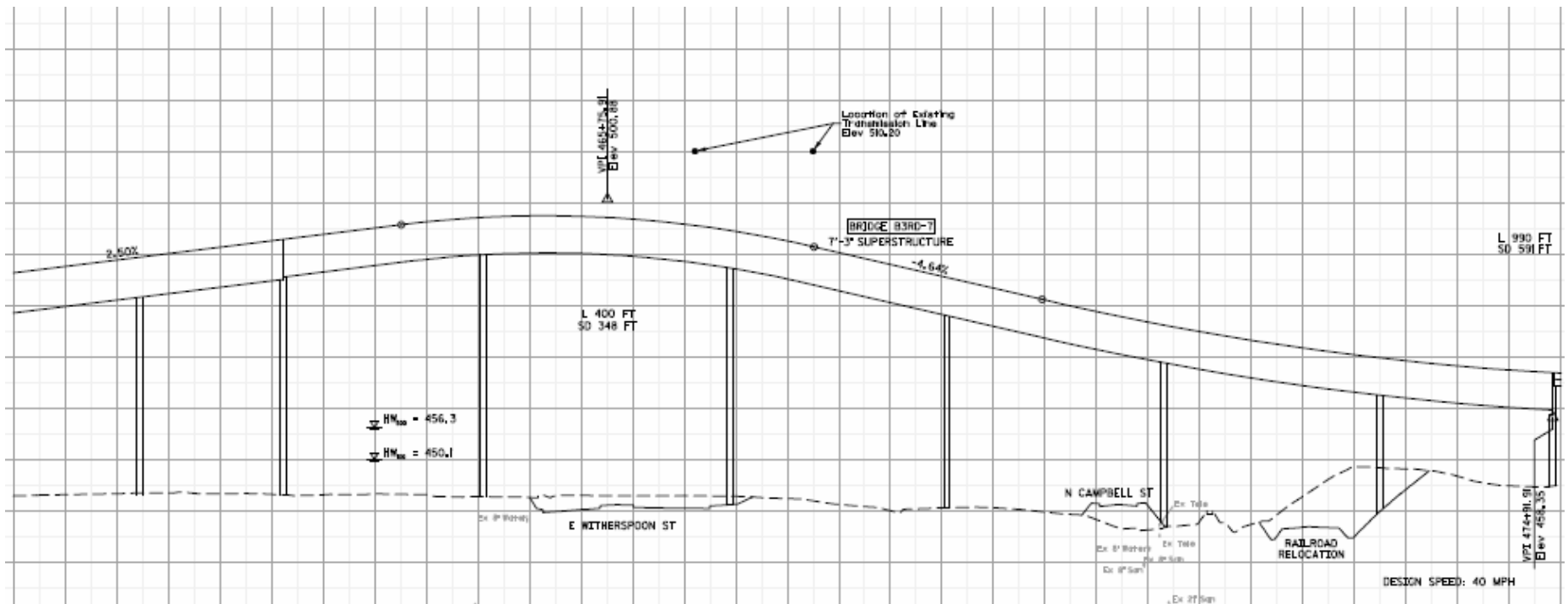
Alternatives 5
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)



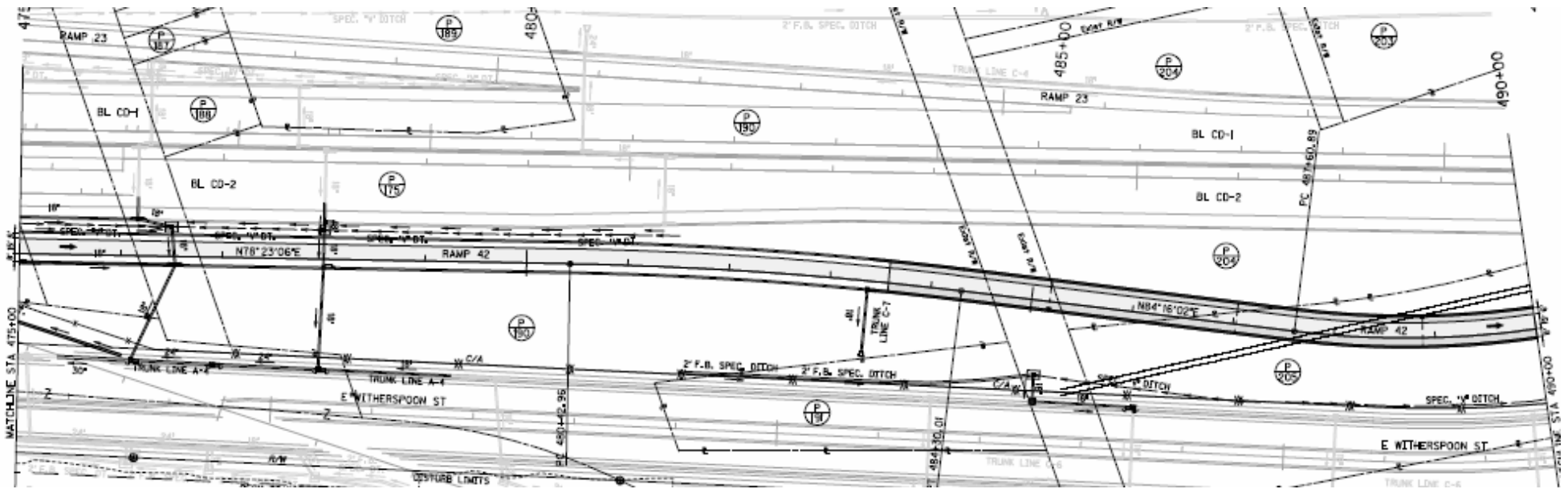
Alternatives 5
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)



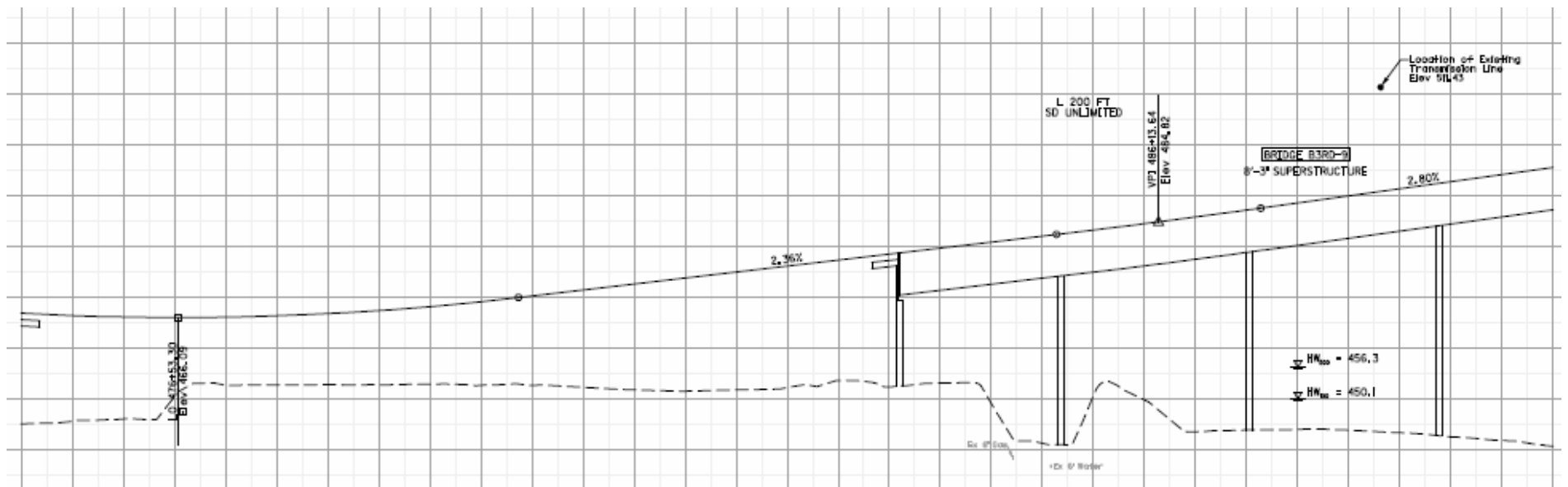
Alternatives 5
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)



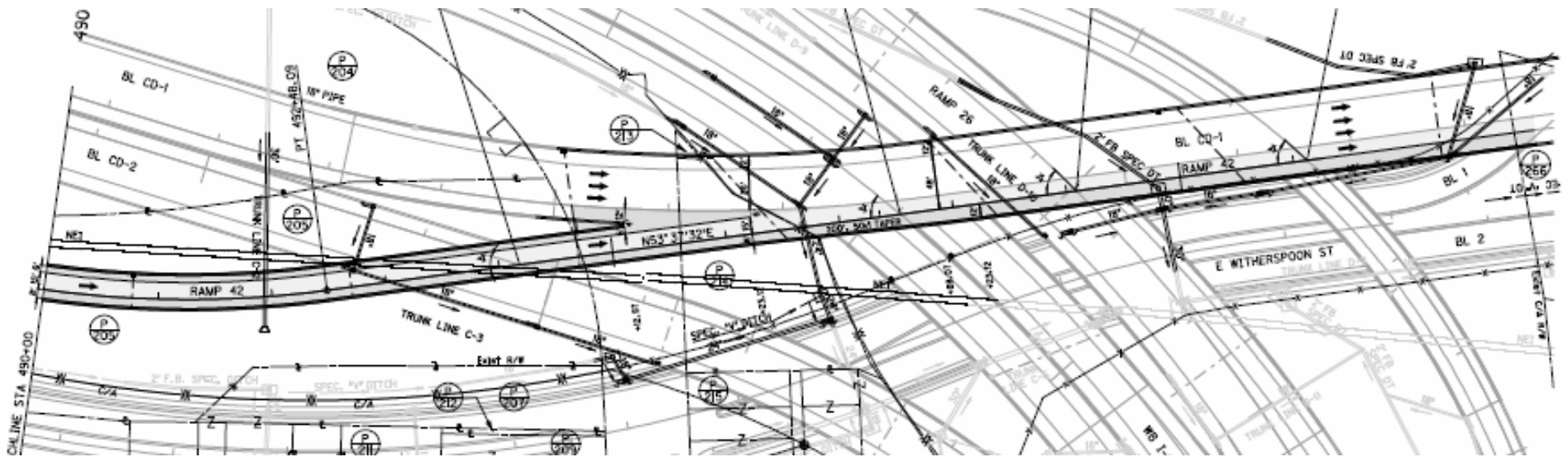
Alternatives 5
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)



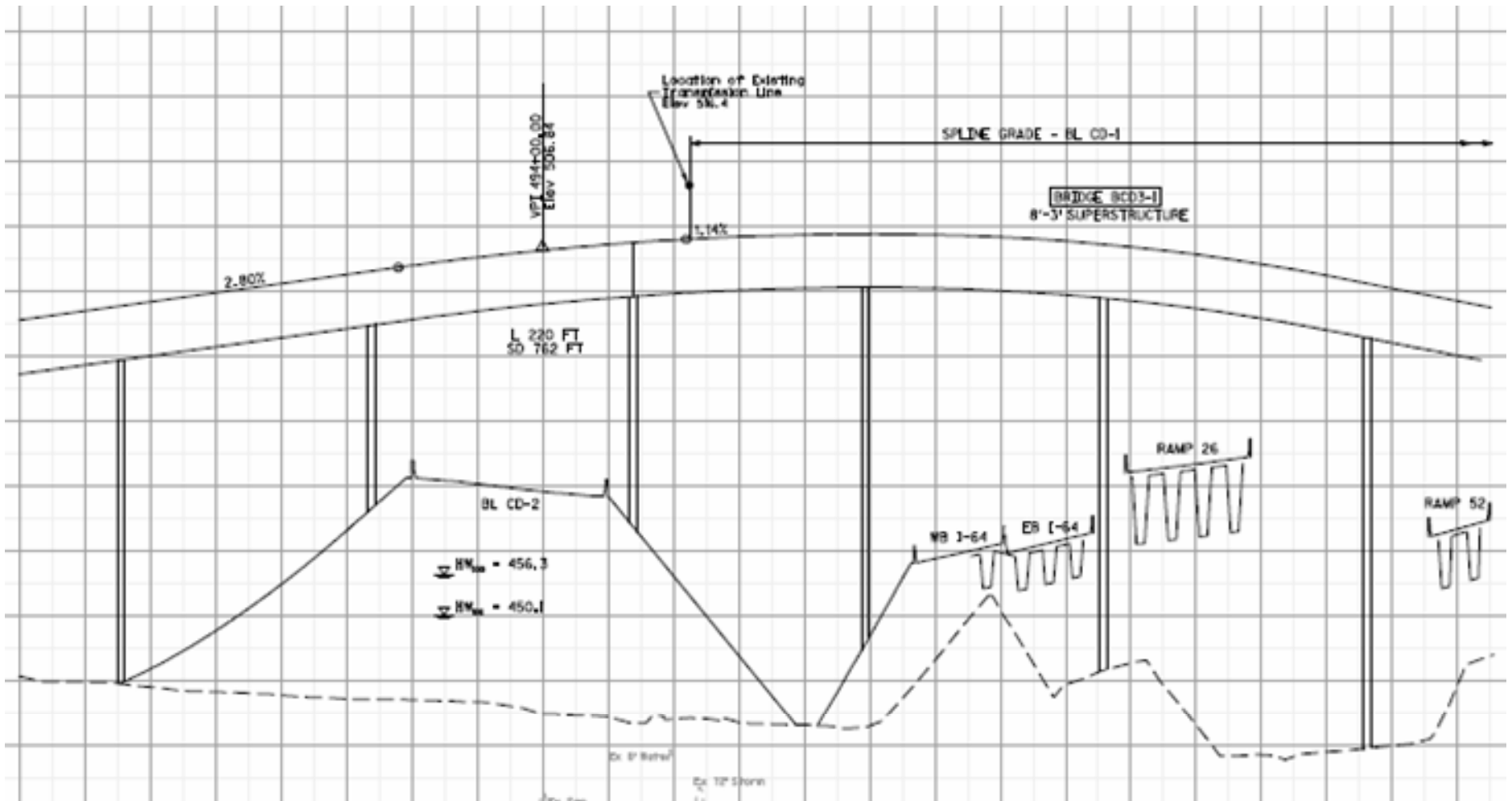
Alternatives 5
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)



Alternatives 5
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)



Alternatives 5
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)



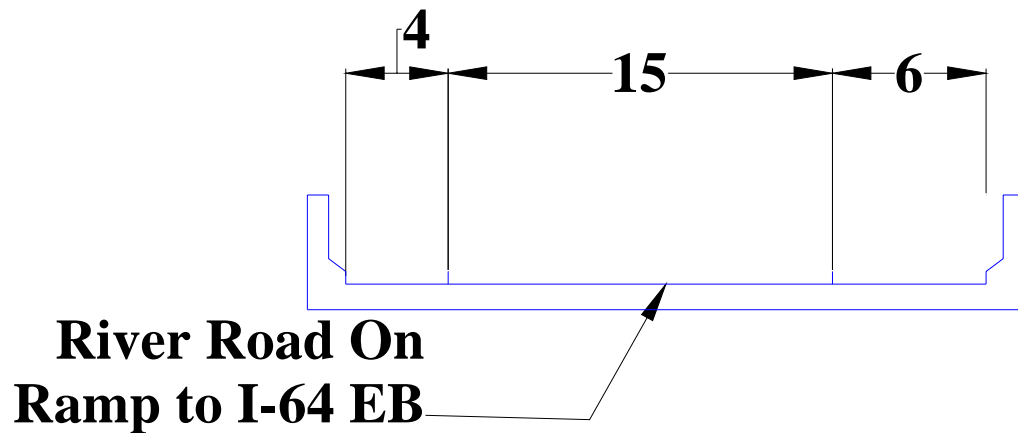
Alternatives 5
A. Ramp Number 42 (continued)
As Proposed A.1 (continued)

A. RAMP NUMBER 42 *(continued)***VALUE ENGINEERING ALTERNATIVE A.2:**

Replace Ramp Number 42 at 2nd Street with an eastbound “on” ramp from River Road to eastbound I-64 and River Road northbound. Move eastbound exists for Ramp Numbers 21 & 22 to the same location.

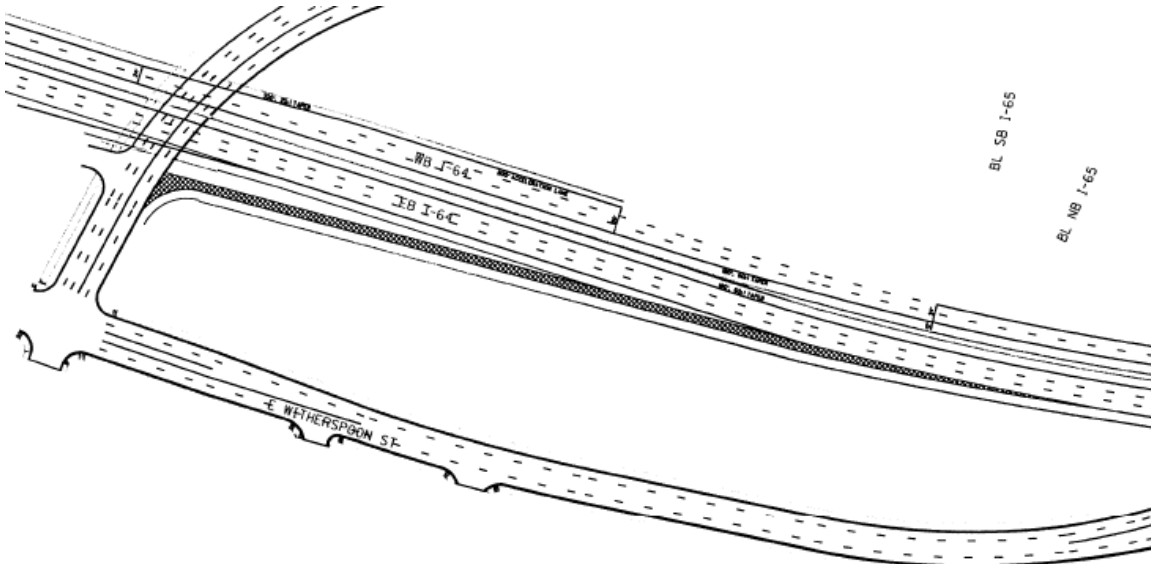
The Value Engineering Team recommends eliminating Ramp 42 and associated connecting ramps by replacing it with 2 separate ramps located north of the Witherspoon/N. Preston Street intersection on River Road and at the proposed location of the Bike/Ped Ramp.

The ramp located north of the Witherspoon/ N. Preston Street intersection on River Road will provide access for the local traffic wishing to go east on I-64 and north on I-71. Traffic for northbound I-71 would exit at Ramp 23.



A. RAMP NUMBER 42 *(continued)*

VALUE ENGINEERING ALTERNATIVE A.2: *(continued)*

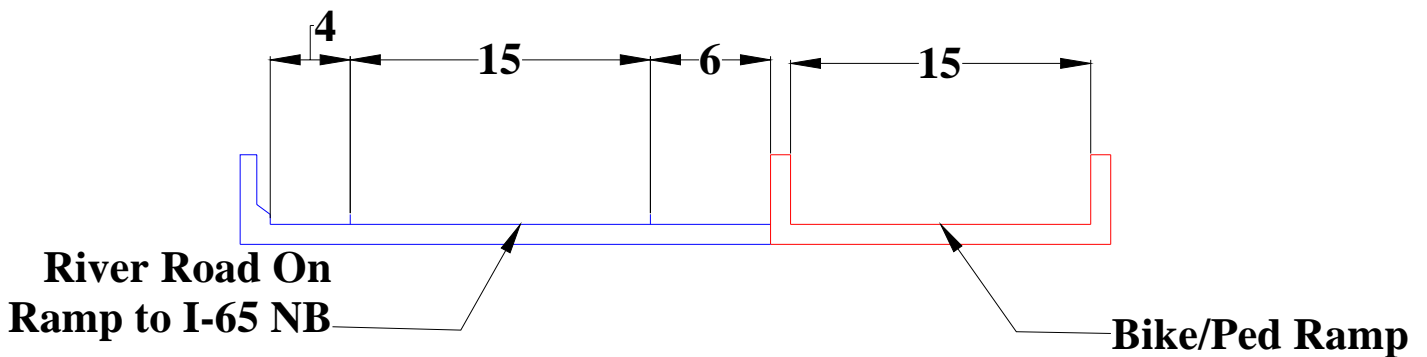


I-64 EASTBOUND ON RAMP FROM RIVER ROAD

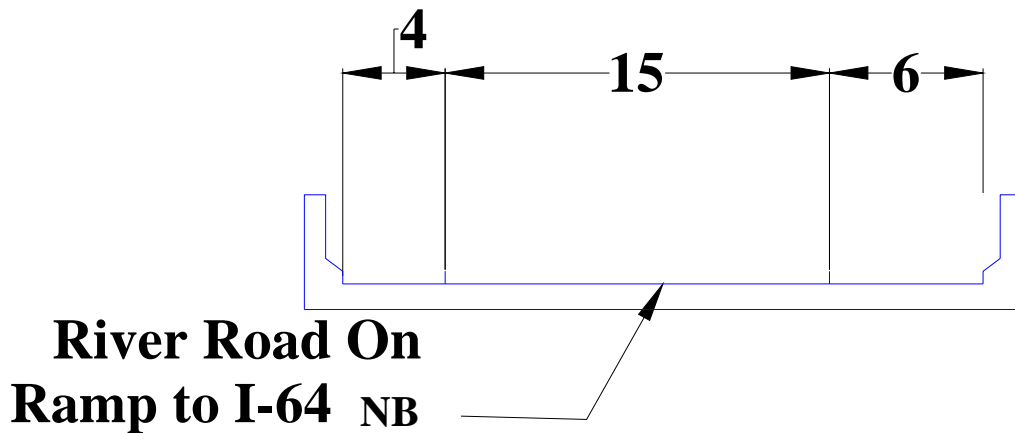
A. RAMP NUMBER 42 *(continued)*

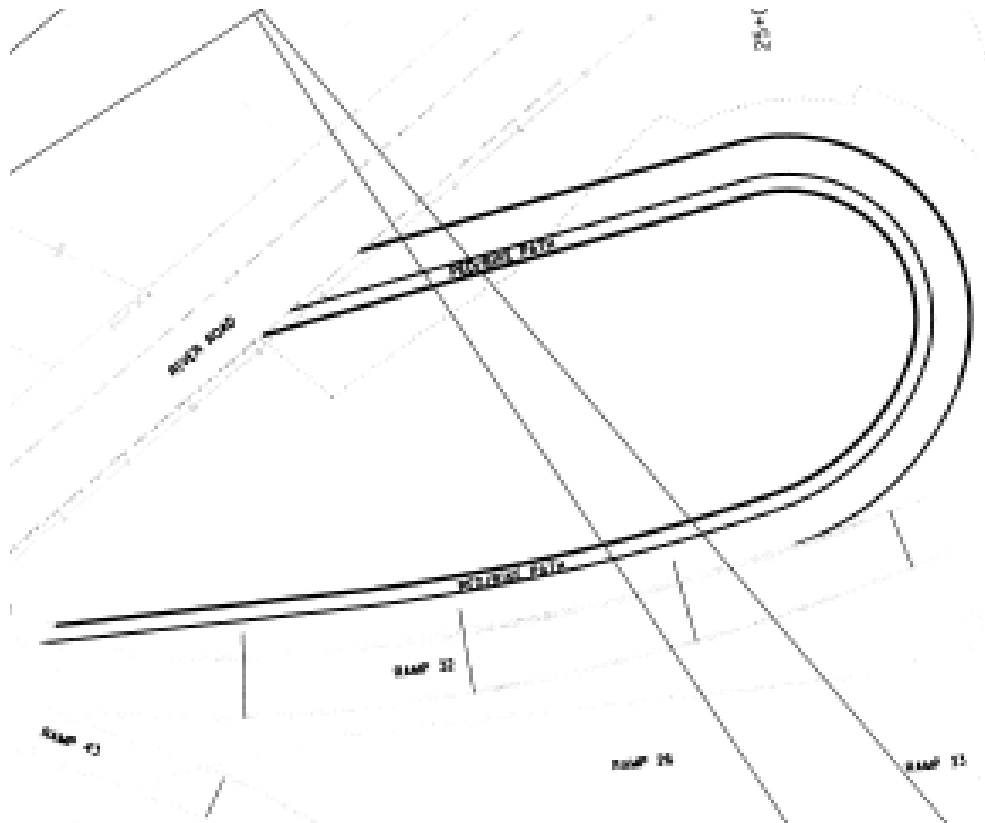
VALUE ENGINEERING ALTERNATIVE A.2: *(continued)*

The ramp located at the Pedestrian/Bike path will provide access for the local traffic as well as bicyclists and pedestrians to Indiana. The ramp would terminate about 700' west of the Clay Street Intersection on River Road. This will increase the amount of traffic through the N. Preston Street/E. Witherspoon/River Road intersection, but the Value Engineering Team assumes that the northbound I-65 traffic will evenly split from westbound Witherspoon making the right onto River Road, from N. Preston continuing on straight through to River Road and from eastbound Witherspoon turning left onto River Road



NOTE: If Pedestrian/Bike ramp is eliminated as recommended by the Value Engineering Team then the “on” ramp would be as shown below.



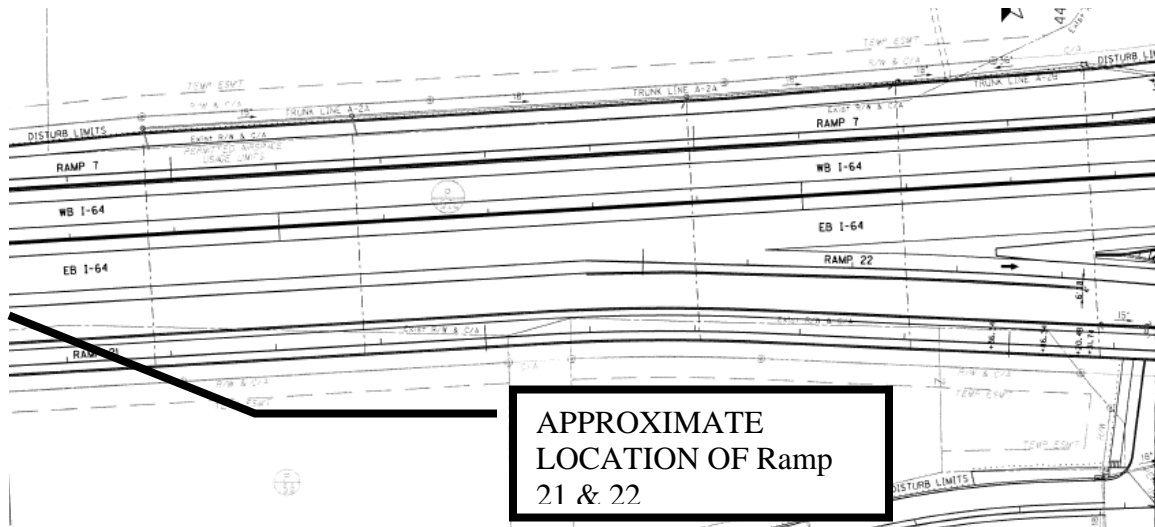
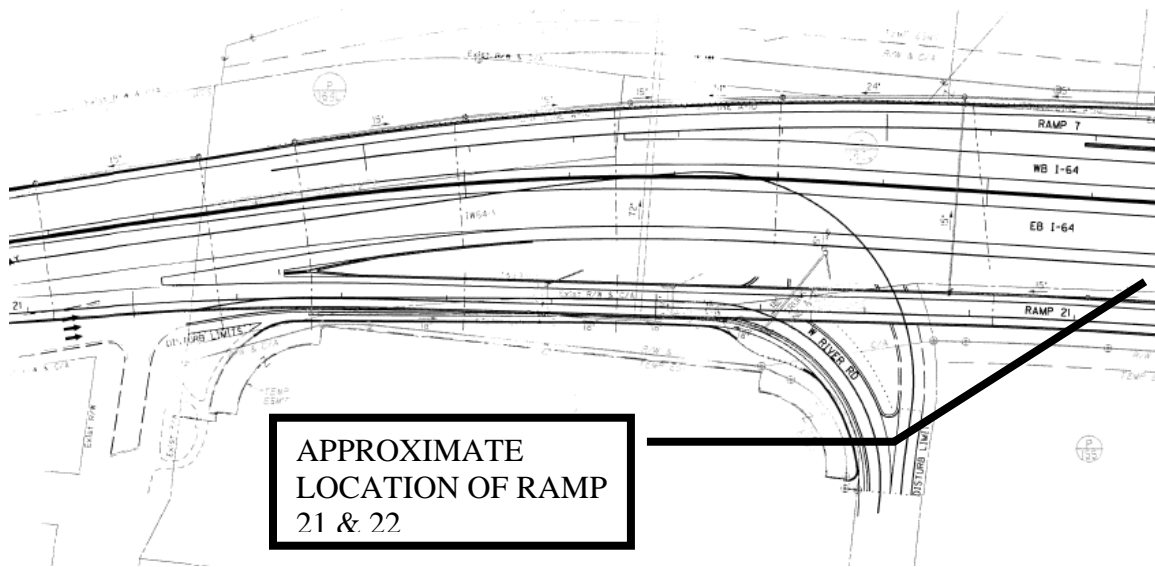
A. RAMP NUMBER 42 *(continued)***VALUE ENGINEERING ALTERNATIVE A.2:** *(continued)***RAMP FROM RIVER ROAD TO I-65 NORTHBOUND**

The only access that is not available to the traffic from downtown is access to Story Street exit. They will have to use the Louisville surface streets – E. Market Street or exit I-64 at the Grinstead Drive Interchange. From the traffic projections this will preclude about 50 VPH in the morning and 300 VPH in the afternoon.

By eliminating Ramp 42, it allows for a single dual lane exit for the I-64 eastbound traffic to I-65 northbound and southbound Traffic (combined traffic of 1170 AM Peak/1700 PM Peak). The Value Engineering Alternative would locate the dual exit ramp at the mid point between the two. This would increase the length of Ramp 22 by approximately 1,200' and reduce the length of Ramp 21 by 1,200'.

A. RAMP NUMBER 42 *(continued)*

VALUE ENGINEERING ALTERNATIVE A.2: *(continued)*



Elimination of Ramp 42 will also reduce the footprint of the interchange. Between Witherspoon and I-64 eastbound it was estimated a 50' wide by 3,500' length of right-of-way acquisition could be eliminated (approximately 3.2 acres less).

**RAMP 42
VALUE ENGINEERING ALTERNATIVE A.2
COST COMPARISON SHEET**

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
RAMP 42 TOTAL	LS	\$53,262,910.00	1.0	\$53,262,910	0.0	\$0
RAMP 44 TOTAL	LS	\$8,549,148.00	1.0	\$8,549,148	0.0	\$0
RAMP 21 TOTAL	LS	\$31,006,793.00	1.0	\$31,006,793	0.9	\$29,374,857
RAMP 22 TOTAL	LS	\$1,850,761.00	1.0	\$1,850,761	2.2	\$4,063,547
VE RAMP I-65 NB/WITH BIKE/PED	SF	\$115.00	0.0	\$0	75,600.0	\$8,694,000
VE RAMP I-64 EASTBOUND	SF	\$120.00	0.0	\$0	49,970.0	\$5,996,400
PED/BIKE PATH TOTAL	LS	\$5,478,121.00	1.0	\$5,478,121	0.0	\$0
SUBTOTAL				\$100,147,733		\$48,128,804
RIGHT-OF-WAY	AC	\$782,296.61	70.7	\$55,300,000	67.5	\$52,785,732
GRAND TOTAL				\$155,447,733		\$100,914,535
POSSIBLE SAVINGS:				\$54,533,198		

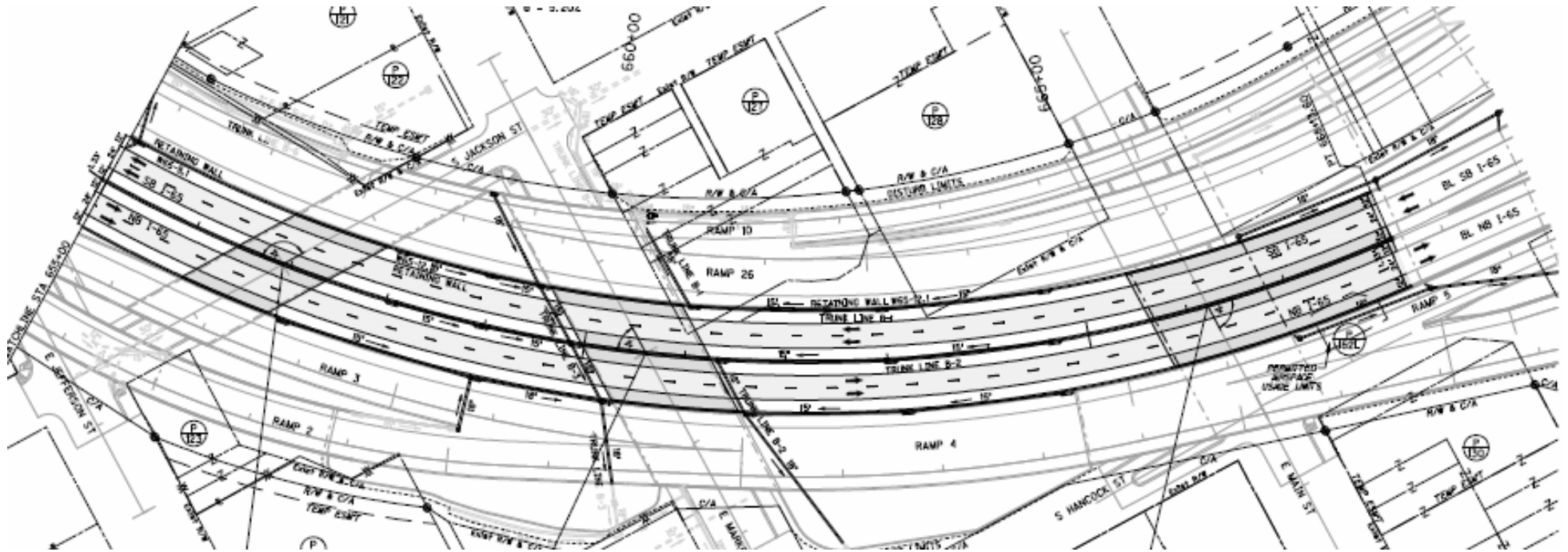
B. RAMP NUMBERS 3 AND 5**AS PROPOSED ALTERNATIVE B.1:**

Relocate Ramp Number 5 from Ramp Number 4 to the south to provide a direct connection to northbound I 65 from Ramp Number 3.

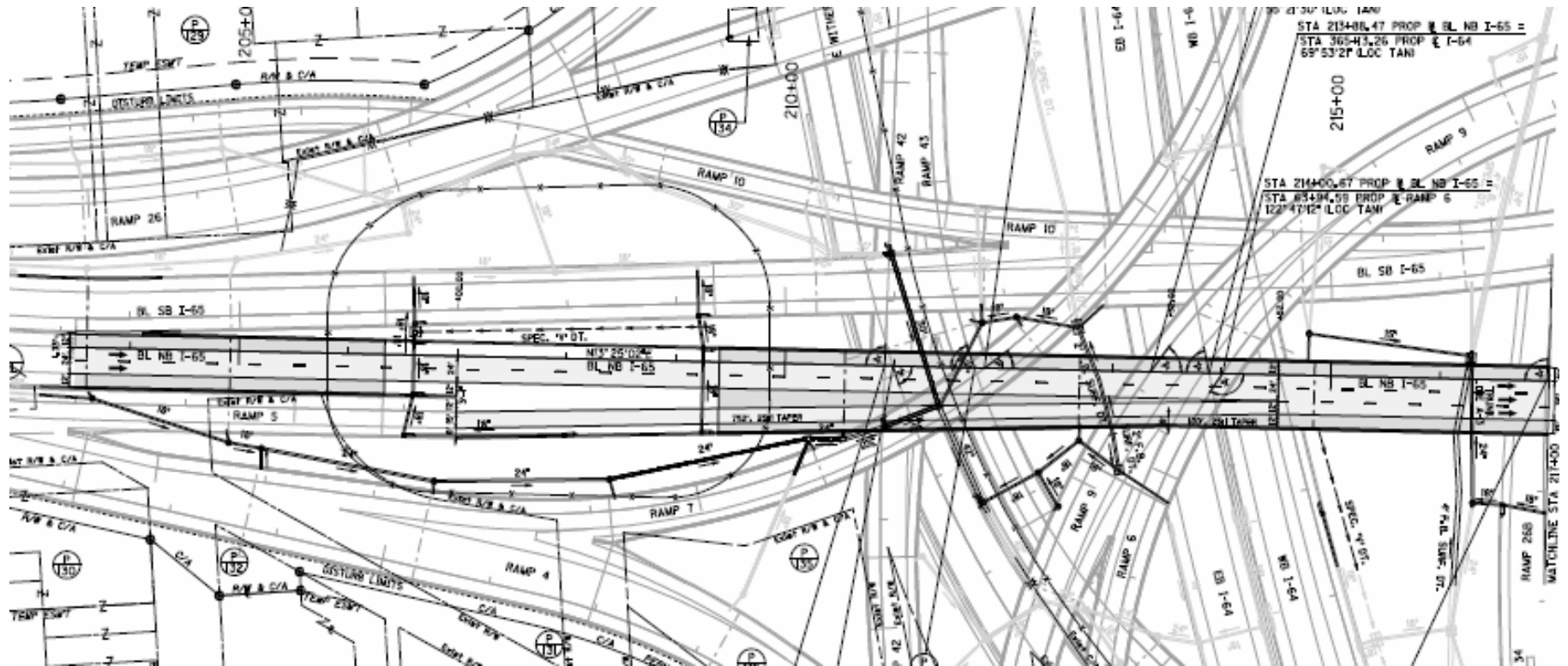
The “as-proposed” Ramp #3 is a relocation of an existing ramp. This ramp begins at Liberty Street and Muhammad Ali Blvd. and carries traffic from the local city streets to provide access to I-65 northbound, I-71 northbound and I-64 westbound. In order to accomplish this task Ramp #3 merges with Ramp #2 and becomes Ramp #4. As Ramp #4 progresses northward Ramp #5 splits from Ramp #4 to carry the traffic for I-65 northbound. As Ramp #4 continues northward, Ramp #7 splits to the west to carry traffic to I-64 westbound and Ramp #4 turns to the east to carry traffic to I-71 northbound.

Ramp#3 travels north from Muhammad Ali Blvd and bridges over Liberty Street, Preston Street, Jefferson Street, Jackson Street, and Market Street before merging with Ramp #2 to become Ramp #4. Ramp #5 begins on the south side of E. Main Street and proceeds northward on bridge B65-10 then across a short section of embankment to merge with the I-65 northbound bridge B65-15.

The location of Ramps 2, 3, 4 and 5 are shown on the following plan sheets:



Alternatives 5
B. Ramp Numbers 3 and 5 *(continued)*
As Proposed B.1 *(continued)*



Alternatives 5
B. Ramp Numbers 3 and 5 (continued)
As Proposed B.1 (continued)

B. RAMP NUMBERS 3 AND 5 *(continued)***VALUE ENGINEERING ALTERNATIVE B.2:**

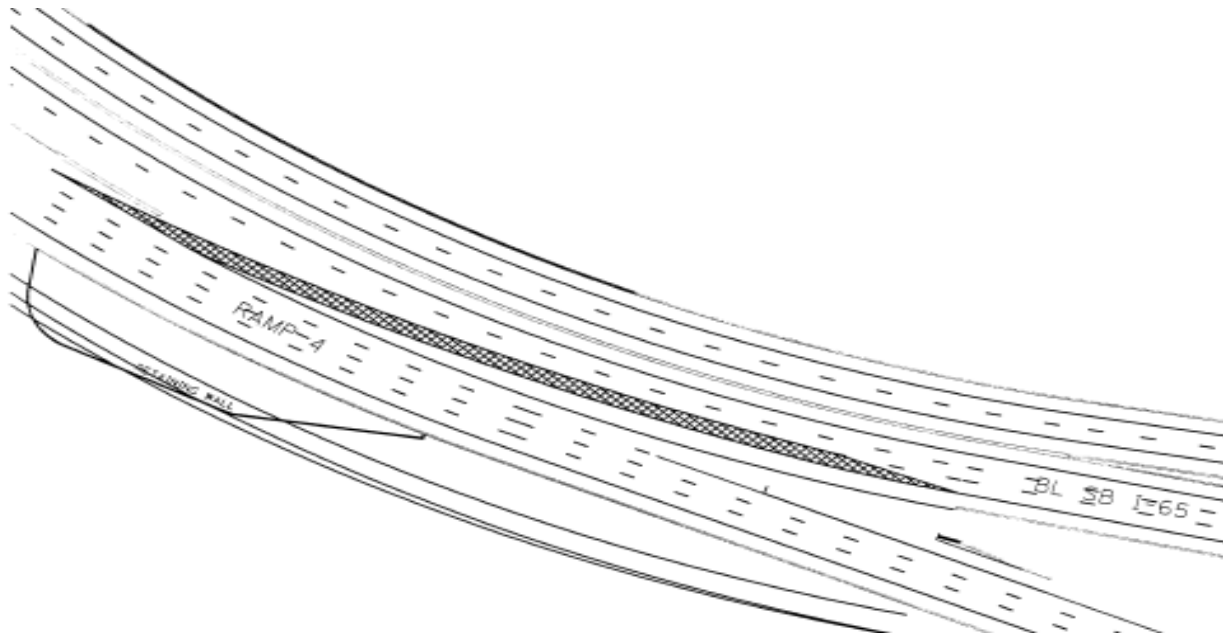
This alternative proposes to merge Ramp #3 with the I-65 northbound mainline between Jefferson and Market Streets and add an additional northbound lane to I-65. This change will allow for the elimination of Ramp #5 and the single lane bridge structure that carried the I-65 northbound traffic. By eliminating the split between Ramp #4 and Ramp #5 the distance between the merge points of Ramp #2 and Ramp #3 and the split of Ramp #4 and Ramp #7 will increase the decision distance by approximately 600' to approximately 1100'. This change should make the signage for just one split with a greater decision distance much easier.

Between Jefferson Street and Market Street, Ramp #3 is located on an embankment section of roadway. One bridge structure over Market Street carries the I-65 mainline, Ramp #2, Ramp #3, and Ramp #26. From the Market Street bridge to Main Street the roadway is located on embankment. This section of roadway allows approximately 800' of mainline distance to allow the left lane of Ramp #3 to enter the mainline corridor and utilize the proposed new third lane that is to be added to the outside of the two proposed northbound lanes of I-65. The bridge at Market Street would need to only have the traffic barrier wall relocated to the east to accommodate the new proposed third lane on the northbound lanes of I-65. The proposed new entrance ramp will not require any additional embankment or bridge width between Jefferson Street and south side of the E. Main Street bridge.

Starting from the south side of E. Main Street, Ramp #5 is on Bridge Structure #B65-10. Ramp #4 also uses part of this structure. Part of the calculations to show the savings gained by eliminating Ramp #5 were done as a reduction of the square footage of deck surface on Structure # B65-10.

B. RAMP NUMBERS 3 AND 5 *(continued)*

VALUE ENGINEERING ALTERNATIVE B.2: *(continued)*



RELOCATED RAMP 5



Ramp Numbers 3 and 5
VALUE ENGINEERING ALTERNATIVE B.2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT RAMP #5	SY	\$60.00	1,205	\$72,300	0	0
EMBANKMENT RAMP#5	CY	\$9.00	13,060	\$117,540	0	0
BRIDGE B65-10 ON RAMP #5	SF	\$187.44	41,800	\$7,834,992	21,600	\$4,048,704
BRIDGE BR-2 ON I-65	SF	\$134.88	26,093	\$3,519,424	32,616	\$4,399,246
I-65 NB THIRD LANE	SY	\$60	0	\$0	414	\$24,840
EMBANKMENT I-65NB	CY	\$9.00	0	\$0	4,822	\$43,398
BRIDGE B-65-15 I-65 NB	SF	\$134.88	95,420	\$12,870,250	903,001	\$121,796,775
GRAND TOTAL				\$24,414,506		\$20,695,852

POSSIBLE SAVINGS:

\$3,718,412

C. RAMP NUMBER 32 EXIT**AS PROPOSED ALTERNATIVE C.1:**

The As Proposed Ramp 32 is a tapered off ramp from I-71 to I-65 and the local street system. The ramp diverge point is 1,000' from the next divergence point. The alignment of ramp 32 requires a separate ramp structure over Frankfort Avenue.

C. RAMP NUMBER 32 EXIT *(continued)***VALUE ENGINEERING ALTERNATIVE C.2:**

Eliminate the separate Ramp Number 32 structure over Frankfort Avenue and add an auxiliary lane to the mainline structure over Frankfort Avenue.

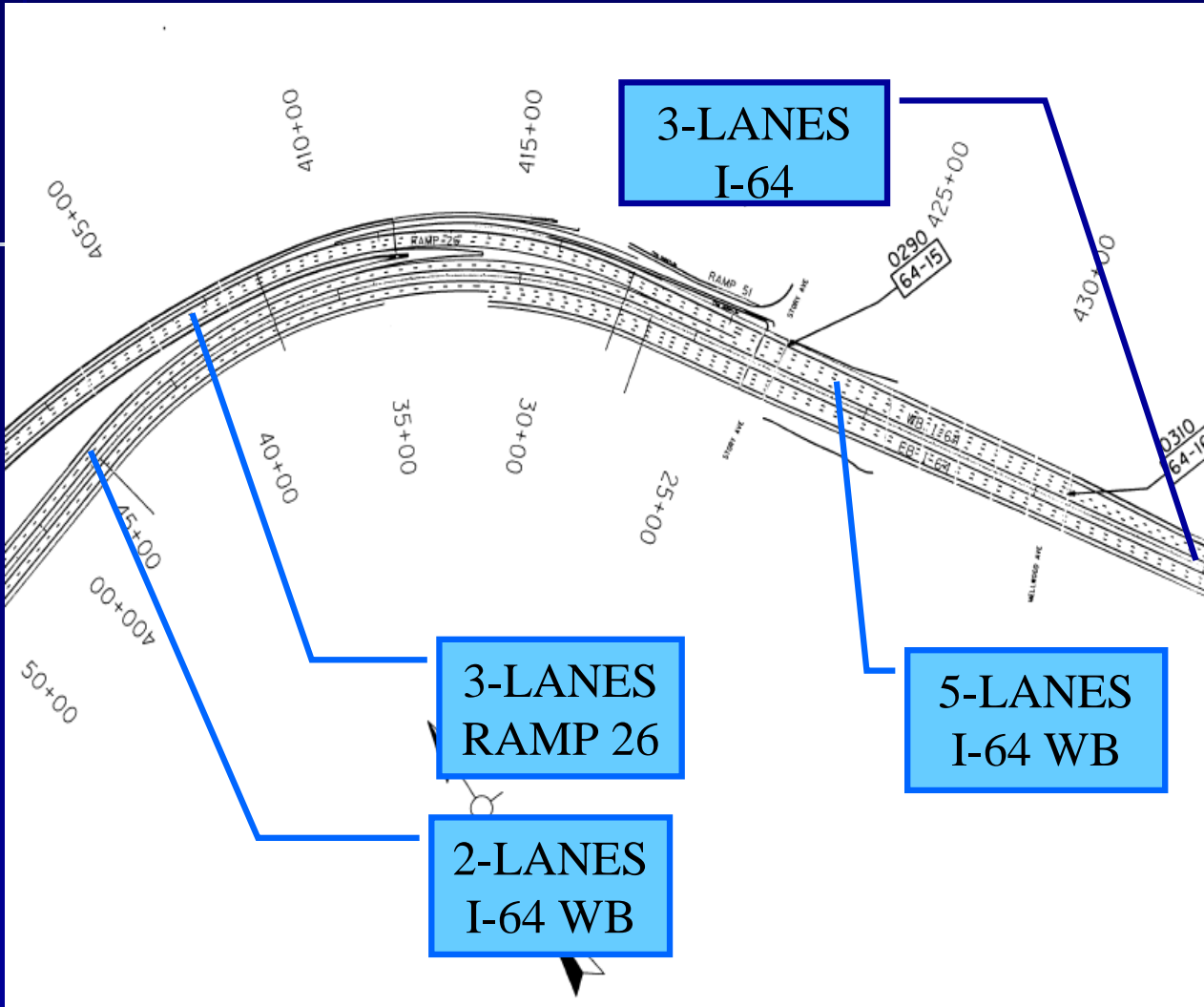
The Value Engineering team investigated using a parallel off ramp configuration to combine the ramp structure with the I-71 main line structure. However, the exit gores for the I-71 to ramp 32 exist and the gore of ramp 32 and ramp 33 would be less than the desired spacing of 800'.

THIS VALUE ENGINEERING ALTERNATIVE WAS DROPPED DURING THE DEVELOPMENT STAGE.

D. RAMP NUMBER 26 EXIT**AS PROPOSED ALTERNATIVE D.1:**

The As Proposed connection from I-64 westbound to I-65 and the local street system is a three-lane ramp that splits off of I-64 westbound at Mellwood Avenue. On I-64 westbound a five-lane section is started near Mellwood Avenue and proceeds to the main lane/ramp divergent point, then I-64 is a two-lane main line and a three lane off ramp configuration. The three-lane ramp is carried from the I-64 westbound to the I-65 diverge point for the northbound and southbound split. Auxiliary lanes are added to ramp 26 to accommodate traffic that is entering and exiting ramp 26 for the local street system.

I-64 westbound structures #290 at Story Avenue and #310 at Mellwood Avenue. are widened from three lanes to five lanes to accommodate the three-lane ramp 26. Ramp 26 structure #680 is a 1,515' long three-lane structure. Ramp 26 has an average width of 77'.



D. RAMP NUMBER 26 EXIT *(continued)***VALUE ENGINEERING ALTERNATIVE D.2:**

The Value Engineering team recommends that the I-64 westbound lanes remain as three lanes and not widen to a five lane section over Mellwood and Story Avenues. I-64 westbound main three lanes would split into two main lanes - two ramp lanes at the I-65 and local street diverge point. The I-65 and local street traffic would be carried on a two lane ramp 26. The auxiliary lanes additions are the same as the As Proposed additions.

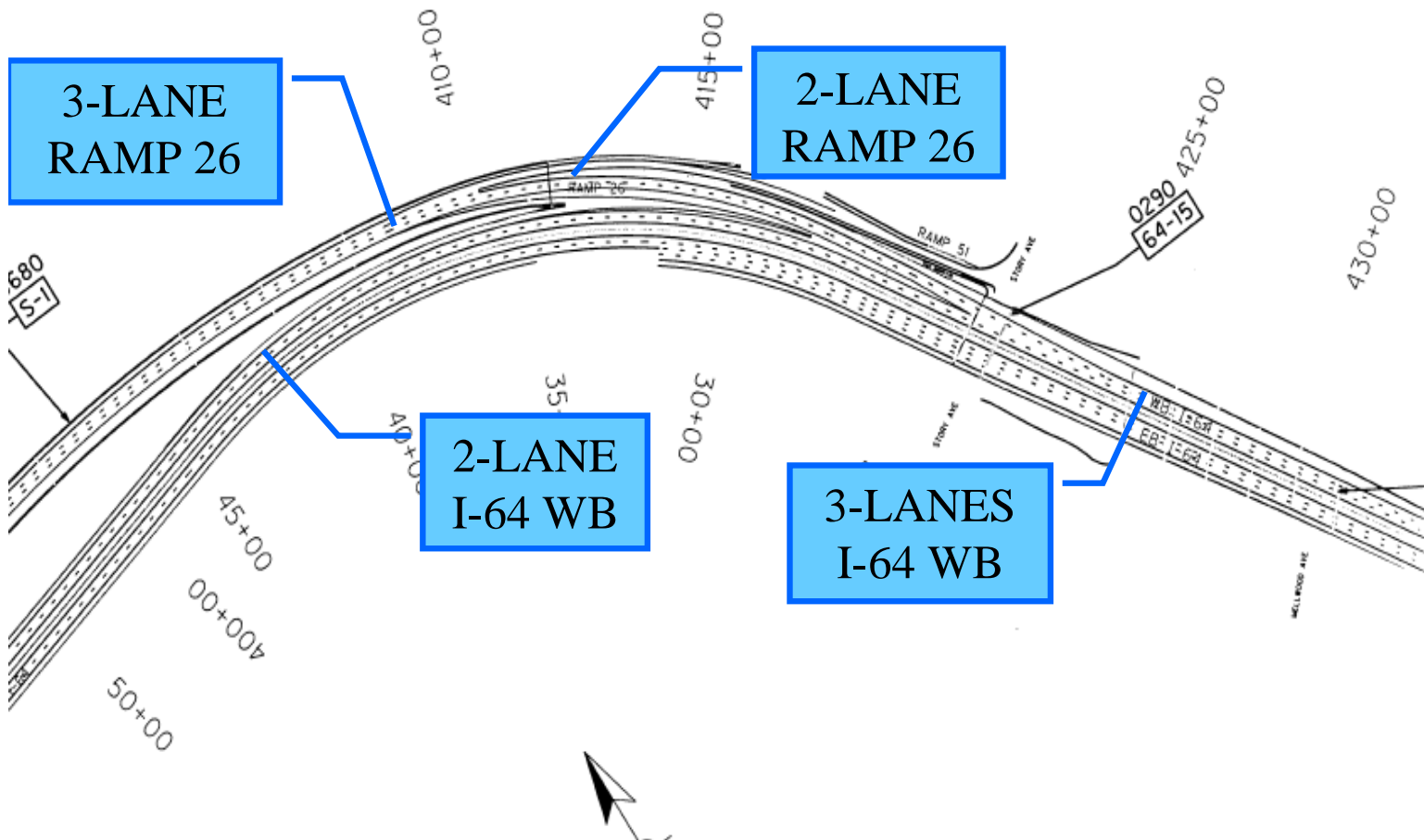
The design year traffic volumes on ramp 26 are:

- ADT -30,100 vehicles
- AM peak hour -2820 vehicles
- PM peak hour -1880 vehicles

The traffic capacity will not be adversely affected by the three lane to two-two lane split. The three lanes to a two lane-two lane splits are efficient and common on the freeway system.

The widths of the I-64 westbound structures at Mellwood and Story Avenues are reduced by two lanes or 24'. 4,000' of ramp 26 will reduce by one lane.

The lane reduction for ramp 26 will save approximately \$5,000,000.



RAMP 26
VALUE ENGINEERING ALTERNATIVE NUMBER D.2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
STRUCTURE #310	SF	\$90.00	76,093.0	\$6,848,370	63,360.0	\$5,702,400
STRUCTURE #290	SF	\$90.00	11,738.0	\$1,056,420	10,960.0	\$986,400
STRUCTURE #680	SF	\$140.00	116,593.0	\$16,323,020	98,150.0	\$13,741,000
STRUCTURE Wentzel St.	SF	\$115.00	12,800.0	\$1,472,000	10,400.0	\$1,196,000
PAVEMENT	SY	\$60.00	36,000.0	\$2,160,000	30,600.0	\$1,836,000
EMBANKMENT	CY	\$9.00	69,500.0	\$625,500	57,500.0	\$517,500
GRAND TOTAL				\$28,485,310		\$23,979,300

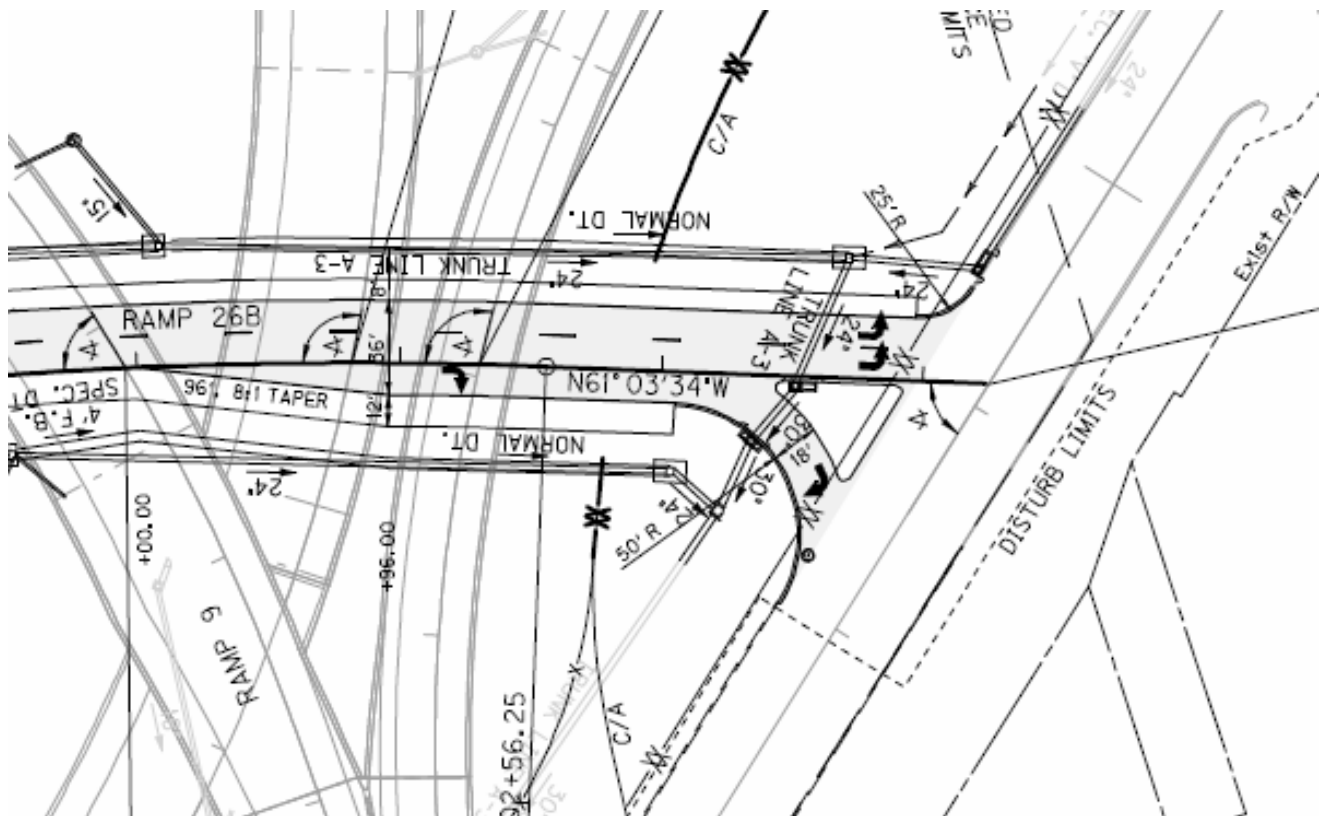
POSSIBLE SAVINGS

\$4,506,010

E. RAMP NUMBER 26B TERMINUS

AS PROPOSED ALTERNATIVE E.1:

Ramp 26B collects traffic from westbound I-64 and southbound I-71 headed for the downtown Louisville area. The connection to the local grid is through River Road approximately 1,000' north east of the intersection of E Witherspoon/N Preston/River Road. Ramp 26B splits from Ramp 26 with 2-lanes and tapers to 1-lane and is joined by Ramp 34 to create 2-lanes on Ramp 26B. The "T" intersection at River Road consists of a single right turn lane and dual left turns that will be signalized.

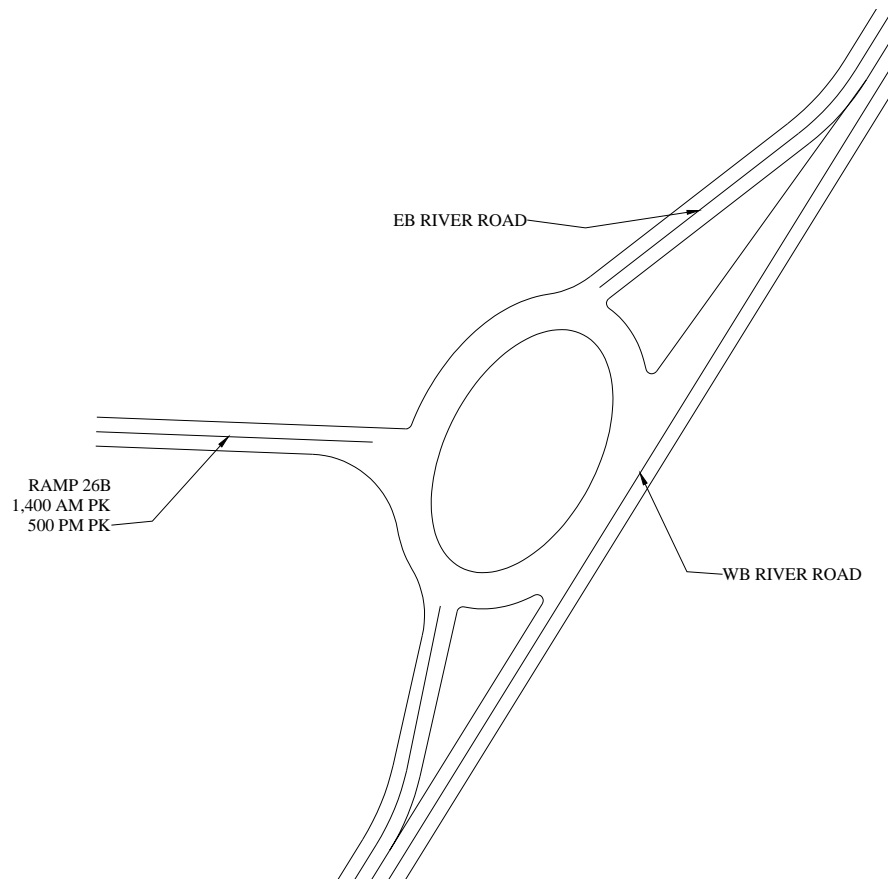


AS PROPOSED RAMP 26B TERMINI

E. RAMP NUMBER 26B TERMINUS *(continued)***VALUE ENGINEERING ALTERNATIVE E.2:**

Construct a roundabout for the intersection of Ramp Number 26B and River Road.

The Value Engineering Team recommends replacing the at grade intersection of Ramp 26B and River Road with a roundabout as shown below.

**VALUE ENGINEERING ALTERNATIVE ROUNDABOUT**

The major benefit to the roundabout is the overall decrease in delay for the major movement, which is the AM Peak left turn movement towards downtown Louisville. Left turn movements have priority in roundabouts. It will also eliminate the signal for the intersection which in turn will reduce maintenance costs.

F. EASTERN I-64 PROJECT LIMITS

AS PROPOSED ALTERNATIVE F.1:

The east terminus of I-64 is approximately 3,500' from the Grinstead Interchange. At the project terminus, the project three lanes in each direction transitions into the existing two lanes in each direction.



F. EASTERN I-64 PROJECT LIMITS *(continued)*

VALUE ENHANCEMENT ALTERNATIVE F.2:

Construct 6 – lanes from the Grinstead Interchange to the west.

The Value Engineering team recommends that the project I-64 east terminus three lane section be extended to the Grinstead Interchange and that the transition from three to two lanes be accomplished in the Grinstead Interchange area. The estimated cost of the project extension is \$1,297,200.



EASTERN I-64 PROJECT LIMITS
VALUE ENHANCEMENT ALTERNATIVE F.2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT	SY	\$60.00	0.0	\$0	9,400.0	\$564,000
EMBANKMENT	CY	\$9.00	0.0	\$0	9,400.0	\$84,600
SUBTOTAL						\$648,600
CONTINGENCY			100.0%	\$0	100.0%	\$648,600
GRAND TOTAL				\$0		\$1,297,200

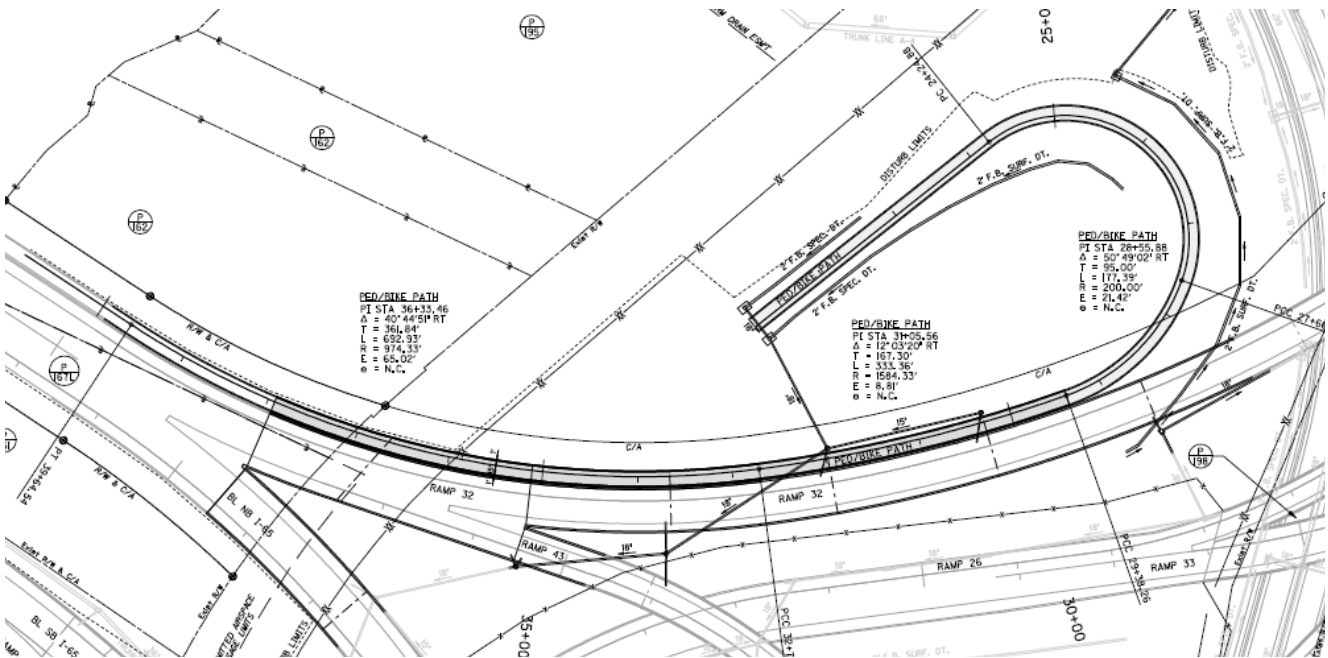
POSSIBLE COST INCREASE

\$1,297,200

G. PEDESTRIAN/ BIKE PATH

AS PROPOSED ALTERNATIVE G.1:

The Ped/bike path begins at a point just south of River Road with a short section of roadway at ground level. The path then begins to climb in elevation on Bridge S-6 to connect to the new bridge on I-65 northbound. The path will continue across the new bridge over the Ohio River to the Indiana side of the river. This will require additional width to be added to the most expensive bridge on the entire project. The construction cost estimate for this path is \$40.6 million.

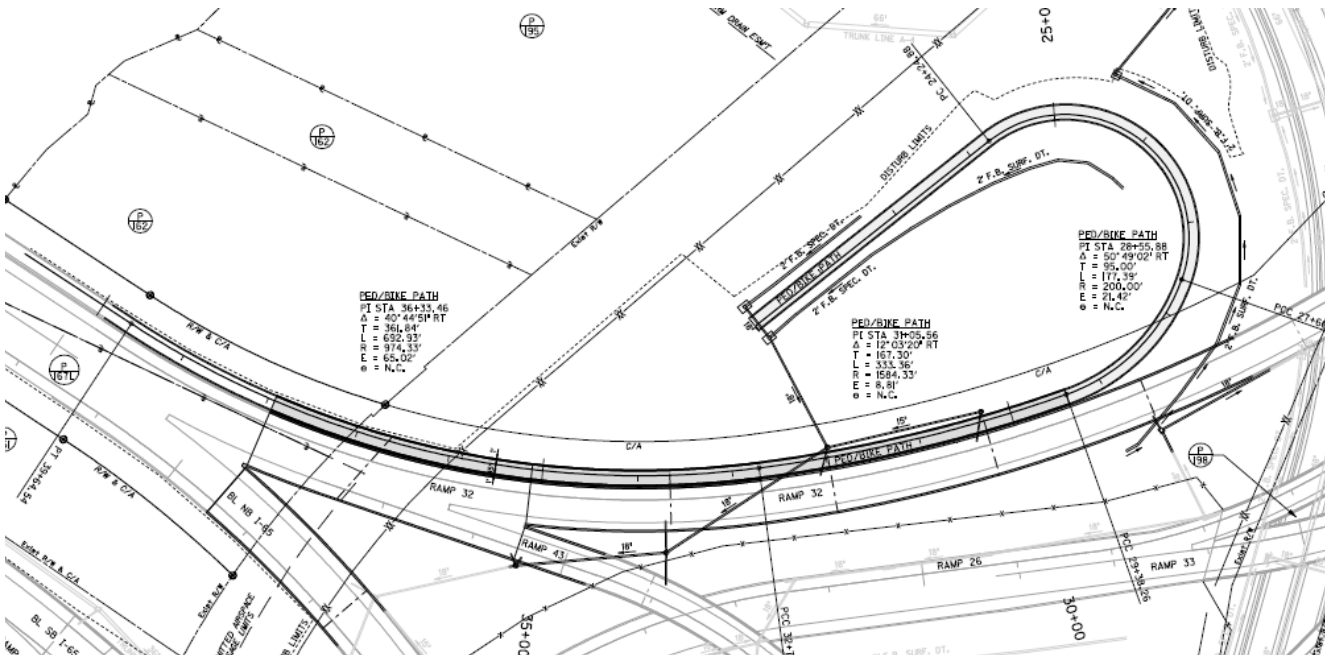


G. PEDESTRIAN/BIKE PATH *(continued)*

VALUE ENGINEERING ALTERNATIVE G.2:

Eliminate the proposed Pedestrian/Bike Path.

No Build. This path appears to contain some very expensive components. The cost of the bridge to raise the path from ground level to joint the new I-65 northbound bridge is \$5.5 million dollars. The cost to widen the new bridge over the Ohio River is estimated at \$29 million dollars. Indiana must also make commitments and provisions for a pathway on their side of the river. The cost of the path on Indiana’s side should be in the same cost range of \$5.5 million dollars plus the potential cost of right-of-way on the Indiana side of the river. It appears that the minimum cost for construction of the path will be \$40.6 million dollars. In view of the high costs with uncertain benefits it appears to be prudent to strongly consider a “no-build” alternative.



**PEDESTRIAN/BIKE PATH
VALUE ENGINEERING ALTERNATIVE NUMBER G.2
COST COMPARISON SHEET**

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
BRIDGE S-6	LUMP	2,354,000	1	2,354,000	0	0
ROADWAY/PAVEMENT	LUMP	423,594	1	423,594	0	0
PATH ELEMENTS	LUMP	2,700,527	1	2,700,527	0	0
I-65 NB EXTRA WIDTH	SF	510/SF	56,750	28,942,500	0	0
INDIANA PATH-NORTH SIDE OF RIVER	LUMP	5,500,000	1	5,500,000	0	0
BRIDGE S-8 ELIMINATION	LUMP	720,000	1	720,000	0	0
GRAND TOTAL				40,640,621		\$0

POSSIBLE SAVINGS:

\$40,640,621

G. PEDESTRIAN/BIKE PATH *(continued)***VALUE ENGINEERING ALTERNATIVE G.3:**

Consider shifting the ped/bike path to the abandoned railroad bridge that is located just east of the proposed site of the new bridge for I-65 northbound over the Ohio River. By moving to this location, the entrance to the path would be on the north side of River Road near existing parking facilities. The ped/bike path could be removed from the staging of the interchange and could be designed independent of the project. Considering that the work on the path is not scheduled until Phase 7 of the interchange work, other funding sources could be explored that could advance the date of construction. The possibility of starting work on the path, years earlier than planned, may be improved.

The cost of rehabilitating the existing railroad bridge is estimated to be \$6.2 million dollars. This estimate includes new ramps on each end of the bridge to get the peds and bikes from ground level to the deck of the bridge. The cost to construct the “as proposed” ped/bike path is \$40,640,621.00. This is a total savings of \$34,451,501.00

Even in the event that this rehabilitation estimate was to double in cost the total savings will still be considerable.



**PEDESTRIAN/BIKE PATH
VALUE ENGINEERING ALTERNATIVE NUMBER G.3
COST COMPARISON SHEET**

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
REHAB R/R BRIDGE	SF	112/SF	0	\$0	42,000	\$4,704,000
SOUTH END RAMP BRIDGE	SF	112/SF	0	\$0	6,630	\$742,560
NORTH END RAMP BRIDGE	SF	112/SF	0	\$0	6,630	\$742,560
AS-PROPOSED COST	LUMP	40,640,621	1	\$40,640,621	0	\$0
GRAND TOTAL				\$40,640,621		\$6,189,120

POSSIBLE SAVINGS:

34,451,501

PRESENTATION FOR VALUE ENGINEERING STUDY NUMBER 1

KENNEDY INTERCHANGE

March 30, 2007

NAME	AFFILIATION	PHONE
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Thomas A Hartley, P.E., C.V.S.	VE Group	850/627-3900
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Siamak Shafaghi	KYTC	502/564-9900
Stephen Hoefler	CTS	502/394-3254
John Sacksteder	CTS	502/394-3847
Dan Byers	KTA	859/299-5226
Mindy Rockwell	KYTC-Program Performance	502/564-4555
Robert Semones	KYTC	502/564-4555

6.1 INTERIM/FOLLOW UP MEETINGS

There are currently two follow-up Value Engineer Team meetings scheduled for the Kennedy Interchange.

May 29-June 8, 2007

The interim meeting scheduled on May 29 is planned for the Design Team and/or the Kentucky Transportation Cabinet to present back to the Value Engineer Study Team their preliminary findings/implementation for the previous Value Engineering alternatives. Any implemented Value Engineering alternatives should be developed to a point that would include preliminary drawings, preliminary cost estimates and cursory traffic analysis to determine if any Value Engineering Alternatives have any “fatal flaws.”

In addition, the design team will update the Value Engineering team as to any other changes that have been made to the design.

During the May 29,-June 8, 2007 Value Engineering Study, the Value Engineering Team will review all the construction components of the interchange to determine any VE alternatives that will be recommended to the Design Team and the Kentucky Transportation Cabinet to be carried forward for final development by the design team.

On June 8, 2007 the Value Engineering Team will present them to the Kentucky Transportation Cabinet and the Design Team.

July 30-August 3, 2007

The interim meeting scheduled on August 30 is planned for the Design Team and/or the Kentucky Transportation Cabinet to present back to the Value Engineer Study Team their preliminary findings/implementation for the previous Value Engineering alternatives. Again, any implemented Value Engineering alternatives should be developed to a point that would include preliminary drawings, preliminary cost estimates and cursory traffic analysis to determine if any Value Engineering Alternatives have any “fatal flaws.”

During the July 30-August 3, 2007 Value Engineering Study, the Value Engineering Team will review the constructability of the interchange to determine any VE alternatives that will be recommended to the Design Team and the Kentucky Transportation Cabinet to be carried forward for final development by the design team.

On August 3, 2007 the Value Engineering Team will present them to the Kentucky Transportation Cabinet and the Design Team.

POWER POINT PRESENTATION