

VALUE ENGINEERING REPORT

CR 665 (Carbondale Road) / I-75 Interchange
Project No. IM-STP-75-3(208) Whitfield County
PI No.: 610890

October 23, 2007

OWNER:



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VALUE ENGINEERING STUDY

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

VALUE ENGINEERING REPORT

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Project No. IM-STP-75-3(208) Whitfield County
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Introduction

This report summarizes the results of a value engineering (VE) study conducted on the CR 665 Carbondale Road / I-75 Interchange located in northern Georgia approximately 6 miles south of Dalton. The project consists of a new bridge over I-75, upgrading a portion of CR 665 to four lanes, reconstructing and relocating a two lane section of CR 665 and constructing a new bridge over the Norfolk Southern Railroad crossing which is currently at grade. The project length is 1.5 miles and the existing cost estimate is \$28,244,000. The project is being designed in house by GDOT. The study was conducted October 2-5, 2007 at the GDOT offices in Atlanta using a four person VE team.

This report presents the Team's recommendations and all back-up information for consideration by the decision-makers. This **Executive Summary** includes a brief description of each recommendation. The **Study Identification** section contains information about the project and the team. The **Recommendations** section presents a more detailed description and support information about each recommendation. Lastly, the **Appendix** includes a complete record of the Team's activities and findings as well as the meeting attendees sign in sheet. The reader is encouraged to review all sections of the report in order to obtain a complete understanding of the VE process.

Considerations

This project contains one historic structure that will not be impacted by the proposed design.

The current schedule is to start purchasing Right of Way in January 2008 and the project is scheduled to be bid in June 2009.

There are several streams and drainage ditches within the project that have also been classified as streams, which are under environmental review at this time. Preliminary results indicate there may be longitudinal impact on some of these areas.

Results Obtained

The VE Team generated fourteen ideas and presented 12 recommendations for consideration by GDOT. The recommendations involve changes to; project alignment, width of certain

pavements, and centerline profile to reduce grading and bridge modifications. These have the potential to reduce project costs by as much as \$4.9 Million while continuing to provide the required functionality.

A brief presentation of these recommendations was conducted on October 5th, 2007, with the following in attendance: GDOT representations, Brian Summers, Lisa Myers and Ron Wishon, and the VE Team Dave Wohlscheid, Steve Gaines, Tom Gandolfi, and Greg Grant

Recommendation Highlights

A-1 Shorten project limits on Carbondale Road

This recommendation includes shifting the alignment of the bridge to the south of the existing railroad trestle crossing of Swamp Creek and the RR. This allows for a shorter segment for Carbondale and a shorter connection on Old Dug Gap Road. Cost shown is for roadway savings only. See Item B-1 for bridge savings.

Potential savings is \$826,200

A-2 Decrease number of lanes on west side of I-75

This recommendation includes reducing the number of lanes to two on the west side of the I-75 bridge. The traffic figures indicate minimum traffic in this area.

Potential savings is \$581,500

B-1 Realign the crossing of the Norfolk Southern RR and Swamp Creek to the south

This recommendation includes shifting the alignment of the bridge to the south of the existing railroad trestle crossing of Swamp Creek to where they are in closer proximity to each other (same as Item A-1). This allows a shortening of the bridge and a crossing that is much closer to 90°. Savings shown is for the bridge costs only

Proposed initial savings is \$486,000

B-2 Widen existing I-75 bridge to accommodate proposed increased lanes

This analysis compared widening the existing structure in lieu of building a new structure as the existing bridge is structurally sound with a sufficiency rating of 73.86. The proposal was not cost effective and is therefore not recommended.

Not Recommended

B-3 Reduce the width of the I-75 bridge from 6 lanes to 5 lanes

The proposed concept is to have back to back left turn lanes in lieu of separate left turns in each direction thus reducing the width by 12 feet. This is acceptable because of the low volumes of traffic making this movement.

The total potential savings if accepted is \$342,000

B-4 Use MSE walls in lieu of end span / end roll with slope paving

This concept allows for the elimination of the end spans using MSE walls. The two center spans increase to 106 feet each.

The total net savings for this option is \$389,000

B-4.1 Use MSE walls and minimize I-75 spans for outside future widening

This concept includes the concept in B-4 plus reducing the center spans by not using the 30 foot clear zone shown in the original concept. In lieu of the clear zone, use a guardrail / barrier to protect the MSE wall which results in a center span revised length of 90 feet each.

Total potential savings of this option is \$620,000

B-4.2 Use MSE walls and minimize I-75 spans for inside future widening

This concept includes the concept included in B-4.1 plus assumes the future lane widening on I-75 can be performed on the inside not the outside. This results in a minimal center span length of 78 feet each.

Total potential savings of \$806,000

B-5 Use Type III in lieu of bulb Ts

This idea compares the original 5 span structure with the proposed 6 span facility using the proposed beams which save approximately 9 inches in profile height.

Proposed savings is \$11,400

C-1 Widen the future mainline lanes on the inside and reduce the ramp taper length

By relocating the future lane widening to the inside, substantial tapering can be reduced which in turn saves substantial quantities of pavement.

Potential savings is \$1,372,000

D-1 Revise the profile along Carbondale Road to reduce earthwork

Lowering the profile somewhat and rolling the grade allows for a substantial reduction in earthwork.

Savings is estimated at 849,800

E-1 Use Asphalt in lieu of PCCP on the ramps

The concept is to use AC in lieu of concrete pavement. Although the idea was initially less expensive, over a 30 year design life cycle, concrete proved to be more economical.

Not Recommended

**CR 665/I-75 Interchange
SUMMARY OF POTENTIAL COST SAVINGS**

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL PRESENT WORTH SAVINGS	MAXIMUM SAVINGS IN COMBINATION WITH OTHER VE PROPOSALS
A	Right of Way						
A-1	Shorten project limits	826,200	-0-	826,200	-0-	826,200	826,200
A-2	Decrease number of lanes on west side of project	581,500	-0-	581,500	-0-	581,500	581,500
B	Bridges						
B-1	Realign crossing of RR and Swamp Creek to the south	1,721,000	1,235,000	486,000	-0-	486,000	486,000
B-2	Widen existing I-75 bridge in lieu of building a new bridge	2,692,000	2,780,000	(88,000)			NOT Recommended
B-3	Reduce width of I-75 bridge from 6 lanes to 5 lanes	2,507,000	2,165,000	342,000	-0-	342,000	140,000
B-4	Use MSE walls in lieu of end span / end roll.	2,673,000	2,284,000	389,000	-0-	389,000	-0-
B-4.1	Use MSE walls and minimize I-75 spans for outside widening.	2,673,000	2,053,000	620,000	-0-	620,000	-0-
B-4.2	Use MSE walls and minimize I-75 spans using inside widening	2,673,000	1,867,000	806,000	-0-	806,000	806,000

**CR 665/I-75 Interchange
SUMMARY OF POTENTIAL COST SAVINGS**

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL PRESENT WORTH SAVINGS	MAXIMUM SAVINGS IN COMBINATION WITH OTHER VE PROPOSALS
B-5	Eliminate 54 inch bulb T's, use Type III	83,500	72,100	11,400	-0-	11,400	-0-
C	Asphalt Paving						
C-1	Widen future mainline lanes on the inside and reduce the ramp taper length	1,372,000	-0-	1,372,000	-0-	1,372,000	1,372,000
D	Earthwork						
D-1	Revise profile to reduce earthwork	849,800	-0-	849,800	-0-	849,800	748,000
E	Concrete Paving						
E-1	Use asphalt for concrete on the ramps	1,252,000	959,300	291,700	(401,600)	(109,900)	NOT Recommended
	TOTAL POTENTIAL SAVINGS						\$4,960,000

STUDY IDENTIFICATION

STUDY IDENTIFICATION

Project: CR 665 Carbondale Road / I-75 Interchange, PI No. 610890	Dates: October 2-5, 2007
Location: GDOT HQ - Atlanta	

VE Team Members

Name:	Discipline:	Organization:	Telephone:
David Wohlscheid	VE Team Leader	MACTEC	703-471-8383
Tom Gandolfi	Construction	Parsons Transportation Group	678-969-2307
Greg Grant	Structural – Bridges	Wolverton	770-447-8999
Steven Gaines	Highway Design	Wolverton	770-447-8999

Project Description

This project is the reconstruction of CR665 / Carbondale Road interchange over I-75 in Whitfield County approximately six miles southeast of Dalton. The proposed project will correct a sight distance deficiency and increase future capacity by replacing County Road (CR) 665 (Carbondale Road) bridge over I-75. CR 665 will also be improved by the addition of two through lanes (for a total of 4) from CR 16 to the west to SR 3/US 41 to the east , as well as turn lanes on the bridge at the entrance to the Interstate ramps. Due to the large number of trucks using this interchange (I-75 is approximately 33% trucks in this area) the substandard sight distances and turning radii need to be improved to current standards.

This project will widen and relocate CR 665 to approximately 0.5 miles north of the existing CR 16 at grade intersection with the Norfolk Southern Railroad. CR 665 would begin at this point with 2-12 foot lanes and 10 foot rural shoulders continuing eastward. CR 665 would include a new bridge over Swamp Creek and the Railroad. The typical section would then transition from the 2-12 foot lanes with 10 foot shoulders to 4-12 foot lanes with a 20 foot raised median and 12 foot urban shoulders. This typical section would continue on a new location to approximately 500 feet west of the I-75/CR 665 interchange. A new 4 lane bridge with turn lanes would replace the existing 2 lane bridge over I-75.

The urban typical section would continue eastward on the existing alignment to SR 3/US 41 intersection. East of the SR 3/US 41 intersection the typical section would transition to the existing roadway in approximately 600 feet. SR 3/US 41 would be widened approximately 1,000 feet north and south of the intersection with CR 665 to accommodate a four lane roadway with turning lanes.

The total length of the project along CR 665 is 1.5 miles. Work on I-75 would consist of realigning and lengthening the ramps to and from the CR 665 interchange. These ramps are configured to accommodate a future 4th lane. The ramp typical section would be a 16 foot lane with 6 foot inside shoulders (4 foot paved) and 10 foot outside shoulders (6 foot paved). Access along CR 665 would be by county permit and access along I-75 is limited.

Future traffic volumes along CR 665 are projected to be 10,600 ADT to the west of the I-75 interchange and 13,000 east of the interchange. The design speed is 45 mph for the entire length of CR 665 and the section of SR 3/US 41 to be widened.

The current project estimate is \$28.24 million. Please refer to the Cost Distribution Model attached for more details.

Kick off Meeting/Design Presentation

The following personnel attended this meeting which was held at the outset of the VE study:

Lisa Myers	GDOT Engineering Services
Ron Wishon	GDOT Engineering Services
Fletcher Miller	GDOT Road Design Project Manager
Peter Emmanuel	GDOT Road Design
Vanna Oun	GDOT Road Design
Ken Werho	GDOT TS&D Design Review
Paul Denard	GDOT TS&D Operations
James Magnus	GDOT Construction
Kenny Beckworth	GDOT District 6
Paul Condit	GDOT Environmental
Dave Wohlscheid	MACTEC VE Team Leader
Tom Gandolfi	Parsons Transportation Group – Construction
Greg Grant	Wolverion & Associates - Bridge
Steven Gaines	Wolverion & Associates - Roadway

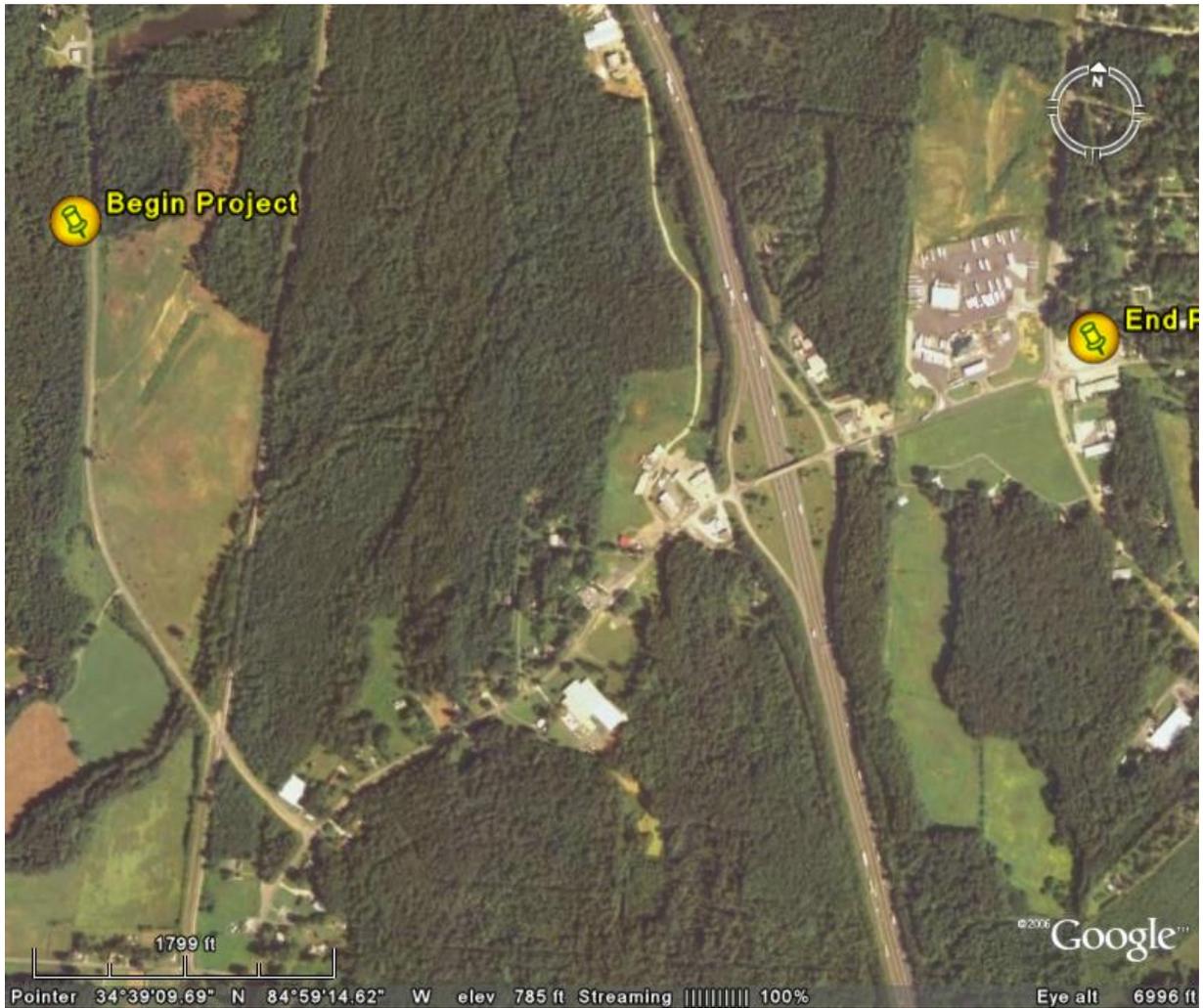
The VE Team appreciated the project overview given by Fletcher Miller and Peter Emmanuel. Highlights included:

- No signalization will be included at the intersection with I-75.
- This project contains one historic structure that will not be impacted by the proposed design.
- The current schedule is to start purchasing Right of Way in January 2008 and the project is scheduled to be bid in June 2009.
- There are several streams and drainage ditches within the project that have also been classified as streams, which are under environmental review at this time. Preliminary results indicate there may be longitudinal impact on some of these areas.
- The project is a combination two lane rural and four lane urban cross section with two new bridges over a 1.5 mile length with a design speed of 45 mph.

Project Location



Project Limits



VE RECOMMENDATIONS

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:	
A-1	1 of 6	Shorten project limits at the beginning of the project	
Comp By: GG	Date: 10/3/07	Checked By: DCW	Date: 10/4/07

Original Concept:

This project includes approximately 7,600 feet of roadway along Carbondale Road. (See sketch).

Proposed Change:

Reduce roadway to 6,700 feet as shown on the attached sketch.

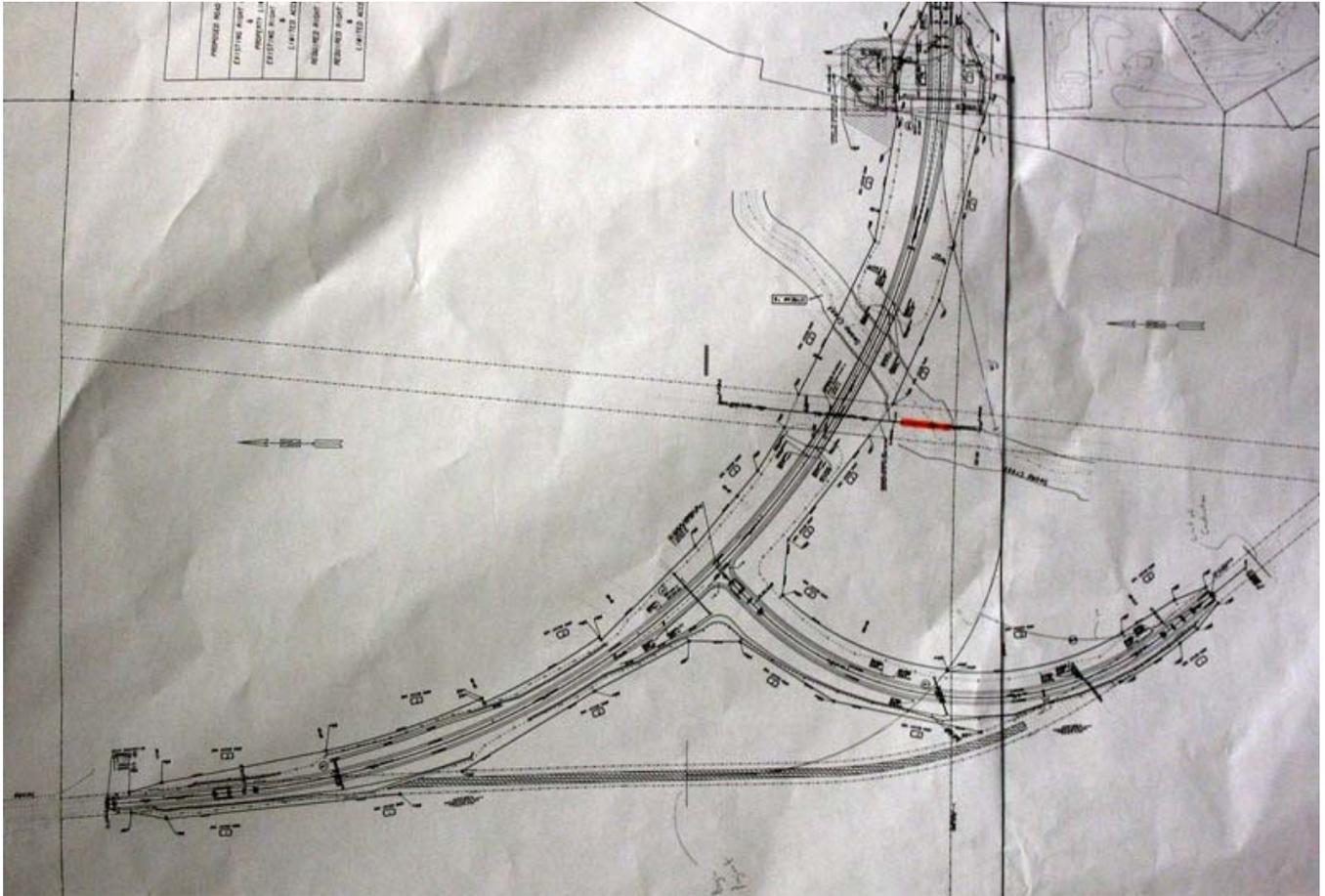
Justification:

The proposed revisions reduce the project limits to reduce construction costs and R/W costs. The proposed design makes no noticeable sacrifices to the functional aspects of this project.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	826,200		
- Proposed	-0-		
- Savings	826,200		826,200
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			826,200

CR 665/I-75 Interchange

ITEM N^o: A1
CLIENT: GDOT
Sheet 2 of 6

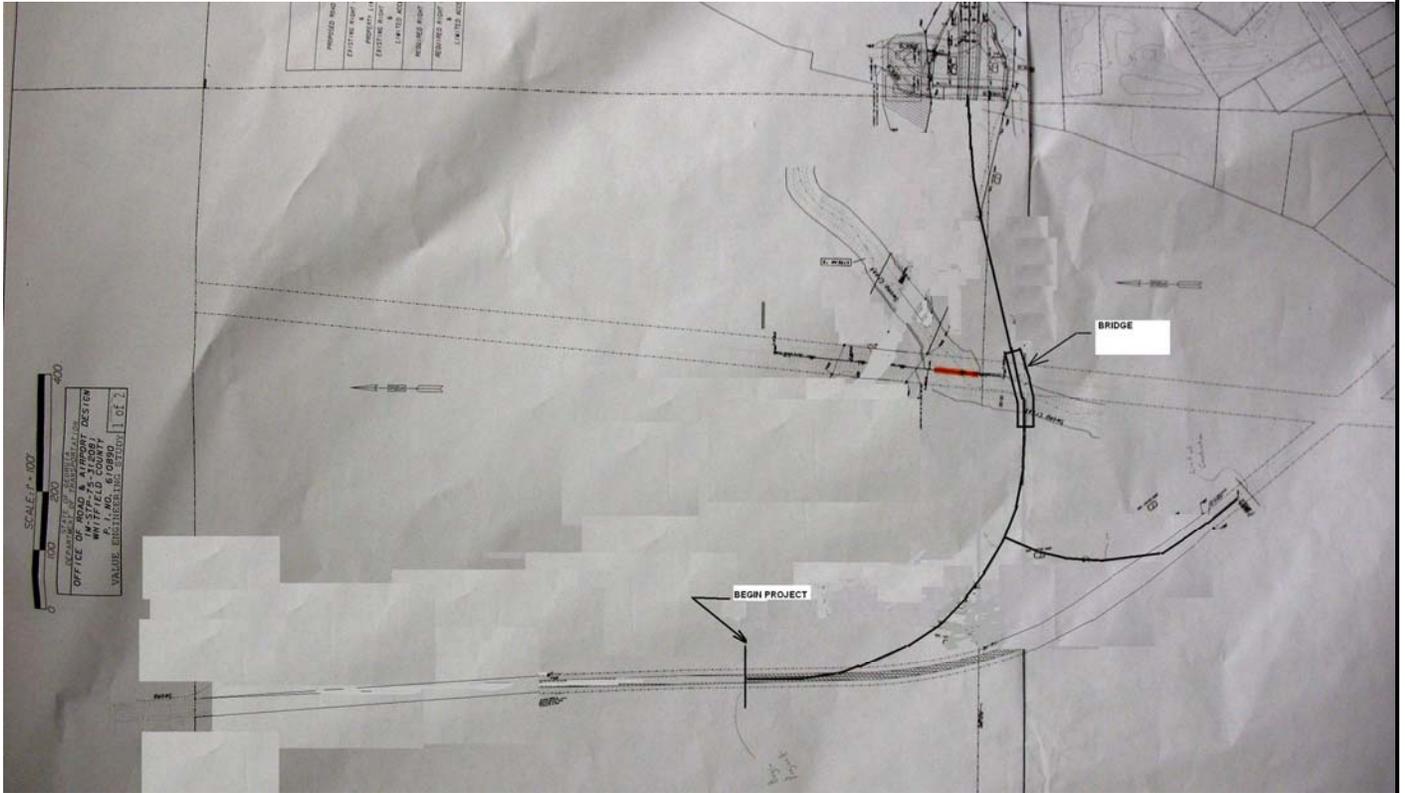


Original Concept

SKETCH

CR 665/I-75 Interchange

ITEM N^o: A1
CLIENT: GDOT
Sheet 3 of 6



Proposed Concept

COST WORKSHEET

PROJECT: CR 665/I-75 Interchange	ITEM No: A-1
	CLIENT: GDOT
	Sheet 4 of 6

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/UNIT	TOTAL COST	No. UNITS	COST/UNIT	TOTAL COST
Carbondale (931.55 feet)							
AC 12.5 mm, Superpave	tons	316	87.81	27,748			
AC 19 mm, Superpave	tons	421	65.62	27,626			
AC 25 mm, Superpave	tons	843	65.32	55,065			
Graded Agg. Base, 12 in.	tons	2,529	17.46	44,156			
Earthwork	yd ³	12,772	10.00	127,720			
R/W	acres	3.2	21,000	67,200			
Old Dug Gap Road (950 feet)							
AC 12.5 mm, Superpave	tons	322	87.81	28,275			
AC 19 mm, Superpave	tons	430	65.62	28,217			
AC 25 mm, Superpave	tons	430	65.32	28,088			
Graded Agg. Base, 12 in.	tons	2,578	17.46	45,012			
Earthwork	yd ³	13,019	10.00	130,190			
R/W	acres	3.3	21,000	69,300			
SUBTOTAL				678,596			0
Markup @ 21.275%				147,595			0
TOTAL				826,191			0
TOTAL ROUNDED				826,200			0

CALCULATIONS**CR 665/I-75 Interchange**ITEM N^o: A1
CLIENT: GDOT
Sheet 5 of 6**Along Carbondale (CR 665)****Original Concept**

Length - Along Carbondale (CR 665)

Station 13+28.45 to 94+00

8071.55 feet – bridge length = $8071.55 - 453 = 7618.55$ **Proposed Concept**

Length - Along Carbondale (CR 665)

Station 22+60 to 94+00

7140 feet – bridge length = $7140 - 453 = 6687.00$

931.55 feet eliminated

12 % reduction in Project length

Pavement Section (37' width – 24' travel lanes, 13' paved shoulders)

12.5 mm – 165#/SY

19mm – 220#/SY

25mm – 440#/SY

GAB – 1320#/SY

Earthwork (Average 5' depth, 75' width)

ROW – 150' width

SEE COST WORK SHEET FOR QUANTITIES

CALCULATIONS**CR 665/I-75 Interchange**ITEM N^o: A1
CLIENT: GDOT
Sheet 6 of 6**Along Old Dug Gap Road****Original Concept**

Length - Along Old Dug Gap Road

Station 200+00 to 217+00

1700 feet

Proposed Concept

Length - Along Old Dug Gap Road

Station 209+50 to 217+00

750 feet

950 feet eliminated

56% reduction in Project length

Pavement Section (37' width – 24' travel lanes, 13' paved shoulders)

12.5 mm – 165#/SY

19mm – 220#/SY

25mm – 220#/SY

GAB – 1320#/SY

Earthwork (Average 5' depth, 75' width)

ROW – 150' width

SEE COST WORK SHEET FOR QUANTITIES

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:
A-2	1 of 4	Decrease number of lanes on west side of project
Comp By:	GG	Date: 10/3/07
		Checked By: DCW
		Date: 10/4/07

Original Concept:

Original Concept widens CR665 on the west side of I-75 as it approaches the bridge for approximately 2200 feet

Proposed Change:

The proposed condition would eliminate the widening to 4 lanes and retain a 2 lane section all the way to the interchange.

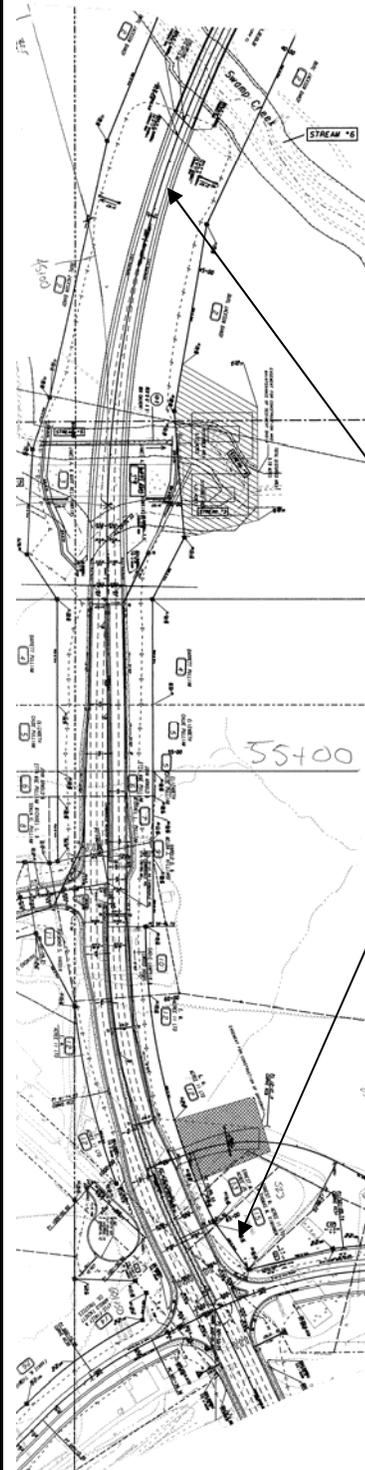
Justification:

The traffic volumes on Carbondale Road on the west side of I-75 do not warrant a 4 lane section based on capacity requirements.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	581,500		
- Proposed	-0-		
- Savings	581,500		581,500
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			581,500

CR 665/I-75 Interchange

ITEM N^o: A-2
CLIENT: GDOT
Sheet 2 of 4



Proposed Condition eliminates the 4 lane condition on the west side of I-75

Retain a 2 lane section through this area

CALCULATIONS**CR 665/I-75 Interchange**ITEM N^o: A-2
CLIENT: GDOT
Sheet 4 of 4**Reduce Number of Travel Lanes on West Side (Sta. 44+00 to Sta 66+00)****Original Concept**

Additional Roadway Area #1 (Taper 2-4 lanes - Sta. 44+00 to 51+50) = 1,013 SY

Additional Roadway Area #2 (4 lanes - Sta. 51+50 to 66+00) = 3,733 SY

Additional Concrete Median Area = 1,889 SY

Proposed Concept

Roadway Area #1 (Sta. 44+00 to 51+50) = 0 SY

Roadway Area #2 (Sta. 51+50 to 65+00) = 0 SY

Concrete Median Area = 0 SY

Pavement Section

12.5 mm – 165#/SY

19mm – 220#/SY

25mm – 440#/SY

GAB – 1320#/SY

Earthwork (Average 5' depth, 75' width)***ROW*** – Average 20' width**SEE COST WORK SHEET FOR QUANTITIES**

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:
B-1	1 of 6	Realign Crossing of RR and Swamp Creek to the south

Comp By: Grant Date: 10/3/07 Checked By: DCW Date: 10/3/07

Original Concept:

The original concept for the bridge crossing of the NS Railroad and Swamp Creek is to the north of the existing railroad trestle. The bridge is on a horizontal curve and requires skewed bents at the creek and railroad crossing. The overall bridge length is 453 feet.

Proposed Change:

Shift the alignment to the south of the existing railroad trestle crossing of Swamp Creek and cross the rail road bridge and creek where they are in closer proximity to each other. (See Sketch) See also A-1.

This idea was previously suggested by GDOT Bridge Hydraulics to Road Design. (See Attachment #1). Road Design said that they could not shift to the south because of a conflict with a church and cemetery. We believe this to be the Swamp Creek Baptist Church and cemetery. There was a confusion because of where they were in the alignment process that realigning for a southern crossing would impact the church. Based on the current alignment, a shift to the south at approximately station 50+00 then crossing the creek and railroad seems feasible with no significant impacts. In this change, the stream will be on the west side of the rail road track. Savings shown is for bridge costs only.

Justification:

Justifications for doing so are as follows:

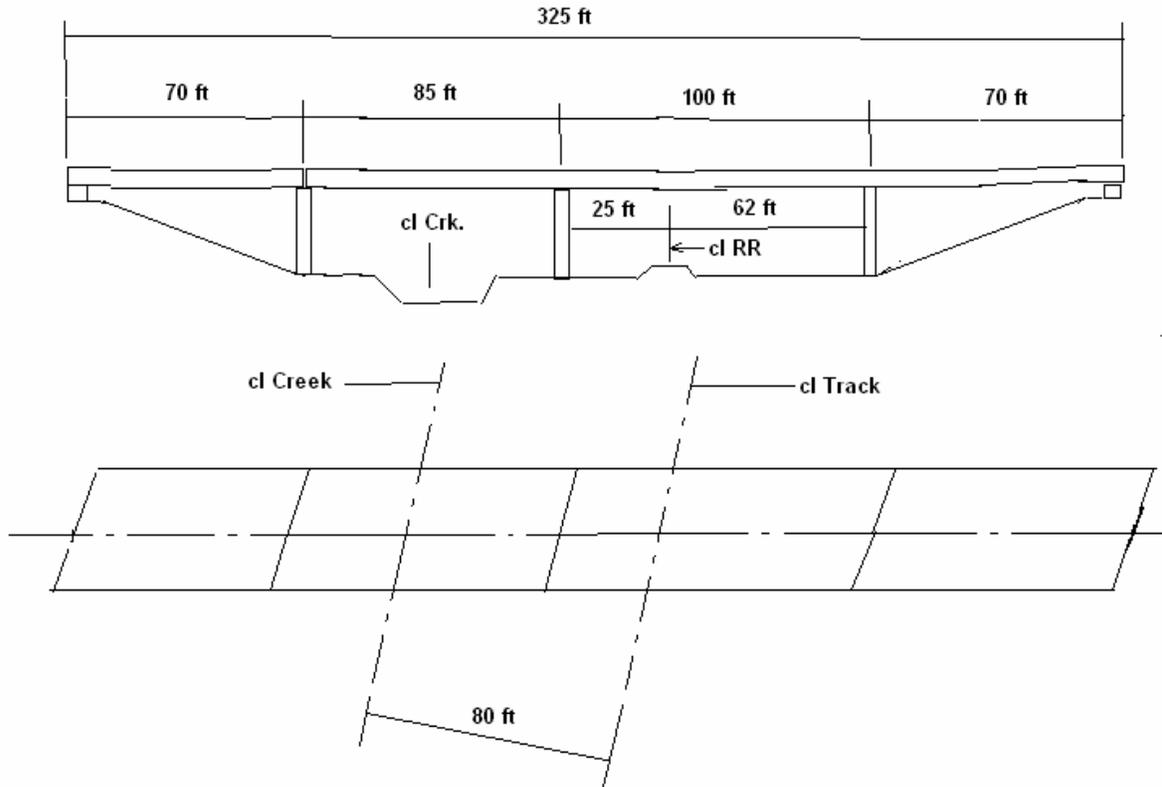
1. The crossing south of the railroad trestle is much closer to a 90 degree crossing for the railroad and swamp creek, reducing the geometric complexity of the bridge.
2. The creek and the railroad track are running roughly parallel to each other resulting in a much shorter bridge.
3. The southern crossing of the creek and railroad reduces the length of tie in required along Dug Gap Road. (See Idea No. A-1)

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	1,721,000		
- Proposed	1,235,000		
- Savings	486,000		486,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			486,000

SKETCH

CR 665/I-75 Interchange

ITEM N^o: B-1
CLIENT: GDOT
Sheet 2 of 6



PROPOSED BRIDGE SKETCH

CALCULATIONS

CR 665/I-75 Interchange

ITEM N^o: B-1
CLIENT: GDOT
Sheet 4 of 6

Existing Bridge (from the project Construction cost estimate – Dated September 28, 2007)

453 feet x 40 feet x \$78/sft = \$1,413,000

(18,120 SF)

New bridge must span the railroad and stream banks.

Crossing is approximately a 70 degree skew

Proposed Bridge Cost: (See Sketch)

325 ft x 40 ft x \$78/sqft = \$1,014,000

(13,000 SF)

WHITFIELD	610890	IM-STP-75-3(208)	CARBONDALE ROAD OVER	NEW	CONSULTANT
		PEIM-75-3(208)	SWAMP CREEK	LOC	JJ&G-BRTOC

REMARKS:

From JKM notes: Jason McCook and Kinney Wilson supplied this office with a quad map and a preliminary roadway sheet to obtain our input on this crossing. The proposed alignment crosses at the intersection of a RR bridge and Swamp Creek. The RR bridge is poorly placed on the floodplain. HST looked at this and felt that placing bents close to this intersection was a bad idea due to the potential for scour problems. It was recommended that the alignment be shifted to the south away from the RR trestle and bend in the stream channel. Road Design said that they could not shift to the south due to a church and cemetery. Looked at the possibility of flattening out the horizontal curve and crossing the creek and RR to the north of the RR/Stream intersection. JKM checked w/JWP about the minimum horizontal clearance requirements between the RR and the intermediate bents. JWP said that 25' clear to the CL of RR is desirable. (about 27'-27.5' from CL RR to CL bent). JKM mentioned that bents near RR always seem to be parallel to the track. JWP says yes, if the bents are not parallel to RR and the overpass gets widened in the future, then there goes your clearance. 8/2/00: Discussed with HST and decided to keep alignment as originally proposed and use a long steel plate girder span to get the intermediate bents out of harms way. A rough sketch of this is in the file. Shifting the alignment to the north called for either a much longer structure or two separate structures. The ideal alignment (just south) was recommended but could not be achieved due to the conflicts with the roadway. 8/14/00: Checked w/Jason McCook on priority. They have not completed plans yet. Have some time on this one. 11/16/00: While visiting Andy & Jason on another project, Kinney asked if we received the data they sent down for this project. It seems we (hydraulics) have not. Will check w/JPT to see if front office did not realize that a stream crossing was involved. 11/20/00: JPT did have plans. I kept 1 set of plans, HFR and a copy of the transmittal and gave the other two sets and original trans back to JPT. Told HST about this.



11/20/00: JKM received plans from JPT on this new location project last week. This is from Mike Bolden's squad in Road Design. Per JKM, he got a call from road design last week asking if we had gotten what we needed on this project. JKM told them we had not seen anything. He then checked with JPT and the plans and transmittal were on jpt's desk. JPT did not know that a stream crossing was involved. JKM kept a set of roadway plans and gave the other 2 sets to jpt for his use; evidently there is a crossing at I-75 as well. This is the crossing with the bad alignment and railroad trestle.



4/6/01: Kenny Wilson of Mike Bolden's squad in road design came down and had a work order to go to consultant for this project from jpt to tom turner; the info on the memo was given as CR 665 (Carbondale Rd) at Swamp Creek and Southern Railway, project no. IM-STP-75-3(208). 5/18/01: Checked with JPT and he showed me the memo from PVL to Tom Turner dated 2/15/01 requesting that this project be performed by consultant. 5/31/01 – Susan Wynn (JJG) called about this project. She wanted to check about the hydraulics for this project and mentioned a 200 ft span over the

B-1

Pg 6 of 6

creek. I let her know about the 200 ft span that had been discussed, but we had not done the hydraulics for this site yet. I did not know about the task order contract mentioned above at the time. 6/7/01: HST discussed the above-mentioned long span and the reasons for it with JPT. He agreed that the span needed to be long enough to provide clearance from the channel banks and avoid the turbulence at the rr trestle. I also mentioned that we usually built rr bridge bents parallel to the rr. He said in this case it would not matter because the bents would be so far away from the rr anyway. JPT → said the vertical clearance needed over the rr was 23 ft. The roadway plans for this project are in the bottom middle file drawer. 2/20/03: Received a CD with study and one half size copy each of pl for CR 665 over Norfolk Southern and Swamp Creek and CR 665 over I-75. Talked with JPT and he said this project was on his list and he had already approved it. To ELS to be entered into our electronic files. 6/27/03: TPRO lists JPT; keep hydraulics file in our squad for now. Roadway plans are in the bottom, left plan file drawer.

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:	
B-2	1 of 3	Widen existing I-75 Bridge to accommodate proposed laneage	
Comp By:	Grant	Date: 10/3/07	Checked By: DCW Date: 10/3/07

Original Concept:

Original Concept is to replace the existing bridge with a new bridge

Proposed Change:

Keep the existing bridge and widen it to accommodate the additional lanes

Justification:

The existing bridge is structurally sound. Retaining it for a longer duration appeared to be cost effective, however due to the increased unit costs for bridge widening vs. new construction, the idea proved to be not cost effective.

NOT RECOMMENDED

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	2,692,000		
- Proposed	2,780,000		
- Savings	(88,000)		(88,000)
FUTURE COST - Savings			-0-
TOTAL PRESENT WORTH SAVINGS			N/A

CONTINUATION

CR 665/I-75 Interchange

ITEM N^o: B-2
CLIENT: GDOT
Sheet 2 of 3

Existing Bridge is a four span continuous steel plate girder unit with cast-in-place concrete deck. The bridge has a sufficiency rating of 73.86. The deck is 28 feet wide from gutter-line to gutter-line.

The existing bridge is tangent and the bents are skewed approximately 82°.

Retaining the existing bridge is dependant on being able to accommodate the proposed traffic under the bridge.

Presently the radial dimensions are:

- CL Bent 3 to edge of inside shoulder = 22 feet
- edge of inside shoulder to edge of travel lane = 10 ft
- 2 travel lanes = 24 feet
- Outside shoulder = 10 foot paved and 2 foot unpaved
- Edge of outside shoulder to cl bent 4 = 16 feet

The only way a proposed section like this will work will be to construct jersey barrier on the inside adjacent to the intermediate bent and build out the section from there.

With a 73 foot span and 82 degree skew it is 72.29 feet radial from cl bent to cl bent

Width required

Existing intermediate bent 2'-6"column/2	= 1.25 ft
Inside jersey barrier	= 1.5 ft
Inside shoulder requirements	= 5.25 ft
4 lanes at 12 feet	= 48 ft
Outside Shoulder	= 13.54ft
Inside jersey barrier	= 1.5 ft
Outside column	= 1.25 ft
Total	= 72.29 ft <----- Fits

CONTINUATION**CR 665/I-75 Interchange**ITEM N^o: B-2
CLIENT: GDOT
Sheet 3 of 3

How much does the existing bridge need to be widened?

Existing bridge is 28 feet gutter to gutter

New bridge is 76 feet gutter to gutter + 12 foot sidewalk and 2.17 feet parapet =90.17 ft

New deck to be added = $90.17 - 28 = 62.17$ ft

Length of existing bridge = 264 ft

Sq ft to add = $264 \times 62.17 = 16,413$ sq ft

New bridge from cost estimate = $300 \times 88 \times \$78 = \$2,059,200 \times 1.21 = 2,492,000$

Remove existing bridge not shown, but assume \$200,000

Total new bridge = $\$2,492,000 + \$200,000 = \$2,692,000$

Widen existing Bridge = $16,413$ sq ft x $\$140/\text{sq ft} = \$2,297,820 \times 1.21 = \$2,780,000$

Slightly more expensive in initial construction and is less safe for traveling public on I-75.
Future maintenance / rehabilitation difficulties due to the different ages of the structural system.

*****IDEA ABANDONED*****

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:
B-3	1 of 3	Reduce width of I-75 Bridge from 6 Lanes to 5 Lanes
Comp By: Grant	Date: 10/3/07	Checked By: DCW Date: 10/3/07

Original Concept:

Original concept bridge accommodates 6 lanes (2 through lanes and 1 left turn lane in each direction)

Proposed Change:

Proposed bridge would eliminate 12 feet of bridge width by forcing left turn to be back to back

Justification:

Left turn traffic volumes do not warrant the dedicated lane on bridge. Separation to match 20 foot median on west side does not seem context sensitive.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	2,507,000		
- Proposed	2,165,000		
- Savings	342,000		342,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			342,000

CALCULATIONS

CR 665/I-75 Interchange

ITEM N^o: B-3
CLIENT: GDOT
Sheet 3 of 3

Original Concept:

The proposed bridge uses this approach but separates the lanes an additional 12 feet to match the 20 foot median on the east side of the bridge

Proposed Concept:

Remove the additional 12 foot that is striped out and use this area for left turns

Westbound on CR665 to Southbound I-75 430 vph

Eastbound on CR665 to Northbound I-75 160 vpd

Rule of Thumb is 1 ft per vehicle

$430 + 160 = 590$ feet of combined storage (Plans indicate 680 feet) **OK**

An effort would need to be made to have only a 12 foot median on the east side of the bridge verses the 20 foot typical median. However, this 20 foot median only exists for approximately 350 feet before a left turn lane onto Old Carbondale road is carved out of it. So this design exception seems context sensitive.

Original Concept:

New bridge from cost estimate = $300 \times 88 = 26,400$ SF

Proposed Concept:

New bridge from cost estimate = $300 \times 76 = 22,800$ SF

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:

B-4.0

PAGE No.:

1 of 5

CREATIVE IDEA:

Use MSE walls in lieu of end span / end roll
I-75 center spans the same as the original concept

Comp By: TG

Date:

10/4/07

Checked By: DCW

Date: 10/4/07

Original Concept:

Bridge #2 (CR 665 over I-75) consists of four spans (48 + 100 + 100 + 48) with spill thru abutment and slope paving being provided on the ends.

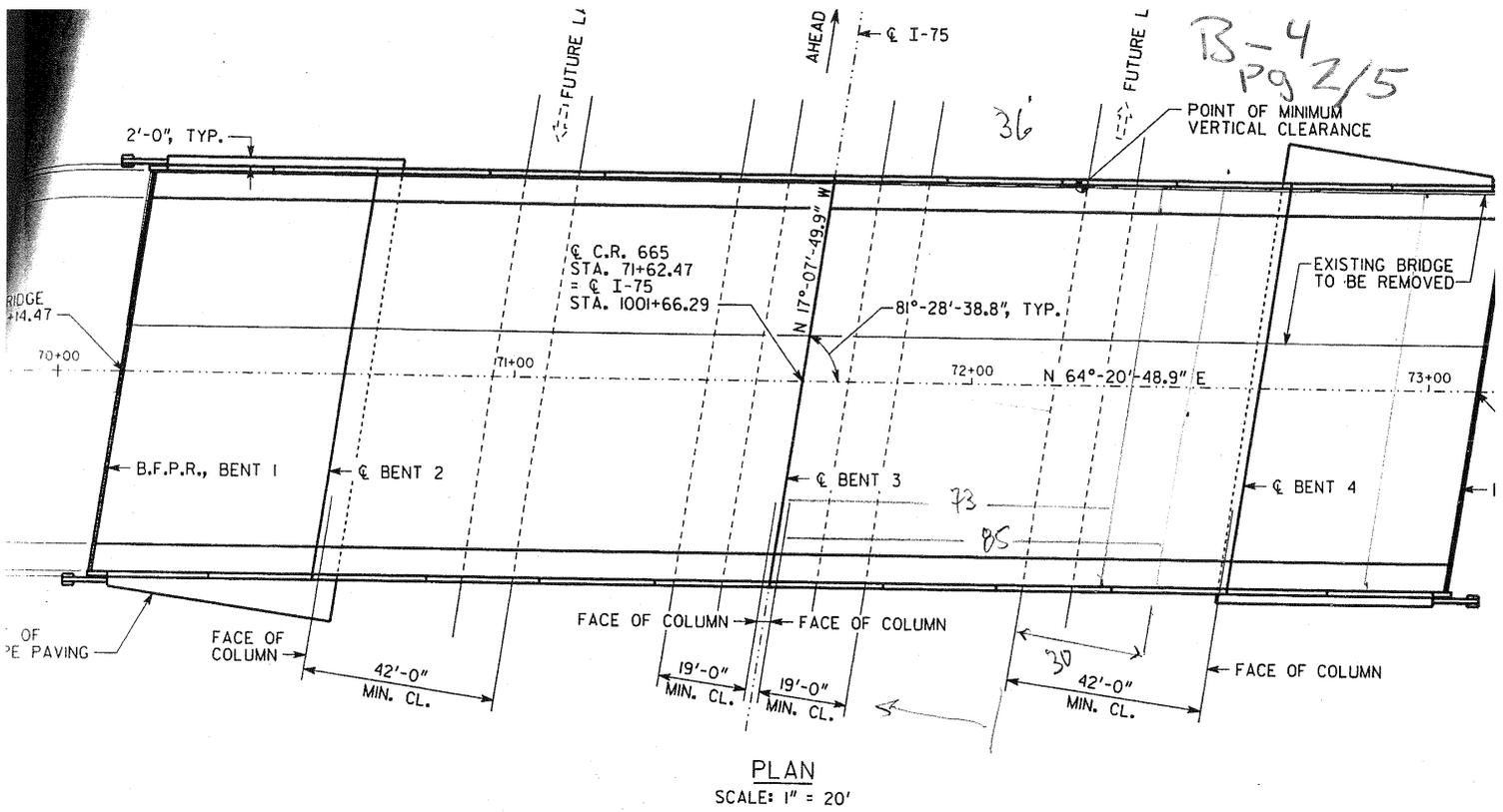
Proposed Change:

Eliminate the end spans and provide these with MSE wall abutments. The center spans will be increased to 106 feet each.

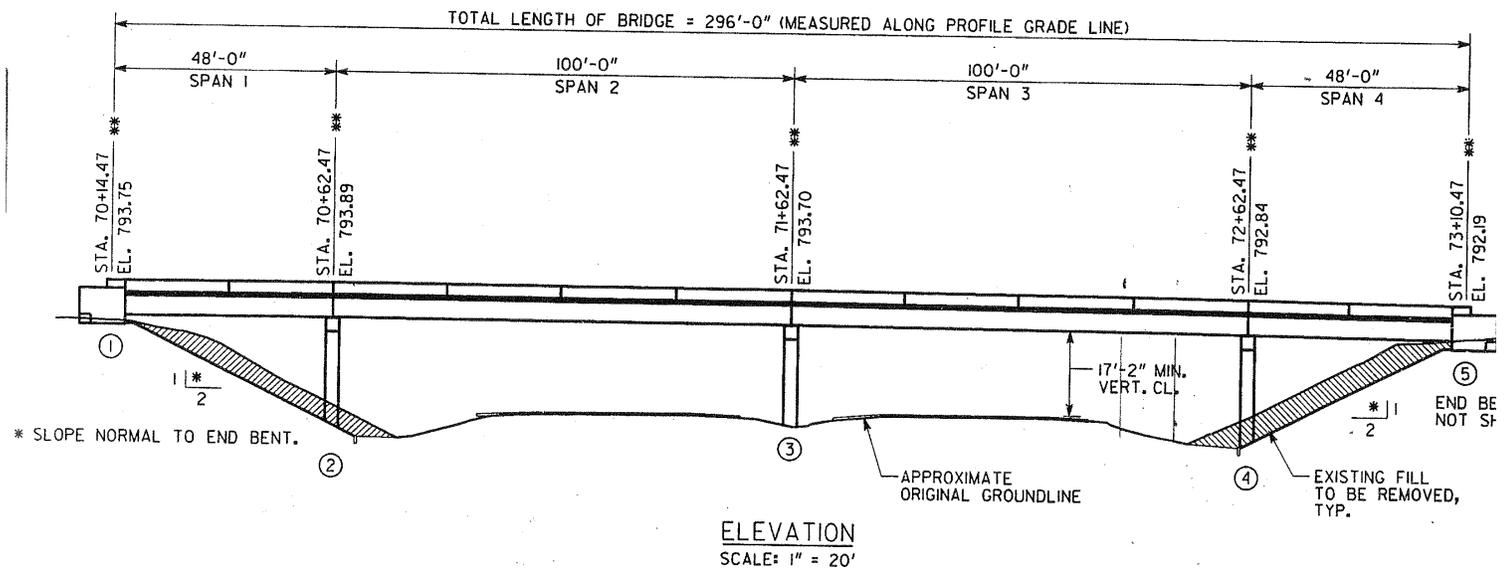
Justification:

The proposed change will shorten the bridge length with a net savings as shown below. The new bridge length is 212 feet.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	2,673,000		
- Proposed	2,284,000		
- Savings	389,000		389,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			389,000



NG PROFILE GRADE LINE
RADE LINE AND



0+00.00
13
18%
PVC STA. 1009+00.00
EL. 775.33

PVI STA. 71+50.00
EL. 795.45
+1.0576%
-1.9467%
450 FT. V.C.

DE DATA

C.R. 665 GRADE DATA

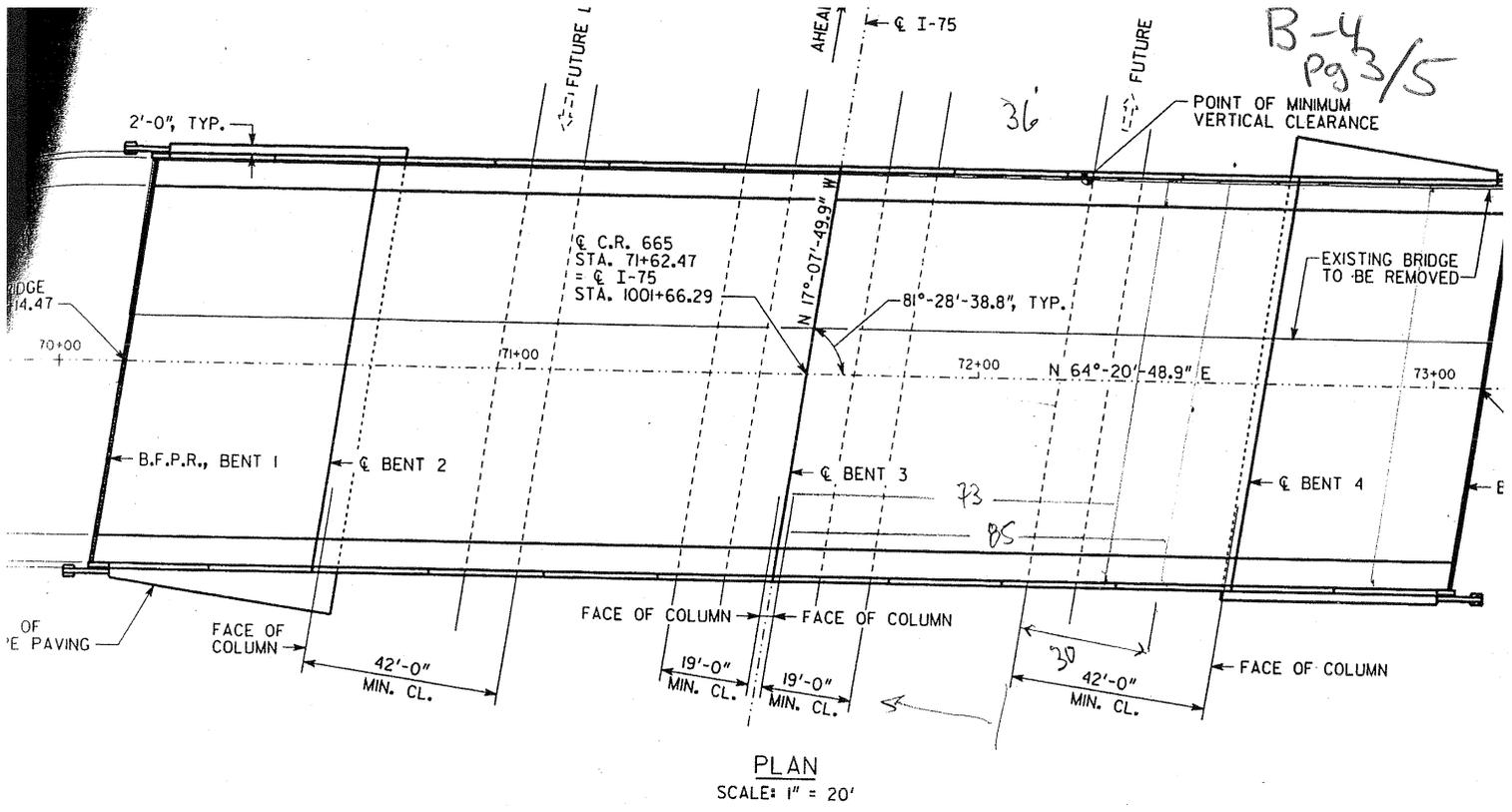
NOTES

1. ALL BENTS ARE PARALLEL.
2. SPANS 2 AND 3 CALCULATED BASED ON

ORIGINAL CONCEPT

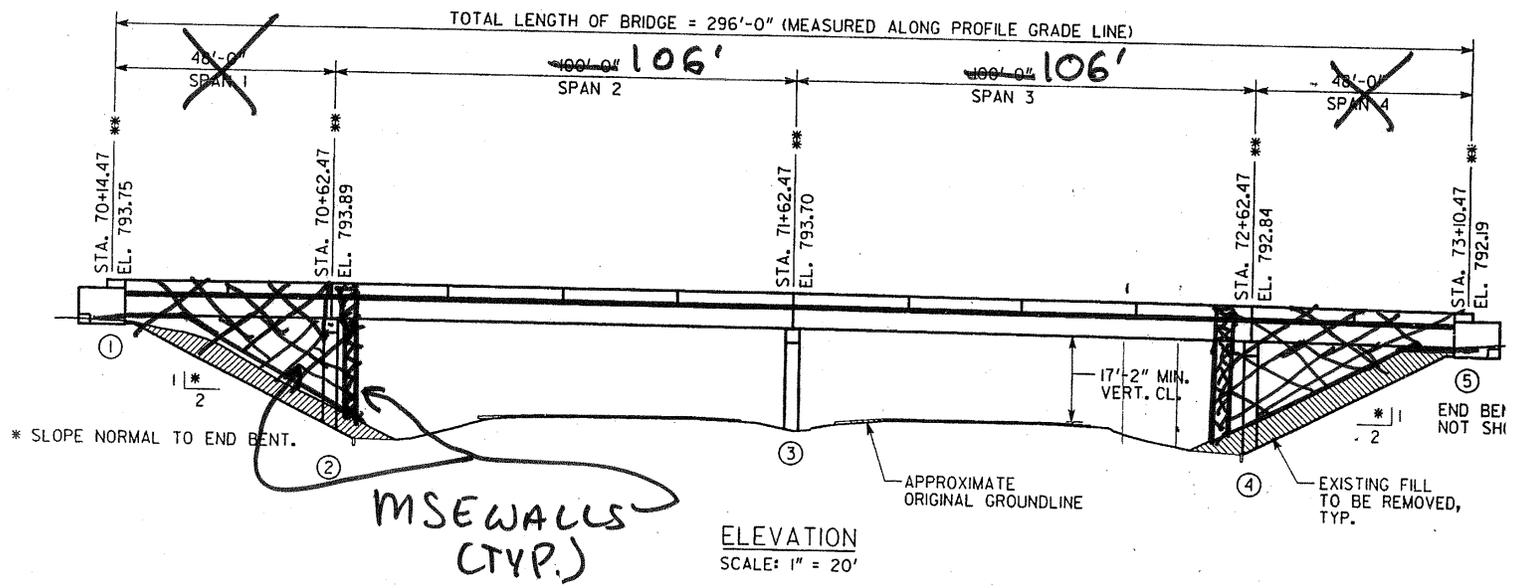
B-4
Pg 2/5

B-4
Pg 3/5

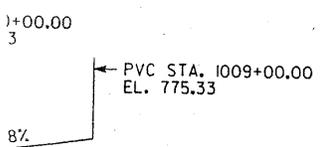


PLAN
SCALE: 1" = 20'

PROPOSED PROFILE GRADE LINE
EXISTING PROFILE GRADE LINE AND
RADE LINE AND



ELEVATION
SCALE: 1" = 20'



C.R. 665 GRADE DATA

NOTES

1. ALL BENTS ARE PARALLEL.
2. SPANS 2 AND 3 CALCULATED BASED ON A...

PROPOSED CHANGE

GRADE DATA

CALCULATIONS**CR 665/I-75 Interchange**ITEM N^o: B-4
CLIENT: GDOT
Sheet 5 of 5

Carbondale Typical Section

	Tons/SF	Unit Cost \$/SF	Cost / SF
3 inches, 19 mm AC	0.0183	\$65.62	\$1.20
1.25 inches, 12.5 mm AC	0.0076	\$87.81	\$0.67
1.5 inches, 12.5 mm AC	0.0092	\$77.34	\$0.71
10 inches, 25 mm AC	0.0611	\$65.32	\$3.99
12 inches, GAB	0.0741	\$17.46	\$1.29

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:
B-4.1	1 of 3	Use MSE walls in lieu of end span / end roll I-75 center spans are minimized for outside widening in the future

Comp By: TG Date: 10/4/07 Checked By: DCW Date: 10/4/07

Original Concept:

Bridge #2 (CR 665 over I-75) consists of four spans (48 + 100 + 100 + 48) with spill thru abutment and slope paving being provided on the ends.

Proposed Change:

Eliminate the end spans and provide these with MSE wall abutments. Do not allow for the 30 foot clear zone as shown in the original concept. Use guard rail / barrier to protect MSE wall. Use 2-90 foot center spans in this scenario (See sketch).

Justification:

The proposed change will shorten the bridge length with a net savings as shown below. This concept allows for an additional reduction in bridge span for a new length of 180 feet.

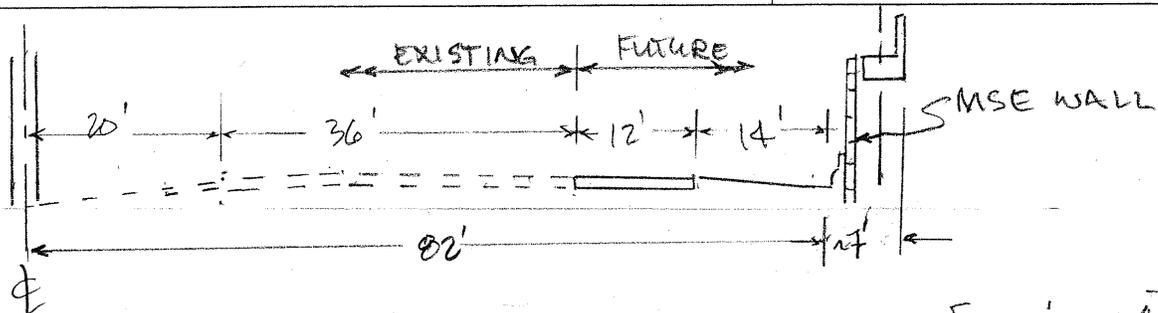
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	2,673,000		
- Proposed	2,053,000		
- Savings	620,000		620,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			620,000

CR 665/I-75 Interchange

ITEM N^o: B-401

CLIENT: GDOT

Sheet of

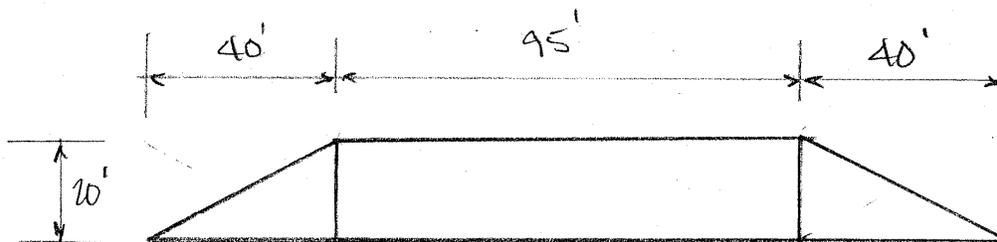


ELEVATION

2 [90.5' x 90']

16,290 SF

SAY 2-90' SPANS



WALL ENVELOPE

2 [20' x 135']

5,400 SF

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:
B-4.2	1 of 3	Use MSE walls in lieu of end span / end roll. The I-75 center spans are minimized for inside widening in the future

Comp By: TG Date: 10/4/07 Checked By: DCW Date: 10/4/07

Original Concept:

Bridge #2 (CR 665 over I-75) consists of four spans (48 + 100 + 100 + 48) with spill thru abutment and slope paving being provided on the ends. Total bridge length is 296 feet.

Proposed Change:

Eliminate the end spans and provide these with MSE wall abutments. Do not allow for the 30 foot clear zone as shown in the original concept. Use guard rail / barrier to protect MSE wall. Provide for the future widening in the center using column protection and median barrier. Use 2-78 foot center spans in this scenario (See sketch).

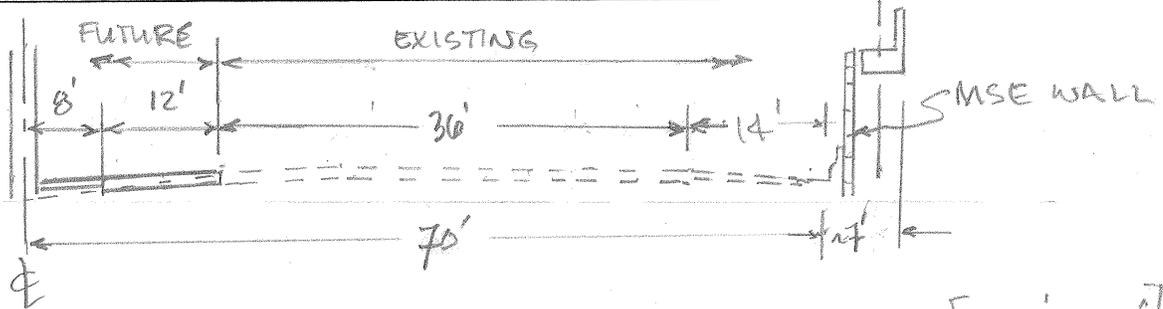
Justification:

The proposed change will shorten the bridge length with a net savings as shown below. This concept allows for an additional reduction in bridge span for a new length of 156 feet.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	2,673,000		
- Proposed	1,867,000		
- Savings	806,000		806,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			806,000

CR 665/I-75 Interchange

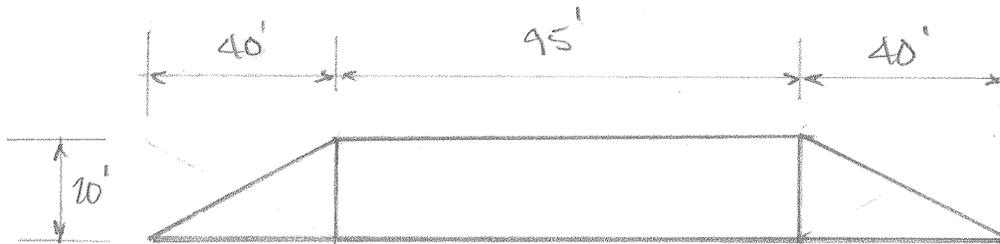
ITEM N^o: B-4.2
 CLIENT: GDOT
 Sheet 2 of 3



ELEVATION

SAY 2-78' SPANS

2 [90.5' x 78']
 14,118 SF



WALL ENVELOPE

2 [20' x 135']
 5,400 SF

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:

B-5

PAGE No.:

1 of 4

CREATIVE IDEA:

Eliminate 54" bulb T spans on bridge over the RR

Comp By:

GG

Date:

10/04/07

Checked By:

DCW

Date:

10/04/07

Original Concept:

Original concept is a 5 span bridge with spans of 78 – 103 – 103 – 103 - 66 = 453

Proposed Change:

Proposed bridge is a 6 span bridge 78 -78 -70 -74 -81 -72 = 453

Justification:

Allows for a 9" reduction in the PGL because of the reduced height between the 54" Bulb T and the type III (54" vs 45")

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	83,500		
- Proposed	72,100		
- Savings	11,400		11,400
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			11,400

CALCULATIONS

CR 665/I-75 Interchange

ITEM N^o: B-5
CLIENT: GDOT
Sheet 3 of 4

For a 40 foot wide cross section for 103 foot span

Typical section for the 54" bulb T

40 ft gutter to gutter + 2 x 1.625' barrier = 43.25' wide

Should be a 5 beam section with beams spacings of 9.25 ft and overhangs of 3.125 ft

Slab: 9.25' beam spacing - 3.5' top flange/2 = 7.5 ft design span for Bulb T

Slab thickness for 2.75" clear chart = 8.25"

Typical section for the AASHTO Type III for 80 ft span

40 ft gutter to gutter + 2 x 1.625' barrier = 43.25' wide

Slab: 9.25' - 16" top flange = 7.91 ft design span for type III

Slab thickness for 2.75" clear chart = 8.375"

So difference is in the difference in cost of beams for 3x103 ft (309 ft) and the additional 1/8" slab over 43.25ft and the cost of a concrete bent

From the mean item summary:

54" Bulb T = 221.98/ft

AASHTO Type III = 136.7/ft

Class AA Concrete = 548.95/yd

Class A Concrete = 574.82/yd

Super Structure Rebar = 0.97 (Assume 225 #/ yd3)

Bar Reinf Steel = 0.94 (Assume 200#/ yd3)

14 x73 piling = 61.98/ft

Pile points = 215.48/each

CALCULATIONS**CR 665/I-75 Interchange**ITEM N^o: B-5
CLIENT: GDOT
Sheet 4 of 4

Size of intermediate bent

Cap: 3.5 wide x 3.5 deep x 42 ft long/27 = 19.1 yd³Column: 3' wide x 3' wide x 35 ft tall x 2 columns/27 = 23.3 yd³Footings: 3 feet thick x 8' wide x 8' long x 2 footings/27 = 14.2 yd³Total Class A Concrete = 19.1+23.3+14.2 = 56.6 yd³Bar reinf steel = 56.6 yd³ * 200 #/yd³ = 11,320 #

Piling: 2 footings x 5 piles x 30 feet long = 300 ft (assume HP14x73)

Pile points: 2 footings x 5 piles = 10 points

Superstructure concrete:

1/8"/12 x 43.25 ft wide x 309 ft /27 = 5.2 yd³Superstructure rebar 5.2 yd³ x 225 #/yd³ = 1170#

Earthwork

Lowers the profile 9"

Fill is 35 foot high x 43.25 ft wide at top with 2:1 slopes

Width at bottom = 35 x 2 x 2 sides + 43.25 = 183.25 ft over say 1000 ft

183.25 wide x 0.75 ft high x 1000 ft /27 = 5,090 yd³

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:	
C-1	1 of 5	Reduce Ramp Tapers	
Comp By: TG	Date: 10/3/07	Checked By: DCW	Date: 10/03/07

Original Concept:

Taper length designs at all four ramps are based on adding an additional lane on the outside of the existing I-75 roadway in the future.

Proposed Change:

Propose future lane addition be placed on the inside rather than the outside of the existing I-75 roadway. This will allow for reduced taper lengths and minimize shoulder reconstruction. Areas as shown on attached sketch.

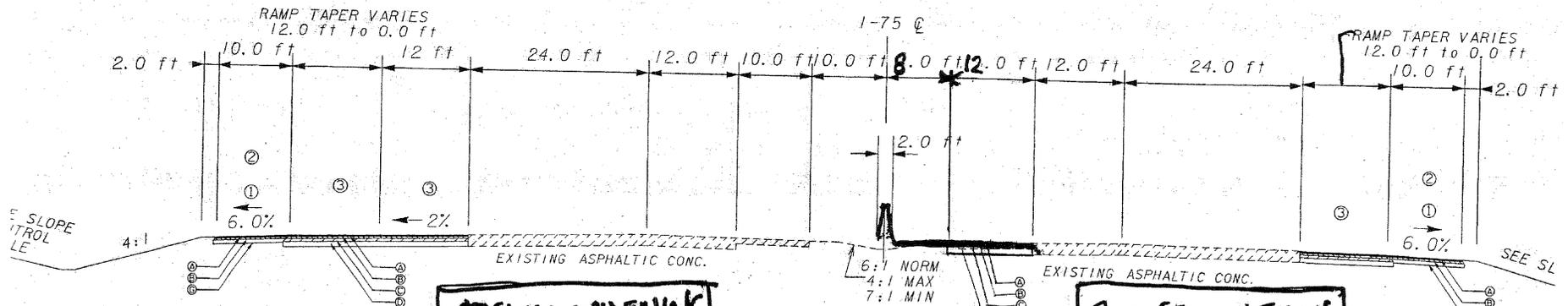
Justification:

Functional classification of I-75 is an “urban interstate principle arterial.” Future lane addition in the existing median is an acceptable section for this classification.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	1,372,000		
- Proposed	0		
- Savings	1,372,000		1,372,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			1,372,000

TYPICAL GRADING AND PAVING SECTION FOR I-75 RAMP TAPER CONSTRUCTION

(NO SCALE)



ORIGINAL WIDENING ON OUTSIDE

PROPOSED WIDENING IN MEDIAN

SLOPE CONTROLS		
SLOPE	CUT	FILL
4:1	0'-6'	0'-10'
3:1	6'-10'	--
2:1	OVER 10'	OVER 10'

⊙ REQUIRES GUARDRAIL

TS-13 · TANGENT SECTION
 RAMP-A STA 300+00.00 TO 307+24.63
 RAMP-B STA 411+97.56 TO ~~424~~ 453.72
 RAMP-C STA 500+00.00 TO 509+73.60
 RAMP-D STA 612+70.04 TO 638+96.91

C-1
 P920F5

CR 665/I-75 Interchange

ITEM N^o: C-1
CLIENT: GDOT
Sheet 3 of 5

Ramp A and D Taper Areas



Ramps B and C Taper Areas



CALCULATIONS**CR 665/I-75 Interchange**ITEM N^o: C-1
CLIENT: GDOT
Sheet 5 of 5**Ramp Taper Typical Section and Costs:**

1.25" 12.5 mm AC @ 0.0076 tons/SF x \$87.81/ton = \$0.67/SF

1.5" 12.5 mm AC @ 0.0092 tons/SF x \$77.34/ton = \$0.71/SF

3" 19mm AC @ 0.0183 tons/SF x \$65.62/ton = \$1.20/SF

15" 25mm AC @ 0.0917 tons/SF x \$65.32/ton = \$5.99/SF

12" GAB @ 0.0741 tons/SF x \$17.46/ton = \$1.29/SF

Total Ramp Taper Costs = \$9.86/SF or \$88.77/SY**Ramp A**Length: varies $A = \frac{(750 \times 12 + 350 \times 26/2)}{9} = 1,500 \text{ CY}$

Width: varies

Area: 1,500 SY

Ramp BLength: varies $A = \frac{(1600) \times (45 + 12)/2}{9} = 5,070 \text{ SY}$

Width: varies

Area: 5,070 SY

Ramp CLength: varies $A = \frac{(950 \times 12) + (630 \times 26/2)}{9} = 2,175 \text{ SY}$

Width: varies

Area: 2,175 SY

Ramp DLength: varies $A = \frac{(1,950 \times 12) + (1,000 \times 24/12)}{9} = 3,950 \text{ SY}$

Width: varies

Area: 3,950 SY

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:
D-1	1 of 7	Revise Profile at stations 18+00 to 37+00 and stations 41+00 to 54+00 to reduce earthwork
Comp By: GG	Date: 10/3/07	Checked By: DCW Date: 10/4/07

Original Concept:

See Sketch for Original Profile.

Proposed Change:

See Sketch for Proposed Profile

Justification:

The proposed change reduces the amount of borrow by lowering the profile to reduce the fill height and increases the amount of cut to bring the earthwork closer to balancing. However, the project is still a borrow project from an earthwork perspective. Additional lowering of the profile and increasing the amount of cut on the project near Station 54+00 will offer additional savings.

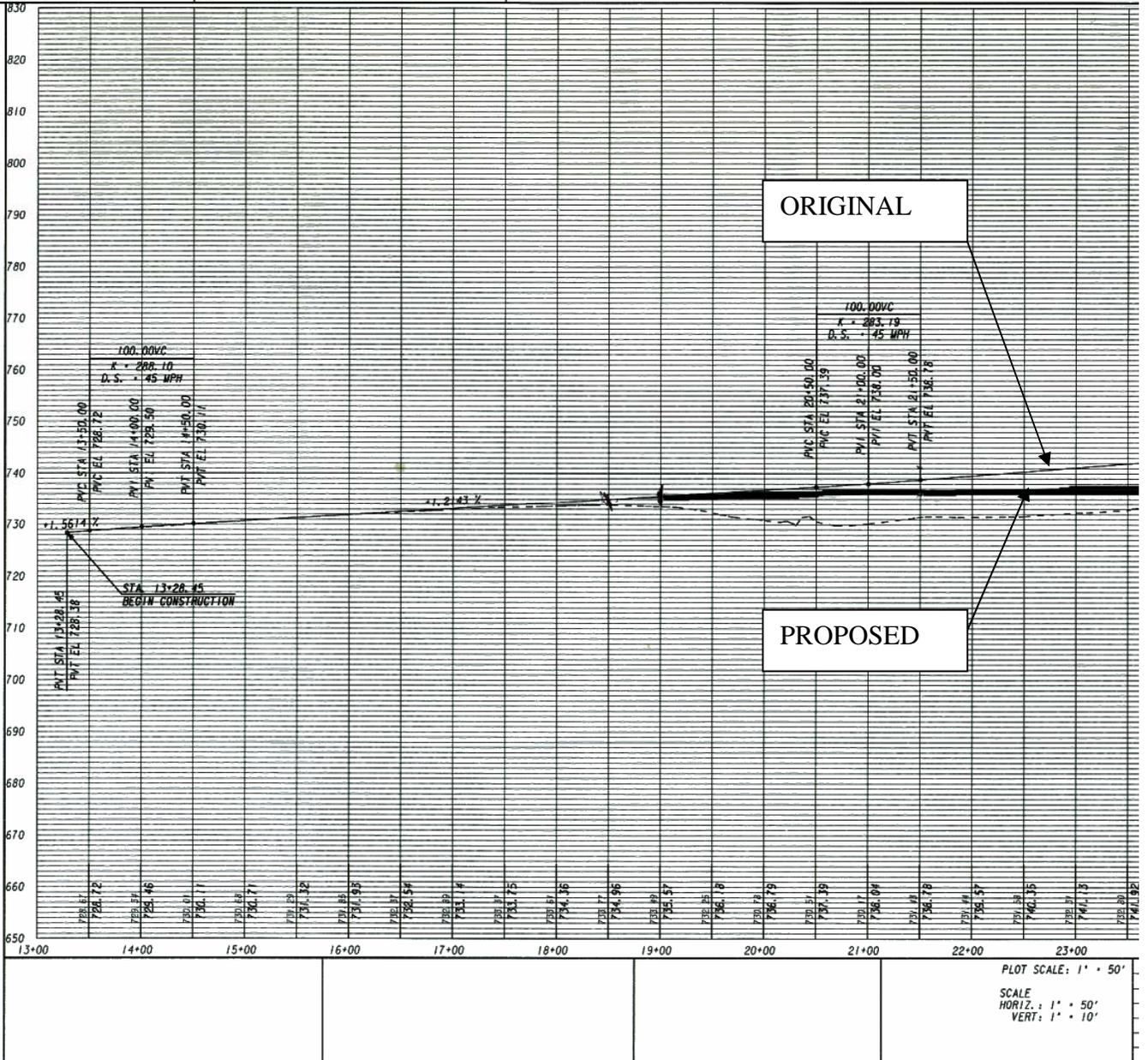
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	849,800		
- Proposed	-0-		
- Savings	849,800		849,800
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			\$849,800

SKETCH

CR 665/I-75 Interchange

ITEM N^o: D-1
 CLIENT: GDOT
 Sheet 2 of 7

Wed Oct 03 10:54:49 2007 C:\TMP\002\610890\PRO1.prj \\gdot-dsn\gsofgr\resources\gdot2007\helf_kfp.tbl W:\610890\610890PK.DWG DW- 1-63

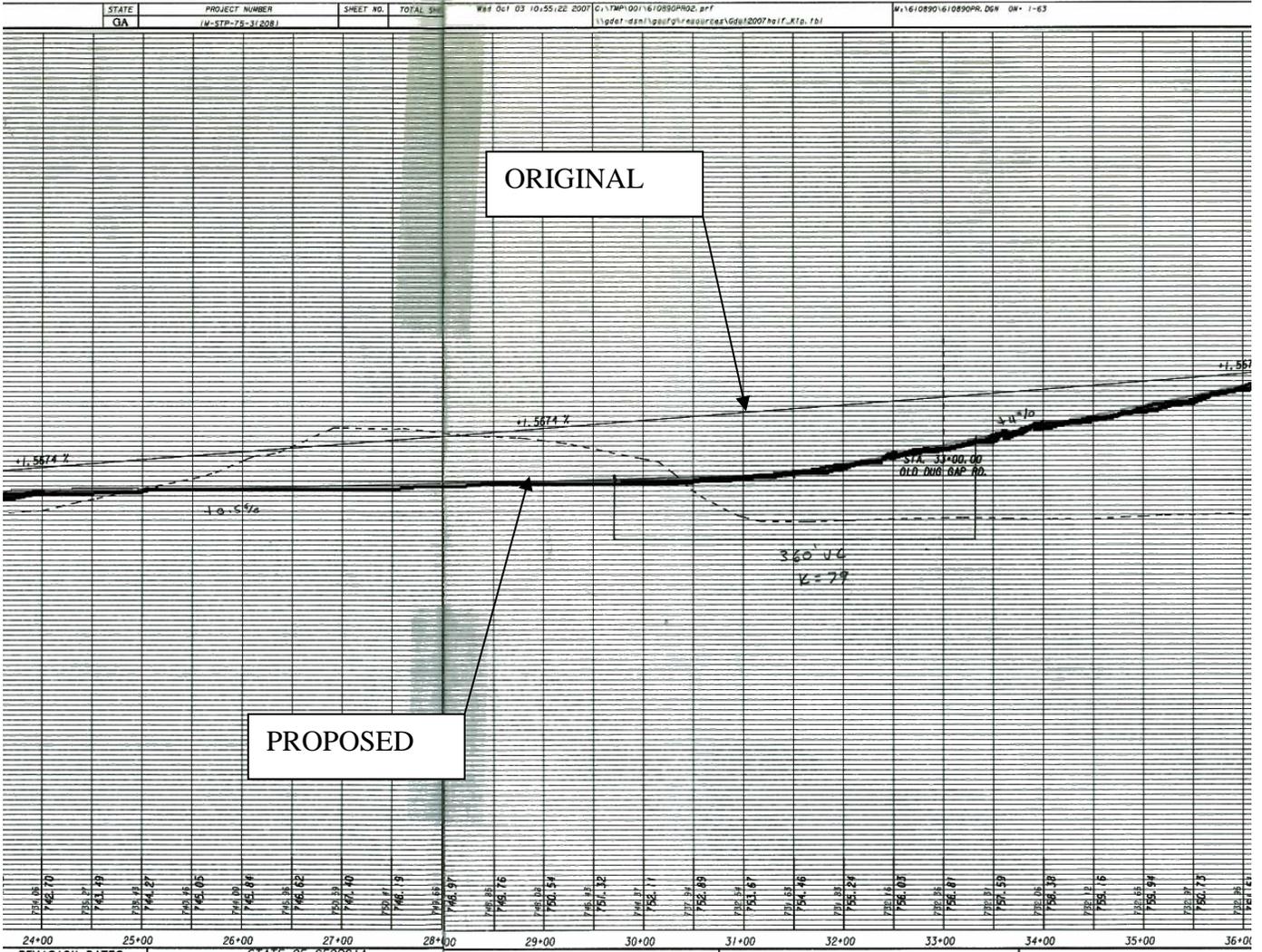


PLOT SCALE: 1" = 50'
 SCALE
 HORIZ.: 1" = 50'
 VERT.: 1" = 10'

SKETCH

CR 665/I-75 Interchange

ITEM N^o: D-1
 CLIENT: GDOT
 Sheet 3 of 7



24+00	25+00	26+00	27+00	28+00	29+00	30+00	31+00	32+00	33+00	34+00	35+00	36+00
746.70	747.70	748.70	749.70	750.70	751.70	752.70	753.70	754.70	755.70	756.70	757.70	758.70
759.25	760.25	761.25	762.25	763.25	764.25	765.25	766.25	767.25				

REVISION DATES

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE OF ROAD & AIRPORT DESIGN

MAINLINE PROFILE
 C. R. 665/CARBONDALE RD
 COUNTY WHITFIELD

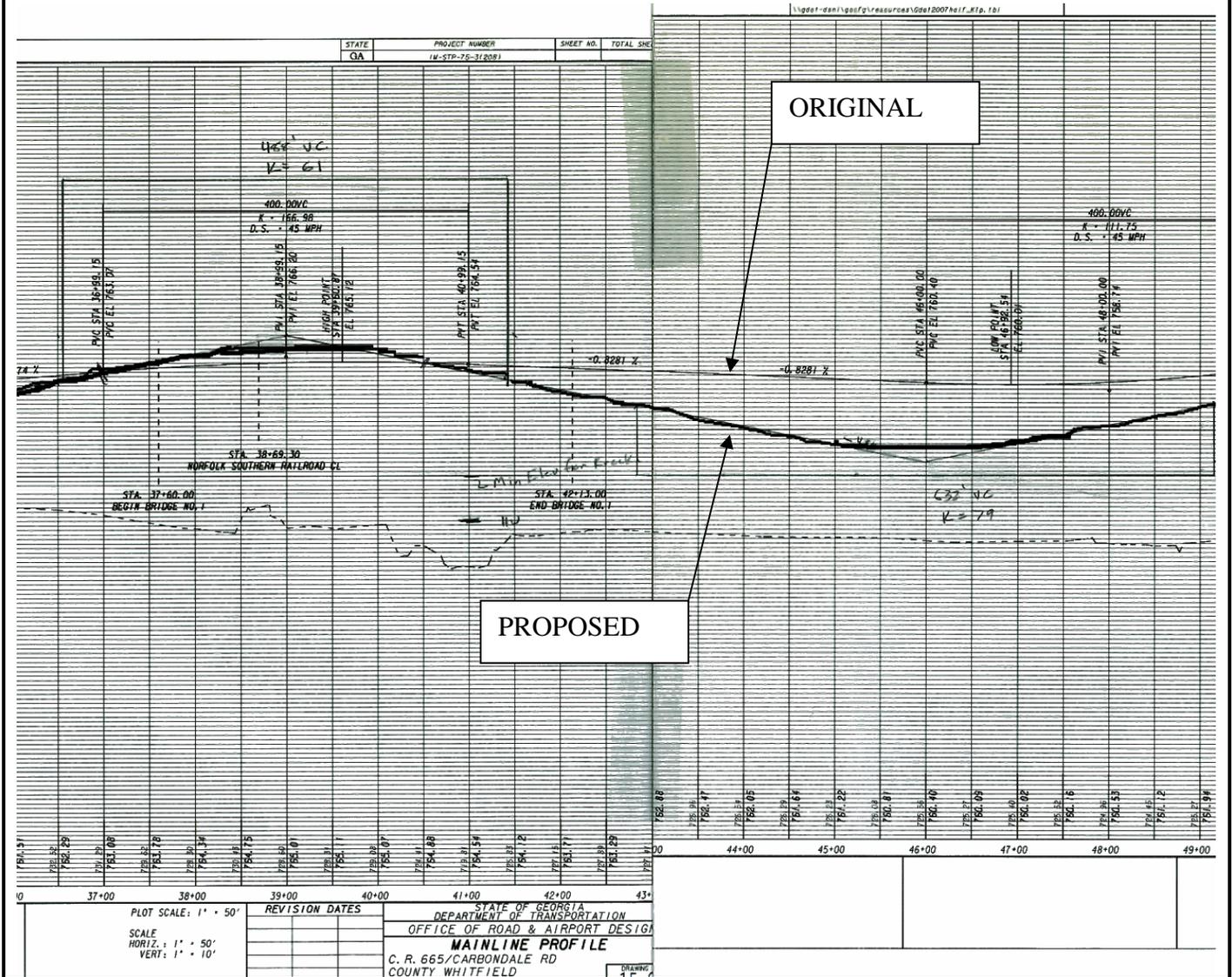
DATE:

DRAWING
 15-1

SKETCH

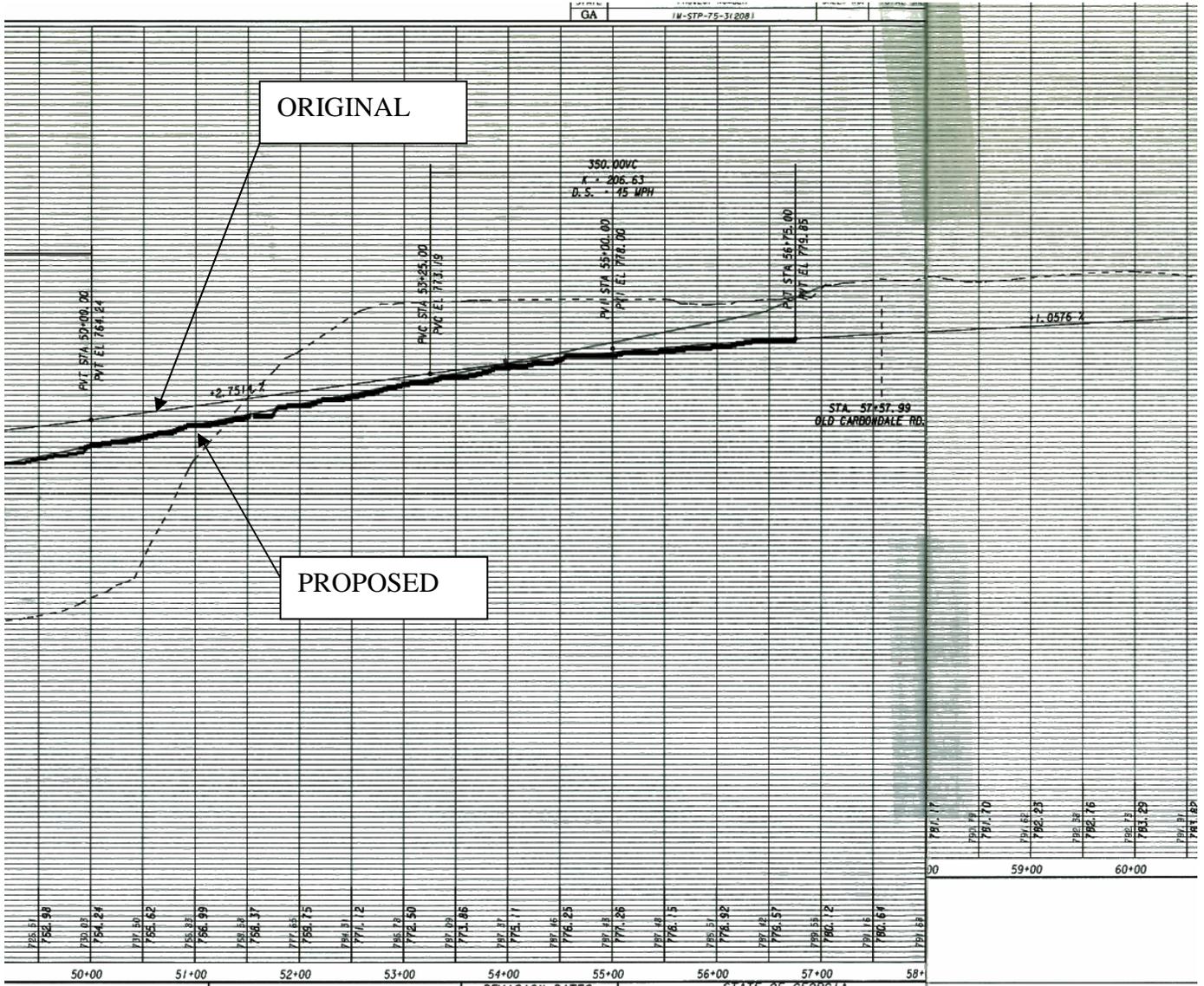
CR 665/I-75 Interchange

ITEM NO: D-1
 CLIENT: GDOT
 Sheet 4 of 7



CR 665/I-75 Interchange

ITEM N^o: D-1
 CLIENT: GDOT
 Sheet 5 of 7



PLOT SCALE: 1" = 50' SCALE HORIZ.: 1" = 50' VERT.: 1" = 10'	REVISION DATES	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF ROAD & AIRPORT DESIGN MAINLINE PROFILE C. R. 665/CARBONDALE RD COUNTY WHITFIELD DATE:	DRAWING 15-3
	1315		

IPR03.pr f GO-RD3

CALCULATIONS

CR 665/I-75 Interchange

ITEM N^o: D-1
CLIENT: GDOT
Sheet 7 of 7

Revised Profile

Assumptions

In Place Embankment

Length = 2800 ft
Average Fill Height Reduction = 5 ft
Average Embankment Width = 150 ft

Unclassified Excavation

Length = 750 ft
Average Cut Height Addition = 6 ft
Average Embankment Width = 120 ft

Original Concept

Additional In Place Embankment (Fill) = 77,800 CY

This is the amount of calculated savings with the revised grade from the original concept

Additional Excavation (Cut) = 0

Proposed Concept

Additional In Place Embankment (Fill) = 0 CY

Additional Excavation (Cut) = 20,000 CY

This is the amount of calculated increase in cut with the revised profile from the original concept.

DEVELOPMENT AND RECOMMENDATION PHASE

CR 665/I-75 Interchange

IDEA No.:	PAGE No.:	CREATIVE IDEA:
E-1	1 of 5	Use Asphalt in lieu of PCCP on Ramps
Comp By: TG	Date: 10/3/07	Checked By: DCW Date: 10/04/07

Original Concept:

Ramps are constructed with concrete typical section.

Proposed Change:

Use asphalt in lieu of concrete on the ramps.
Areas show on sketch.

Justification:

Rather than strictly going with an unwritten policy, compare the alternative by taking life cycle cost into consideration.

NOT RECOMMENDED

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	1,251,000	105,300	
- Proposed	959,300	506,900	
- Savings	291,700		291,700
FUTURE COST - Savings		(401,600)	(401,600)
TOTAL PRESENT WORTH SAVINGS			(109,900)

CR 665/I-75 Interchange

ITEM N^o: E-1
CLIENT: GDOT
Sheet 2 of 5

Ramps A and D Pavement areas



Ramps B and C Pavement Areas



Life Cycle Cost Analysis – Present Worth Method Future Cost Calculation

CR 665/I-75 Interchange

Creative Idea No. E-1

Sheet 4 of 5

Discount Rate: 3.0%

Economic Life: 30 Years

	A	B	C	D
	Original Design		Alternate Design	
	Cost	PW	Cost	PW
1. Single Expenditures: (i.e., stage Construction, Major Maintenance)				
a. Year <u> 10 </u> PWF .7747			381,600	295,600
b. Year <u> 20 </u> PWF 0.5537	190,200	105,300	381,600	211,300
c. Year <u> </u> PWF <u> </u>				
d. Salvage / Unused Service Life Year <u> </u> PWF <u> </u>				
1. Total Future Single Costs:		105,300		506,900
2. Annual Costs:				
a. General Maintenance PWF' 14.877				
b. Other Annual Costs PWF' 14.877				
2. Total Future Annual Costs				
3. Total Future Costs: (1 + 2)		105,300		506,900
4. Total Future Cost Savings on a Present Worth Basis (3B-3D)		(401,600)		

CALCULATIONS**CR 665/I-75 Interchange**ITEM N^o: E-1
CLIENT: GDOT
Sheet 5 of 5**Assumed Asphalt Ramp Typical Section and Costs:**

(Assumed section is same as Carbondale/CR665)

1.25" 12.5 mm AC @ 0.0076 tons/SF x \$87.81/ton = \$0.67/SF

1.5" 12.5 mm AC @ 0.0092 tons/SF x \$77.34/ton = \$0.71/SF

10" 25mm AC @ 0.0917 tons/SF x \$65.32/ton = \$3.99/SF

Total Ramp Cost = \$5.37/SF or \$48.34/SY**Ramp A**

Length: varies

Width: varies

Area: 4,933 SY

Ramp B

Length: varies

Width: varies

Area: 2,533 SY

Ramp C

Length: varies

Width: varies

Area: 5,167 SY

Ramp D

Length: varies

Width: varies

Area: 3667 SY

O&M

Based on costs contained in Toccoa Bypass VE, Concrete rehab at 20 yr = 15.2% capital = \$190,200

AC = 39.78% capital = 10 year rehab cost = \$381,600

APPENDIX

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
CR 665/I-75 Interchange			
NO.	CREATIVE IDEA	COMMENTS	IDEA RATING
A	Right of Way		
A-1	Shorten alignment at beginning of project		✓
A-2	Decrease number of lanes on west side of project		✓
A-3	Minimize Dixie Highway improvements		✓
A-4	Move ramps C and D east		✓
B	Bridges		
B-1	Realign RR crossing to the south		✓
B-2	Widen existing I-75 bridge in lieu of a new bridge	Not cost effective	X
B-3	Reduce width of I-75 bridge from 6 to 5 lanes		✓
B-4	Consider MSE walls in lieu of 2:1 end slopes		✓
B-4.1	B-4 plus minimize outside widening of mainline		✓
B-4.2	B-4.1 plus use inside widening of the mainline in the future		✓
B-5	Evaluate 54 inch bulb T spans		✓
C	Asphalt Paving		
C-1	Widen the future lanes on the inside and reduce their length		✓

NO.	CREATIVE IDEA	COMMENTS	IDEA RATING
D	Earthwork		
D-1	Revise west profile Sta 28 to 36 and 43 to 58 to reduce earthwork	Revised profiles show an improved concept with reduced material movement	✓
E	Concrete Paving		
E-1	Use AC in lieu of concrete		✓

VE STUDY SIGN-IN SHEET

Project No.: IM-STP-75-3(208)

County: Whitfield

PI No.: 610890

Date: 10/2-5/07

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