Georgia Department of Transportation

Jeffersonville Road (CR 727) Reconstruction

STP00-0000-00(835), P.I. No. 000835
STP00-3223-00(005), P.I. No. 351080
STP00-3223-00(004), P.I. No. 351090
BRMLB-3223-00(006), P.I. No. 351095
STP00-3223-00(002), P.I. No. 342080
Bibb County, Georgia

Value Engineering Study Report

February 2010

Designers

Stantec

Cunningham & Company Engineers

STV/Ralph Whitehead Associates, Inc.

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Mr. Matthew J. Sanders, AVS
Value Engineering Specialist
Georgia Department of Transportation - Engineering Services
One Georgia Center – 5th Floor
600 West Peachtree Street
Atlanta, Georgia 30308

Re: Jeffersonville Road (CR 727) Reconstruction Project
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Value Engineering Study Report

Date:
February 16, 2010

Contact:
David Hamilton

Phone:
253.229.7703

Email:
dahamilton@lza.com

Our ref:
LZ083352.0000

Dear Mr. Sanders:

Lewis & Zimmerman Associates, Inc. is pleased to submit two hard copies and one electronic copy of the referenced value engineering (VE) study report documenting the study that took place on January 25 – 28, 2010. The objective of the VE effort was to identify opportunities to enhance the value of the traffic improvements and reduce impacts to the residences and businesses located along Jeffersonville Road and Millerfield Road.

The VE team developed several ideas to reduce the construction by minimizing the improvements on the side roads, reducing or phasing lane widening from 3 lanes to five, and a reduction in the length of the Norfolk Southern Railway Bridge by adjusting the alignment and skew angle on Jeffersonville Road.

We thank you for your assistance during the course of the VE team's work. Please do not hesitate to call upon us if you or any of the reviewers have any questions regarding the information presented in this report.

Sincerely yours,

LEWIS & ZIMMERMAN ASSOCIATES, INC.
an ARCADIS company

David A. Hamilton, PE, CVS, CCE, LEED^{AP}
Vice President/VE Team Leader

Attachment

TABLE OF CONTENTS

EXECUTIVE SUMMARY

INTRODUCTION

This value engineering (VE) study report documents the events and results of the VE study conducted by Lewis & Zimmerman Associates, Inc. for the Georgia Department of Transportation (GDOT). The subject of the study was the Jeffersonville Road (CR 727) Reconstruction project located in Bibb County, comprising the following project numbers:

- STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 3+109 to STA 1+852
- STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300, Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820
- BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek
- STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828
- STP00-0000-00(835), P.I. No. 000835 – Norfolk Southern Railway Bridge over Jeffersonville Road

Cunningham & Company Engineers is developing P.I. Nos. 342080 and 351090 to the preliminary design stage; Stantec is developing P.I. No. 351080; STV/Ralph Whitehead Associates, Inc. is designing the Norfolk Southern Railway Bridge, P.I. No. 0000835; and GDOT in-house staff is designing the Walnut Creek Bridge, P.I. No. 351095. The total estimated construction cost for the combined 4.3 km-long project is $29.1M plus an additional $9.3M for right-of-way purchase. The preliminary design documents and updated GDOT cost estimates were used as the basis of the VE study which was conducted January 25–28, 2010, at GDOT's Atlanta, Georgia, headquarters.

Comprising the VE team were two highway engineers, a bridge engineer, a construction specialist, and a Certified Value Specialist (CVS) team leader. The team used the following six-phase VE job plan to guide its deliberations.

- Information Gathering Phase
- Function Identification and Analysis Phase
- Creative Idea Generation Phase
- Evaluation/Judgment of Creative Ideas Phase
- Alternative Development Phase
- Presentation Phase

PROJECT DESCRIPTION

This project encompasses a total of five individual P.I. numbers on Jeffersonville Road east of Macon, Georgia, and the roadway elements have been grouped into three project segments to simplify discussion and organization of the report. The project segments and associated P.I. numbers include a total of 4.3 km of improvements to Jeffersonville Road, Millerfield Road, and adjacent roadways. Collectively, the projects have an estimated construction value of $29.1M including the

Norfolk Southern Railway Bridge (P.I. No. 000835) and Walnut Creek Bridge (P.I. No. 351095) replacements. The project locations are identified on Figure 1 – Project Segments.

- West Segment – P.I. No. 351090
- Middle Segment - P.I. No. 342080 and P.I. No. 351095 (Bridge over Walnut Creek)
- East Segment - P.I. No. 351080 and P.I. No. 000835 (Norfolk Southern Railway Bridge)

West Segment – P.I. #351090

Project STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 3+109 to STA 1+852, consists of the widening and reconstruction of Jeffersonville Road (CR 727) from Emery Highway to Walnut Creek for a total length of 1.12 km. The existing route is a rural two-lane facility with 7.2m-wide pavement and 1.8m shoulders. The existing major structure is a narrow and structurally deficient 55.0m-long x 7.4m-wide bridge over Walnut Creek with a sufficiency rating of 21.7. Jeffersonville Road provides an alternate route to the congested US 129/Gray Highway corridor and provides relief for the congested Gray Highway/Shurling Drive intersection by allowing traffic between Milledgeville and Macon to bypass Gray Highway and this congested intersection. This project will result in an improved alternate route alleviating the current congested conditions on Gray Highway and provide an important connector to the Fall Line Freeway in east Macon. Project STP00-3223-00(004), P.I. No. 351090 will widen Jeffersonville Road between the above termini from two to four 3.6m-wide lanes with a 4.2m-wide center turn lane and 1.525m-wide contiguous sidewalk on both sides. The proposed right-of-way is 30.0m wide. No design exceptions are required to implement this project. Traffic will be maintained during the construction phase. Total estimated cost of construction is $1.7M.

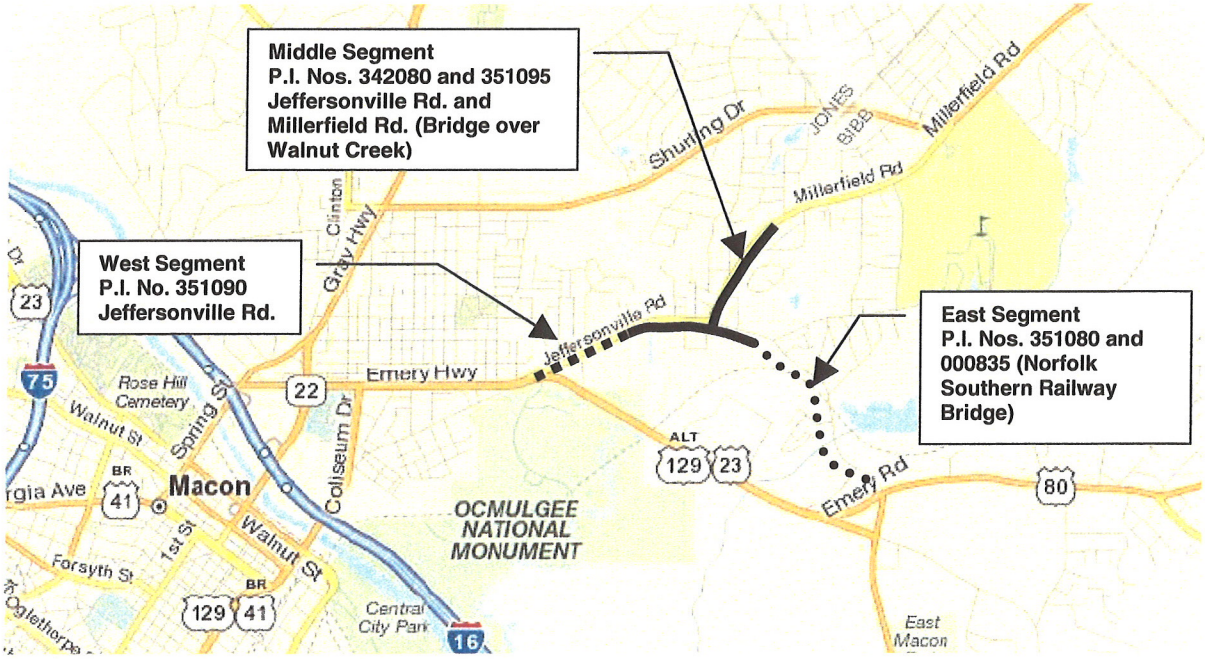


Figure 1 - Project Segments

Middle Segment - P.I. No. 342080 and P.I. No. 351095 (Bridge over Walnut Creek)

Project STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300, and Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820 is a widening and reconstruction of Jeffersonville Road (CR 727) from Walnut Creek to Recreation Road and Millerfield Road (the continuation of CR 727) from Jeffersonville Road (CR 727) to Bristol Drive. The total project length is 1.76 km. The existing routes are rural two-lane facilities with a 7.2m total pavement width. Drainage ditches are located immediately adjacent to shoulders and often contain utility poles in the back slopes. Jeffersonville Road and Millerfield Road provide an alternate route to the congested US 129/Gray Highway corridor

The additional lane capacity is needed to accommodate future traffic growth along Jeffersonville and Millerfield Roads. The base year traffic (1999) varies from 12,220 vehicles per day (VPD) to 12,560 VPD and the design year traffic (2019) varies from 18,140 VPD to 21,380 VPD. The posted speed and the design speed vary from 60km/h to 65km/h. The proposed construction will provide four 3.6m-wide lanes with a 4.2m-wide center turn lane and 1.525m-wide sidewalk on both sides for the entire project limit. The proposed right-of-way is 30.0m wide. The west terminus of this project ties to project P.I. No. 351090, with similar typical sections. The east terminus ties into a locally funded project to widen Millerfield Road from New Clinton Road to SR 49 to a three-lane urban section. The total construction cost for P.I. No. 342080 is $5.9M.

Project BRMLB-3223-00(006), P.I. No. 351095 will replace the existing bridge over Walnut Creek with a 77.5m long x 25.0m-wide bridge at the existing bridge site. The new structure will span the wetlands of Walnut Creek. Traffic will be maintained during construction of the bridge. Total construction cost for P.I. No. 351095 is $2.6M.

East Segment - P.I. Nos. 351080 and 000835 (Norfolk Southern Railway Bridge)

Project STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828 includes improvements on Jeffersonville Road (CR 727) from Recreation Road to Fall Line Freeway (Emery Road, US 80, SR 19), widening from a two-lane rural section with 7.3m-wide pavement to a five-lane urban section with 18.6 m of asphaltic concrete pavement (four 3.6m-wide through lanes and a 4.2m two-way center turn lane) with curb and gutter, and 1.525m-wide contiguous sidewalk on both sides of the road from Recreation Road to Avalon Circle. The proposed shoulder is 3.6m wide. Total length of the improvements is 1.42 km. Total construction cost for P.I. No. 351080 is $6.0M.

Project STP00-0000-00(835), P.I. No. 0000835 - Norfolk Southern Railway Bridge over Jeffersonville Road, replaces the Norfolk Southern Railway Bridge over Jeffersonville Road with two new spans, each 6.1m wide x 50m long. Sidewalks are to be included from Recreation Road to Avalon Circle on both sides. This project also includes improvements to the dam spillway and retaining walls adjacent to the bridge. Total construction cost for P.I. No. 000835 is $14.7M.

CONCERNS AND OBJECTIVES

This project encompasses a wide range of improvements along Jeffersonville Road, Millerfield Road, and the adjoining side roads in the area. The following key concerns were noted by the team as they reviewed the various projects.

- The 30-degree skew angle on the Norfolk Southern Railway Bridge has driven the length of the structure to 75.4m.
- Drainage improvements utilize numerous parallel pipes on either side of the roads
- The length of side road improvements appears excessive in several places
- A lane width of 3.6 m has been used on several fairly small side roads
- Some inconsistencies are noted between projects in lane, shoulder, and median widths
- Increasing from the existing two-lane section to a five-lane section requires a substantial amount of new right-of-way and an extensive amount of new pavement

With this background, the VE team was tasked with identifying opportunities that will enhance the functionality of the project and reduce impacts to the businesses and residences located along the project site.

RESULTS OF THE STUDY

The value engineering team developed 21 alternatives to address the concerns noted above with the emphasis being on reducing the encroachment onto residential and commercial properties lining the roadways and to provide options for project budget control. All of the alternatives are shown on the following Summary of Value Engineering Alternatives table and detailed in Section Two of the report. The following highlights those alternatives having the greatest potential impact on the project.

West Segment (W)

- **(STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 1+852 to STA 3+109)**

A limited number of alternatives are presented for the West Segment, but some opportunities for value improvement exist in the extent of improvements on Magnolia Place. It may be possible to reduce the construction limits on Magnolia Place from STA 6+055 back to STA 6+190. This would shorten the improvements on this side road by 135 m and eliminate associated drainage improvements for a savings in the range of $36,000. (Alt. No. W-1)

Possible drainage improvements are identified along Jeffersonville Road and some reduction in pipe lengths and the number of drainage structures are recommended. The parallel drains on either side of the street could be replaced with several cross drains eliminating several reaches of 450mm and 600mm drain pipe. Collectively these modifications to the drainage design could save an estimated $33,000. (Alt. No. W-10)

Middle Segment (M)

- **BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek**
- **STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300**
- **Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820**

Although the traffic volumes in the area are increasing, expanding Jeffersonville Road from a two-lane facility to a five-lane roadway is a major investment in both right-of-way and pavement. An alternate approach could be to increase from a two-lane to a three-lane roadway. This could be done in two ways: purchase only enough right-of-way for the three-lane facility (Alt. No. M-3) with a

potential savings in the range of $650,000, or install a three-lane facility on five lanes of right-of-way (Alt. No. M-7) with a potential savings slightly over $500,000. Both options would require a second construction mobilization in the future to build the section out to five lanes but could offer some immediate short-term improvements in traffic capacity. The reduction in construction cost is more accurately described as deferred since the full five lanes will be needed to meet the design year ADTs.

The construction limits on Millerfield Road could also be reduced by shortening the extent of improvements from STA 10+140 to STA 10+080. Pavement and drainage improvements in this area could be reduced for a potential savings in the range of $100,000. Nearly two-thirds of this savings is from a reduction in right-of-way along Millerfield Road. (Alt. No. M-13)

East Segment (E)

- **STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828**
- **STP00-0000-00(835), P.I. No. 000835 - Norfolk Southern Railway Bridge over Jeffersonville Road**

The East Segment of the project offers some of the most interesting options on the roadway and Norfolk Southern Railway Bridge. The roadway improvements could be phased, similar to Alt. Nos. M-3 and M-7. Jeffersonville Road could be expanded from a two-lane facility to a three-lane facility with either three lanes of right-of-way, or five lanes of right-of-way. Both options would require a second construction mobilization, but purchasing all five lanes now would streamline the process considerably. Traffic capacity would see a marked improvement with a three-lane section, but considerably less than the full five-lane option. The savings in this deferred approach would be $1.5M for the three-lane right-of-way option and slightly more than $900,000 for the five lanes of right-of-way. (Alt. Nos. E-8 and E-16).

Improvements to the Norfolk Southern Railway Bridge can also be achieved by slightly modifying the alignment of the roadway and reducing the skew angle from 30 degrees to 39 degrees. Reducing the skew will allow the bridge length to be shortened from 75.4m to 59.9m. The shorter structure will result in a savings in the range of $570,000. To achieve this savings, redesign will be necessary on both the alignment and the bridge, but this alternative appears to offer clear advantages due to the shorter spans and reduced bridge deck area. (Alt. No. E-13)

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
WEST SEGMENT (W)						
• ***STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 1+852 to STA 3+109***						
W-1	Reduce the extent of improvements on Magnolia Place and end the pavement at STA 6+190 instead of STA 6+055 and modify the storm drainage system.	$36,124	$0	$36,124	$0	$36,124
W-2	Reduce the lane widths on the side streets, Wallace Rd., Sunnydale Dr., Magnolia Pl., Indian Circle, and Trinity Pl., from 3.6m to 3.3m.	$3,621	$0	$3,621	$0	$3,621
W-10	Modify drainage piping configurations to reduce pipe lengths and number of drainage structures.	$41,590	$8,188	$33,402	$0	$33,402
W-11	Use one larger storm pipe (1050mm) instead of the double pipe (600mm & 750mm) layout at STA 1+550.	$23,416	$19,665	$3,751	$0	$3,751
W-13	Increase the width of the flush median from 3.6m to 4.2m to be consistent with projects P.I. 351080 and P.I. 351095.	DESIGN SUGGESTION				
MIDDLE SEGMENT (M)						
• ***BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek***						
• ***STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300;***						
• ***Millerfield Rd. – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820***						
M-1	Reduce the length of Lynhaven Road improvements by 40m and end at STA 9+020 instead of 9+060.	$32,092	$2,713	$29,379	$0	$29,379
M-2	Reduce the width of the side street lanes on Artic Circle, Royster Rd., Roseview Circle, and Kelly Dr. from 3.6m to 3.3m.	$11,595	$0	$11,595	$0	$11,595
M-3	Use a 3-lane roadway with auxiliary lanes at selected locations in lieu of a 4th lane on Jeffersonville Rd., east of Millerfield Road. Purchase only 3-lanes of right-of-way at the present time.	$650,113	$0	$650,113	$0	$650,113

SUMMARY OF POTENTIAL COST SAVINGS

JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION
PROJECT: ***P.I. Nos. 342080, 351095, 351080, 000835, 351090***
Bibb County, Georgia - Preliminary Engineering Submittal

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
MIDDLE SEGMENT (M) (cont.) • ***BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek*** • ***STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300;*** • ***Millerfield Rd. – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820***						
M-4	Reduce the sidewalk width on the bridge over Walnut Creek from 1.8m to 1.7m.	$4,194	$0	$4,194	$0	$4,194
M-7	Build 3-lane roadway with rural ditch section on Jeffersonville, east of Millerfield Rd., but purchase 5-lanes of right-of-way.	$553,045	$41,627	$511,418	$0	$511,418
M-12	Modify the drainage piping configuration and use more cross drains in lieu of parallel lines.	$34,001	$16,638	$17,363	$0	$17,363
M-13	On Millerfield Rd., eliminate the ditch from STA 10+025 to 10+140, reduce the extent of pavement from STA 10+140 to STA 10+080, and reduce the right of way.	$100,552	$0	$100,552	$0	$100,552
EAST SEGMENT (E) • ***STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828*** • ***STP00-0000-00(835), P.I. No. 000835 - Norfolk Southern Railway Bridge Over Jeffersonville Road***						
E-2	Reduce lane width on the side roads, Morningside Dr., McCall Rd., Lakeside Rd., from 3.6m to 3.3m.	$4,041	$0	$4,041	$0	$4,041
E-7	Modify the drainage piping configuration and eliminate some of the parallel lines.	$108,653	$70,564	$38,089	$0	$38,089
E-8	Use a 3-lane roadway with auxiliary lanes at selected locations in lieu of a 4th lane on Jeffersonville Rd., shorten the railroad bridge, but only purchase 3-lanes of right of way.	$1,500,602	$0	$1,500,602	$0	$1,500,602

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
EAST SEGMENT (E) (cont.)						
	• ***STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828***					
	• ***STP00-0000-00(835), P.I. No. 000835 - Norfolk Southern Railway Bridge Over Jeffersonville Road***					
E-9	Create a low point at the box culvert (STA 6+080) and move the catch basins B-16 & B-17. Eliminate the 1500mm RCP pipe.	$19,542	$3,308	$16,234	$0	$16,234
E-10	Reduce the travel lane width on Jeffersonville Road from 3.6m to 3.3m to match the other projects.	$78,681	$0	$78,681	$0	$78,681
E-11	Reduce the shoulder width on Jeffersonville Road from 3.6m to 3.0m.	$25,024	$0	$25,024	$0	$25,024
E-12	At the Norfolk Southern railroad bridge, use 100mm thick concrete pavement between the traffic barriers around the center column in the median in lieu of 450mm thick pavement.	$36,818	$9,194	$27,624	$0	$27,624
E-13	Realign Jeffersonville Rd., reduce the skew from 30-degrees to 39-degrees, and shorten the bridge from 75.4m to 59.9m.	$596,024	$24,180	$571,844	$0	$571,844
E-16	Build a 3-lane roadway on Jeffersonville Rd. with rural ditch section on R/W for future 5-lane urban section.	$984,656	$41,627	$943,029	$0	$943,029
E-17	Extend the concrete pavement near the Norfolk Southern railroad bridge to match the length of the spillway.	DESIGN SUGGESTION				
E-18	Revise the drainage piping network between STA 5+437 and 5+742 to reduce the piping length and number of catch basins.	$40,948	$25,512	$15,436	$0	$15,436

STUDY RESULTS

GENERAL

The results of this value engineering study conducted on the Jeffersonville Road (CR 727) Reconstruction project portray the benefits that can be realized by GDOT; the owner; Bibb County, the users of the roadway, and the design teams. The results will directly affect the project's design and will require coordination among GDOT staff to determine the disposition of each alternative.

During the conduct of the study, many ideas for potential value enhancements were conceived and evaluated by the team for technical merit, applicability to the project, implementability considering the project's status, and the ability to meet the owner's project value objectives. Research performed on those ideas considered to have potential to enhance the value of the project resulted in the development of individual alternatives identifying specific changes to the project as a whole, or individual elements that comprise the project. These may be in the form of VE alternatives (accompanied by cost estimates) or design suggestions (typically without cost estimates). For each alternative developed the following information is provided:

- A summary of the original design
- A description of the proposed change to the project
- Sketches and design calculations if appropriate
- A capital cost comparison and life cycle discounted present worth cost comparison of the alternative and original designs, where appropriate
- A descriptive evaluation of the advantages and disadvantages of selecting the alternative
- A brief narrative to compare the original design and the proposed change and provide a rationale for implementing the change into the project

The capital cost comparisons used unit quantities contained in the project cost estimate prepared by the designers, whenever possible. If unit quantities were not available, published data bases, such as the one produced by the RS Means Company, or team member or owner data bases were consulted. A composite markup of 10%, as described in the Value Analysis and Conclusions section of the report, was used to generate an all-inclusive project cost for the construction items being compared.

Each design suggestion contains the same information as the VE alternatives, except that no cost information is usually included. Design suggestions are presented to bring attention to areas of the design that, in the opinion of the VE team, should be changed for reasons other than cost. Examples of these reasons include improved facility operation, ease of maintenance, ease of construction, safer working conditions, reduction in project risk, etc. In addition, some ideas cannot be quantified in terms of cost with the design information provided; these are also presented as design suggestions and are intended to improve the quality of the project.

Each alternative or design suggestion developed is identified with an alternative number (Alt. No.) to track it through the value analysis process and thus facilitating referencing between the Creative Idea Listing and Evaluation worksheets, the alternatives, and the Summary of Potential Cost Savings table. The Alt. No. includes a prefix that refers to a major project element listed below:

PROJECT ELEMENTS AND P.I. NOS.		PREFIX
West Segment	• STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 1+852 to STA 3+109	W
Middle Segment	• BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek • STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300; Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820	M
East Segment	• STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828 • STP00-0000-00(835), P.I. No. 0000835 – Norfolk Southern Railway Bridge Over Jeffersonville Road	E

Summaries of the alternatives and design suggestions are provided on the Summary of Potential Cost Savings tables. The tables are divided into project elements for the convenience of the reviewer and are used to divide the results section. The complete documentation of the developed alternatives and design suggestions follow each of the Summary of Potential Cost Savings tables.

KEY ISSUES

This project is being developed to improve traffic operations by increasing capacity on Jeffersonville Road and Millerfield Road to accommodate additional traffic. The following key concerns were noted by the team as they reviewed the various projects.

- The Norfolk Southern Railroad Bridge has a skew angle of 30 degrees which has driven the length of the structure to 75.4 meters. The spillway to the dam is also being upgraded under a separate contract and the flow during storm periods could cause scour near the bridge piers.
- Drainage improvements utilize numerous parallel pipes on either side of the roads.
- The length of side road improvements appears excessive in several places.
- The 3.6m-width of the side road travel lanes appears fairly generous.
- Design packages have some inconsistencies in lane, shoulder, and median widths since they were produced by several different design teams.
- Increasing from the existing two lane section on Jeffersonville Road and Millerfield Road to a five lane section requires a substantial amount of new right-of-way and an extensive amount of new pavement.

To achieve the goal of traffic improvement it will be necessary to acquire a significant amount of right-of-way whose cost is a substantial portion of the total construction cost. A number of residential and commercial properties will be impacted by the construction. In addition, the current configuration of the roads has resulted in numerous rear-end, angle and, sideswipe collisions.

STUDY OBJECTIVES

To assist GDOT in achieving its project goal of increasing the level of service on Jeffersonville Road and Millerfield Road in a cost-effective manner, it convened this VE study. The study team was tasked with identifying specific changes to the current design that will enhance its value by improving functionality, saving cost, or a combination of the two. The VE alternatives presented in this report offer alternate methods for the design, phasing, and construction of these improvements, and decisions will be needed in selecting the combination of alternatives that best optimize the project goals.

RESULTS OF THE STUDY

Research of the ideas identified as having potential for enhancing the value of the project resulted in the development of eight alternatives for consideration by the GDOT. These alternatives address the key issues described above and are detailed in the remainder of this section of the report.

EVALUATION OF ALTERNATIVES AND DESIGN SUGGESTIONS

When reviewing the study results, the reader should consider each part of an alternative or design suggestion on its own merit. There may be a tendency to disregard an alternative because of a concern about one part of it. Each area within an alternative or design suggestion that is acceptable should be considered for use in the final design, even if the entire alternative or design suggestion is not implemented. Variations of these alternatives and design suggestions by the owner or designer are encouraged.

All alternatives and design suggestions were developed independently of each other to provide a broad range of options to consider for implementation. Therefore, some of them are "mutually exclusive," so acceptance of one may preclude the acceptance of another. In addition, some of the alternatives may be interrelated, so acceptance of one or more may not yield the total of the cost savings shown for each alternative. Design suggestions could also be interrelated thus precluding a part of one or more suggestions from being implemented if another design suggestion is also implemented.

The reader should evaluate all alternatives carefully in order to select the combination of ideas with the greatest beneficial impact on the project. Once this has been accomplished, the total cost savings resulting from the VE study can be calculated based on implementing a revised, all-inclusive design solution.

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
WEST SEGMENT (W)						
	• ***STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 1+852 to STA 3+109***					
W-1	Reduce the extent of improvements on Magnolia Place and end the pavement at STA 6+190 instead of STA 6+055 and modify the storm drainage system.	$36,124	$0	$36,124	$0	$36,124
W-2	Reduce the lane widths on the side streets, Wallace Rd., Sunnydale Dr., Magnolia Pl., Indian Circle, and Trinity Pl., from 3.6m to 3.3m.	$3,621	$0	$3,621	$0	$3,621
W-10	Modify drainage piping configurations to reduce pipe lengths and number of drainage structures.	$41,590	$8,188	$33,402	$0	$33,402
W-11	Use one larger storm pipe (1050mm) instead of the double pipe (600mm & 750mm) layout at STA 1+550.	$23,416	$19,665	$3,751	$0	$3,751
W-13	Increase the width of the flush median from 3.6m to 4.2m to be consistent with projects P.I. 351080 and P.I. 351095.	DESIGN SUGGESTION				
MIDDLE SEGMENT (M)						
	• ***BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek***					
	• ***STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300;***					
	• ***Millerfield Rd. – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820***					
M-1	Reduce the length of Lynhaven Road improvements by 40m and end at STA 9+020 instead of 9+060.	$32,092	$2,713	$29,379	$0	$29,379
M-2	Reduce the width of the side street lanes on Artic Circle, Royster Rd., Roseview Circle, and Kelly Dr. from 3.6m to 3.3m.	$11,595	$0	$11,595	$0	$11,595
M-3	Use a 3-lane roadway with auxiliary lanes at selected locations in lieu of a 4th lane on Jeffersonville Rd., east of Millerfield Road. Purchase only 3-lanes of right-of-way at the present time.	$650,113	$0	$650,113	$0	$650,113

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **W-1**

DESCRIPTION: **REDUCE EXTENT OF IMPROVEMENTS ON MAGNOLIA PLACE AND END PAVEMENT AT STA 6+190 INSTEAD OF STA 6+055 AND MODIFY STORM DRAINAGE SYSTEM**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (sketch attached)

Install 30 meters of curb and gutter and 35 meters of 450mm pipe on east side of Magnolia Place, asphaltic concrete (AC) pavement to STA 6+055, concrete driveway on Parcel 8, 450mm pipe under driveway and associated construction easement.

ALTERNATIVE: (sketch attached)

Construct curb and gutter and AC pavement only up to curb return. Eliminate concrete driveway on Parcel 8 and 450mm pipe underneath it. Construct only 5 m of 450mm pipe on east side. Eliminate construction easement. Relocate catch basin A-10 and a section of pipe as shown. Pavement improvements on Magnolia Place would end at STA 6+190W.

ADVANTAGES:

- Reduces construction cost
- Slightly reduces project cost and schedule
- Eliminates easement

DISADVANTAGES:

- Less improvement to side road

DISCUSSION:

Magnolia Place is a small side street with negligible traffic. Reducing the extent of the proposed improvements will have no effect on the vehicle movement on Jeffersonville Road.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 36,124	—	$ 36,124
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 36,124	—	$ 36,124

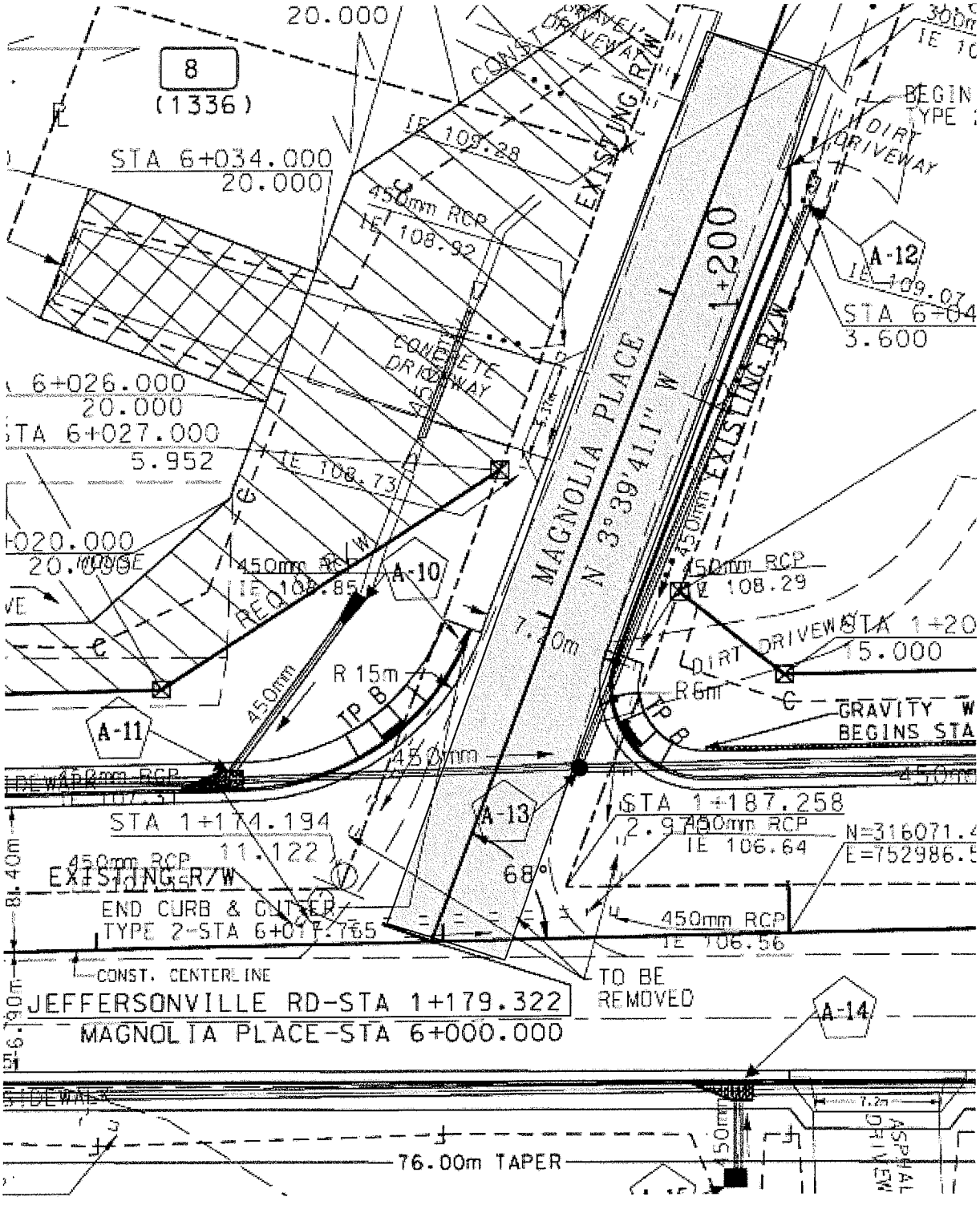
SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: W-1

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia – Preliminary Engineering Submittal

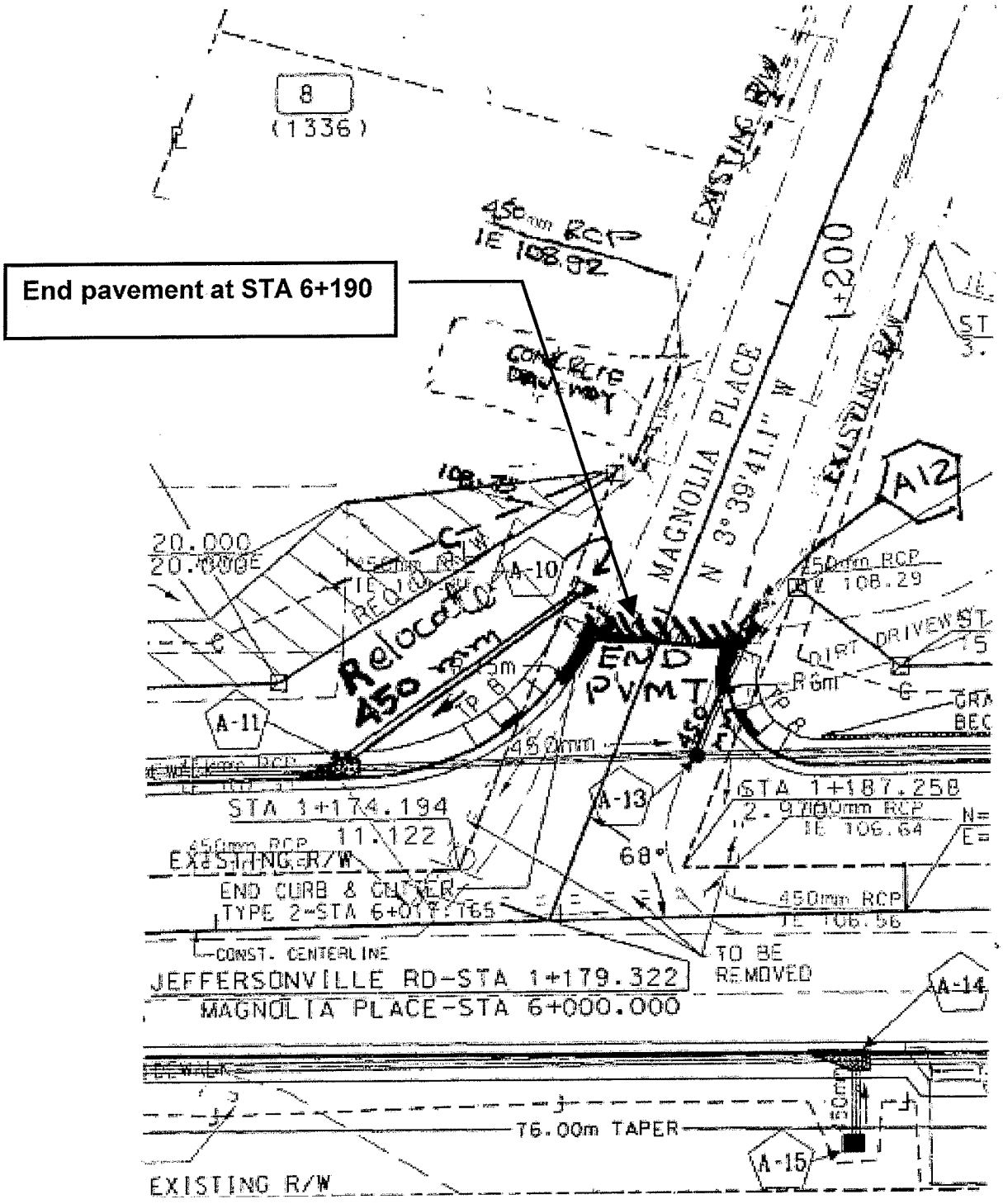
ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: **2 of 5**



SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: W-1
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐ SHEET NO.: **3 of 5**



PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: W-1

SHEET NO.: 4 of 5

Pavement to be eliminated:

37 m x 7.2 m = 266.4 m^2

RCP (450 mm) pipes to be eliminated:

East side: 30 m

west side under driveway: 10 m

Total: 30 + 10 = 40 m

Also Eliminate
2 - 450 mm Flared Section.

Eliminate 30 m of C & G:

Eliminate 490 m^2 of construction easement:

$28 \times 8 + 14 \times 6 + \frac{1}{2} \times 14 \times 20 + \frac{1}{2} \times 14 \times 6 = 490\ m^2$

Eliminate 30 x 5 = 150 m^2 of concrete driveway

1.5" of 12.5 mm A-C. concrete = 90 kg = 0.09 MG x 80.2 = 7.22/m^2
2" of 19 mm A-C. concrete = 120 kg = 0.12 MG x $74.81 = $ 8.98/m^2
3" of 25 mm A-C. concrete = 180 kg = 0.18 MG x $70.46 = $12.68 m^2
12" of G.A.B. [redacted] x $ 25.98 = $25.98/$m^2$

Total → $54.86/$m^2$

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **W-1**

SHEET NO.: **5 of 5**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
A.C. Pavement	M2	266	54.88	14,598			
Curb and Gutter	LM	30	52.50	1,575			
450 mm RCP	LM	40	143.32	5,733			
Flared Ends	EA	2	453.75	908			
Concrete Driveway	M2	150	37.08	5,562			
Sub-Total				28,376			
10% Markup				2,838			
Total Construction Cost				**31,214**			
Residential Property							
Construction Easement	M2	490	4.04	1,980			
>> $0.75/sf /2							
>> $0.75/sf x 3.281²/2							
= $4.04/m2							
R/W Markup = 148%				2,930			
Total R/W Cost				**4,910**			
Subtotal				36,124			
Markup (%) at Included							
TOTAL				36,124			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **W-2**

DESCRIPTION: **REDUCE LANE WIDTHS ON SIDE STREETS-- WALLACE ROAD, SUNNYDALE DRIVE, MAGNOLIA PLACE, INDIAN CIRCLE, AND TRINITY PLACE--FROM 3.6M TO 3.3M**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (sketch attached)

Design and construct all side roads to be 3.6 meters wide each way.

ALTERNATIVE: (sketch attached)

Reduce side road width to 3.3 meters both ways from curb return inwards.

ADVANTAGES:

- Reduces construction cost

DISADVANTAGES:

- Section would need to be modified
- Narrower travel lane

DISCUSSION:

Existing side roads are of varying width ranging from 6 meters to 6.6 meters. Increasing the width of these side roads to 7.2 meters (3.6 + 3.6) will not add significant value to the overall goal of the project.

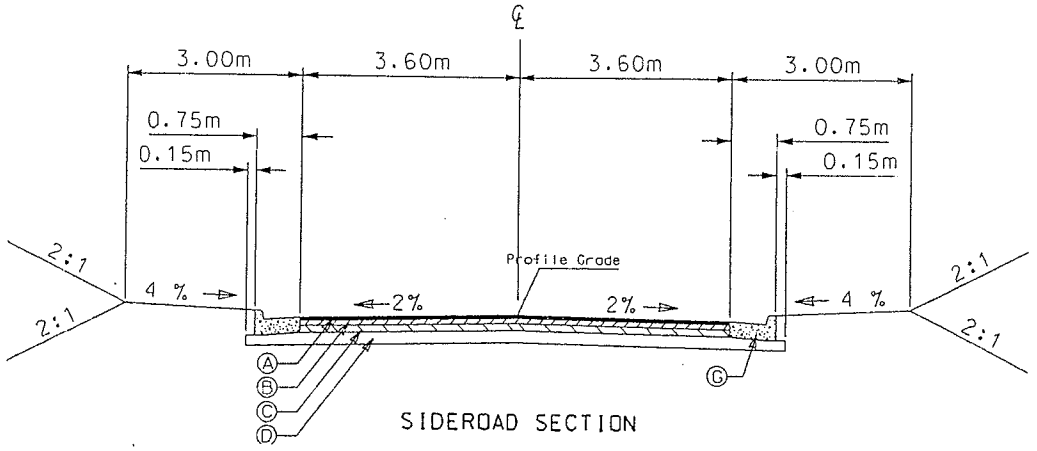
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 3,621	—	$ 3,621
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 3,621	—	$ 3,621

SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

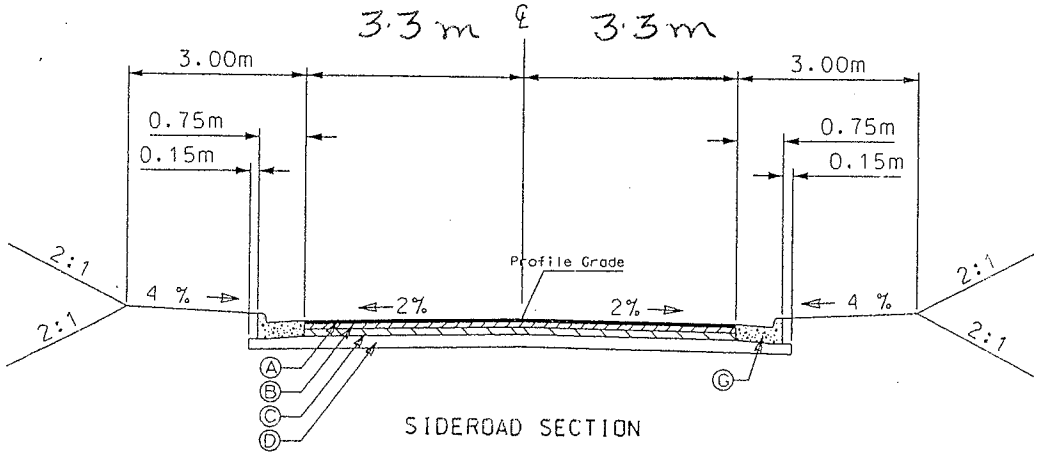
ALTERNATIVE NO.: W-2

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 2 of 5



SIDEROAD SECTION

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐



SIDEROAD SECTION

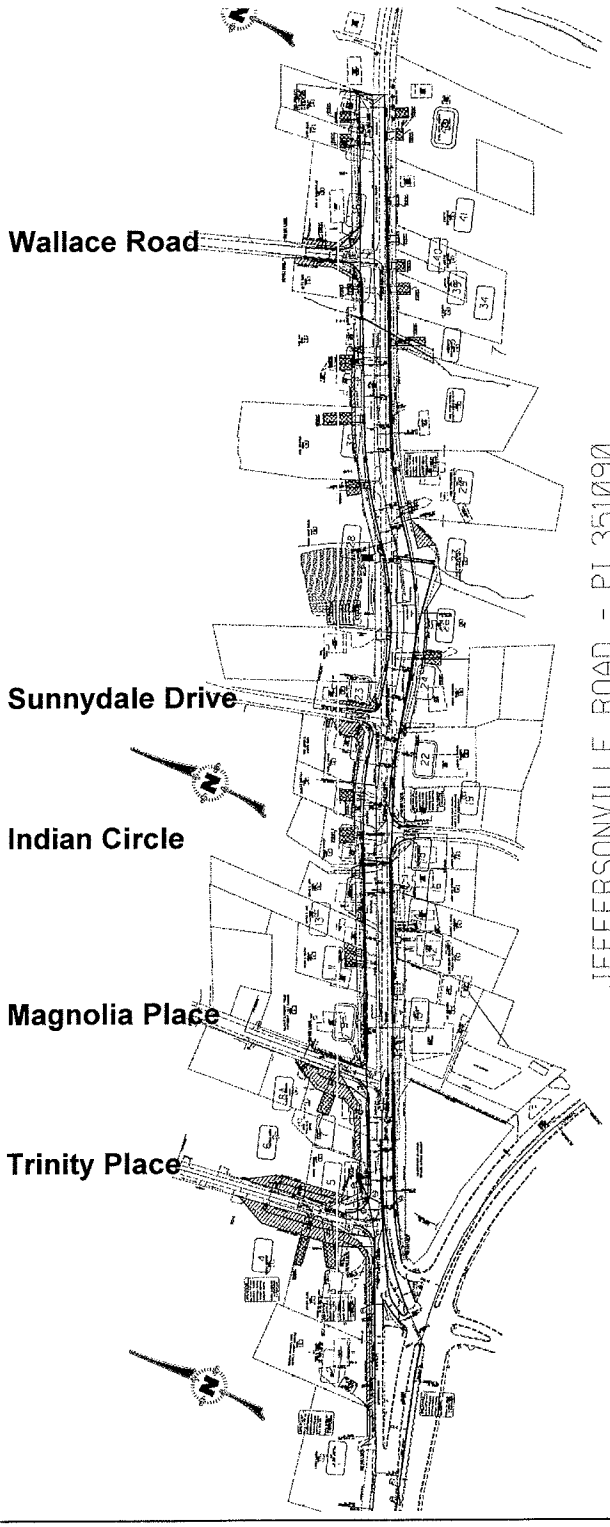
SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: W-2

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia – Preliminary Engineering Submittal

ORIGINAL DESIGN X ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: **3 of 5**



PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: W-2

SHEET NO.: 4 of 5

Side Road Asphalt Concrete Pavement :

1.5" of 12.5 mm A.C. concrete → 90 kg
= 0.09 MG x $80.2 = 7.22/m²

2.0" of 19 mm A.C. concrete → 120 kg
= 0.12 MG x $74.81 = 8.98/m²

3.0" of 25 mm A.C. concrete → 180 kg
= 0.18 MG x $70.46 = $12.68/m²

12" of G.A.B. = $25.98 = $25.98/m²

Total : $54.86/m²

- Trinity Place : 45 m x [3.6-3.3 + 3.6-3.3] = 27 m²
- Magnolia Place : 30 m x [0.3 m + 0.3 m] = 18 m²
- Sunnydale Drive : 10 m x 0.6 m = 6 m²
- Indian Circle : zero
- Wallace Road : 15 x 0.6 m = 9 m²

Total : 60 m²

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **W-2**

SHEET NO.: **5 of 5**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
A.C. Pavement	m2	60	54.86	$3,292			
Subtotal				$3,292			
Markup (%) at	**10%**			$329			
TOTAL				$3,621			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **W-10**

DESCRIPTION: **MODIFY DRAINAGE PIPING CONFIGURATIONS TO REDUCE PIPE LENGTHS AND NUMBER OF DRAINAGE STRUCTURES**

SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (sketch attached)

Storm drain piping is typically run parallel and on both sides of the roads.

ALTERNATIVE: (sketch attached)

Modify the piping layout and use more cross drains to reduce piping lengths. Piping near drainage structures A-8, 9, 14, and 16-18 and C-4, 9, and10 would be modified.

ADVANTAGES:

- Reduces construction cost
- May increase capacity and/or slope of pipes in certain locations

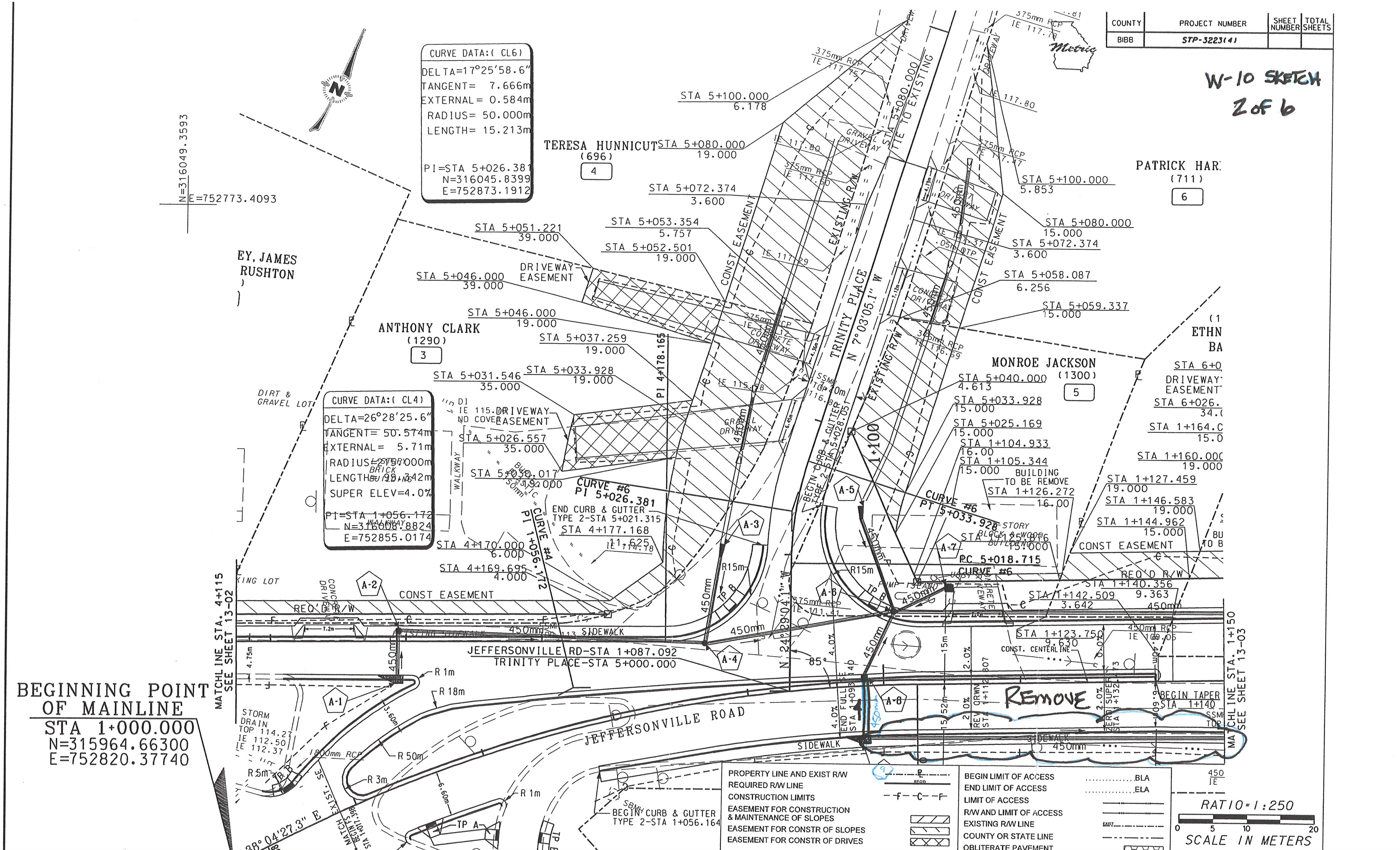
DISADVANTAGES:

- More trenching across the existing road
- Need to verify adequate backfill cover for the pipe

DISCUSSION:

Although constructing pipes across the existing road may complicate the maintenance of traffic, the decrease in construction cost is considerable.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 41,590	—	$ 41,590
ALTERNATIVE	$ 8,188	—	$ 8,188
SAVINGS	$ 33,402	—	$ 33,402



COUNTY: BIBB
PROJECT NUMBER: STP-3223(4)
SHEET NUMBER
TOTAL SHEETS
Metric
W-10 SKETCH 2 of 6
CURVE DATA:(CL6)
DELTA=17°25'58.6"
TANGENT= 7.666m
EXTERNAL= 0.584m
RADIUS= 50.000m
LENGTH= 15.213m
PI=STA 5+026.381
N=316045.8399
E=752873.1912
CURVE DATA:(CL4)
DELTA=26°28'25.6"
TANGENT= 50.574m
EXTERNAL= 5.71m
RADIUS= 215.000m
LENGTH= 99.342m
SUPER ELEV=4.0%
PI=STA 1+056.172
N=316008.8824
E=752855.0174
N=316049.3593
E=752773.4093
TERESA HUNNICUT (696) 4
PATRICK HAR (711) 6
ANTHONY CLARK (1290) 3
MONROE JACKSON (1300) 5
EY, JAMES RUSHTON
TRINITY PLACE
N 7°03'05.1" W
EXISTING R/W
CONST EASEMENT
DRIVEWAY EASEMENT
CURVE #6 PI 5+026.381
CURVE #6 PT 5+033.928
PC 5+018.715 CURVE #6
CURVE #4 PI 1+056.172
END CURB & GUTTER TYPE 2-STA 5+021.315
BEGIN CURB & GUTTER TYPE 2-STA 5+028.051
BEGIN CURB & GUTTER TYPE 2-STA 1+056.164
JEFFERSONVILLE RD-STA 1+087.092
TRINITY PLACE-STA 5+000.000
JEFFERSONVILLE ROAD
SIDEWALK
REQ'D R/W
BUILDING TO BE REMOVE
BEGINNING POINT OF MAINLINE
STA 1+000.000
N=315964.66300
E=752820.37740
MATCHLINE STA. 4+115 SEE SHEET 13-02
MATCHLINE STA. 1+150 SEE SHEET 13-03
BEGIN TAPER STA 1+140
REMOVE
N 24°29'04.1" W
38°04'27.3" E
A-1
A-2
A-3
A-4
A-5
A-7
A-8
PROPERTY LINE AND EXIST R/W
REQUIRED R/W LINE
CONSTRUCTION LIMITS
EASEMENT FOR CONSTRUCTION & MAINTENANCE OF SLOPES
EASEMENT FOR CONSTR OF SLOPES
EASEMENT FOR CONSTR OF DRIVES
BEGIN LIMIT OF ACCESS .BLA
END LIMIT OF ACCESS .ELA
LIMIT OF ACCESS
R/W AND LIMIT OF ACCESS
EXISTING R/W LINE
COUNTY OR STATE LINE
OBLITERATE PAVEMENT
RATIO=1:250
0 5 10 20
SCALE IN METERS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

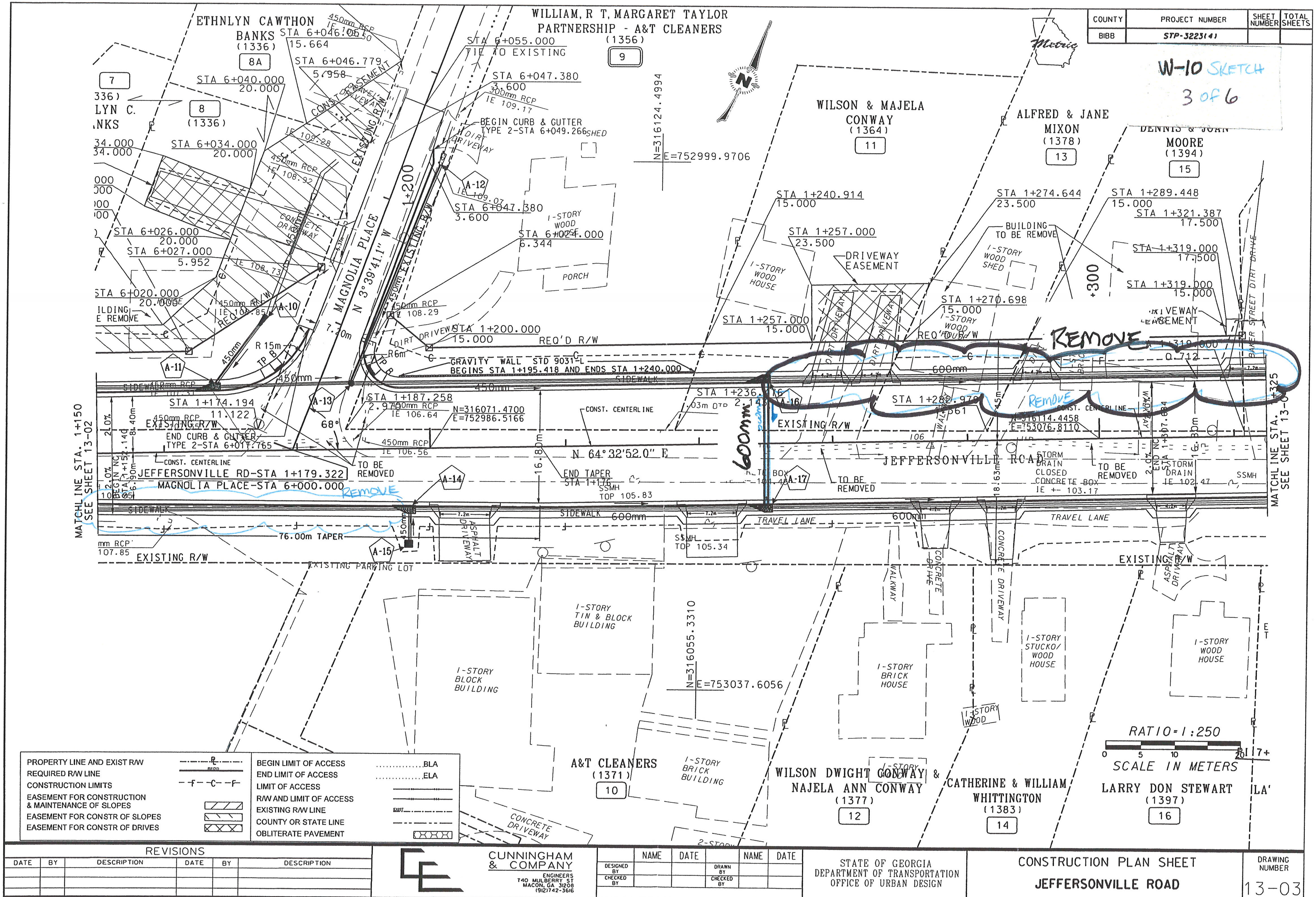
CUNNINGHAM & COMPANY
ENGINEERS
740 MULBERRY ST
MACON, GA 31208
(912)742-3616

	NAME	DATE		NAME	DATE
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

CONSTRUCTION PLAN SHEET
JEFFERSONVILLE ROAD

DRAWING NUMBER 13-02


COUNTY
BIBB
PROJECT NUMBER
STP-3223(4)
SHEET NUMBER
TOTAL SHEETS
Metric
W-10 SKETCH
3 of 6
ETHNLYN CAWTHON BANKS
(1336)
8A
WILLIAM, R T, MARGARET TAYLOR PARTNERSHIP - A&T CLEANERS
(1356)
9
WILSON & MAJELA CONWAY
(1364)
11
ALFRED & JANE MIXON
(1378)
13
DENNIS & JOHN MOORE
(1394)
15
7
8
(1336)
MAGNOLIA PLACE
N 3°39'41.1" W
EXISTING R/W
N=316124.4994
E=752999.9706
STA 6+055.000
TIE TO EXISTING
STA 6+046.779
5.958
STA 6+040.000
20.000
STA 6+047.380
3.600
BEGIN CURB & GUTTER TYPE 2-STA 6+049.266
STA 6+034.000
20.000
STA 6+026.000
20.000
STA 6+027.000
5.952
STA 6+020.000
20.000
STA 6+024.000
6.344
1-STORY WOOD HOUSE
PORCH
SHED
STA 1+240.914
15.000
STA 1+257.000
23.500
DRIVEWAY EASEMENT
STA 1+257.000
15.000
STA 1+274.644
23.500
BUILDING TO BE REMOVED
1-STORY WOOD SHED
STA 1+270.698
15.000
STA 1+289.448
15.000
STA 1+321.387
17.500
STA 1+319.000
17.500
STA 1+319.000
15.000
DRIVEWAY EASEMENT
BAKER STREET DIRT DRIVE
REMOVE
STA 1+200.000
15.000
REQ'D R/W
GRAVITY WALL STD 9031-L
BEGINS STA 1+195.418 AND ENDS STA 1+240.000
SIDEWALK
450mm
600mm
STA 1+174.194
11.122
STA 1+187.258
2.970
N=316071.4700
E=752986.5166
CONST. CENTERLINE
STA 1+236.
STA 1+282.970
N=316114.4458
E=753076.8110
REMOVE
EXISTING R/W
END CURB & GUTTER TYPE 2-STA 6+017.765
JEFFERSONVILLE RD-STA 1+179.322
MAGNOLIA PLACE-STA 6+000.000
N 64°32'52.0" E
JEFFERSONVILLE ROAD
END TAPER STA 1+176
SSMH TOP 105.83
TO BE REMOVED
STORM DRAIN CLOSED
CONCRETE BOX
TO BE REMOVED
STORM DRAIN
SSMH
600mm
REMOVE
76.00m TAPER
EXISTING R/W
EXISTING PARKING LOT
SSMH TOP 105.34
TRAVEL LANE
MATCHLINE STA. 1+150 SEE SHEET 13-02
MATCHLINE STA. 1+325 SEE SHEET 13-04
1-STORY BLOCK BUILDING
1-STORY TIN & BLOCK BUILDING
N=316055.3310
E=753037.6056
1-STORY BRICK BUILDING
1-STORY BRICK HOUSE
1-STORY STUCKO/WOOD HOUSE
1-STORY WOOD HOUSE
CONCRETE DRIVEWAY
A&T CLEANERS
(1371)
10
WILSON DWIGHT CONWAY & NAJELA ANN CONWAY
(1377)
12
CATHERINE & WILLIAM WHITTINGTON
(1383)
14
LARRY DON STEWART
(1397)
16
RATIO = 1:250
SCALE IN METERS
PROPERTY LINE AND EXIST R/W
REQUIRED R/W LINE
CONSTRUCTION LIMITS
EASEMENT FOR CONSTRUCTION & MAINTENANCE OF SLOPES
EASEMENT FOR CONSTR OF SLOPES
EASEMENT FOR CONSTR OF DRIVES
BEGIN LIMIT OF ACCESS ....BLA
END LIMIT OF ACCESS ....ELA
LIMIT OF ACCESS
R/W AND LIMIT OF ACCESS
EXISTING R/W LINE
COUNTY OR STATE LINE
OBLITERATE PAVEMENT
REVISIONS
DATE BY DESCRIPTION DATE BY DESCRIPTION
CUNNINGHAM & COMPANY
ENGINEERS
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MACON, GA 31208
(912)742-3616
NAME DATE
DESIGNED BY
CHECKED BY
DRAWN BY
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN
CONSTRUCTION PLAN SHEET
JEFFERSONVILLE ROAD
DRAWING NUMBER
13-03

COUNTY	PROJECT NUMBER	SHEET NUMBER	TOTAL SHEETS
BIBB	STP-3223(4)		

W-10 SKETCH 4 of 6

Metric

N=316150.8052
E=753074.1418

CHARLES SNEFTALL (1438) 20

NINA LESTER & ANDREW ODON

DONALD MORELEY (1408) 17

PAMELA STRAWS (750) 21

CARL DENERSON (1478)

CARL DENERSON (1460) 23

HIST. PROP.

REMOVE

BUILDING TO BE REMOVE

1-STORY BRICK HOUSE

1-STORY WOOD HOUSE

1-STORY WOOD/BRICK HOUSE

DRIVEWAY EASEMENT

CONST EASEMENT

TEMP EASEMENT

REQ'D R/W

EXISTING R/W

SIDEWALK

DIRT DRIVEWAY

CONCRETE DRIVEWAY

GRAVEL DRIVEWAY

CURVE #5 PI 1+380.476

CURVE #1 PC 1+448.516

PI 8+052.703

BEGIN CURB & GUTTER TYPE 2-STA 8+030.000 TIE TO EXISTING

SUNNYDALE DR N 14°59'35.5" W 7.20m

JEFFERSONVILLE RD-STA 1+348.462
INDIAN CIRCLE=STA 7+000.000

JEFFERSONVILLE RD-STA 1+425.409
SUNNYDALE DR.-STA 8+000.000

N 78°07'25.7" E

INDIAN CIRCLE S 22°20'40.1" E

CURVE DATA:(CL5)
DELTA=13°34'33.5"
TANGENT= 25.591m
EXTERNAL= 1.518m
RADIUS=215.000m
LENGTH= 50.943m
SUPER ELEV=4.0%
PI=STA 1+380.476
N=316149.0310
E=753149.4764

N=316140.1762
E=753131.0134

N=316153.0214
E=753168.8340

N=316113.3871
E=753194.8615

MATCHLINE STA. 1+325 SEE SHEET 13-03

MATCHLINE STA. 1+495 SEE SHEET 13-05

TONYA HALLMAN (1421) 18

GREATER MACON HOUSING CORP & D B A RENAISSANCE HOUSING PARTNERSHIP (1433) 19

WILLIAM & PATRICIA SAUNDERS (1441) 22

VIRGINIA SEABROOKS DANIELY (1457) 24

JESSIE MAE RENFROE (1481) 26

PROPERTY LINE AND EXIST R/W	BEGIN LIMIT OF ACCESS ..... BLA
REQUIRED R/W LINE	END LIMIT OF ACCESS ..... ELA
CONSTRUCTION LIMITS	LIMIT OF ACCESS
EASEMENT FOR CONSTRUCTION & MAINTENANCE OF SLOPES	R/W AND LIMIT OF ACCESS
EASEMENT FOR CONSTR OF SLOPES	EXISTING R/W LINE
EASEMENT FOR CONSTR OF DRIVES	COUNTY OR STATE LINE
	OBLITERATE PAVEMENT

RATIO = 1:250

0 5 10 20

SCALE IN METERS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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	NAME	DATE		NAME	DATE
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

CONSTRUCTION PLAN SHEET
JEFFERSONVILLE ROAD

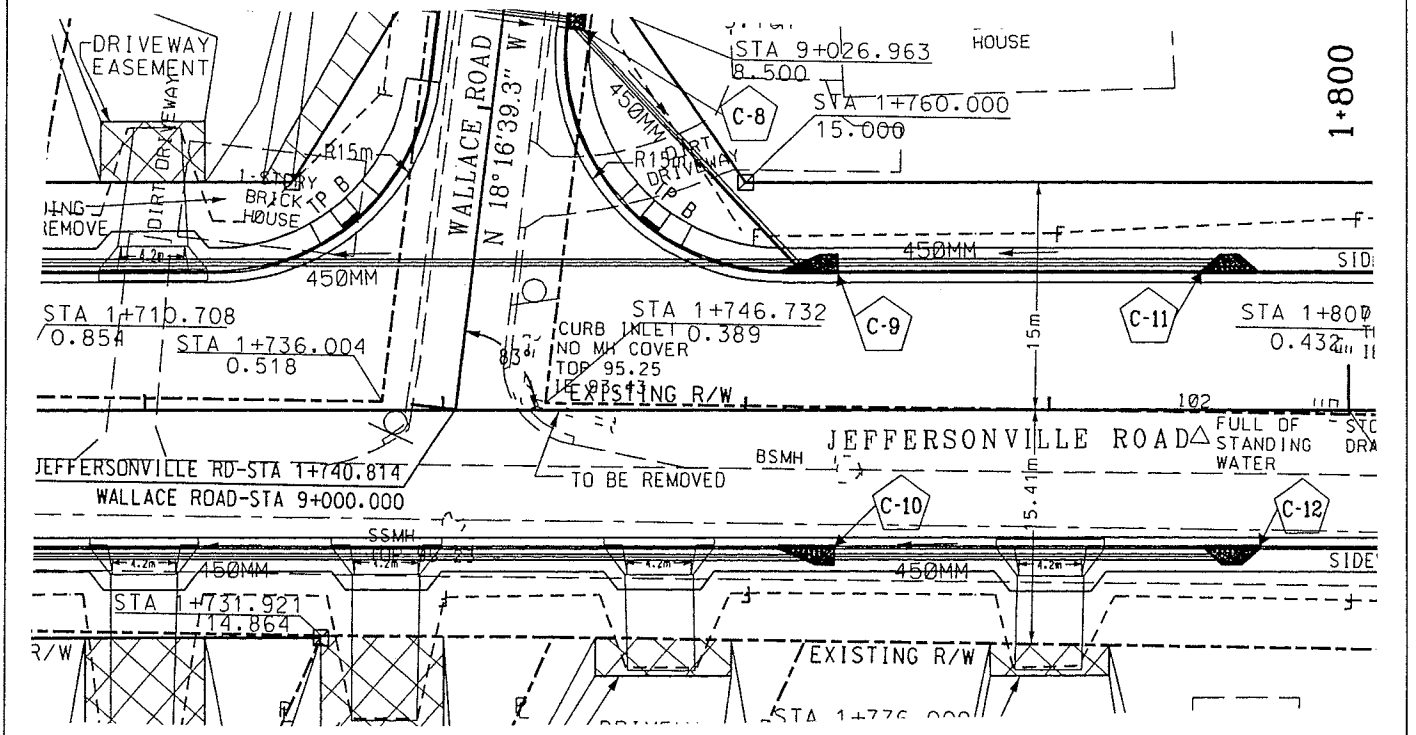
DRAWING NUMBER 13-04

SKETCH

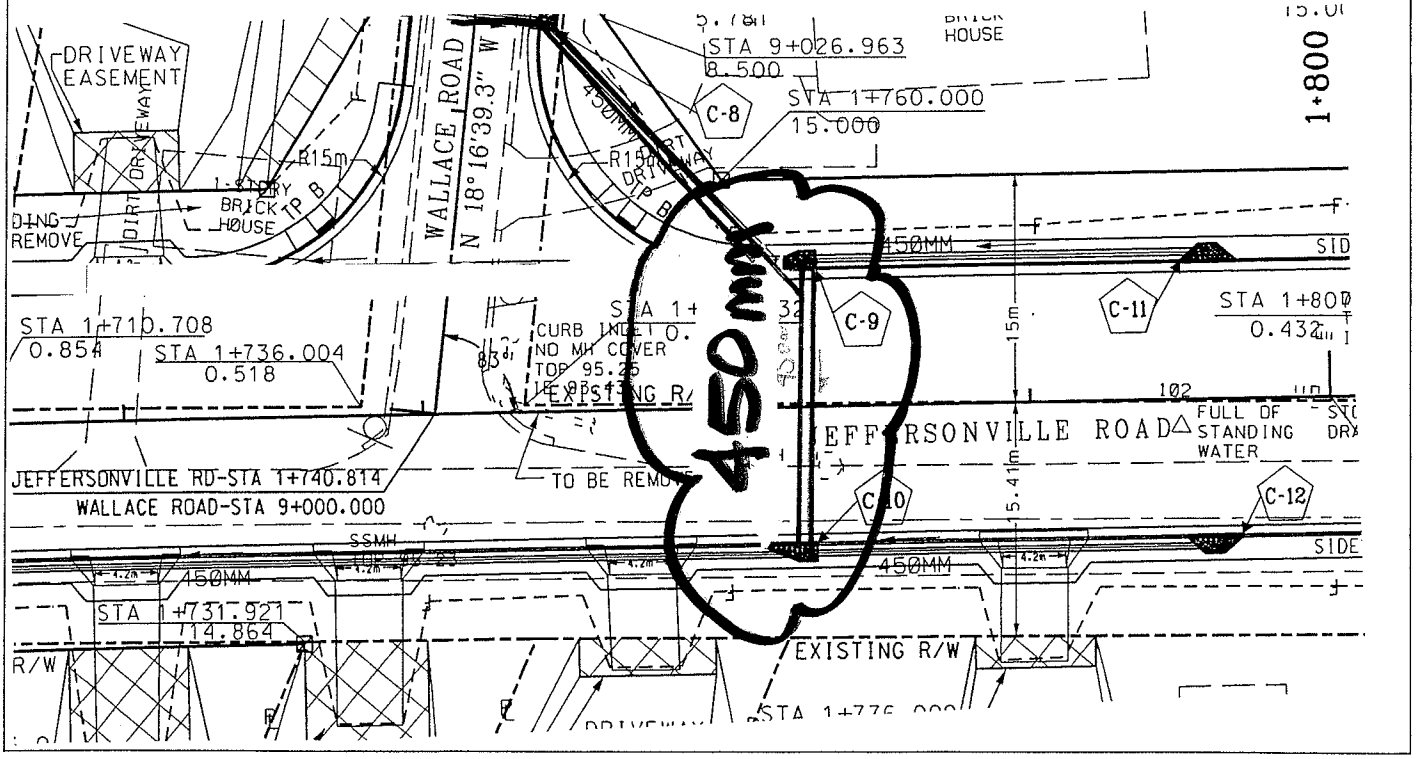
PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: W-10

ORIGINAL DESIGN [X] ALTERNATIVE DESIGN [ ] BOTH [ ] SHEET NO.: 5 of 6



ORIGINAL DESIGN [ ] ALTERNATIVE DESIGN [X] BOTH [ ]



COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **W-10**

SHEET NO.: **6 of 6**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
A-9 to A-14 change to A-9 to A-8	LM	98	143.32	14,045	9	143.32	1,290
(450mm Pipe)							
A-16 to A-18 change to A-16 to A-17	LM	80	180.60	14,448	19	180.60	3,431
(600 mm Pipe)							
C-9 to C4 change to C-9 to C-10	LM	65	143.32	9,316	19	143.32	2,723
(450 mm Pipe)							
Subtotal				37,809			7,444
Markup (%) at 10%				3,781			744
TOTAL				41,590			8,188

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **W-11**

DESCRIPTION: **AT STA 1+550 USE A SINGLE 1050MM STORM PIPE IN LIEU OF DOUBLE 650MM/750MM PIPES AT STA 1+550**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (sketch attached)

The existing 650mm and 750mm pipes will be extended to the fill slope and four manholes added for connections along with two flared end sections.

ALTERNATIVE: (sketch attached)

Remove the existing 650mm and 750mm pipes and replace them with a single 1050mm pipe with two flared end sections and one manhole connection.

ADVANTAGES:

- Reduces material and construction cost
- Reduces number of manholes
- Less backfill needed

DISADVANTAGES:

- Need to check for adequate cover
- Existing pipes need to be removed
- Two larger flared end sections will be needed along with erosion protection

DISCUSSION:

Hydraulics will need to be reviewed on the larger pipe to verify the availability of adequate cover, slope, and erosion protection at the flared ends.

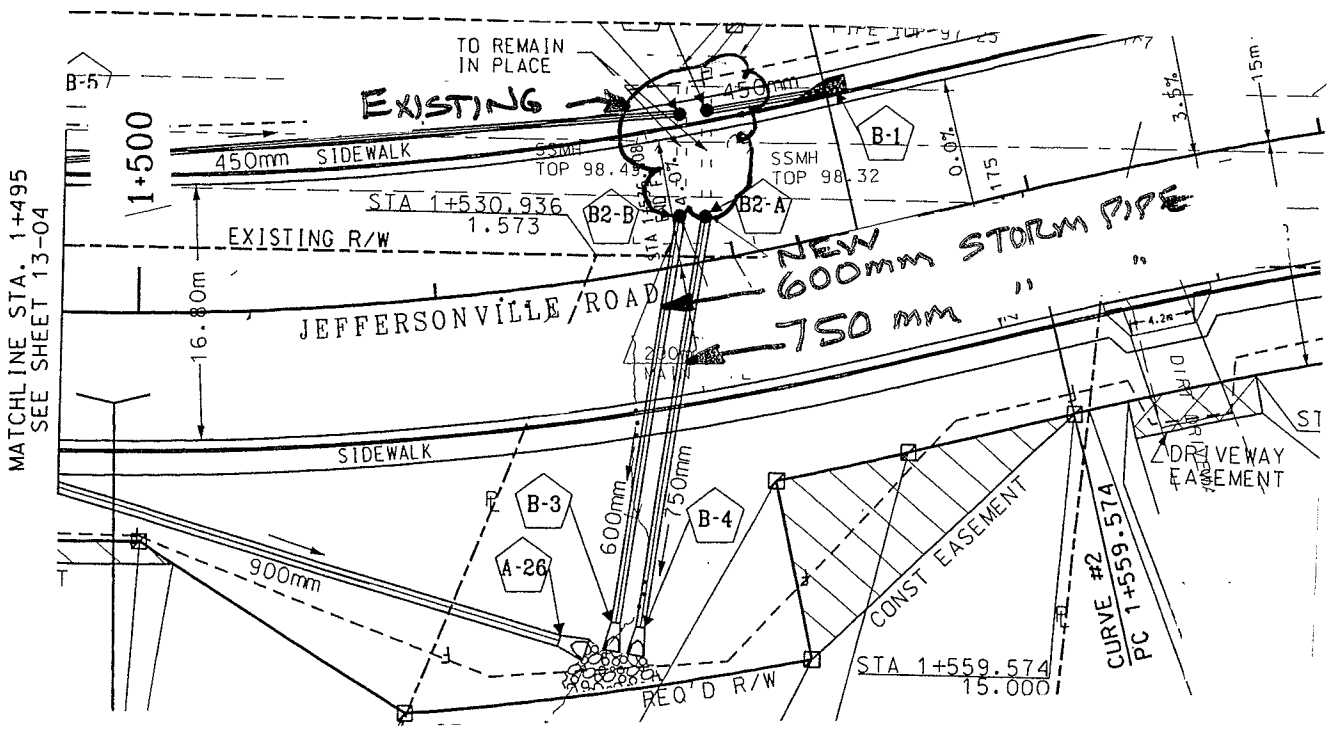
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 23,416	—	$ 23,416
ALTERNATIVE	$ 19,665	—	$ 19,665
SAVINGS	$ 3,751	—	$ 3,751

SKETCH

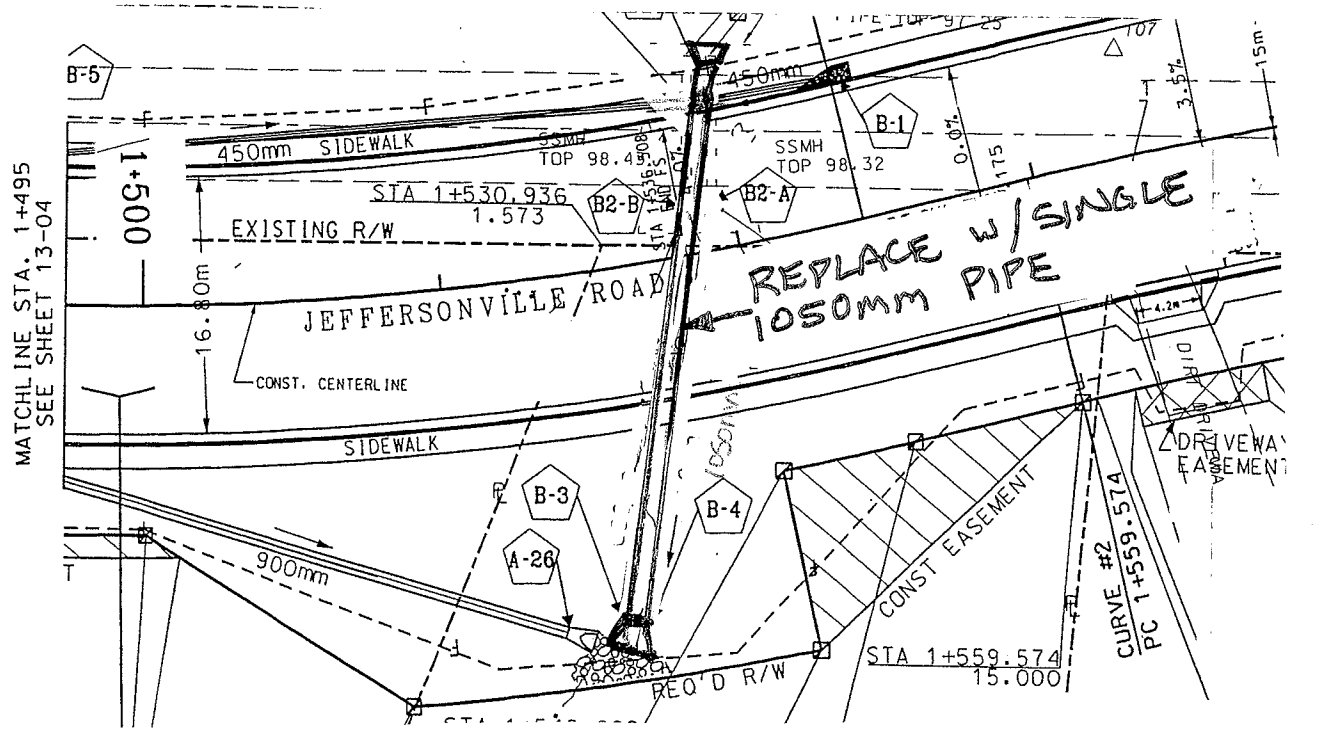
PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: W-11

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 2 of 3



ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐



COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **W-11**

SHEET NO.: **3 of 3**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
450 mm Manhole	ea	2	2,800.00	5,600			
600mm Manhole	ea	1	2,800.00	2,800			
750mm Manhole	ea	1	2,800.00	2,800			
1050mm Manhole	ea				1	2,800.00	2,800
450mm Flared End Section	ea	1	453.75	454			
600mm Flared End Section	ea	1	562.92	563			
1050mm Flared End Section	ea				2	1,558.18	3,116
450mm Pipe	LM	28	143.32	4,013			
600mm Pipe	LM	28	180.60	5,057			
1050mm Pipe	LM				36	332.26	11,961
Subtotal				21,287			17,877
Markup (%) at 10%				2,129			1,788
TOTAL				23,416			19,665

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** *P.I. Nos. 342080, 351095, 351080, 000835, 351090* ***Bibb County, Georgia – Preliminary Engineering Submittal***	ALTERNATIVE NO.: **W-13**
DESCRIPTION:	**INCREASE WIDTH OF FLUSH MEDIAN FROM 3.6M TO 4.2M TO BE CONSISTENT WITH PROJECTS P.I. 351080 AND P.I. 351095**	SHEET NO.: **1 of 1**

ORIGINAL DESIGN: (sketch attached)

The original design proposes a 3.6m-wide flush median.

ALTERNATIVE: (sketch attached)

Use a 4.2m-wide flush median in lieu of the 3.6m to match the adjacent project.

ADVANTAGES:

- Wider center turn lane
- Safer turning maneuver

DISADVANTAGES:

- Additional 0.6m-wide strip of pavement
- Increases project cost by approximately $30,000

DISCUSSION:

The 3.6m-wide median is only used on project STP-3223(4). This design suggestion would increase the median 4.2 meters to provide for a safer turning movement from the center turn lane (flush median). The suggestion would increase the cost for 0.6m of pavement.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN			
ALTERNATIVE	DESIGN SUGGESTION		
SAVINGS			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-1**

DESCRIPTION: **REDUCE LENGTH OF LYNHAVEN ROAD IMPROVEMENTS BY 40M AND END AT STA 9+020 INSTEAD OF 9+060**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (sketch attached)

Install 45 meters of curb and gutter on each side of Lynhaven Road. Also construct AC pavement 4 meters beyond the curb return and install extensions to the existing drainage system. Acquire nearly 3,000 sf of construction easement. Improvements extend to STA 9+060.

ALTERNATIVE: (sketch attached)

Eliminate asphalt pavement and curb/gutter beyond the curb return. Redesign the drainage system by eliminating two catch basins. Do not acquire the construction easement. Extend improvements only to STA 9+020.

ADVANTAGES:

- Reduces project cost
- Less disruption in area
- Reduces right-of-way

DISADVANTAGES:

- Less improvements to side road

DISCUSSION:

Lynhaven Road is a small side street with negligible traffic. Eliminating some of the proposed improvements will have no impact on the vehicle movement on Jeffersonville Road.

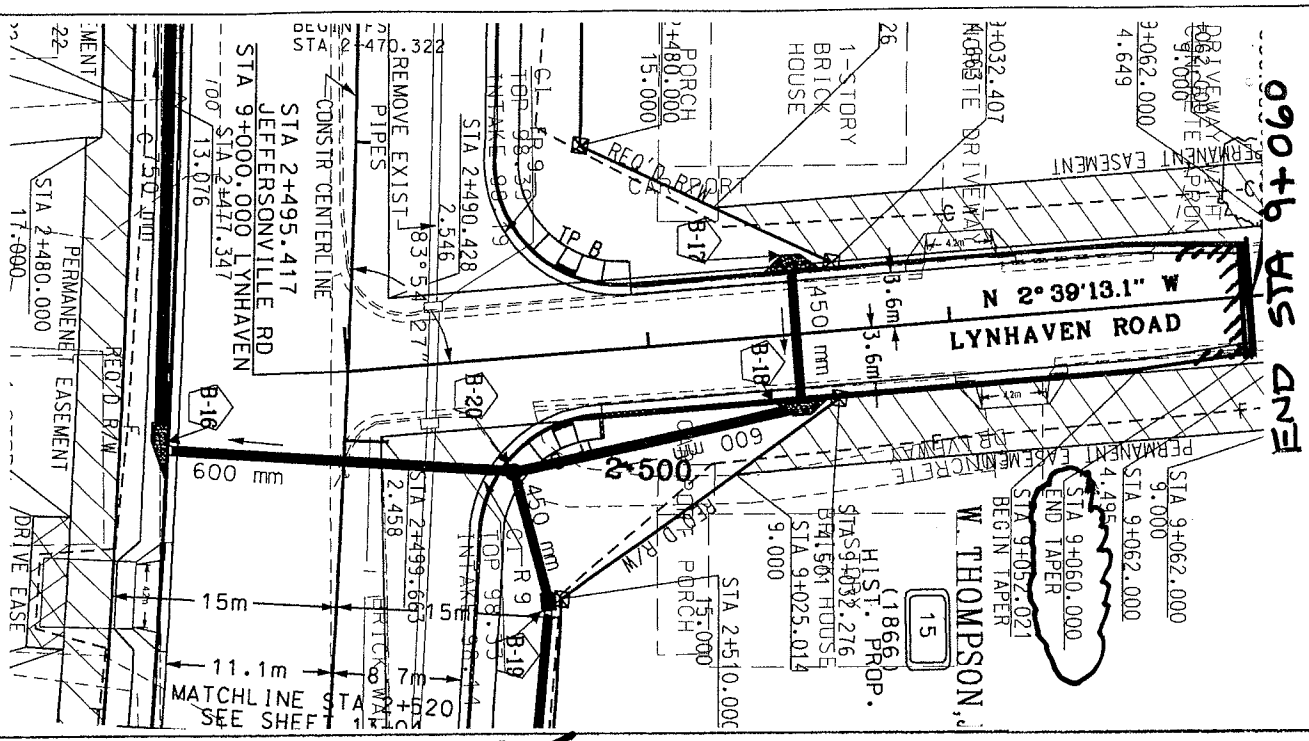
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 32,092	—	$ 32,092
ALTERNATIVE	$ 2,713	—	$ 2,713
SAVINGS	$ 29,379	—	$ 29,379

SKETCH

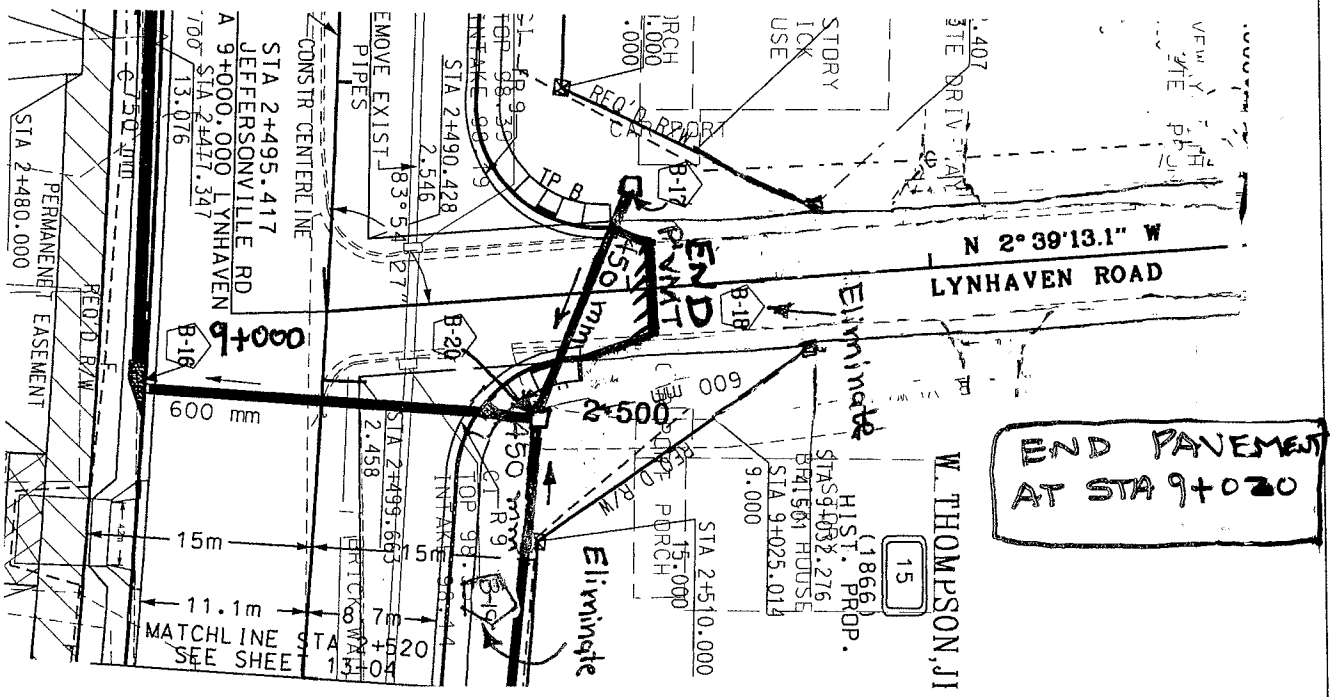
PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: M-1

ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 2 of 4



ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐



PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: M-1

SHEET NO.: 3 of 4

Side Road ~~Asphalt~~ Concrete Pavement:

1.5" of 12.5 mm A.C. concrete → 90 kg
= 0.09 MG x $125 = 11.25/m²

2.0" of 19 mm A.C. concrete → 120 kg
= 0.12 MG x $71.41 = 8.57/m²

3.0" of 25 mm A.C. concrete → ~~1~~80 kg
= 0.~~1~~8 MG x $66.51 = $11.97/m²

12" of G.A.B. $17.01 = $17.01/m²

Total: $48.80/SM

Pavement Area: 40m x 7.2m = 288 m² – Remove
Curb & Gutter: 45 + 45 = 90 LF – Remove
Catch Basins: 2 Each – Remove
450 mm RCP: 7 m – 15 m – 10 m = -18 m (Add 18 m of 450 mm pipe)
600 mm RCP: 20 m – 2 m = 18 m (Remove 18 ~~mm~~ m of 600 mm RCP)

Easements: $\left(\frac{36+30}{2} \times 4\right) 2$ = 264 m² or **2,840 sf**

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION** ALTERNATIVE NO.: **M-1**

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia - Preliminary Engineering Submittal

SHEET NO.: **4 of 4**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
A.C. Pavement	M2	288	48.80	14,054			
Curb and Gutter	LM	90	45.91	4,132			
Catch Basins	EA	2	2,765.62	5,531			
450 mm RCP	LF				18	136.98	2,466
600 mm RCP	LF	18	169.80	3,056			
Sub-Total				26,773			
10% Markup				2,677			247
Total Construction Cost				**29,450**			**2,713**
Residential Property							
Construction Easement	SF	2,840	0.38	1,065			
R/W Markup = 148%				1,576			
Total R/W Cost				**2,641**			
Subtotal				32,092			2,713
Markup (%) at	**Included**						
TOTAL				32,092			2,713

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-2**

DESCRIPTION: **REDUCE WIDTH OF SIDE STREET LANES ON ARTIC CIRCLE, ROYSTER ROAD, ROSEVIEW CIRCLE, KELLY DRIVE, AND ROSEVIEW CIRCLE FROM 3.6M TO 3.3M**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (sketch attached)

Design and construct all side roads to be 3.6 meters wide each way.

ALTERNATIVE: (sketch attached)

Reduce side road width to 3.3 meters both ways from curb return inwards.

ADVANTAGES:

- Reduces construction cost
- Minimizes local impacts

DISADVANTAGES:

- Drawing plan and section would need to be changed

DISCUSSION:

The width of the existing side roads varies from 6 meters to 6.6 meters. Increasing the width of these side roads to 7.2 meters (3.6 + 3.6) will not add significant value to the overall goal of the project.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 11,595	—	$ 11,595
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 11,595	—	$ 11,595

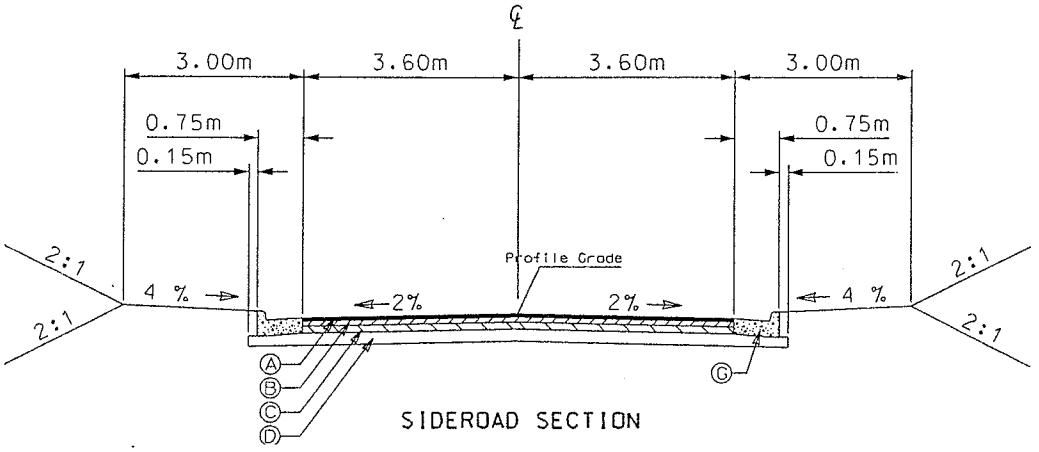
SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: M-2

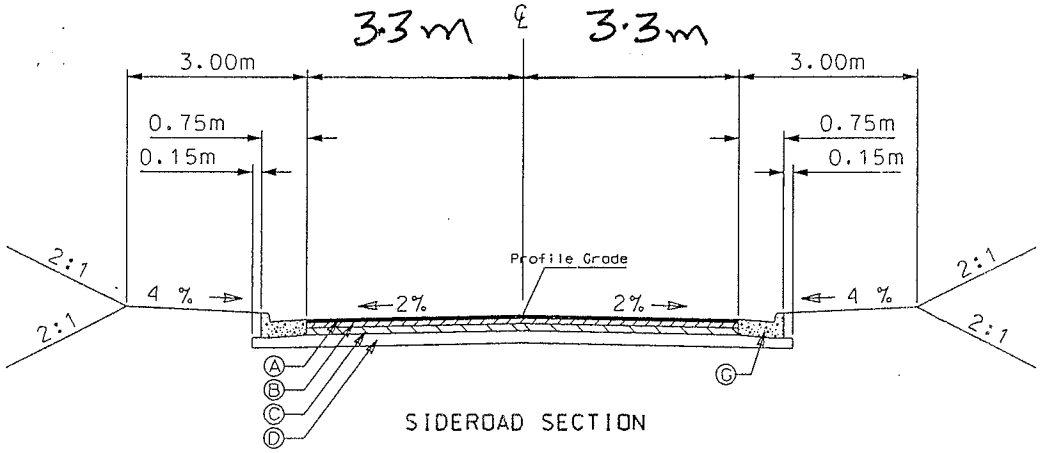
ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐

SHEET NO.: 2 of 5



SIDEROAD SECTION

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐



SIDEROAD SECTION

SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: M-2

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐

SHEET NO.: 3 of 5

JEFFERSONVILLE ROAD - PI 342080

ARTIC CIRCLE = 20m.
LYNHAVEN ROAD = 70m
ROYSTER ROAD - N/C
ROSEVIEW CIRCLE = 45m

TOTAL JEFFERSONVILLE SIDEROADS = 81m²

KELLY DRIVE = 50m
LYNHAVEN ROAD = 70m
STROZIER ROAD = 90m
BRISTAL ROAD = 30m
ROSEVIEW CIRCLE = 55m

TOTAL MILLERFIELD SIDEROADS = 135m²

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: M-2

SHEET NO.: 4 of 5

Side Road Asphalt Concrete Pavement:

1.5" of 12.5 mm A.C. concrete → 90 kg
= 0.09 MG x $125 = $11.25/m²

2.0" of 19 mm A.C. concrete → 120 kg
= 0.12 MG x $71.41 = $8.57/m²

3.0" of 25 mm A.C. concrete → 180 kg
= 0.18 MG x $66.51 = $11.97/m²

12" of G.A.B. = [illegible] x $17.01 = $17.01/m²

Total: $48.80 /m²

✱Artic Circle: 10+10 = 20m ✱Lynhaven Road: 35+35 = 70m
✱Royster Road is already 3.6 m wide each way. No change here
✱Roseview Circle: 25+20 = 45m ✱No change on Recreation Drive

Total length on Jeffersonville side roads: 20+70+45 = 135 m.
Pavement Area Saved: 135 x (3.6 - 3.3 + 3.6 - 3.3) = 81 m²

✱Kelly Drive: 25 m + 25m = 50 m ✱Strozier Road: 45 + 45 = 90 m
✱Roseview Circle: 30m + 25m = 55m ✱Bristol Road: 15 + 15 = 30 m
No change on New Clinton Road due to its geometry

Total length on Millerfield Road: 50 + 90 + 55 + 30 = 225 m
Pavement Area Saved: 225 x (0.3 + 0.3) = 135 m²

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION** ALTERNATIVE NO.: **M-2**

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia - Preliminary Engineering Submittal

SHEET NO.: **5 of 5**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
A.C. Pavement Section	M2	81	48.80	3,953			
(Jeffersonville Side Roads)							
A.C. Pavement Section	M2	135	48.80	6,588			
(Millerfield Side Roads)							
Subtotal				10,541			
Markup (%) at 10%				1,054			
TOTAL				11,595			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-3**

DESCRIPTION: **USE A THREE-LANE ROADWAY WITH AUXILIARY LANES AT SELECTED LOCATIONS IN LIEU OF A FOURTH LANE ON JEFFERSONVILLE ROAD, EAST OF MILLERFIELD ROAD. PURCHASE ONLY THREE LANES OF RIGHT-OF-WAY AT THE PRESENT TIME.**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (sketch attached)

The original design is widening Jeffersonville Road to a five-lane urban roadway.

ALTERNATIVE: (sketch attached)

Widen to a three-lane roadway with an auxiliary lane at selected locations east of Millerfield Road.

ADVANTAGES:

- Lower construction cost
- Reduces right-of-way
- Less environmental impacts
- Less construction time

DISADVANTAGES:

- Less traffic capacity than five-lane section
- Lower level of service provided
- Future widening to five lanes would be needed

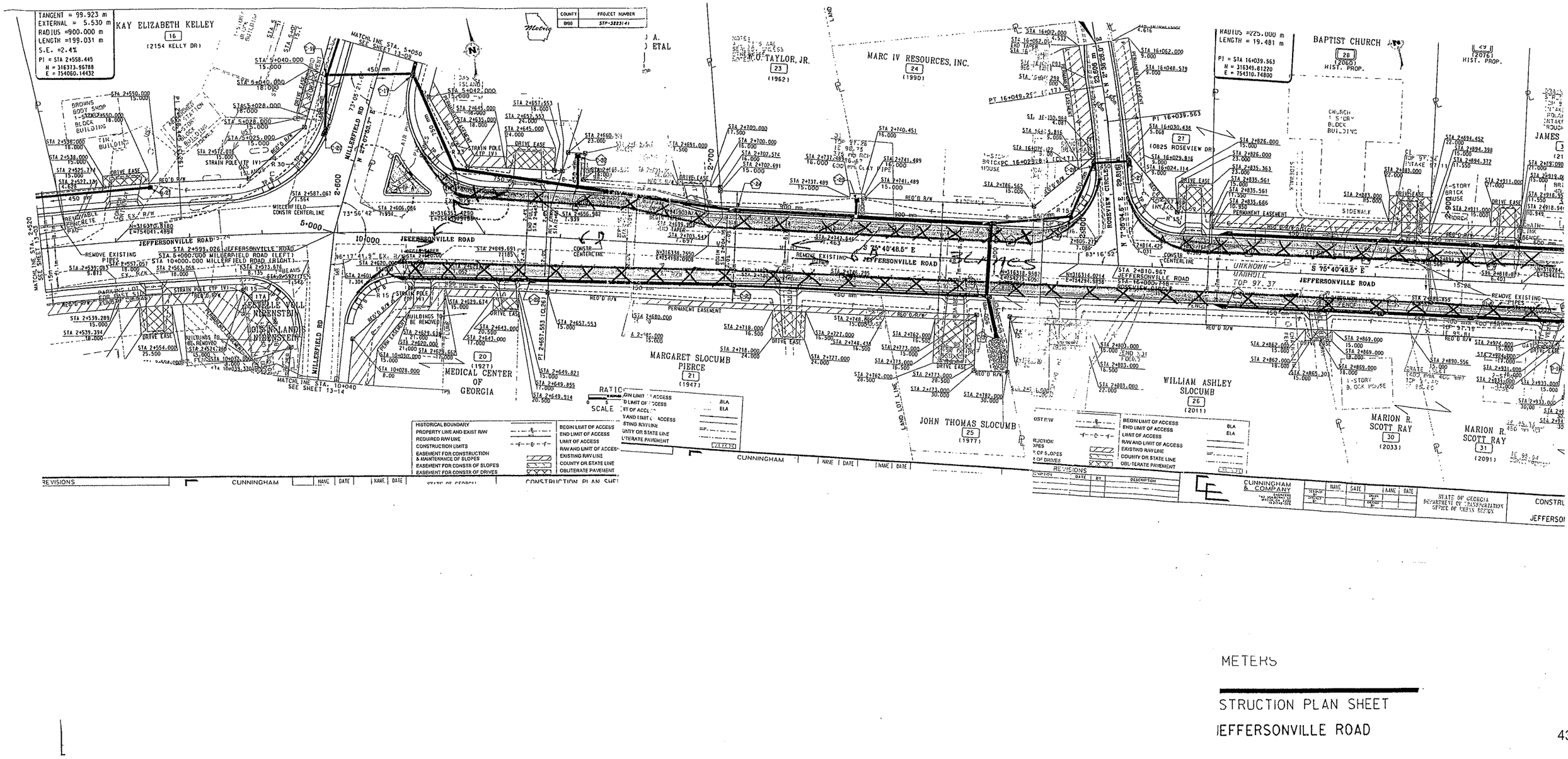
DISCUSSION:

The original design provides a five-lane section based on projected traffic. However, a large portion of the traffic is turning onto Millerfield Road from the west, heading north on Millerfield Road. Since the traffic on Jeffersonville Road "drops off" east of the intersection with Millerfield Road, the alternative proposes to use a three-lane section with an auxiliary lane at selected locations as needed. After studying the project, the auxiliary lanes would be deceleration and acceleration lanes (right turns off and onto Jeffersonville Road) at Millerfield Road and Recreation Road. The typical section would still be an urban section design on a reduced right-of-way width. The required right-of-way would be reduced from 30 meters to 24 meters.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 650,113	—	$ 650,113
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 650,113	—	$ 650,113

Sketch 2/5

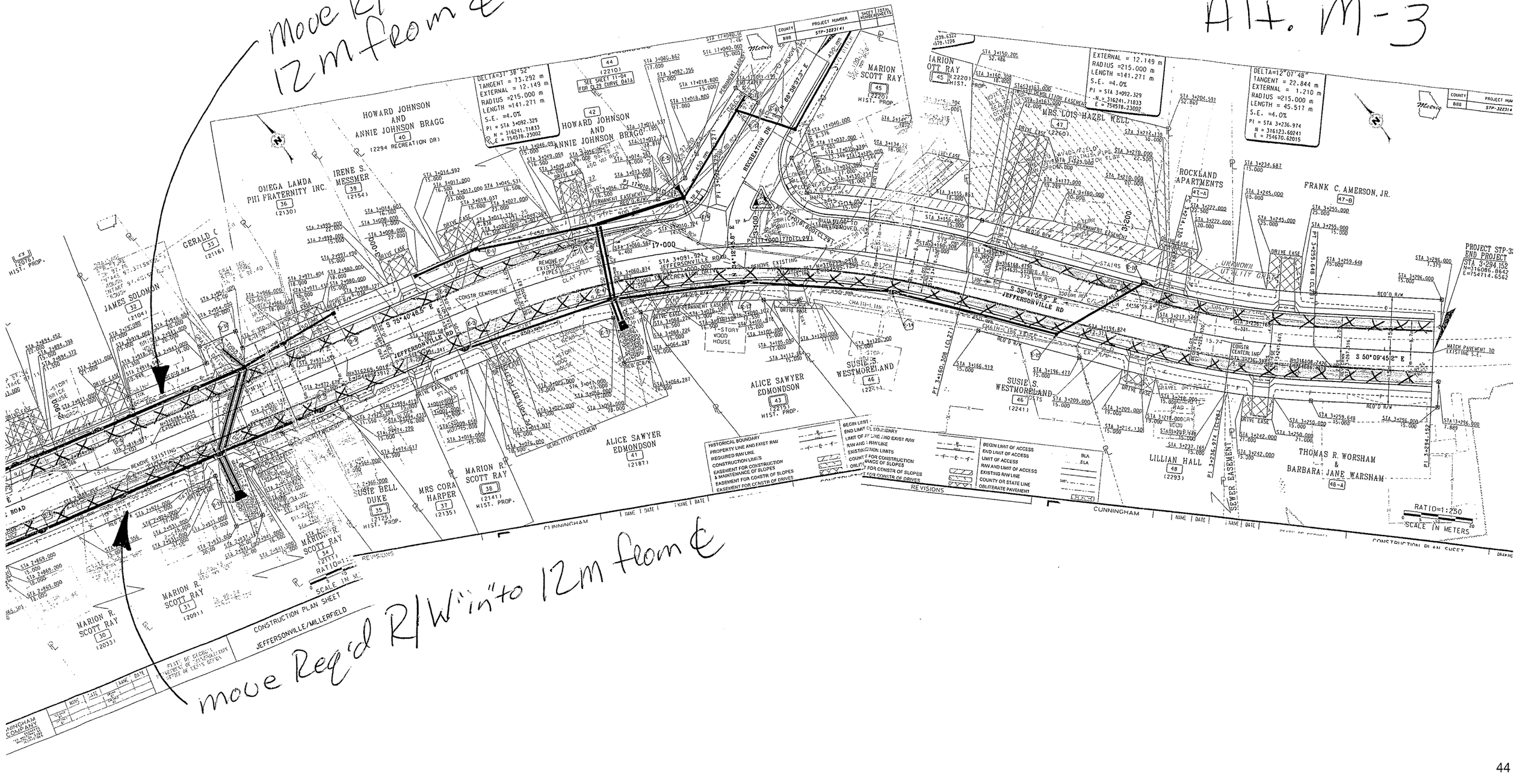
Alt. M-3



Move R/W in" to 12m from ℄.

Sketch 3/5

Alt. M-3



move Req'd R/W in to 12m from ℄

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: **M-3**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

SHEET NO.: **4 of 5**

Original Design cost savings by implementing Alternate M-3 Design:

- Pavement area saved: 3.3m x 2 lanes x 664m = 4,383m2
- Earthwork excavation saved: 3.3m x 2 lanes x 664m x 1.5m = 6,600m3
- Cross-drain pipe saved: 22m of 450mm; 22m of 900mm; 15m of 1050mm

Total R/W saved: (6m x 664m) 10.76ft2/m2 = 42,868ft2

(17,147ft2 40% commercial; 25,721ft2 60% Residential) 1 relocation saved = $40,000/parcel

Pavement unit cost $/m2:

12.5mm -	90kg/m2 x MG/1000kg x $125/MG =	$11.25/m2
19mm -	120kg/m2 x MG/1000kg x $71.41/MG =	$8.57/m2
25mm -	180kg/m2 x MG/1000kg x $66.51/MG =	$11.97/m2
300mm	GAB =	$17.01/m2
	Total Pavement section unit cost =	**$49.00/m2**

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-3**

SHEET NO.: **5 of 5**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Original Costs Saved							
Full-depth Pavement	m2	4,383	49.00	$214,767			
Earthwork saved	m3	6,600	12.11	$79,926			
450mm pipe	m	22	136.98	$3,014			
900mm pipe	m	22	264.14	$5,811			
1050mm pipe	m	15	332.26	$4,984			
Construction Markup	10%	308,502	0.10	$30,850			
R/W saved - Commercial	sf	17,147	3.85	$66,016			
R/W saved - Residental	sf	25,721	0.75	$19,291			
Relocation saved	ea	1	40,000.00	$40,000			
R/W Markup	148%	125,307	1.48	$185,454			
Subtotal				$650,113			
Markup (%) at				incl above			
TOTAL				$650,113			

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
MIDDLE SEGMENT (M) (cont.) • ***BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek*** • ***STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300;*** • ***Millerfield Rd. – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820***						
M-4	Reduce the sidewalk width on the bridge over Walnut Creek from 1.8m to 1.7m.	$4,194	$0	$4,194	$0	$4,194
M-7	Build 3-lane roadway with rural ditch section on Jeffersonville, east of Millerfield Rd., but purchase 5-lanes of right-of-way.	$553,045	$41,627	$511,418	$0	$511,418
M-12	Modify the drainage piping configuration and use more cross drains in lieu of parallel lines.	$34,001	$16,638	$17,363	$0	$17,363
M-13	On Millerfield Rd., eliminate the ditch from STA 10+025 to 10+140, reduce the extent of pavement from STA 10+140 to STA 10+080, and reduce the right of way.	$100,552	$0	$100,552	$0	$100,552
EAST SEGMENT (E) • ***STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828*** • ***STP00-0000-00(835), P.I. No. 000835 - Norfolk Southern Railway Bridge Over Jeffersonville Road***						
E-2	Reduce lane width on the side roads, Morningside Dr., McCall Rd., Lakeside Rd., from 3.6m to 3.3m.	$4,041	$0	$4,041	$0	$4,041
E-7	Modify the drainage piping configuration and eliminate some of the parallel lines.	$108,653	$70,564	$38,089	$0	$38,089
E-8	Use a 3-lane roadway with auxiliary lanes at selected locations in lieu of a 4th lane on Jeffersonville Rd., shorten the railroad bridge, but only purchase 3-lanes of right of way.	$1,500,602	$0	$1,500,602	$0	$1,500,602

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-4**

DESCRIPTION: **REDUCE SIDEWALK WIDTH ON THE BRIDGE OVER WALNUT CREEK FROM 1.8M TO 1.7M**

SHEET NO.: **1 of 4**

6ORIGINAL DESIGN:

The original design provides a 1.8m-wide sidewalk on each side of the Walnut Creek Bridge.

ALTERNATIVE: (sketch attached)

Provide a 1.7m-wide sidewalk on each side of the bridge.

ADVANTAGES:

- Reduces construction cost for the bridge
- Reduces sidewalk dead and live load

DISADVANTAGES:

- Need to revise section

DISCUSSION:

The current GDOT Bridge and Structures Design Policy Manual calls for sidewalks to be 1.7 meters wide.

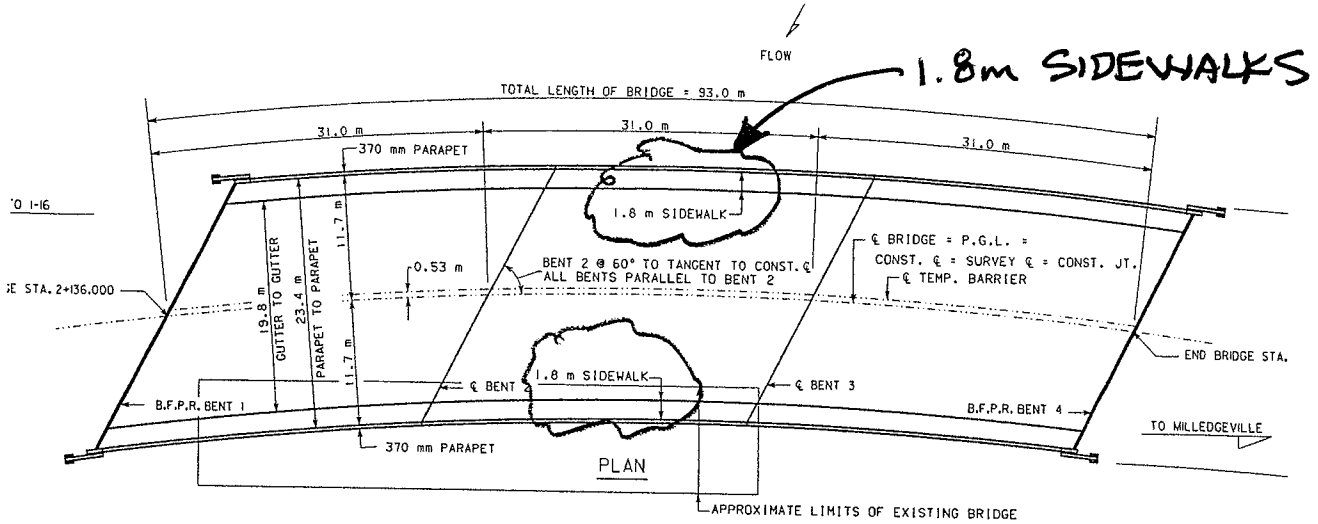
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,194	—	$ 4,194
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 4,194	—	$ 4,194

SKETCH

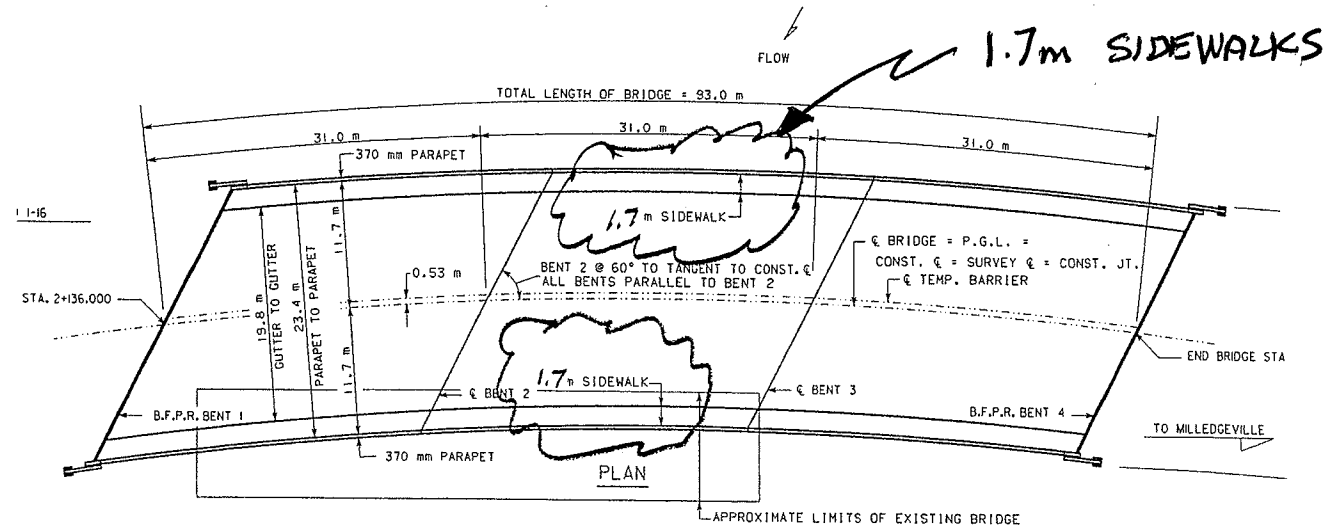
PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: M-4

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 2 of 4



ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐



BRIDGE PLAN

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: **M-4**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

SHEET NO.: **3 of 4**

COST ASSUMPTIONS

- Bridge Length = 93.0m
- Bridge Width = 23.4m + 0.370m + 0.370m = 24.14m
- Reduced area of sidewalk = 93m (2)(1.8 – 1.7) = 18.6 m^2
- The bridge unit price in the estimate = \$2,295,694/[93.0m(24.14m)] = \$1,023/m^2
- Since the number of beams will not be reduced and there will be only a negligible decrease in the substructure cost, use 20% of the bridge cost for the reduction
- **Unit cost = 0.20(1023) = \$205/m^2** <<<<<<<

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-4**

SHEET NO.: **4 of 4**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Bridge Area Reduction	M2	19	205.00	3,813			
Subtotal				3,813			
Markup (%) at 10%				381			
TOTAL				4,194			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-7**

DESCRIPTION: **BUILD THREE-LANE ROADWAY WITH RURAL DITCH SECTION ON JEFFERSONVILLE, EAST OF MILLERFIELD ROAD, BUT PURCHASE FIVE-LANES OF RIGHT-OF-WAY**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (sketch attached)

Widen the existing two-lane road to a five-lane section including urban shoulder with curb and gutter.

ALTERNATIVE: (sketch attached)

Build a three-lane project with a rural ditch section in lieu of curb and gutter east of Millerfield Road. Purchase enough right-of-way for the future urban five-lane section.

ADVANTAGES:

- Reduces construction cost
- Reduces construction time
- Preserves right-of-way for a future five-lane roadway
- Less maintenance of traffic due to reduced number of cross drains

DISADVANTAGES:

- Less traffic capacity initially
- Lower level of service
- Requires a second project in the future

DISCUSSION:

This alternative builds only three lanes with a ditch section on five lanes of right-of-way. The five lanes of right-of-way will provide enough area for the outside ditch section and preserve the right-of-way for the future five-lane widening project. Also a ditch section would initially save the urban drainage cost (longitudinal pipe and drainage structures). A future five-lane widening project would include the urban drainage system. West of Millerfield Road, Jeffersonville Road would require the proposed five-lane section now because of the higher traffic volumes. It will not be a problem ending the urban drainage system at this location since Jeffersonville Road is at a crest at this intersection. For the cost comparison, the three-lane ditch section includes the cost for side drain pipes under each driveway.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 553,045	—	$ 553,045
ALTERNATIVE	$ 41,627	—	$ 41,627
SAVINGS	$ 511,418	—	$ 511,418

Alt. M-7

Sketch

2/5

keep Pipe

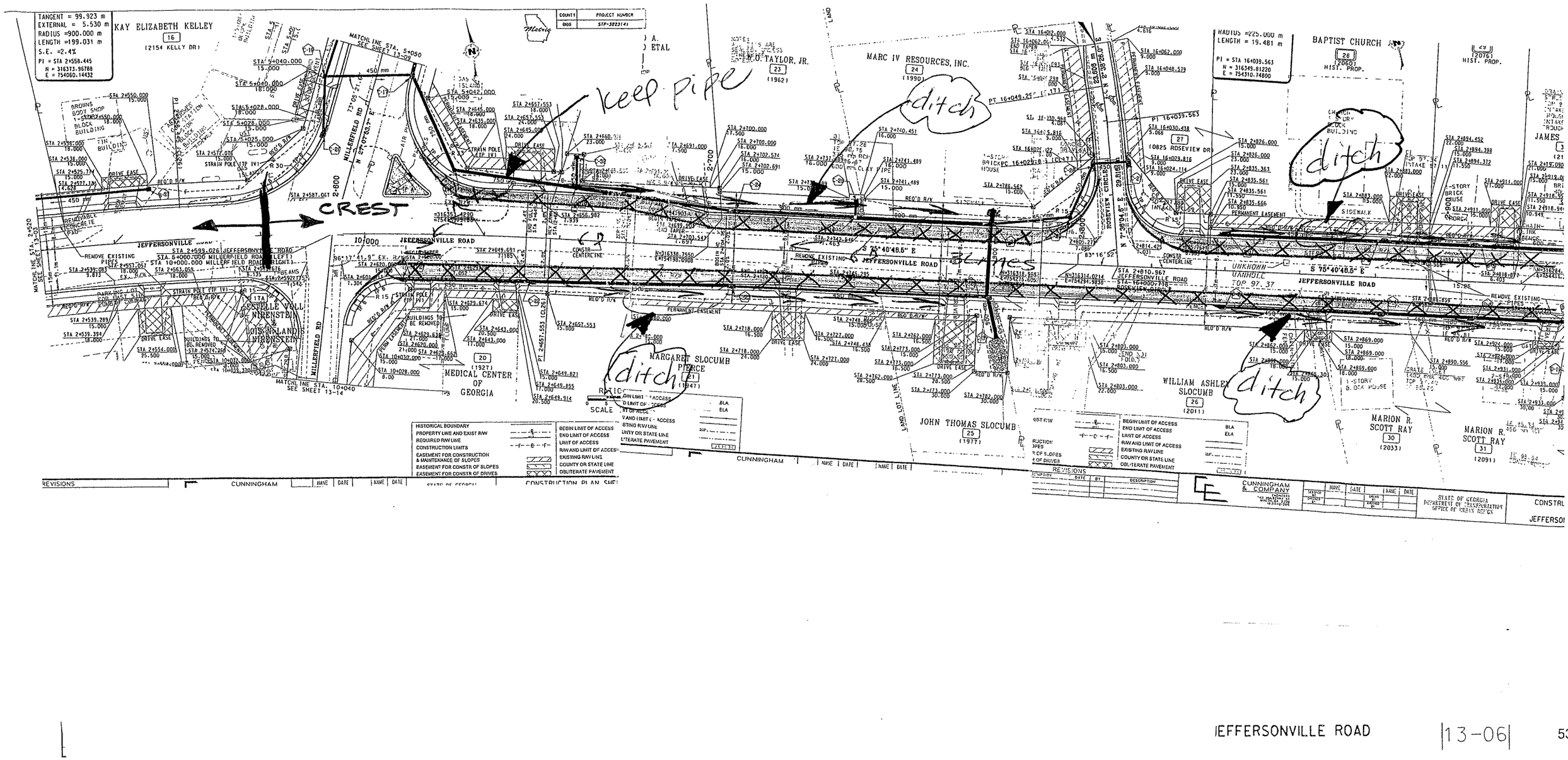
ditch

CREST

ditch

ditch

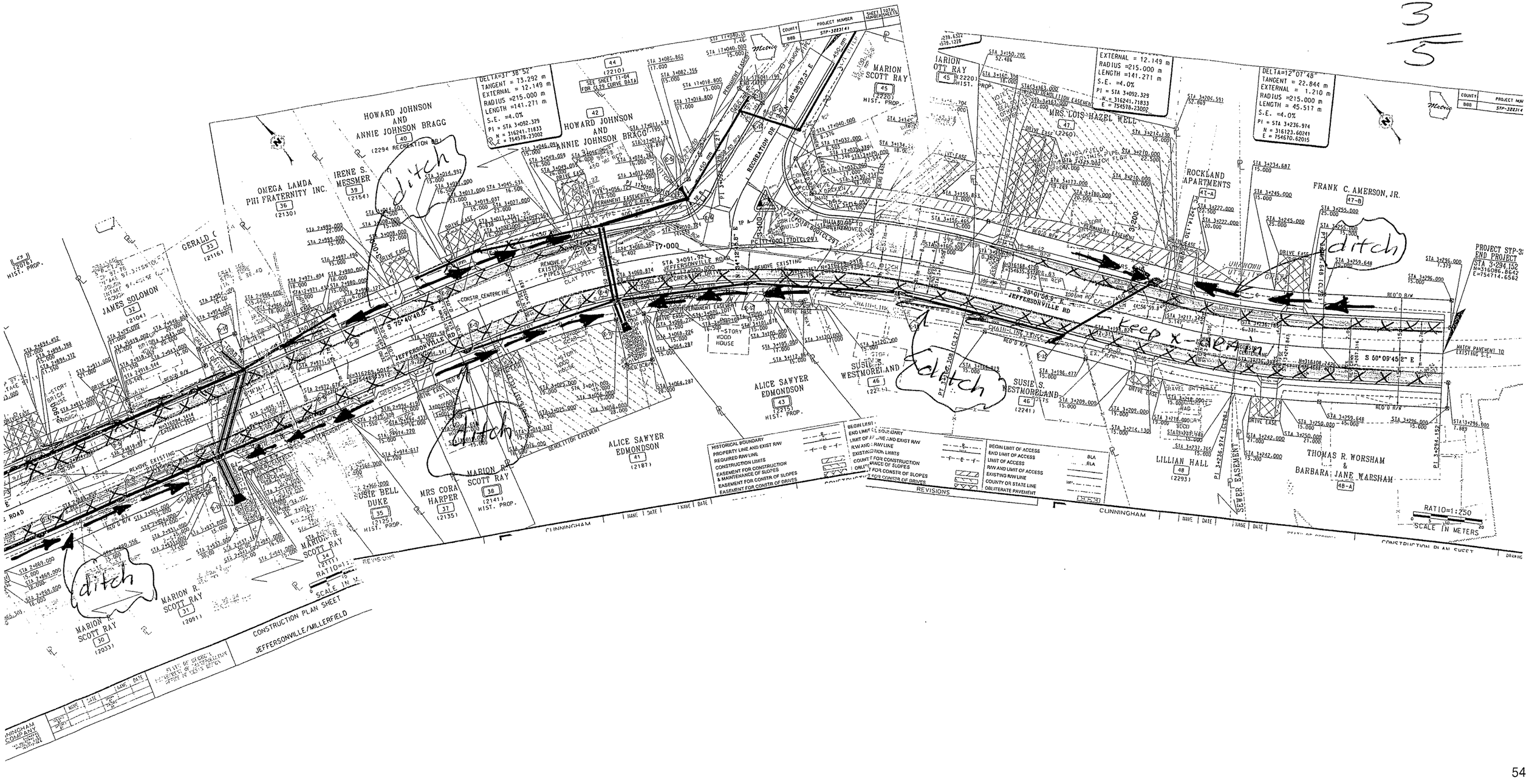
Names



AH. M-7

Sketch

3/5



PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: **M-7**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

SHEET NO.: **4 of 5**

Original Design cost savings by implementing Alternate M-7 Design:

Pavement area saved: 3.6m x 2 lanes x 664m = **4,781m2**

Urban drainage saved:
Longitudinal Pipe:

- 620m of 450mm pipe
- 90m of 600mm pipe
- 50m of 750mm pipe
- 120m of 900mm pipe

Drainage structures (catch basins and manholes) 26 each saved

Length of curb and gutter saved: 664m x 2 sides = 1,328m

Earthwork would be approximately the same since there would be less because of building only 3-lanes, but there would be more because of the rural ditch section and some ditch protection..

Alternate Design added cost for driveway side drain pipes.

9 drives x 13m = 117m of 450mm pipe; 18 each flared end sections – 450mm

4 drives x 13m = 52m of 600mm 8 each flared end sections – 600mm

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-7**

SHEET NO.: **5 of 5**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Original Cost saved							
Full-depth Pavement	m2	4,781	48.80	$233,313			
450mm pipe	m	620	136.98	$84,928			
600mm pipe	m	90	169.80	$15,282			
750mm pipe	m	50	231.31	$11,566			
900mm pipe	m	120	264.14	$31,697			
Less Drainage Structures	ea	26	2,500.00	$65,000			
less Curb & Gutter	m	1,328	45.92	$60,982			
Alternate Added side drain pipe							
450mm pipe	m				117	136.98	$16,027
600mm pipe	m				52	169.80	$8,830
450mm - flared end section	ea				18	409.00	$7,362
600mm - flared end section	ea				8	703.00	$5,624
Subtotal				502,768			37,843
Markup (%) at 10%				50,277			3,784
TOTAL				553,045			41,627

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-12**

DESCRIPTION: **MODIFY DRAINAGE PIPING CONFIGURATION AND USE MORE CROSS DRAINS IN LIEU OF PARALLEL LINES**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (sketch attached)

The storm drain piping layout consistently parallels the proposed road.

ALTERNATIVE: (sketch attached)

Modify the piping layout and shorten the pipe lengths. If possible, modify the piping in the area of drainage structures B-5, B-8 thru 10, B-12 thru 14 and C-15, C-16 to eliminate as many cross drains as possible.

ADVANTAGES:

- Reduces material and construction cost
- May increase capacity/slope of pipes in certain locations

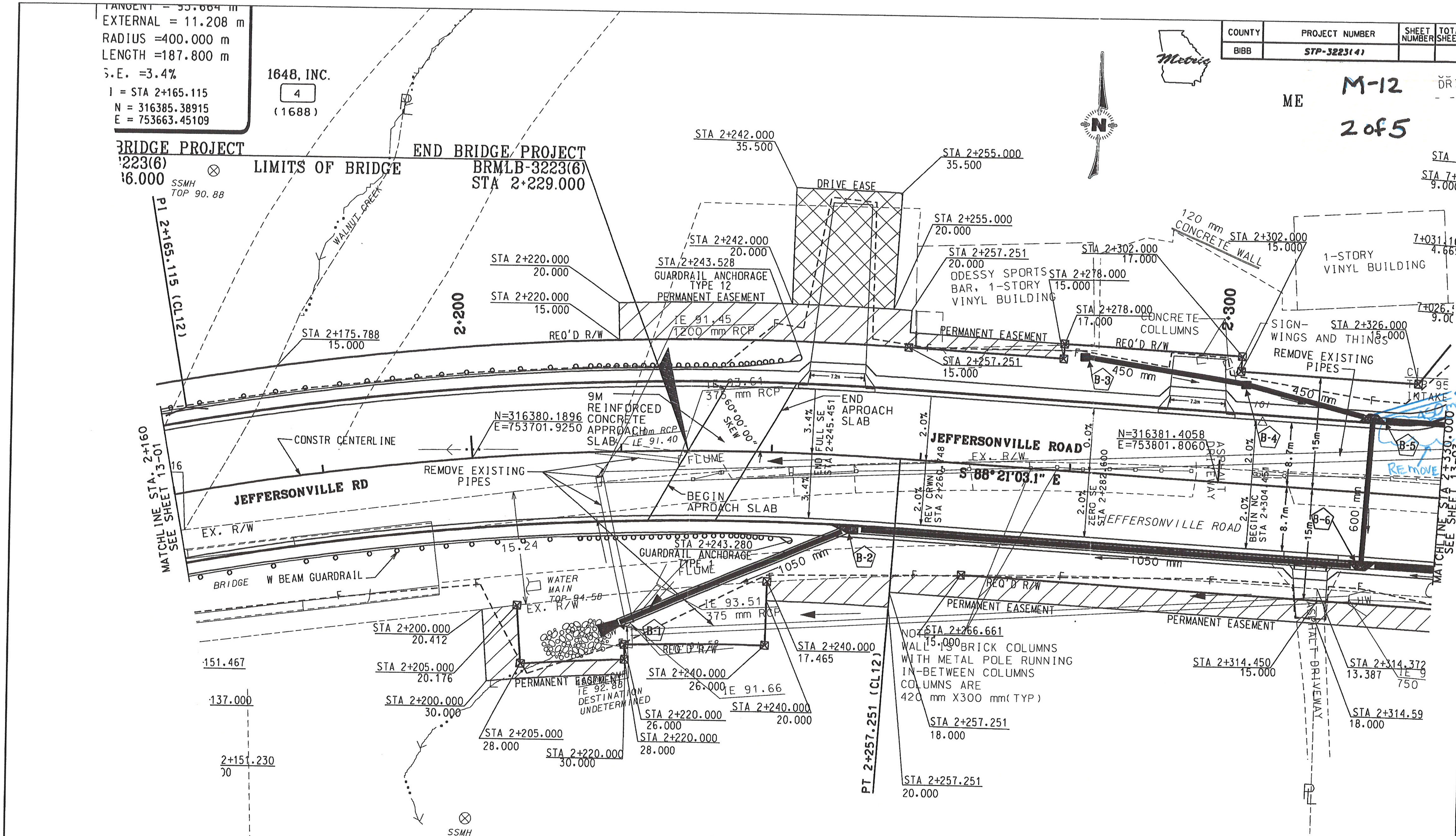
DISADVANTAGES:

- Crosses existing roads
- May increase pipe size downstream
- Changes drainage design

DISCUSSION:

Although constructing pipes across the existing road is not desirable, the decrease in pipe material and installation cost is substantial.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 34,001	—	$ 34,001
ALTERNATIVE	$ 16,638	—	$ 16,638
SAVINGS	$ 17,363	—	$ 17,363



EXTERNAL = 11.208 m
RADIUS =400.000 m
LENGTH =187.800 m
S.E. =3.4%
= STA 2+165.115
N = 316385.38915
E = 753663.45109
1648, INC.
4
(1688)
BRIDGE PROJECT
3223(6)
LIMITS OF BRIDGE
END BRIDGE PROJECT
BRMLB-3223(6)
STA 2+229.000
SSMH
TOP 90.88
WALNUT CREEK
PI 2+165.115 (CL12)
STA 2+242.000
35.500
STA 2+255.000
35.500
DRIVE EASE
STA 2+255.000
20.000
STA 2+242.000
20.000
STA 2+243.528
GUARDRAIL ANCHORAGE
TYPE 12
PERMANENT EASEMENT
STA 2+220.000
20.000
STA 2+220.000
15.000
STA 2+257.251
20.000
ODESSY SPORTS BAR, 1-STORY VINYL BUILDING
STA 2+278.000
15.000
STA 2+302.000
17.000
120 mm CONCRETE WALL
STA 2+302.000
15.000
1-STORY VINYL BUILDING
STA 2+278.000
17.000
CONCRETE COLUMNS
REQ'D R/W
PERMANENT EASEMENT
STA 2+257.251
15.000
SIGN-WINGS AND THINGS
STA 2+326.000
15.000
REMOVE EXISTING PIPES
STA 2+175.788
15.000
2+200
2+300
IE 91.45
1200 mm RCP
450 mm
450 mm
B-3
B-4
B-5
B-6
B-2
B-1
9M REINFORCED CONCRETE APPROACH SLAB
N=316380.1896
E=753701.9250
60°00'00" SKEW
375 mm RCP
END APROACH SLAB
FULL SE STA 2+245.451
3.4%
2.0%
REV CRWN STA 2+260.748
JEFFERSONVILLE ROAD
EX. R/W
S 88°21'03.1" E
N=316381.4058
E=753801.8060
ASPHALT DRIVEWAY
ZERO SE STA 2+282.600
BEGIN NC STA 2+304.451
15m
8.7m
600 mm
Remove
CONSTR CENTERLINE
JEFFERSONVILLE RD
REMOVE EXISTING PIPES
FLUME
BEGIN APROACH SLAB
JEFFERSONVILLE ROAD
MATCHLINE STA. 2+160 SEE SHEET 13-01
MATCHLINE STA 2+330.000 SEE SHEET 13-03
EX. R/W
15.24
STA 2+243.280
GUARDRAIL ANCHORAGE TYPE 1
FLUME
1050 mm
1050 mm
BRIDGE
W BEAM GUARDRAIL
WATER MAIN TOP 94.58
EX. R/W
IE 93.51
375 mm RCP
REQ'D R/W
PERMANENT EASEMENT
IE 92.88
DESTINATION UNDETERMINED
STA 2+200.000
20.412
STA 2+205.000
20.176
STA 2+200.000
30.000
STA 2+205.000
28.000
STA 2+220.000
30.000
STA 2+220.000
26.000
STA 2+220.000
28.000
STA 2+240.000
26.000
IE 91.66
STA 2+240.000
20.000
STA 2+240.000
17.465
PT 2+257.251 (CL12)
NOTE: WALL IS BRICK COLUMNS WITH METAL POLE RUNNING IN-BETWEEN COLUMNS COLUMNS ARE 420 mm X300 mm (TYP)
STA 2+266.661
15.000
STA 2+257.251
18.000
STA 2+257.251
20.000
STA 2+314.450
15.000
PERMANENT EASEMENT
ASPHALT DRIVEWAY
STA 2+314.372
13.387
STA 2+314.59
18.000
151.467
137.000
2+151.230
SSMH
TOP 91.97
FREDDIE L. GRIER, JR.
7
(1773)

RATIO=1:250

0 5 10 20
SCALE IN METERS

HISTORICAL BOUNDARY	
PROPERTY LINE AND EXIST R/W	
REQUIRED R/W LINE	
CONSTRUCTION LIMITS	–F– –C– –F–
EASEMENT FOR CONSTRUCTION & MAINTENANCE OF SLOPES	
EASEMENT FOR CONSTR OF SLOPES	
EASEMENT FOR CONSTR OF DRIVES	

BEGIN LIMIT OF ACCESS	BLA
END LIMIT OF ACCESS	ELA
LIMIT OF ACCESS	
R/W AND LIMIT OF ACCESS	
EXISTING R/W LINE	
COUNTY OR STATE LINE	
OBLITERATE PAVEMENT	

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CUNNINGHAM & COMPANY
ENGINEERS
740 MULBERRY ST
MACON, GA 31208
(912)742-3616

	NAME	DATE		NAME	DATE
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

CONSTRUCTION PLAN SHEET

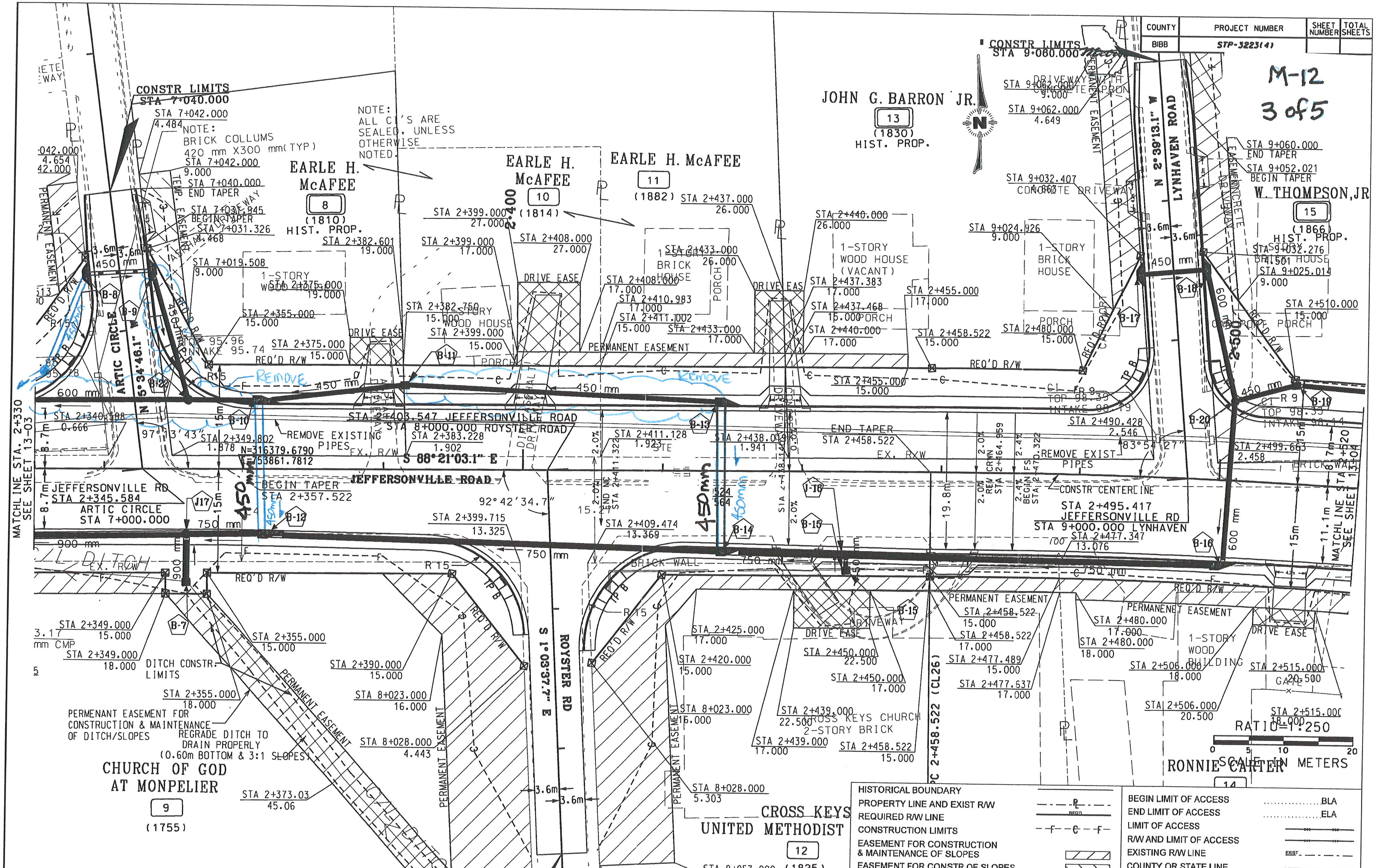
JEFFERSONVILLE/MILLERFIELD

DRAWING NUMBER 58

13-02

COUNTY	PROJECT NUMBER	SHEET NUMBER	TOTAL SHEETS
BIBB	STP-3223(4)		

M-12
3 of 5



HISTORICAL BOUNDARY	
PROPERTY LINE AND EXIST R/W	
REQUIRED R/W LINE	
CONSTRUCTION LIMITS	
EASEMENT FOR CONSTRUCTION & MAINTENANCE OF SLOPES	
EASEMENT FOR CONSTR OF SLOPES	
EASEMENT FOR CONSTR OF DRIVES	
BEGIN LIMIT OF ACCESS	BLA
END LIMIT OF ACCESS	ELA
LIMIT OF ACCESS	
R/W AND LIMIT OF ACCESS	
EXISTING R/W LINE	
COUNTY OR STATE LINE	
OBLITERATE PAVEMENT	

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CUNNINGHAM & COMPANY
ENGINEERS
740 MULBERRY ST
MACON, GA 31208
(912)742-3616

	NAME	DATE		NAME	DATE
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		

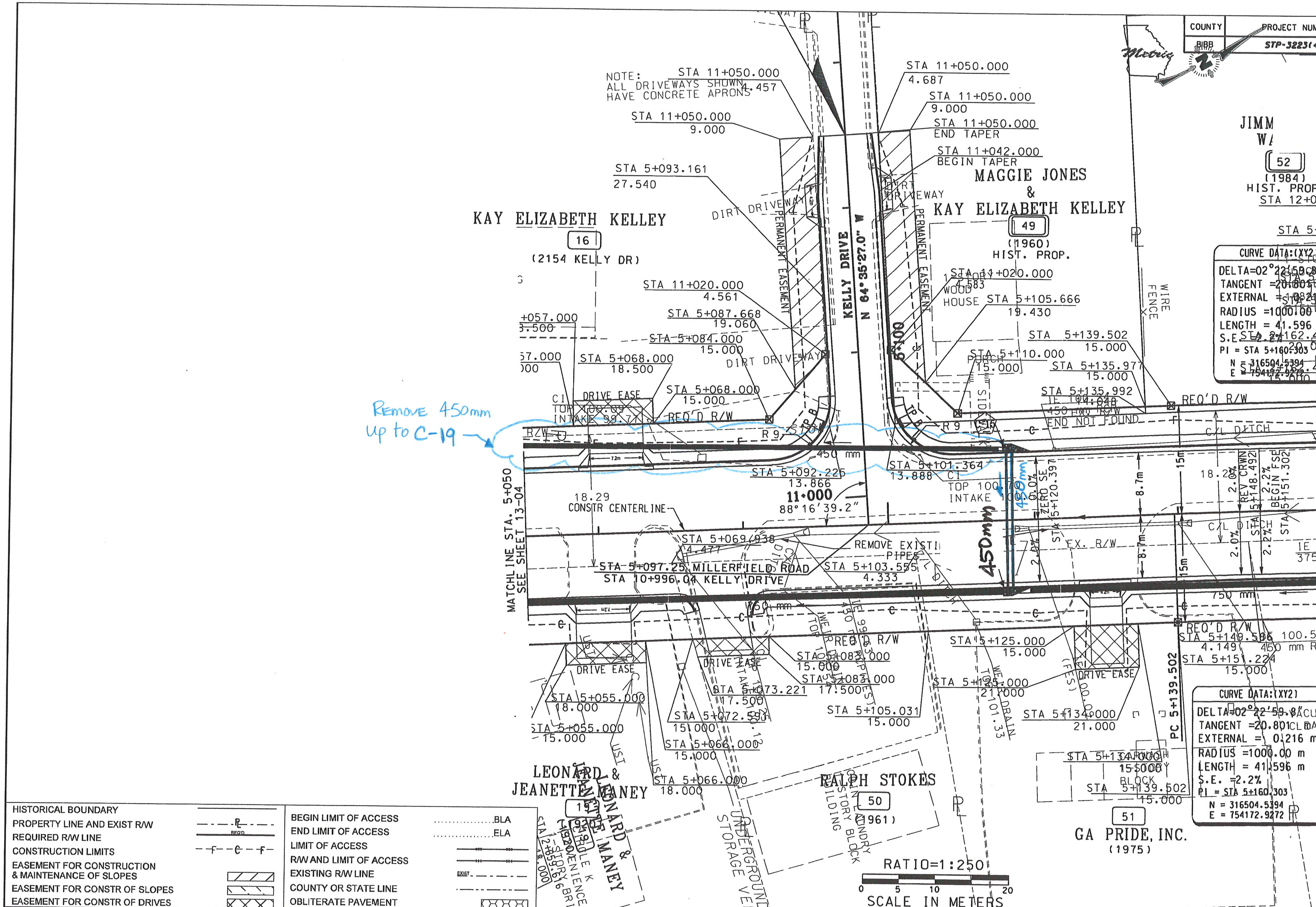
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

CONSTRUCTION PLAN SHEET
JEFFERSONVILLE/MILLERFIELD

DRAWING NUMBER 59
13-03

COUNTY	PROJECT NUMBER	SHEET NUMBER	TOTAL SHEETS
BIBB	STP-3223(4)		

M-12
4 of 5



HISTORICAL BOUNDARY	
PROPERTY LINE AND EXIST R/W	
REQUIRED R/W LINE	
CONSTRUCTION LIMITS	
EASEMENT FOR CONSTRUCTION & MAINTENANCE OF SLOPES	
EASEMENT FOR CONSTR OF SLOPES	
EASEMENT FOR CONSTR OF DRIVES	
BEGIN LIMIT OF ACCESS	BLA
END LIMIT OF ACCESS	ELA
LIMIT OF ACCESS	
R/W AND LIMIT OF ACCESS	
EXISTING R/W LINE	EXIST.
COUNTY OR STATE LINE	
OBLITERATE PAVEMENT	

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CUNNINGHAM & COMPANY
ENGINEERS
740 MULBERRY ST
MACON, GA 31208
(912)742-3616

	NAME	DATE		NAME	DATE
DESIGNED BY			DRAWN BY		
CHECKED BY			CHECKED BY		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

CONSTRUCTION PLAN SHEET

JEFFERSONVILLE/MILLERFIELD

DRAWING NUMBER
13-09

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-12**

SHEET NO.: **5 of 5**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Drainage Structure Modifications							
B-9 to B-8 to B-5; B-10 to B-12							
450mm Manhole	EA	1	2,800.00	2,800	1	2,800.00	2,800
450mm Pipe	LM	19	143.32	2,723	46	143.32	6,593
600mm Pipe	LM	33	243.81	8,046		243.81	
B-13 to B-14							
450mm Pipe	LM	45	143.32	6,449	20	143.32	2,866
C-15 to C-16							
450mm Pipe	LM	76	143.32	10,892	20	143.32	2,866
Subtotal				30,910			15,125
Markup (%) at 10%				3,091			1,513
TOTAL				34,001			16,638

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-13**

DESCRIPTION: **ON MILLERFIELD ROAD, ELIMINATE DITCH FROM STA 10+025 TO STA 10+140 AND REDUCE EXTENT OF PAVEMENT FROM STA 10+140 TO STA 10+080**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN:

This section of Millerfield Road has a long ditch cross section with a taper from STA 10+025 to STA 10+140.

ALTERNATIVE:

Reduce the length of the limits of construction for Millerfield Road from STA 10+140 to STA 10+080 and eliminate the ditch.

ADVANTAGES:

- Reduces material and construction cost
- Reduces easement on the commercial property

DISADVANTAGES:

- Drawings would need to be revised

DISCUSSION:

There is no apparent reason for the long length of the improvements to Millerfield Road in this area. Reducing the limits of construction appears logical if funds are limited. An additional benefit from this modification is that the right of way area needed from a commercial property located south of STA 10+060 can be reduced. This savings is in addition to the construction savings from eliminating the full-depth pavement and ditch excavation in this area.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 100,552	—	$ 100,552
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 100,552	—	$ 100,552

SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: M-13
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐ SHEET NO.: **2 of 4**

Alternative - Millerfield Road

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-13**

SHEET NO.: **3 of 4**

Original Design:

Pavement: $7.2(10140\text{-}10060) = 576\ m^2$

Ditch excavation: $2[4(1)(.5) + 1(1) + 2(1)(.5)](10140\text{-}10025) = 920\ m^3$

Easement: Average width is 7 m on each side
$7(2)(10140\text{-}10060) = 1120\ m^2 = 12{,}050\ ft^2$

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **M-13**

SHEET NO.: **4 of 4**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Pavement	M2	576	48.80	28,109			
Excavation	M3	920	12.11	11,141			
Construction Subtotal				39,250			
Construction markup @ 10%				3,925			
Construction total				43,175			
Easement	SF	12,050	1.92	23,136			
Right-of-way Subtotal				23,136			
Right-of-way Markup @ 148%				34,241			
Right-of-way Total				57,377			
Subtotal				100,552			
Markup (%) at Included							
TOTAL				100,552			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-2**

DESCRIPTION: **REDUCE LANE WIDTH ON SIDE ROADS--MORNINGSIDE DRIVE, MCCALL ROAD, LAKESIDE ROAD--FROM 3.6 M TO 3.3 M**

SHEET NO.: **1 of 7**

ORIGINAL DESIGN: (sketch attached)

Design and construct all side roads to be 7.2m-wide with 3.6m-wide lanes in each direction.

ALTERNATIVE: (sketch attached)

Reduce the side road lane width on Morningside Drive, McCall Road, and Lakeside Road, from 3.6 meters to 3.3 meters from curb return inwards.

ADVANTAGES:

- Reduces project cost
- Less disruption

DISADVANTAGES:

- Section would need to be modified
- Reduces travel lane width

DISCUSSION:

Existing side roads are of varying roadway widths ranging from 6 meters to 6.6 meters. Increasing the width of the side roads to 7.2 meters (3.6 + 3.6) as currently designed will not add significant value to the overall goals of the project.

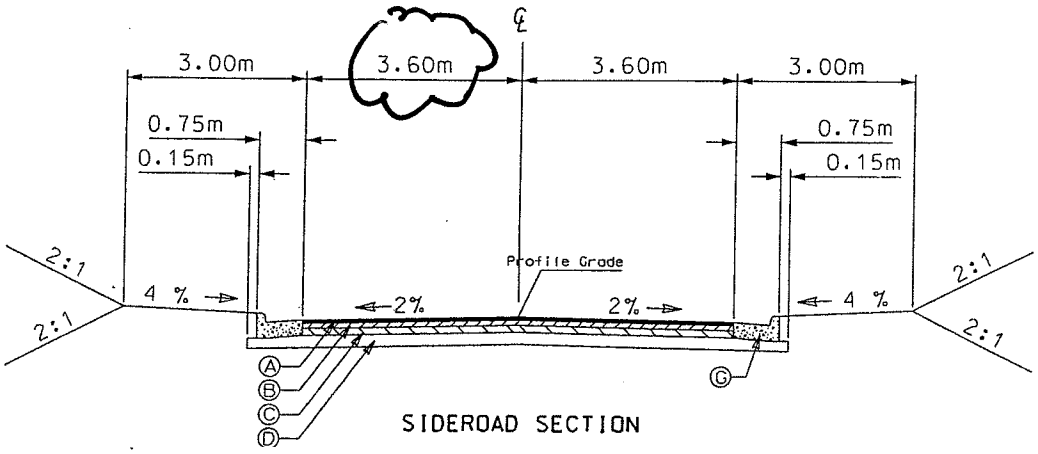
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,041	—	$ 4,041
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 4,041	—	$ 4,041

SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

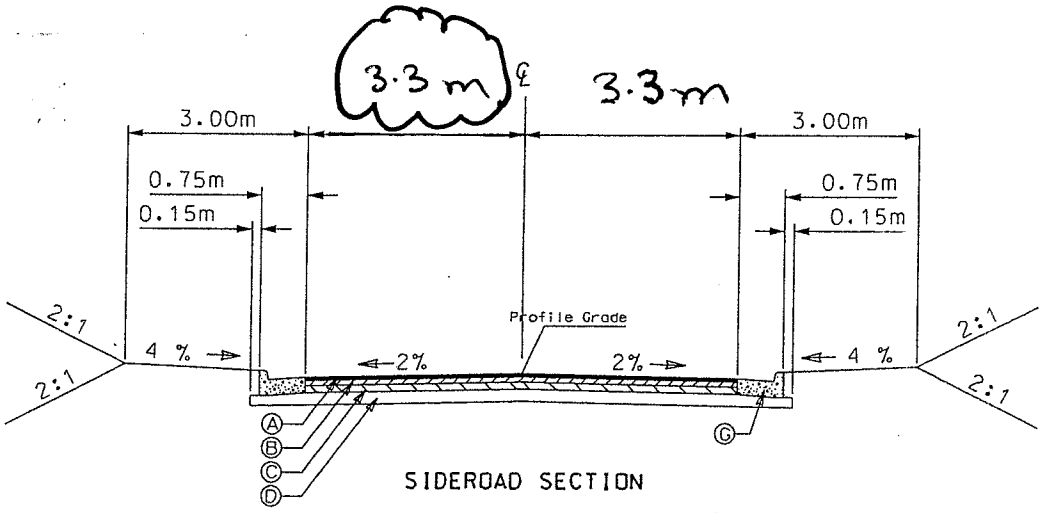
ALTERNATIVE NO.: E-2

ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 2 of 7



SIDEROAD SECTION

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐



SIDEROAD SECTION

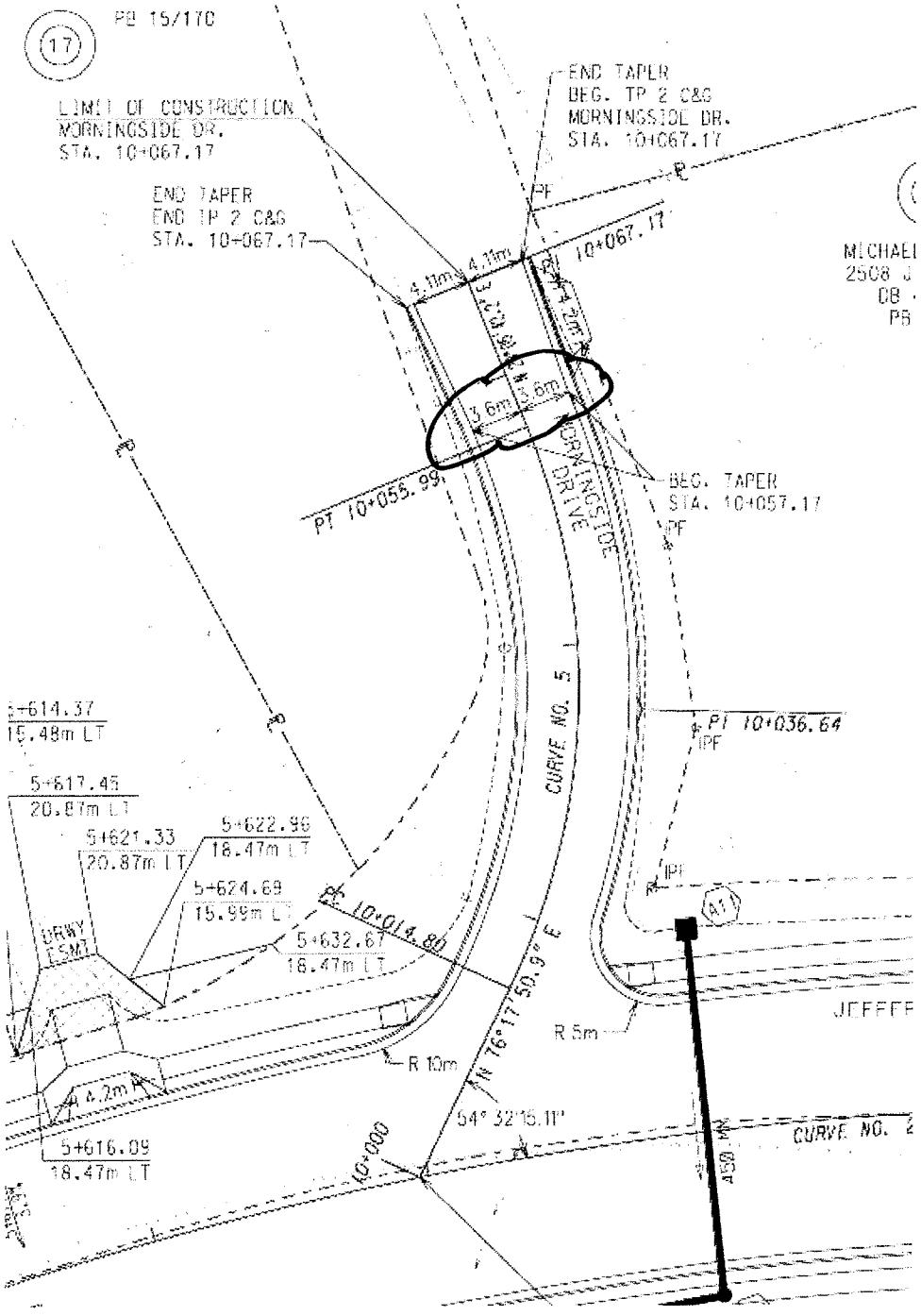
SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: E-2

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia – Preliminary Engineering Submittal

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 3 of 7



MORNINGSIDE DRIVE

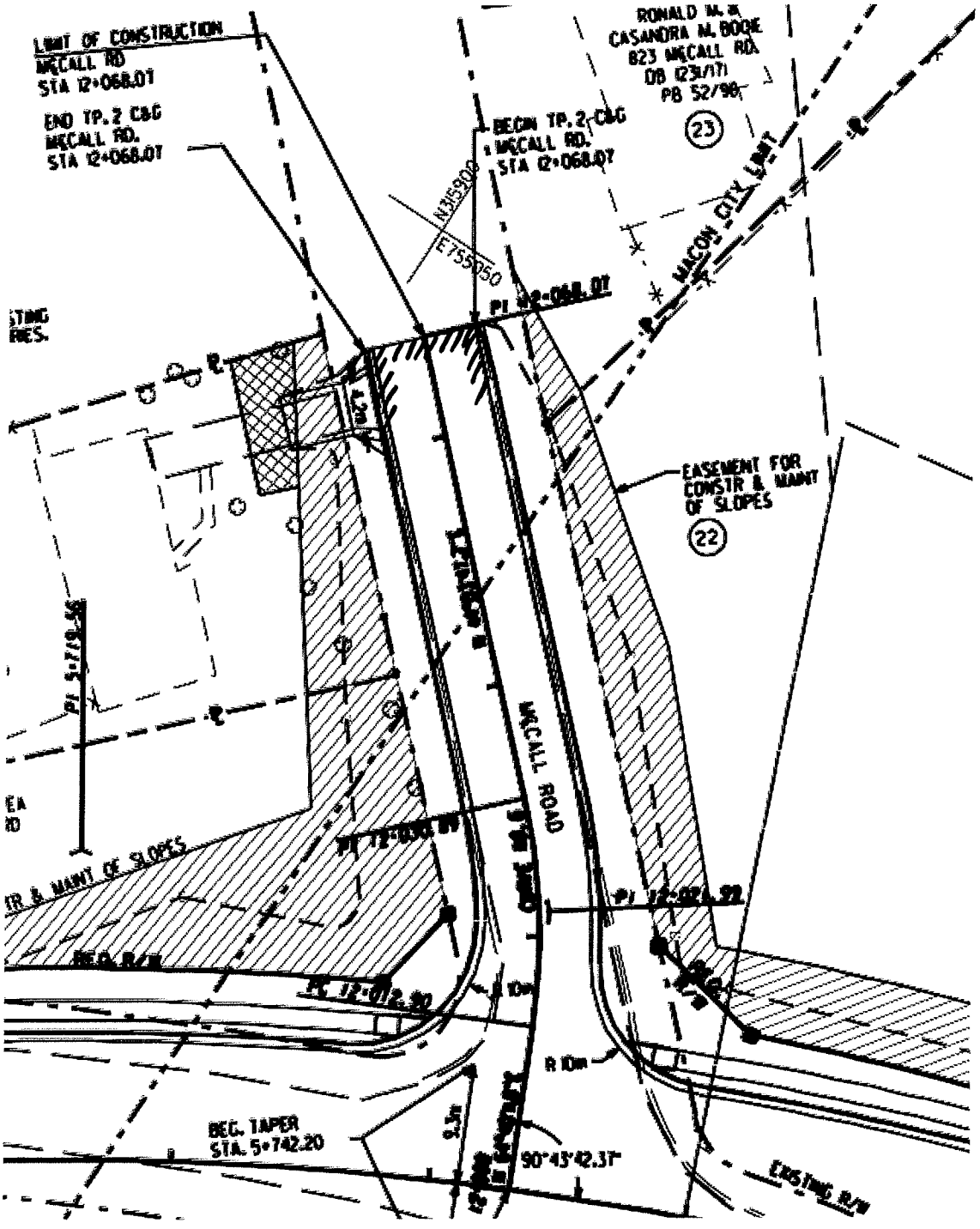
SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: E-2

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia – Preliminary Engineering Submittal

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 4 of 7



McCALL ROAD

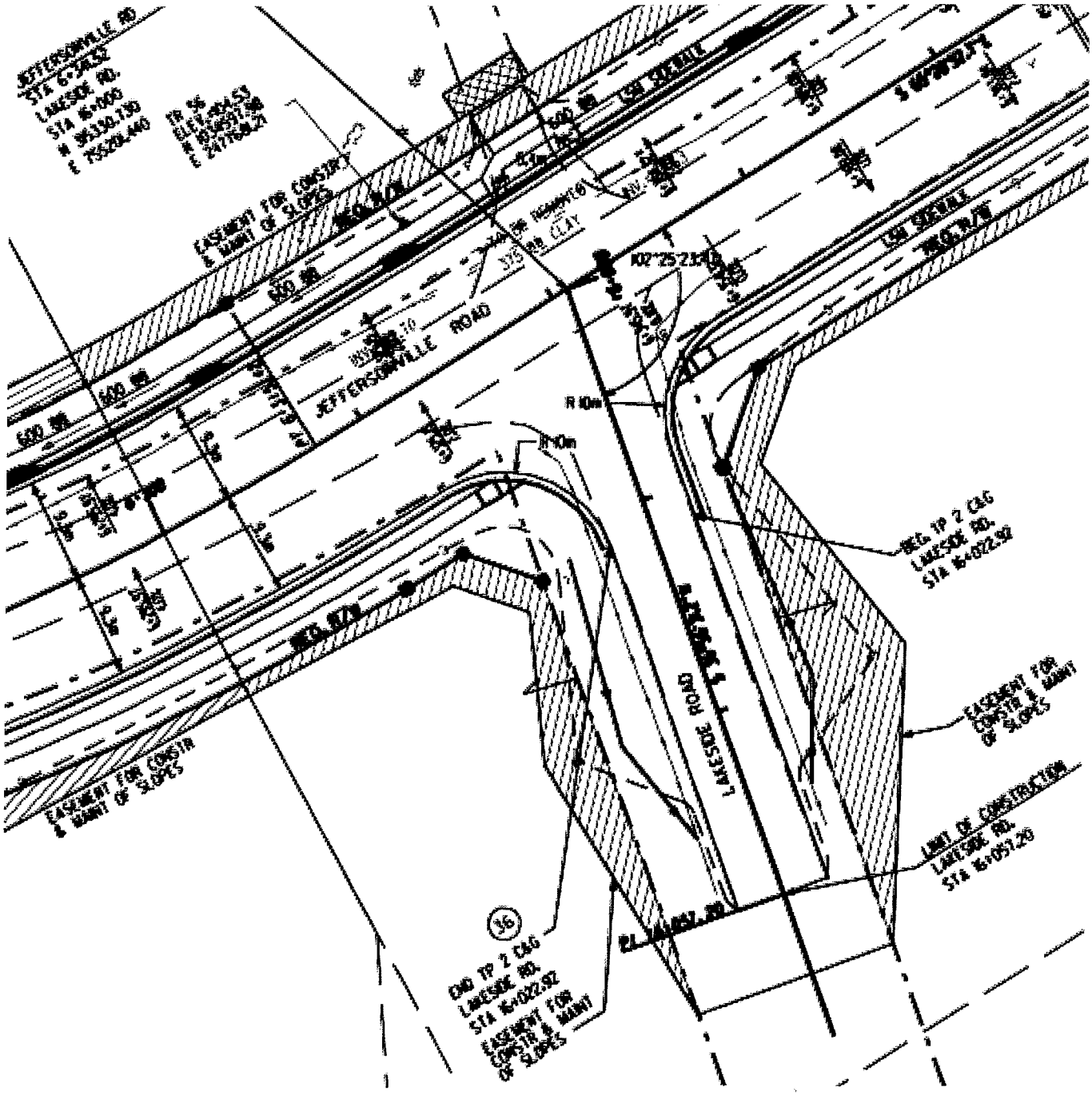
SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: E-2

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia – Preliminary Engineering Submittal

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 5 of 7



LAKESIDE ROAD

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: E-2

SHEET NO.: 6 of 7

Side Road ~~Asphalt~~ Concrete Pavement:

1.5" of 12.5 mm A.C. Concrete: 90 kg → 0.09 x $74.63 = $6.72/m²
2" of 19 mm A.C. Concrete: 120 kg → 0.12 x $75.50 = $9.06/m²
4" of 25 mm A.C. Concrete: 240 kg → 0.24 x $66.01 = $15.84/m²
10" of G.A.B: 600 kg → 0.6 x $19.68 = $11.81/m²

Total: $43.43/m²

- Morningside Drive: $53_m \times [3.6-3.3 + 3.6-3.3] = 31.8\ m^2$
- McCall Road: $48_m \times [0.3 + 0.3] = 28.8\ m^2$
- Lakeside Road: $40_m \times 0.6 = 24\ m^2$
- Total Pavement Area saved: $31.8 + 28.8 + 24 = \underline{\underline{84.6\ m^2}}$

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-2**

SHEET NO.: **7 of 7**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
A.C. Pavement Section	M2	84.6	43.43	3,674			
Subtotal				3,674			
Markup (%) at 10%				367			
TOTAL				4,041			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-7**

DESCRIPTION: **MODIFY DRAINAGE PIPING CONFIGURATIONS TO REDUCE PIPE LENGTHS AND NUMBER OF DRAINAGE STRUCTURES**

SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (sketch attached)

Storm drain piping is typically run parallel and on both sides of the roads.

.

ALTERNATIVE: (sketch attached)

Modify the piping layout and use more cross drains to reduce piping lengths. Piping near drainage structures A-4, 7 and B-7, 8, 9, 10, 26, 28, 31, and 32 would be modified.

ADVANTAGES:

- Reduces material and construction cost
- May increase capacity/slope of pipes in certain locations

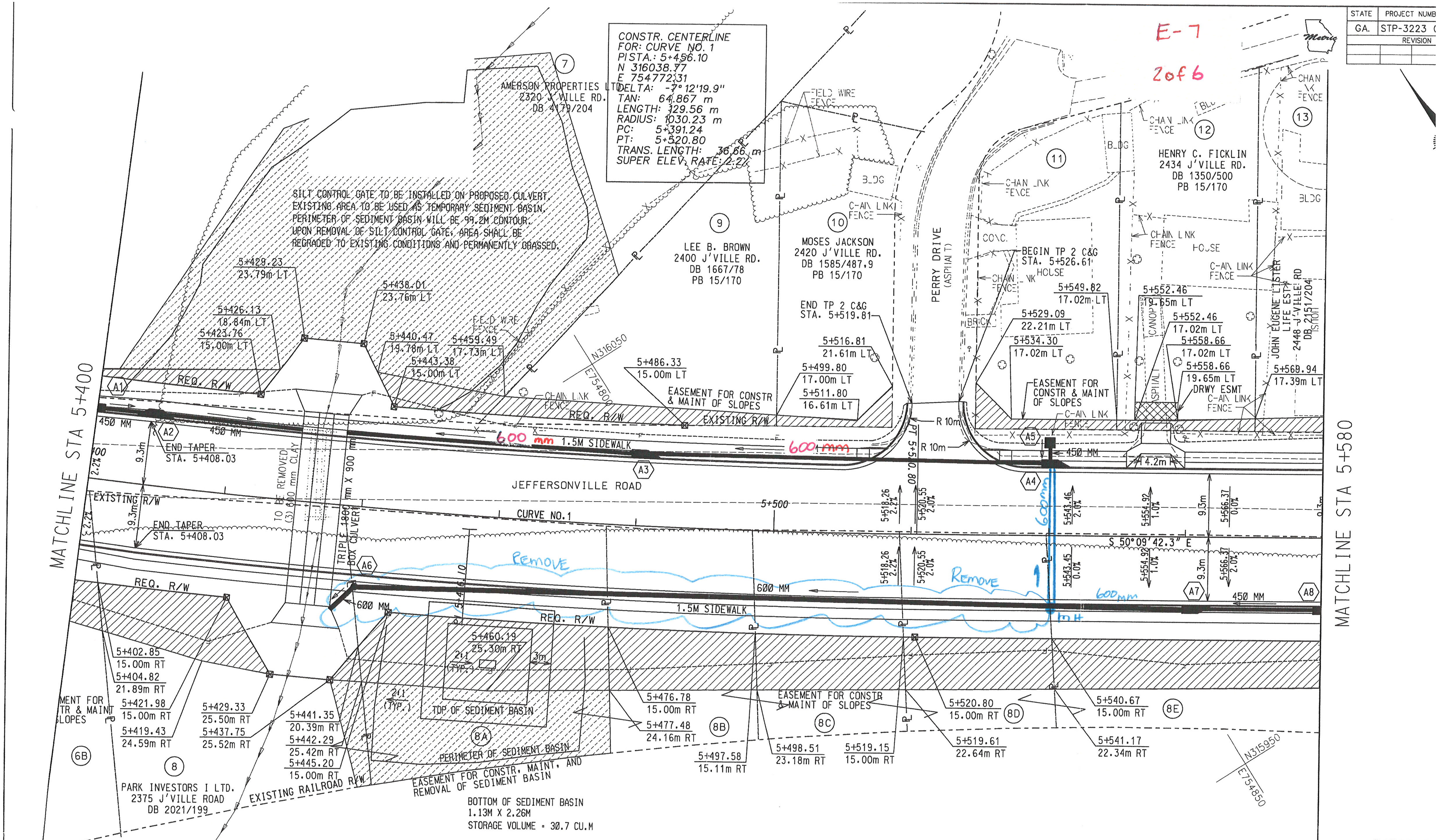
DISADVANTAGES:

- Increase cost to go across existing road
- May increase pipe size downstream

DISCUSSION:

Although constructing pipes across the existing road is not desirable, the decrease in pipe cost in materials and construction is a considerable option for reduction in cost. Check for proper cover and inverts for flow.

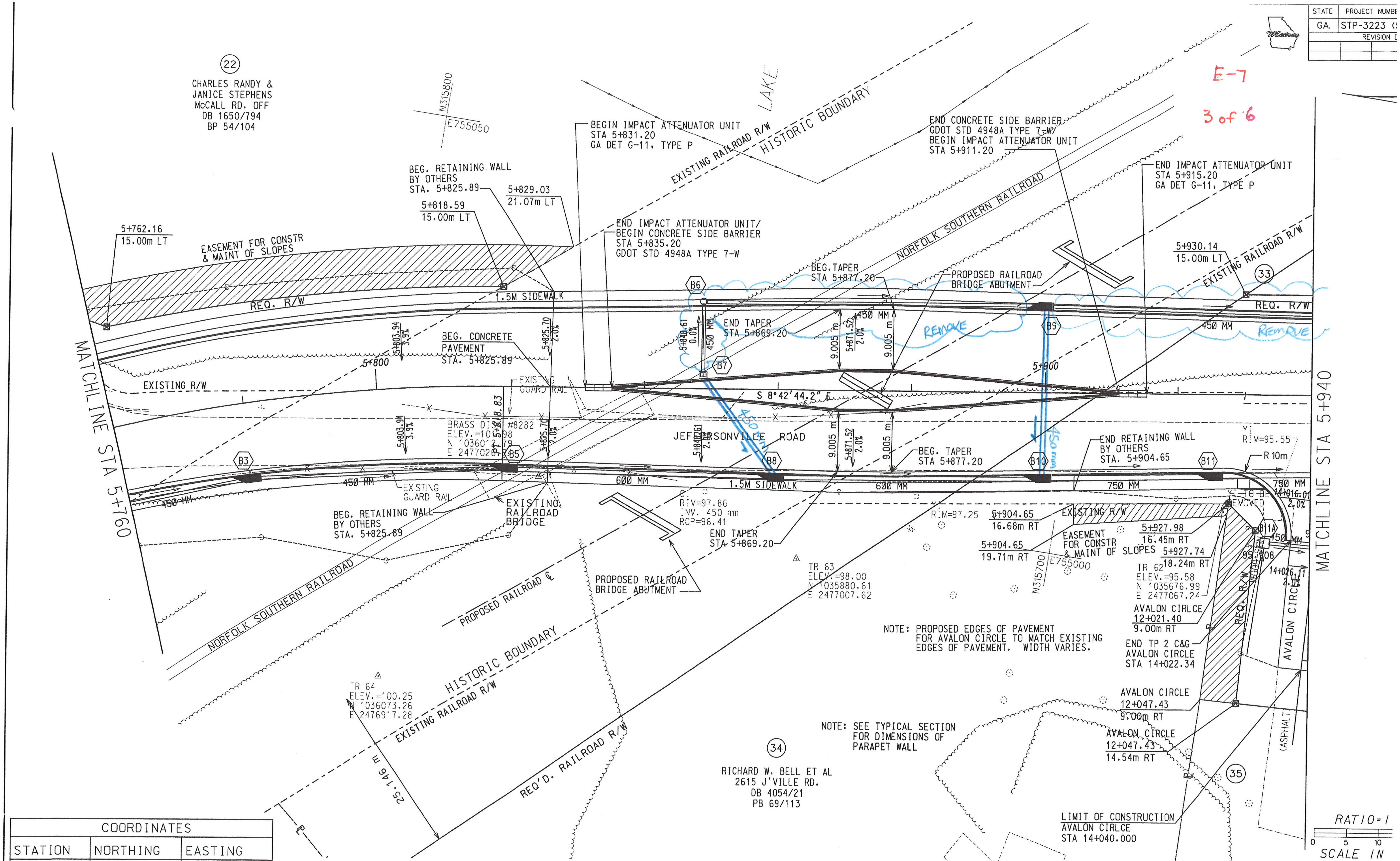
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 108,653	—	$ 108,653
ALTERNATIVE	$ 70,564	—	$ 70,564
SAVINGS	$ 38,089	—	$ 38,089



COORDINATES		
STATION	NORTHING	EASTING
5+440.000	316049.985	754760.669
5+540.000	315993.437	754843.106

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

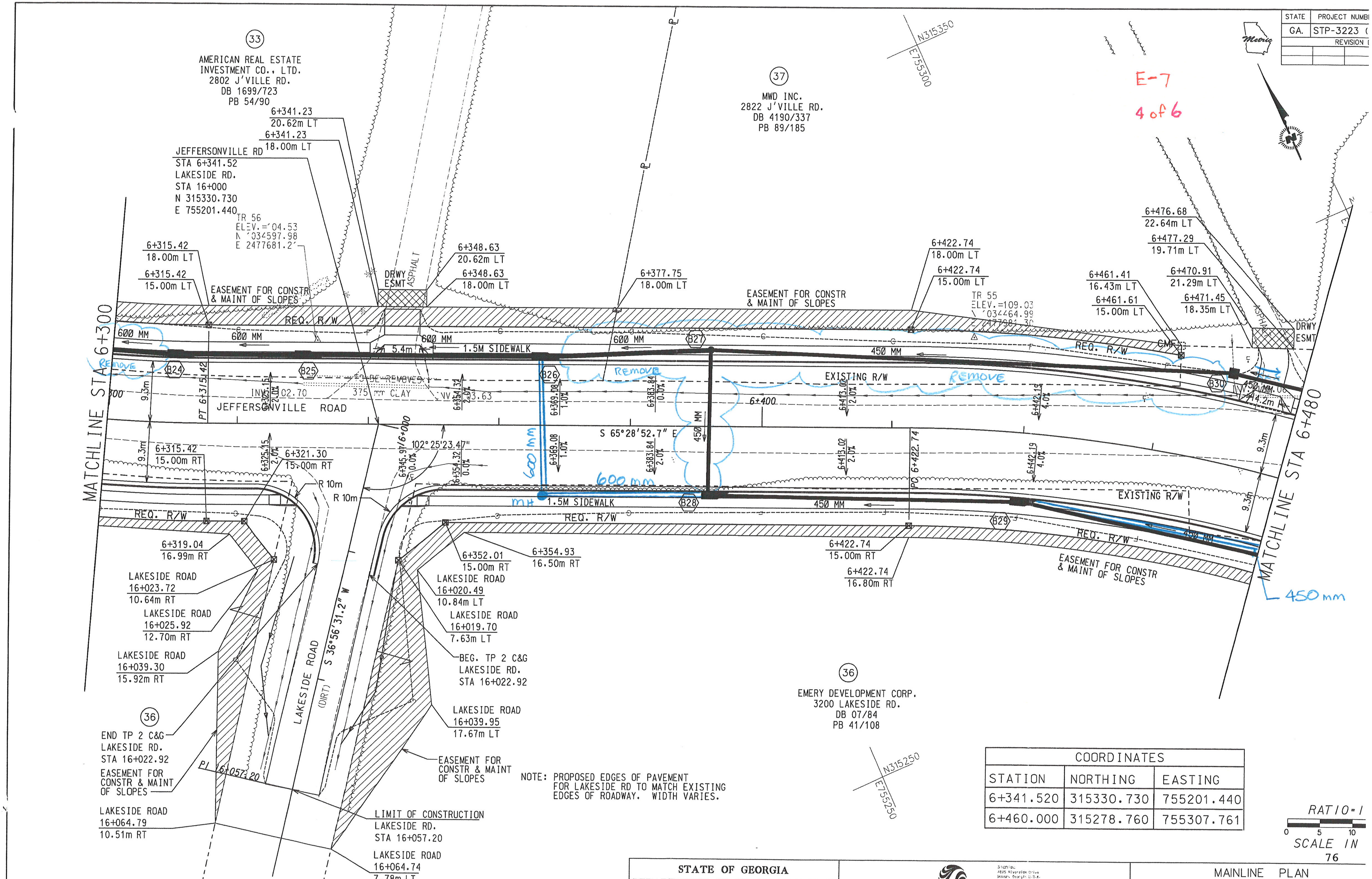
MAINLINE PLAN
JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTI



COORDINATES		
STATION	NORTHING	EASTING
5+800.000	315803.380	755007.890
5+900.000	315704.659	755023.735

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

MAINLINE PLAN
JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTI



STATE
PROJECT NUMBER
GA.
STP-3223
REVISION
Metric
E-7
4 of 6
33
AMERICAN REAL ESTATE
INVESTMENT CO., LTD.
2802 J'VILLE RD.
DB 1699/723
PB 54/90
37
MWD INC.
2822 J'VILLE RD.
DB 4190/337
PB 89/185
N315350
E755300
6+341.23
20.62m LT
6+341.23
18.00m LT
JEFFERSONVILLE RD
STA 6+341.52
LAKESIDE RD.
STA 16+000
N 315330.730
E 755201.440
TR 56
6+315.42
18.00m LT
6+315.42
15.00m LT
EASEMENT FOR CONSTR
& MAINT OF SLOPES
DRWY
ESMT
ASPHALT
6+348.63
20.62m LT
6+348.63
18.00m LT
6+377.75
18.00m LT
EASEMENT FOR CONSTR
& MAINT OF SLOPES
6+422.74
18.00m LT
6+422.74
15.00m LT
TR 55
6+461.41
16.43m LT
6+461.61
15.00m LT
6+476.68
22.64m LT
6+477.29
19.71m LT
6+470.91
21.29m LT
6+471.45
18.35m LT
DRWY
ESMT
REQ. R/W
600 MM
600 MM
600 MM
600 MM
1.5M SIDEWALK
450 MM
Remove
Remove
Remove
EXISTING R/W
6+400
JEFFERSONVILLE ROAD
S 65°28'52.7" E
450 MM
600 mm
600 mm
MH
1.5M SIDEWALK
450 MM
EXISTING R/W
REQ. R/W
REQ. R/W
450 MM
EASEMENT FOR CONSTR
& MAINT OF SLOPES
450 mm
MATCHLINE STA 6+300
MATCHLINE STA 6+480
B24
B25
B26
B27
B28
B29
B30
9.3m
6+315.42
15.00m RT
6+321.30
15.00m RT
R 10m
R 10m
102°25'23.47"
PC 6+422.74
6+319.04
16.99m RT
LAKESIDE ROAD
16+023.72
10.64m RT
LAKESIDE ROAD
16+025.92
12.70m RT
LAKESIDE ROAD
16+039.30
15.92m RT
36
END TP 2 C&G
LAKESIDE RD.
STA 16+022.92
EASEMENT FOR
CONSTR & MAINT
OF SLOPES
LAKESIDE ROAD
16+064.79
10.51m RT
PI 16+057.20
LAKESIDE ROAD
(DIRT)
S 36°56'31.2" W
6+352.01
15.00m RT
6+354.93
16.50m RT
LAKESIDE ROAD
16+020.49
10.84m LT
LAKESIDE ROAD
16+019.70
7.63m LT
BEG. TP 2 C&G
LAKESIDE RD.
STA 16+022.92
LAKESIDE ROAD
16+039.95
17.67m LT
EASEMENT FOR
CONSTR & MAINT
OF SLOPES
LIMIT OF CONSTRUCTION
LAKESIDE RD.
STA 16+057.20
LAKESIDE ROAD
16+064.74
7.78m LT
6+422.74
15.00m RT
6+422.74
16.80m RT
36
EMERY DEVELOPMENT CORP.
3200 LAKESIDE RD.
DB 07/84
PB 41/108
N315250
E755250
NOTE: PROPOSED EDGES OF PAVEMENT
FOR LAKESIDE RD TO MATCH EXISTING
EDGES OF ROADWAY. WIDTH VARIES.
RATIO = 1
SCALE IN

COORDINATES

STATION	NORTHING	EASTING
6+341.520	315330.730	755201.440
6+460.000	315278.760	755307.761

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

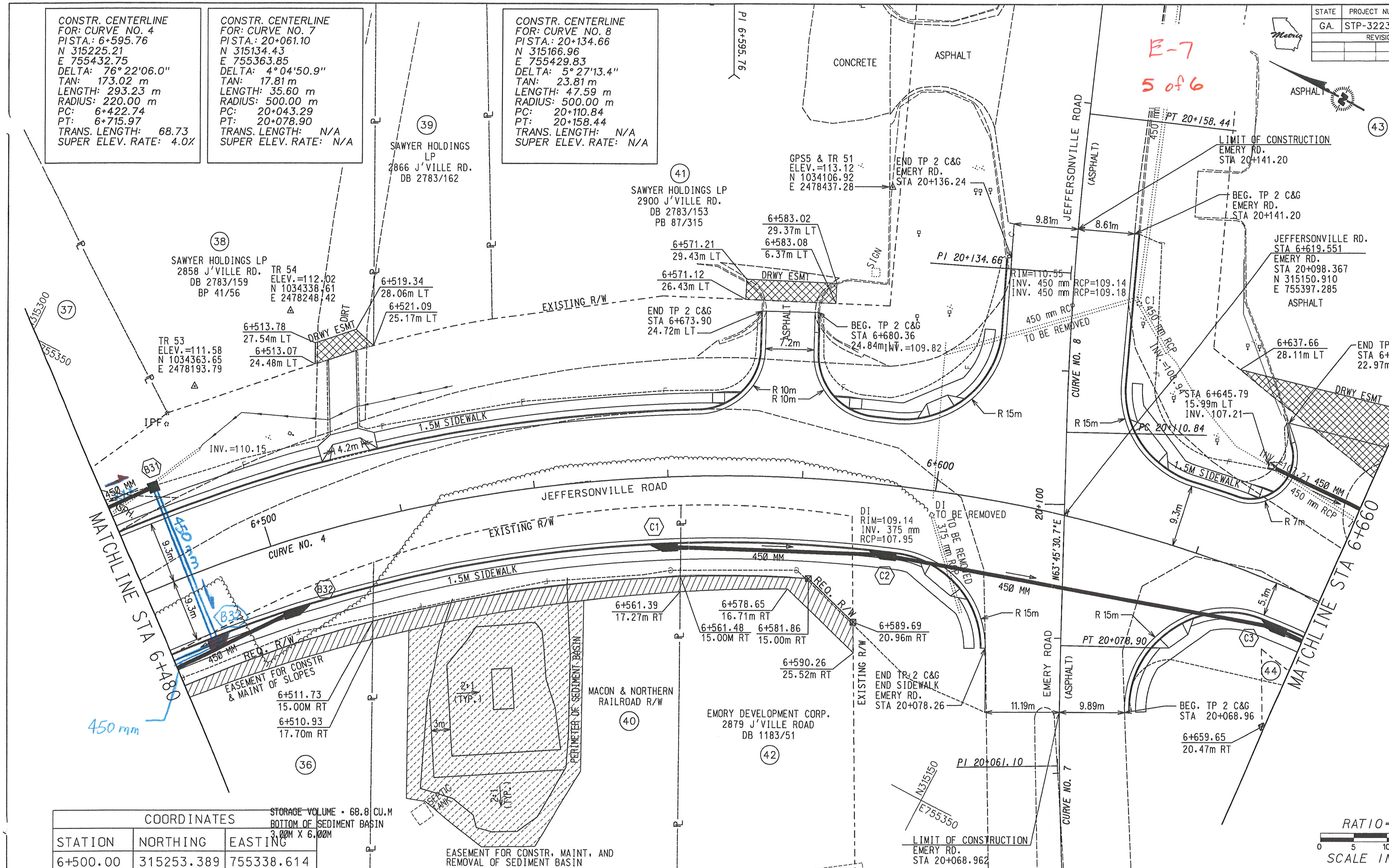
MAINLINE PLAN
JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTI

STATE	PROJECT NUMB
GA.	STP-3223 (
	REVISION

CONSTR. CENTERLINE
FOR: CURVE NO. 4
PI STA.: 6+595.76
N 315225.21
E 755432.75
DELTA: 76°22'06.0"
TAN: 173.02 m
LENGTH: 293.23 m
RADIUS: 220.00 m
PC: 6+422.74
PT: 6+715.97
TRANS. LENGTH: 68.73
SUPER ELEV. RATE: 4.0%

CONSTR. CENTERLINE
FOR: CURVE NO. 7
PI STA.: 20+061.10
N 315134.43
E 755363.85
DELTA: 4°04'50.9"
TAN: 17.81 m
LENGTH: 35.60 m
RADIUS: 500.00 m
PC: 20+043.29
PT: 20+078.90
TRANS. LENGTH: N/A
SUPER ELEV. RATE: N/A

CONSTR. CENTERLINE
FOR: CURVE NO. 8
PI STA.: 20+134.66
N 315166.96
E 755429.83
DELTA: 5°27'13.4"
TAN: 23.81 m
LENGTH: 47.59 m
RADIUS: 500.00 m
PC: 20+110.84
PT: 20+158.44
TRANS. LENGTH: N/A
SUPER ELEV. RATE: N/A


PI 6+595.76
CONCRETE
ASPHALT
ASPHALT
SAWYER HOLDINGS LP
2866 J'VILLE RD.
DB 2783/162
SAWYER HOLDINGS LP
2900 J'VILLE RD.
DB 2783/153
PB 87/315
SAWYER HOLDINGS LP
2858 J'VILLE RD.
DB 2783/159
BP 41/56
TR 54
ELEV.=112.02
N 1034338.61
E 2478248.42
TR 53
ELEV.=111.58
N 1034363.65
E 2478193.79
GPS5 & TR 51
ELEV.=113.12
N 1034106.92
E 2478437.28
END TP 2 C&G
EMERY RD.
STA 20+136.24
JEFFERSONVILLE ROAD
(ASPHALT)
PT 20+158.44
LIMIT OF CONSTRUCTION
EMERY RD.
STA 20+141.20
BEG. TP 2 C&G
EMERY RD.
STA 20+141.20
JEFFERSONVILLE RD.
STA 6+619.551
EMERY RD.
STA 20+098.367
N 315150.910
E 755397.285
ASPHALT
6+583.02
29.37m LT
6+583.08
6.37m LT
6+571.21
29.43m LT
6+571.12
26.43m LT
DRWY ESMT
PI 20+134.66
RIM=110.55
INV. 450 mm RCP=109.14
INV. 450 mm RCP=109.18
450 mm RCP
TO BE REMOVED
EXISTING R/W
END TP 2 C&G
STA 6+673.90
24.72m LT
BEG. TP 2 C&G
STA 6+680.36
24.84m LT
INV.=109.82
7.2m
6+519.34
28.06m LT
6+521.09
25.17m LT
DIRT DRWY ESMT
6+513.78
27.54m LT
6+513.07
24.48m LT
6+637.66
28.11m LT
END TP 2
STA 6+64
22.97m L
STA 6+645.79
15.99m LT
INV. 107.21
CURVE NO. 8
R 10m
R 10m
R 15m
R 15m
PC 20+110.84
1.5M SIDEWALK
IPF
INV.=110.15
4.2m
B31
450 MM
6+600
JEFFERSONVILLE ROAD
DI
TO BE REMOVED
20+100
N63°45'30.7"E
9.3m
R 7m
450 MM
450 mm RCP
MATCHLINE STA 6+660
MATCHLINE STA 6+480
9.3m
450 mm
6+500
EXISTING R/W
CURVE NO. 4
C1
DI
RIM=109.14
INV. 375 mm
RCP=107.95
375 mm RCP TO BE REMOVED
450 MM
C2
450 MM
1.5M SIDEWALK
B32
9.3m
B32
450 MM
REQ. R/W
REQ. R/W
EASEMENT FOR CONSTR & MAINT OF SLOPES
6+561.39
17.27m RT
6+578.65
16.71m RT
6+561.48
15.00M RT
6+581.86
15.00m RT
6+589.69
20.96m RT
6+590.26
25.52m RT
R 15m
R 15m
5.1m
PT 20+078.90
C3
EMERY ROAD
(ASPHALT)
EXISTING R/W
END TP 2 C&G
END SIDEWALK
EMERY RD.
STA 20+078.26
11.19m
9.89m
9.81m
8.61m
BEG. TP 2 C&G
STA 20+068.96
6+659.65
20.47m RT
6+511.73
15.00M RT
6+510.93
17.70m RT
450 mm
2:1 (TYP.)
3m
2:1 (TYP.)
SEPTIC TANK
PERIMETER OF SEDIMENT BASIN
MACON & NORTHERN
RAILROAD R/W
EMORY DEVELOPMENT CORP.
2879 J'VILLE ROAD
DB 1183/51
PI 20+061.10
CURVE NO. 7
N315150
E755350
LIMIT OF CONSTRUCTION
EMERY RD.
STA 20+068.962
315300
755350
SIGN
36
37
38
39
40
41
42
43
44

STORAGE VOLUME - 68.8 CU.M
BOTTOM OF SEDIMENT BASIN
3.00M X 6.00M

EASEMENT FOR CONSTR, MAINT, AND
REMOVAL OF SEDIMENT BASIN

COORDINATES		
STATION	NORTHING	EASTING
6+500.00	315253.389	755338.614
6+619.551	315150.910	755397.285

RATIO = 1
0 5 10
SCALE IN

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

MAINLINE PLAN
JEFFERSONVILLE ROAD (CR 727) RECONSTRUCT

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-7**

SHEET NO.: **6 of 6**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
A-7 to MH to A-4							
600mm Manhole	ea	1	2,800.00	2,800	1	2,800.00	2,800
450mm Pipe	mm	102	143.32	14,619		143.32	
600mm Pipe	mm	126	243.81	30,720	143	243.81	34,865
B-7 to B-8; B-9 to B-10							
450mm Manhole	ea	1	2,800.00	2,800		2,800.00	
450mm Pipe	mm	112	143.32	16,052	43	143.32	6,163
B-31 to B-32; B-28 to MH to B-26							
600mm Manhole	ea	1	2,800.00	2,800	1	2,800.00	2,800
450mm Pipe	mm	158	143.32	22,645	44	143.32	6,306
600mm Pipe	mm	26	243.81	6,339	46	243.81	11,215
Subtotal				98,775			64,149
Markup (%) at 10%				9,878			6,415
TOTAL				108,653			70,564

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-8**

DESCRIPTION: **USE A THREE-LANE ROADWAY WITH AUXILIARY LANES IN LIEU OF A FIVE LANE SECTION ON JEFFERSONVILLE RD. SHORTEN THE RAILROAD BRIDGE, BUT ONLY PURCHASE THREE LANES OF RIGHT OF WAY**

SHEET NO.: **1 of 7**

ORIGINAL DESIGN: (sketch attached)

The original design is widening to a five-lane urban roadway.

ALTERNATIVE: (sketch attached)

Widen the existing two lane road to a three-lane roadway and purchase only enough right-of-way for three lanes.

ADVANTAGES:

- Reduces construction cost
- Reduces right-of-way cost
- Reduces environmental impacts
- Reduces construction time

DISADVANTAGES:

- Provides less traffic capacity than five-lane section
- Lower level of service provided
- A second phase would be required in the future

DISCUSSION:

The original design proposes a five-lane section. This alternative proposes to use a three-lane section with an auxiliary turn lane. After studying the project the auxiliary lanes would be deceleration and acceleration lanes (right turns off and onto Emery Highway). The typical section would still be an urban section design on a reduced right-of-way width. The required right-of-way would be reduced from 30 meters to 24 meters.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,500,602	—	$ 1,500,602
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 1,500,602	—	$ 1,500,602

Sketch
Alt. E-8
4/7

LAKESIDE RD.

JEFFERSONVILLE RD.

MATCHLINE STA 6+660

COORDINATES		
STATION	NORTHING	EAST
6+341.520	315330.730	755
6+460.000	315278.760	75

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

NOTE: PROPOSED EDGES OF PAVEMENT FOR LAKESIDE RD TO MATCH EXISTING EDGES OF ROADWAY, WIDTH VARIES.

CONSTR. CENTERLINE FOR CURVE NO. 7
N 315134.13
E 754363.85
DELTA: 4°04'50.9"
TAN: 17.81 m
LENGTH: 35.60 m
RADIUS: 500.00 m
PC: 20+041.29
PT: 20+076.90
TRANS. LENGTH:
SUPER ELEV. RATE: N/A

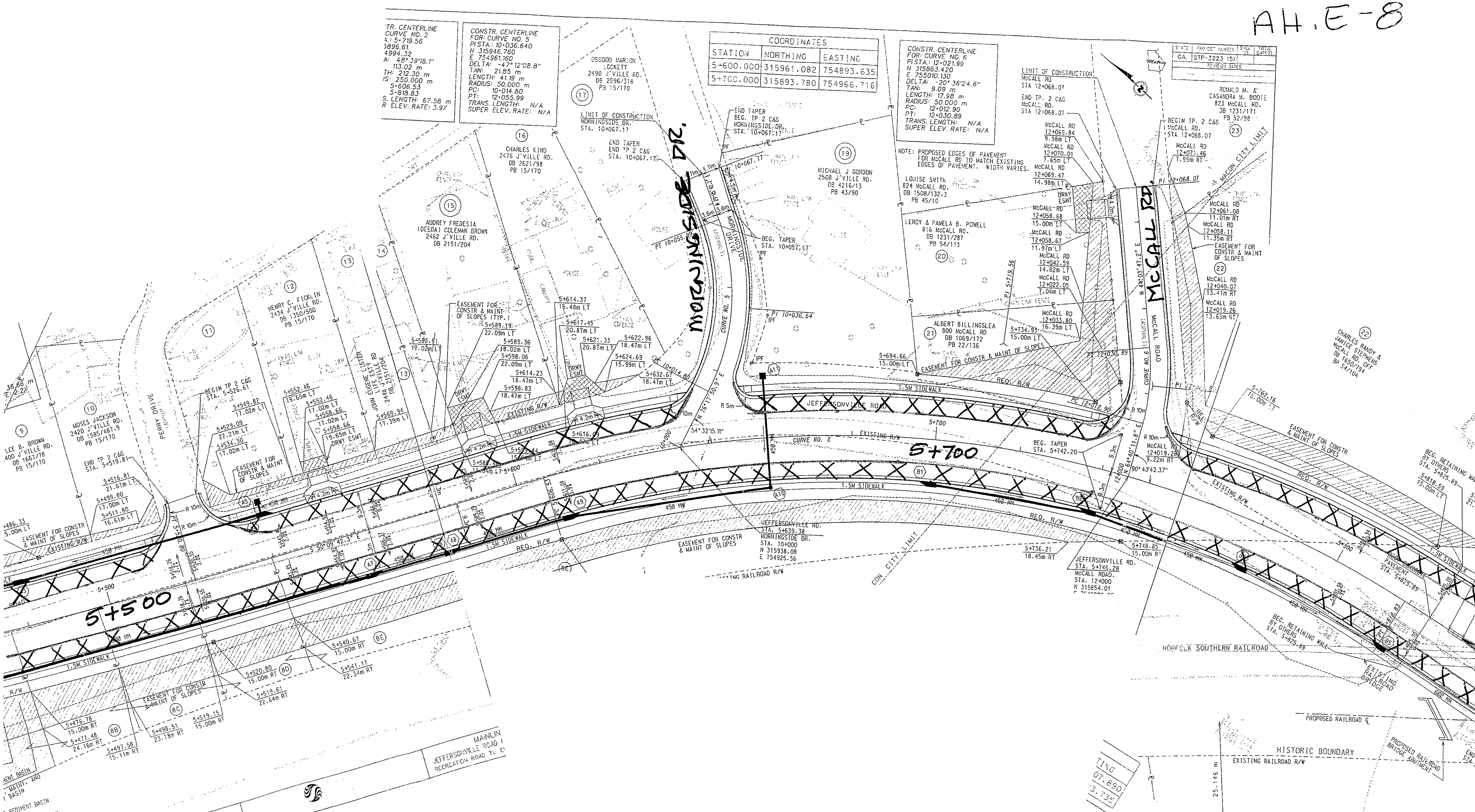
CONSTR. CENTERLINE FOR CURVE NO. 8
N 315166.66
E 754298.93
DELTA: 5°27'13.4"
TAN: 23.81 m
LENGTH: 47.59 m
RADIUS: 500.00 m
PC: 20+110.84
PT: 20+158.44
TRANS. LENGTH:
SUPER ELEV. RATE: N/A

CURVE NO. 4
CURVE NO. 7
CURVE NO. 8

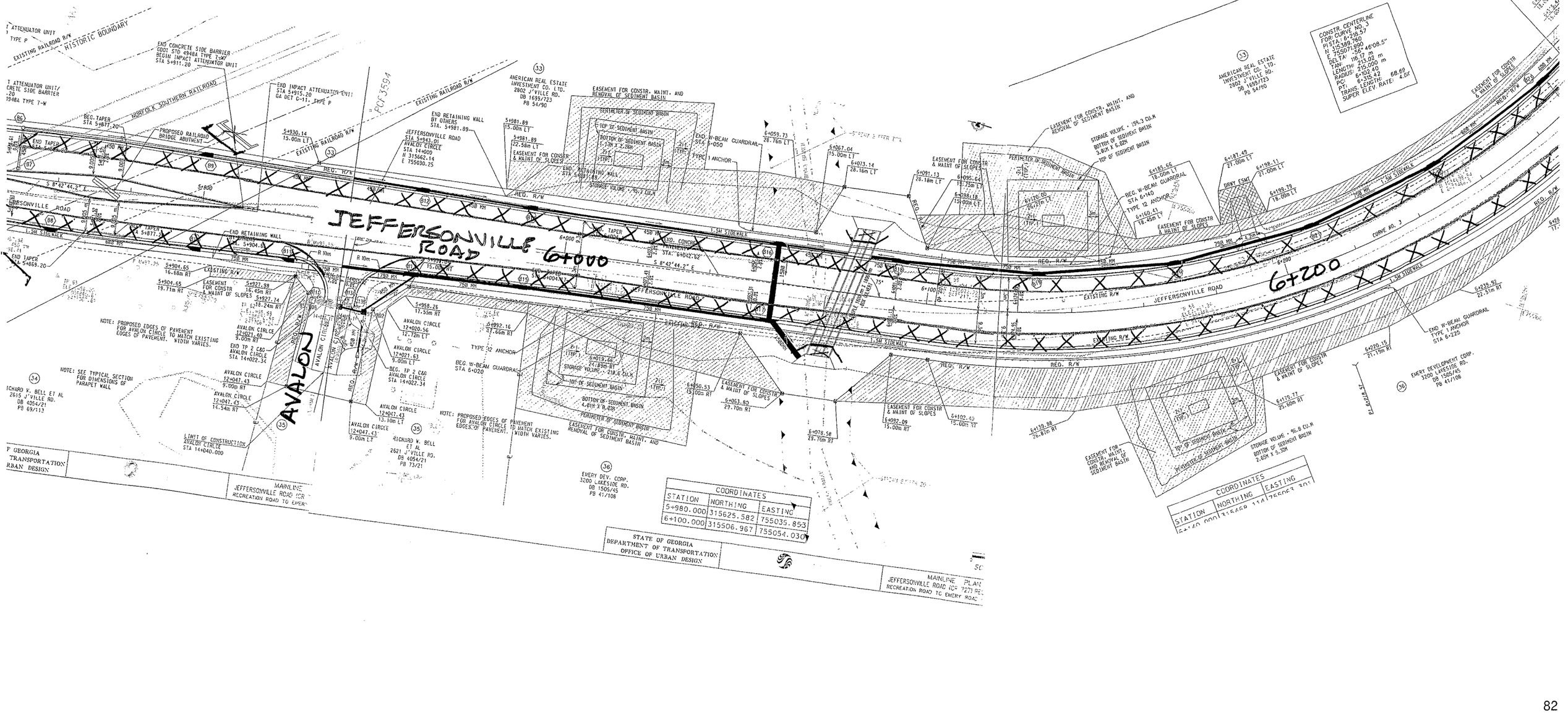
Accel Lane
CREST
R+ TURN ONLY

RATIO: 1:250
SCALE IN METERS

Sketch 2/7
AH.E-8



Sketch
Alt. E-8
3/7



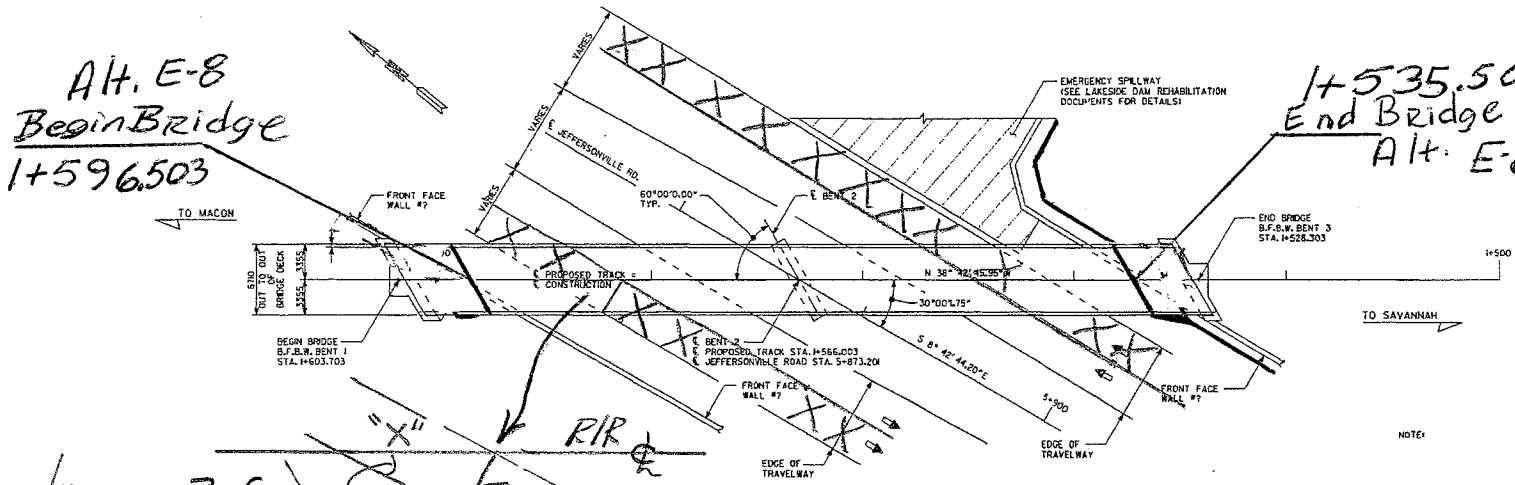
STATION	COORDINATES	
	NORTHING	EASTING
5+980.000	315625.582	755035.853
6+100.000	315506.967	755054.030

STATION	COORDINATES	
	NORTHING	EASTING
6+140.000	315469.144	755063.301

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	5240-07	1	
REVISION DATES			

Alt. E-8
Begin Bridge
1+596.503

1+535.503
End Bridge
Alt. E-8

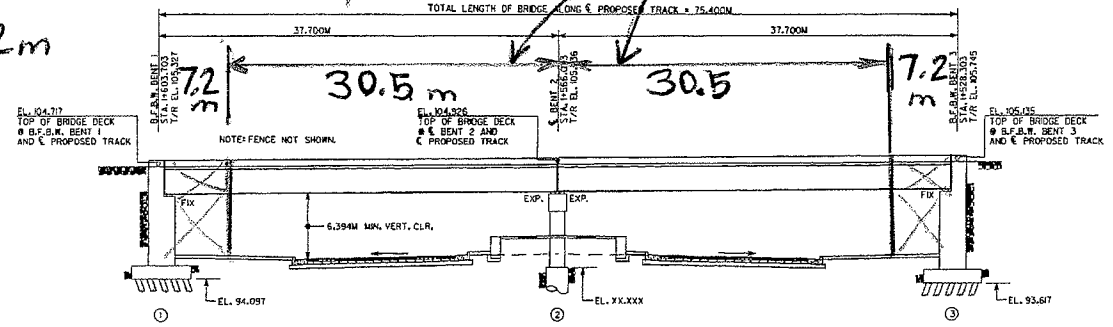


PLAN

$\left("X" = \frac{3.6m}{\sin\phi}\right)$ $30°00'1.75" = \phi$

X = 7.2m

Alt. E-8 Bridge Length = 61.0m



ELEVATION

STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF URBAN DESIGN	RALPH WHITEHEAD ASSOCIATES, INC 3505 Koger Boulevard, Suite 205 Duluth, GA 30096 770.452.0797 Web Site: www.rwhitehead.com	PLAN AND ELEVATION NORFOLK SOUTHERN RAILWAY OVER COUNTY: BIBB JEFFERSONVILLE ROAD DATE: 11/05	DRAWING No. 1

Jefferson. Bibb

Sketch 5/7 Alt. E-8 1/5

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-8**

SHEET NO.: **6 of 7**

Original Design cost savings by implementing Alternate E-8 Design:

- Pavement area saved: 3.6m x 2 lanes x 1,100m = 7,920m2
- Earthwork excavation saved: 3.6m x 2 lanes x 1,100m x 1.5m = 11,800m3
- Cross-drain pipe saved: 14m of 450mm; 7m of 1500mm
- Total R/W saved: (6m x 1,100m) 10.76ft2/m2 = 71,016ft2
- (28,406ft2 40% commercial; 42,610ft2 60% Residential)

Pavement unit cost $/m2:

12.5mm	90kg/m2 x MG/1000kg x $74.63/MG =	$6.72/m2
19mm	120kg/m2 x MG/1000kg x $75.50/MG =	$9.06/m2
25mm	180kg/m2 x MG/1000kg x $66.01/MG =	$15.84/m2
250mm GAB:	600kg x MG/1000kg x $11.81/MG =	$11.81/m2
	Total Pavement section unit cost =	**$43.43/m2**

Bridge saved = 6.71m x 14.4m = 96.624m2

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION** ALTERNATIVE NO.: **E-8**

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia - Preliminary Engineering Submittal

SHEET NO.: **7 of 7**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Full-depth Pavement	m2	7,920	43.43	343,966			
Earthwork saved	m3	11,800	10.00	118,000			
450mm pipe saved	m	14	120.87	1,692			
1500mm pipe saved	m	7	500.00	3,500			
R/R Bridge saved	m2	96.624	5,210.00	503,411			
save 7.2m 1800mm x 900mm culvert	LS	1	25,000.00	$25,000			
save 7.2m 1800mm x 1800mm culver	LS	1	50,000.00	$50,000			
Construction Markup	10%	1,045,569	0.10	$104,557			
R/W saved - Commercial	sf	28,406	3.85	$109,363			
R/W saved - Residental	sf	42,610	0.75	$31,958			
R/W Markup	148%	141,321	1.48	$209,155			
Subtotal				1,500,602			
Markup (%) at	**included**						
TOTAL				1,500,602			

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
EAST SEGMENT (E) (cont.)						
• ***STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828***						
• ***STP00-0000-00(835), P.I. No. 000835 - Norfolk Southern Railway Bridge Over Jeffersonville Road***						
E-9	Create a low point at the box culvert (STA 6+080) and move the catch basins B-16 & B-17. Eliminate the 1500mm RCP pipe.	$19,542	$3,308	$16,234	$0	$16,234
E-10	Reduce the travel lane width on Jeffersonville Road from 3.6m to 3.3m to match the other projects.	$78,681	$0	$78,681	$0	$78,681
E-11	Reduce the shoulder width on Jeffersonville Road from 3.6m to 3.0m.	$25,024	$0	$25,024	$0	$25,024
E-12	At the Norfolk Southern railroad bridge, use 100mm thick concrete pavement between the traffic barriers around the center column in the median in lieu of 450mm thick pavement.	$36,818	$9,194	$27,624	$0	$27,624
E-13	Realign Jeffersonville Rd., reduce the skew from 30-degrees to 39-degrees, and shorten the bridge from 75.4m to 59.9m.	$596,024	$24,180	$571,844	$0	$571,844
E-16	Build a 3-lane roadway on Jeffersonville Rd. with rural ditch section on R/W for future 5-lane urban section.	$984,656	$41,627	$943,029	$0	$943,029
E-17	Extend the concrete pavement near the Norfolk Southern railroad bridge to match the length of the spillway.	DESIGN SUGGESTION				
E-18	Revise the drainage piping network between STA 5+437 and 5+742 to reduce the piping length and number of catch basins.	$40,948	$25,512	$15,436	$0	$15,436

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-9**

DESCRIPTION: **CREATE A LOW POINT AT BOX CULVERT (STA 6+080), MOVE THE CATCH BASINS B-16 AND B-17, AND ELIMINATE CATCH BASIN B-18 AND THE 1500MM RCP**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (sketch attached)

Construct 1500mm (60in.) reinforced concrete pipe (RCP) across the road to carry storm water to the triple box culvert.

ALTERNATIVE: (sketch attached)

Move the low point on the road to the middle box culvert location by slightly changing road profile. Relocate catch basins B-16 and B-17 on top of box culvert. Eliminate catch basin B-18 and all 30 meters of 1500mm pipe. Lengthen 13 meters of 750mm RCP to the box culvert.

ADVANTAGES:

- Reduces construction cost
- Avoids constructing pipe across Jeffersonville Road

DISADVANTAGES:

- Piping layout would be modified

DISCUSSION:

The cost of laying down 1500mm pipe can be entirely avoided by simply moving the low point on the road 15-20 meters ahead. The resulting outcome would also avoid digging through Jeffersonville Road.

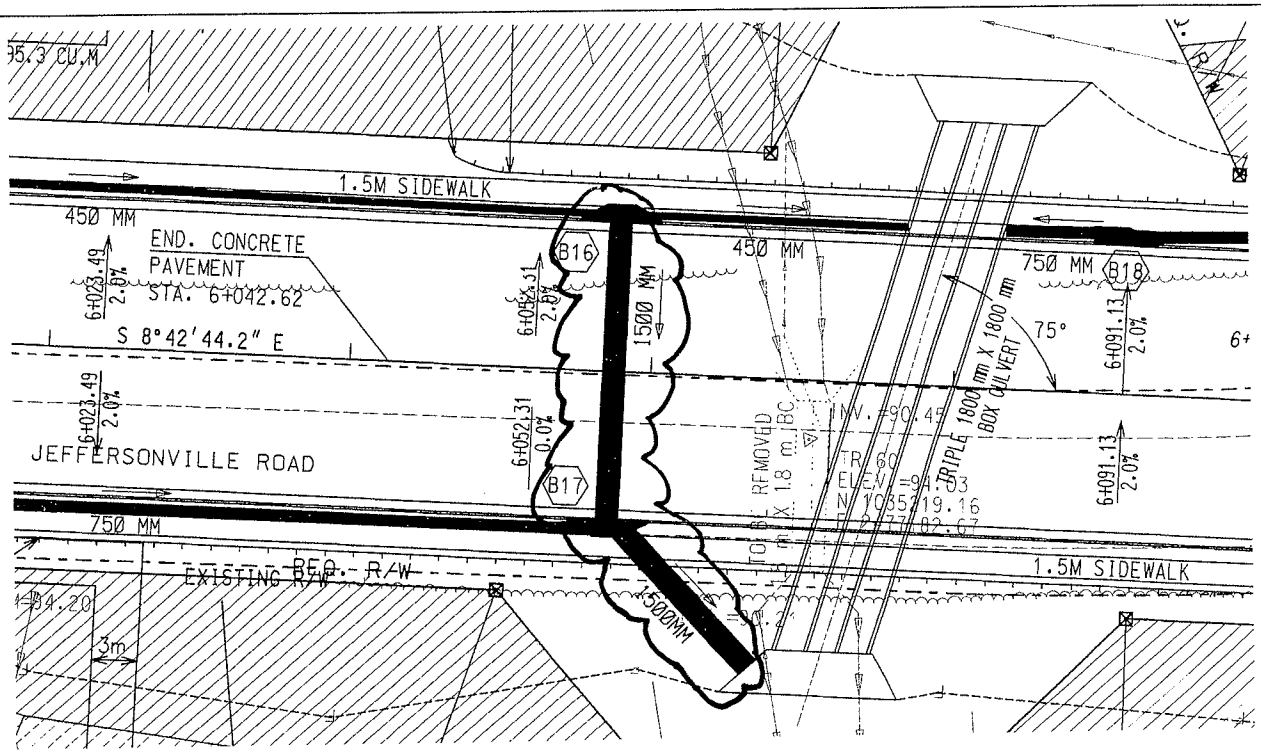
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 19,542	—	$ 19,542
ALTERNATIVE	$ 3,308	—	$ 3,308
SAVINGS	$ 16,234	—	$ 16,234

SKETCH

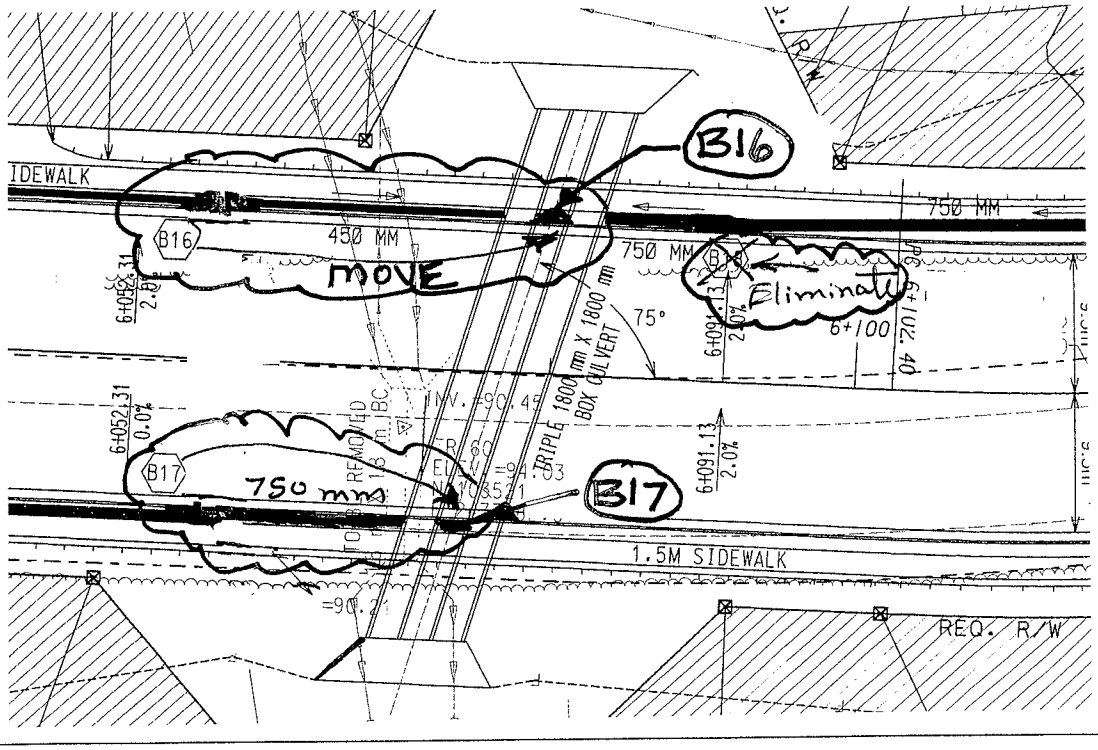
PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: E-9

ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 2 of 3



ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐



COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-9**

SHEET NO.: **3 of 3**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
1500 mm RCP Pipe	LM	30	500.00	15,000			
Catch Basins	EA	1	2,765.00	2,765			
750 mm RCP Pipe	LM				13	231.31	3,007
Subtotal				17,765			3,007
Markup (%) at 10%				1,777			301
TOTAL				19,542			3,308

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-10**

DESCRIPTION: **REDUCE TRAVEL LANE WIDTH FROM 3.6 M TO 3.3 M**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (sketch attached)

The original design provides two 3.6m-wide travel lanes in each direction.

ALTERNATIVE: (sketch attached)

Provide two 3.3m-wide travel lanes in each direction.

ADVANTAGES:

- Reduces construction cost
- Reduces maintenance area
- More consistent lane width

DISADVANTAGES:

- Reduces travel width

DISCUSSION:

The other two roadway projects in this corridor (P.I. Nos. 342080 and 351090) provide 3.3m lanes. The traffic on the other segments is higher than the traffic on this segment. The truck percentage is 4% on this segment, which is moderately low. Since the traffic is lower and the truck percentage is moderate, using the 3.3m lanes will provide a satisfactory travelway.

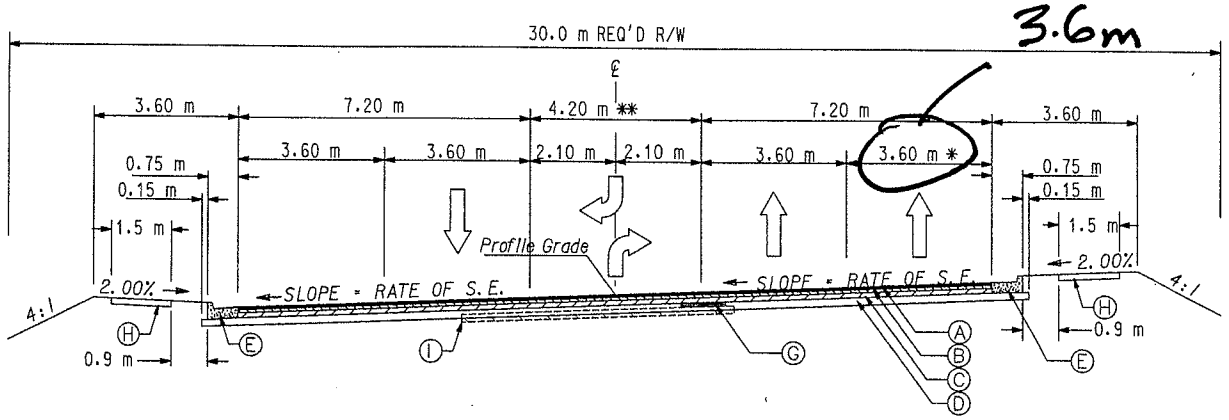
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 78,681	—	$ 78,681
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 78,681	—	$ 78,681

SKETCH

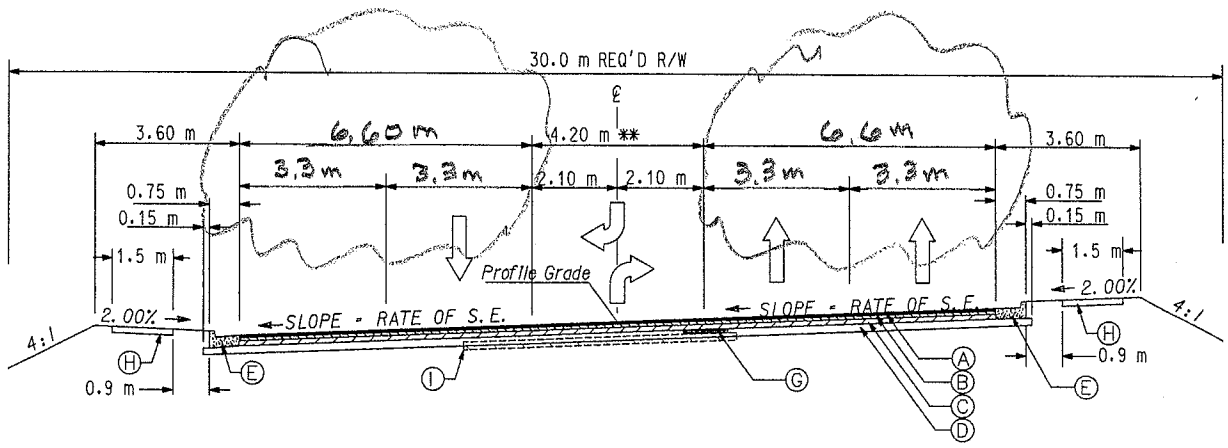
PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: E-10

ORIGINAL DESIGN [X] ALTERNATIVE DESIGN [ ] BOTH [ ] SHEET NO.: 2 of 4



ORIGINAL DESIGN [ ] ALTERNATIVE DESIGN [X] BOTH [ ]



PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** ALTERNATIVE NO.: **E-10**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

SHEET NO.: **3 of 4**

ASSUMPTIONS

Full depth paving cost per m^2

Use 60 kg/m^2/25 mm to convert depths to weights
MG = mega grams (1,000 grams)

38 mm of 9.5 mm Superpave @ $74.63/MG
$60(38/25) = (91.2kg/m^2)(\$74.63)/1000 = \$6.81/m^2$

50 mm of 19 mm Superpave @ $75.50/MG
$60(50/25) = (120kg/m^2)(\$75.50)/1000 = \$9.06/m^2$

100 mm of 25 mm Superpave @ $66.01/MG
$60(100/25) = (240kg/m^2)(\$66.01)/1000 = \$15.84/m^2$
250 mm GAB @ $19.68/MG

To convert $\#/ft^3$ to kg/m^3 multiply by 16.02
$(150\ \#/ft^3)(16.02) = 2403\ kg/m^3 = 2.4\ MG/m^3$
$0.25(1)(1)(2.403)(\$19.68/MG) = \$11.82/m^2$

Pavement unit price = \$6.81 + 9.06 + 15.84 + 11.82 = \$43.53/m^2

Pavement area reduction:

$L = 4(3.6 - 3.3)(6700 - 5391) = 1571\ m^2$

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-10**

SHEET NO.: **4 of 4**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Full Depth Pavement	M2	1,571	45.53	71,528			
Subtotal				71,528			
Markup (%) at 10%				7,153			
TOTAL				78,681			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-11**

DESCRIPTION: **REDUCE SHOULDER WIDTH FROM 3.6 M TO 3.0 M**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (sketch attached)

The original design provides 3.6m-wide shoulders in each direction.

ALTERNATIVE: (sketch attached)

Provide 3.0m-wide shoulders in each direction.

ADVANTAGES:

- Reduces construction cost
- Less earthwork required
- Reduces maintenance area

DISADVANTAGES:

- Reduces shoulder width

DISCUSSION:

The other two roadway projects in this corridor (P.I. Nos. 342080 and 351090) provide 3.0m shoulders. The traffic on the other segments is higher than the traffic on this segment. Since the traffic is lower and the truck percentage is moderate, using the 3.0m shoulders will be satisfactory.

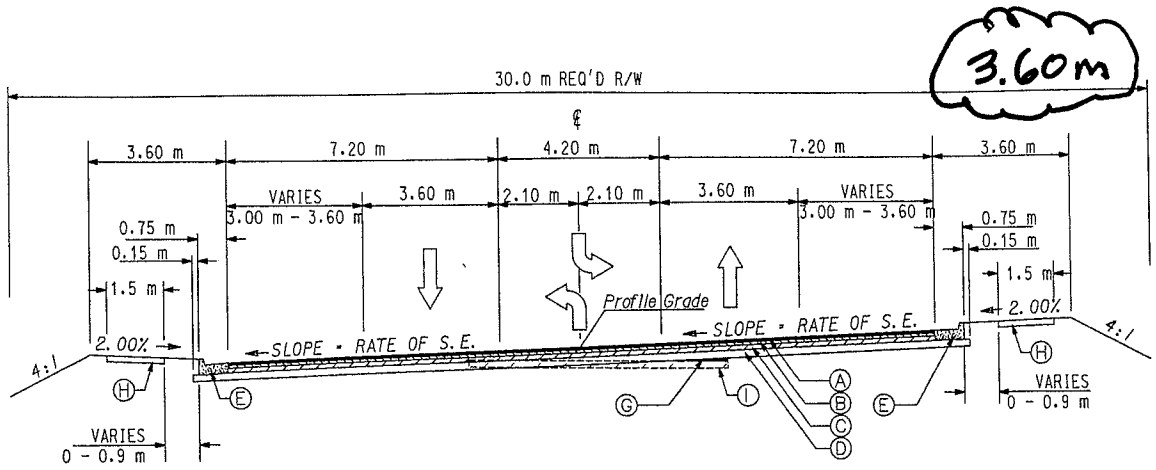
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 25,024	—	$ 25,024
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 25,024	—	$ 25,024

SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

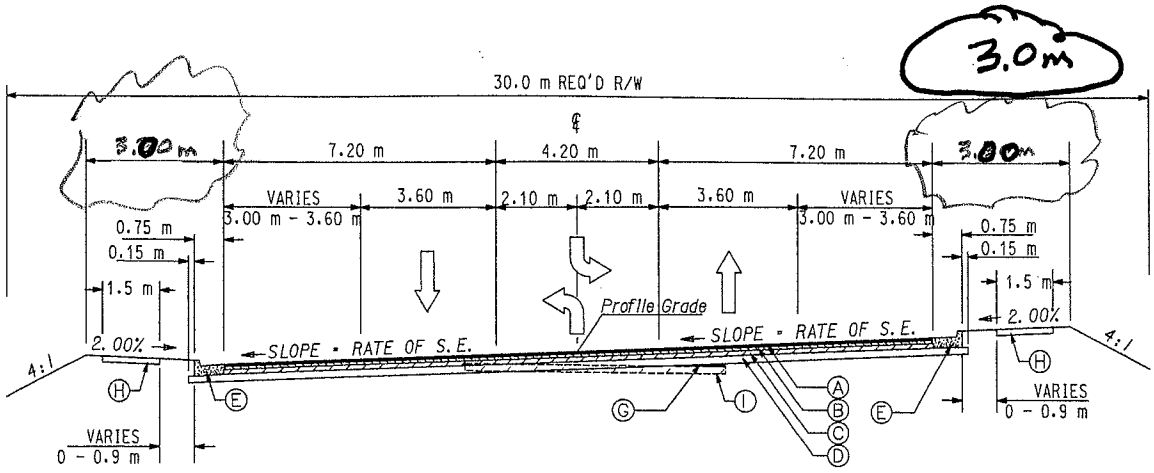
ALTERNATIVE NO.: E-11

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 2 of 4



JEFFERSONVILLE ROAD

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐



JEFFERSONVILLE ROAD

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-11**

SHEET NO.: **3 of 4**

COST ASSUMPTIONS

Earthwork

Assume 1.0m average depth of excavation

Earthwork volume = 2(0.6)(1)(6700-5391) = **1,570 m3**

For the unit cost, average the cost of the borrow excavation and unclassified excavation from the adjacent projects.

Earthwork Unit Cost =(12.11+16.86)/2 = **$14.49/m3**

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-11**

SHEET NO.: **4 of 4**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Earthwork	M3	1,570	14.49	22,749			
Subtotal				22,749			
Markup (%) at 10%				2,275			
TOTAL				25,024			

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** *P.I. Nos. 342080, 351095, 351080, 000835, 351090* ***Bibb County, Georgia – Preliminary Engineering Submittal***	ALTERNATIVE NO.: **E-12**
DESCRIPTION:	**AT RAILROAD BRIDGE, USE 100MM THICK CONCRETE PAVEMENT IN LIEU OF 450MM BETWEEN TRAFFIC BARRIERS AROUND COLUMN IN THE MEDIAN**	SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (sketch attached)

The original design provides 450mm-thick concrete pavement in the area between the traffic barriers in the median at the bridge column. The pavement thickness for the traffic lanes is also 450mm thick.

ALTERNATIVE: (sketch attached)

Use 100mm-thick concrete pavement between the barriers instead of 450mm. The pavement for the traffic lanes would remain using 450mm-thick concrete.

ADVANTAGES:

- Reduces construction cost

DISADVANTAGES:

- Minor change in the drawings

DISCUSSION:

The roadway under the railroad bridge is in the path of the emergency spillway for the reservoir and water may flow over the traffic lanes and the median during peak storms. The 450mm concrete pavement for the traffic lanes appears appropriate based upon the truck volumes but is excessive for the non-load bearing raised median area between the barriers. It appears that the original intention was to keep the concrete paving between the barriers the same 450mm thickness as the travel lanes, but it does not appear to be necessary since there is no traffic on the pavement. In the unlikely event that the water reached an elevation above the barrier, the 100 mm of concrete would be sufficient unless scour velocities are extreme. If water velocities are expected to be above 10 to 12 fps, some reinforcing steel could be added to the 100mm-thick pavement between the barriers.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 36,818	—	$ 36,818
ALTERNATIVE	$ 9,194	—	$ 9,194
SAVINGS	$ 27,624	—	$ 27,624

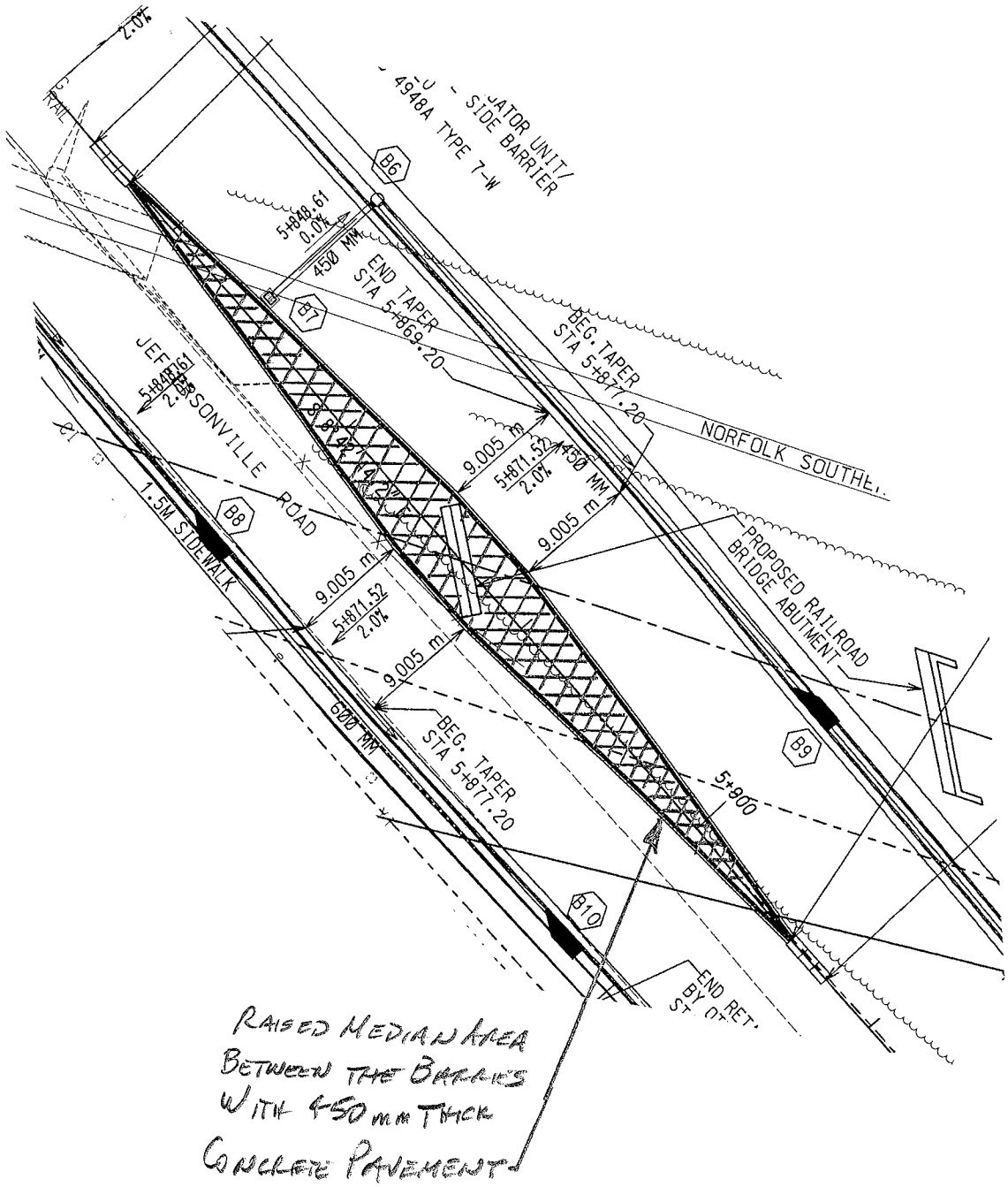
SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: E-12

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☒

SHEET NO.: 2 of 6



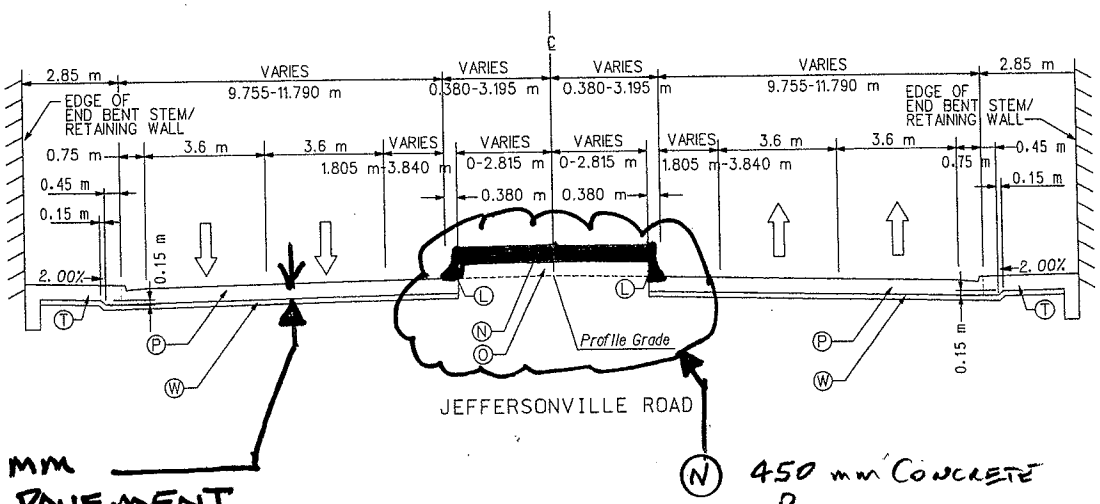
SKETCH

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

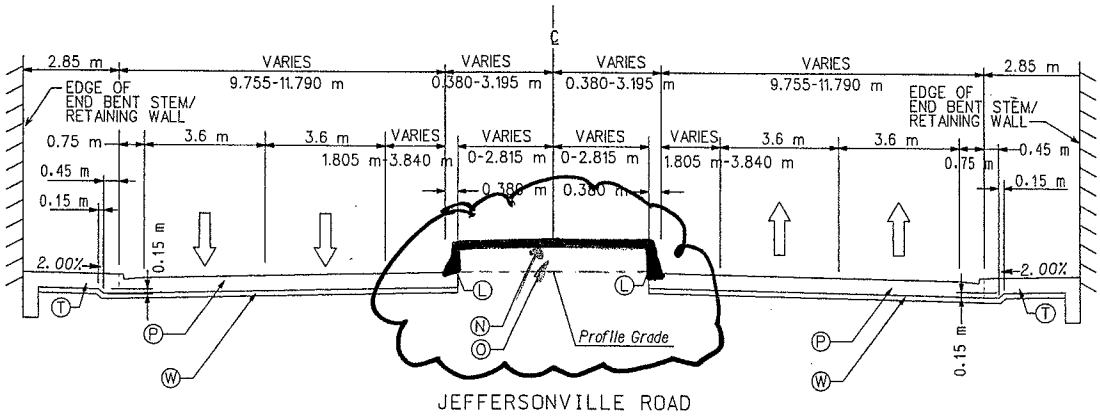
ALTERNATIVE NO.: E-12

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐

SHEET NO.: 4 of 6



ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐



PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-12**

SHEET NO.: **5 of 6**

ASSUMPTIONS

Length of barrier = 5911.2 – 5835.2 = 76 m

Width back of barrier to back of barrier = 5.5 m

Column size = 8.5 m X 1.4 m

Original Design:

Concrete pavement volume = $0.5(76)(5.5)(.45) - 8.5(1.4)(.45) = 89\ m^3$

Alternative Design:

Concrete pavement volume = $.5(76)(5.5)(.10) - 8.5(1.4)(.10) = 20\ m^3$

Earth backfill volume = $89 - 20 = 69\ m^3$

Use the Class A concrete unit price of $\$376.08/m^3$

Use $\$12.11/m^3$ for earth backfill (from project P.I. No. 342080)

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-12**

SHEET NO.: **6 of 6**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Class A Concrete	M3	89	376.08	33,471	20	376.08	7,522
Earth Backfill	M3				69	12.11	836
Subtotal				33,471			8,358
Markup (%) at 10%				3,347			836
TOTAL				36,818			9,194

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-13**

DESCRIPTION: **REALIGN JEFFERSONVILLE ROAD, REDUCE THE SKEW FROM 30° TO 39°, AND SHORTEN THE RAILROAD BRIDGE FROM 75.4M TO 59.9M**

SHEET NO.: **1 of 7**

ORIGINAL DESIGN: (sketch attached)

In the original design Jeffersonville Road crosses under the Norfolk Southern Railway with a skew of 30°, requiring a bridge length of 75.4 meters.

ALTERNATIVE: (sketch attached)

Move the alignment of Jeffersonville Road slightly to the north, on the west side of the railroad bridge, to cross at a skew angle of 39° degrees. The revised alignment will require the use of shorter radius curves on either side of the bridge, but will allow the bridge length to be reduced from 75.4m to 59.9m.

ADVANTAGES:

- Shortens bridge length
- Reduces bridge cost
- Less bridge to maintain

DISADVANTAGES:

- Additional right-of-way
- Redesign of spillway and roadway alignment

DISCUSSION:

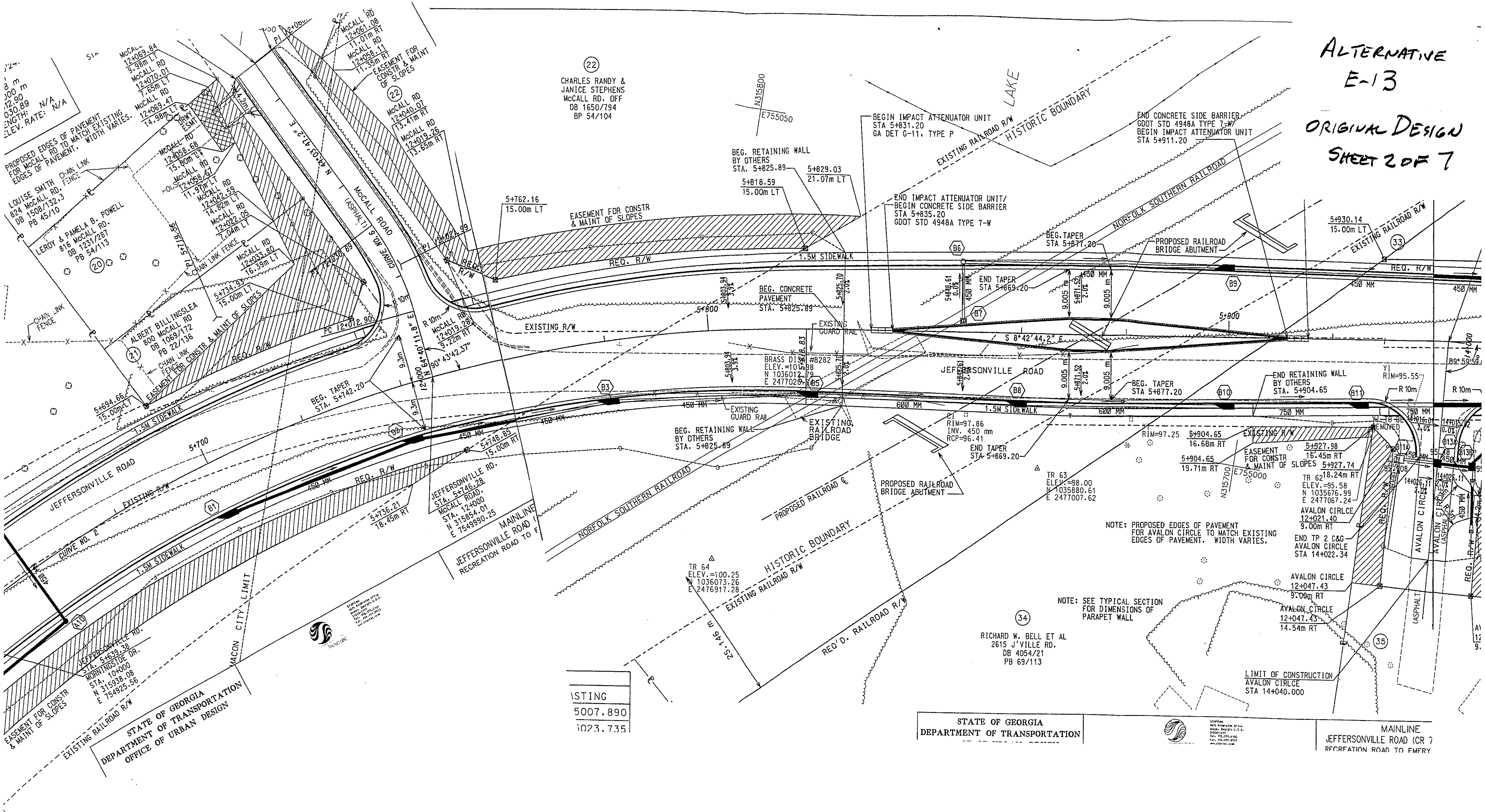
There is so much skew on Jeffersonville Road that the substructure for the railroad bridge cannot be constructed efficiently, resulting in a larger median area at the bridge. By shifting the alignment approximately 10 meters to the north on the west side of the bridge and modifying the curve radius the angle of crossing can be increased from 30° to about 39°. This results in a shorter bridge. Additional right-of-way will be required for this alternative to account for the two curves. There are no residences or businesses in this area, so there will be no additional displacements.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 596,024	—	$ 596,024
ALTERNATIVE	$ 24,180	—	$ 24,180
SAVINGS	$ 571,844	—	$ 571,844

ALTERNATIVE E-13

ORIGINAL DESIGN

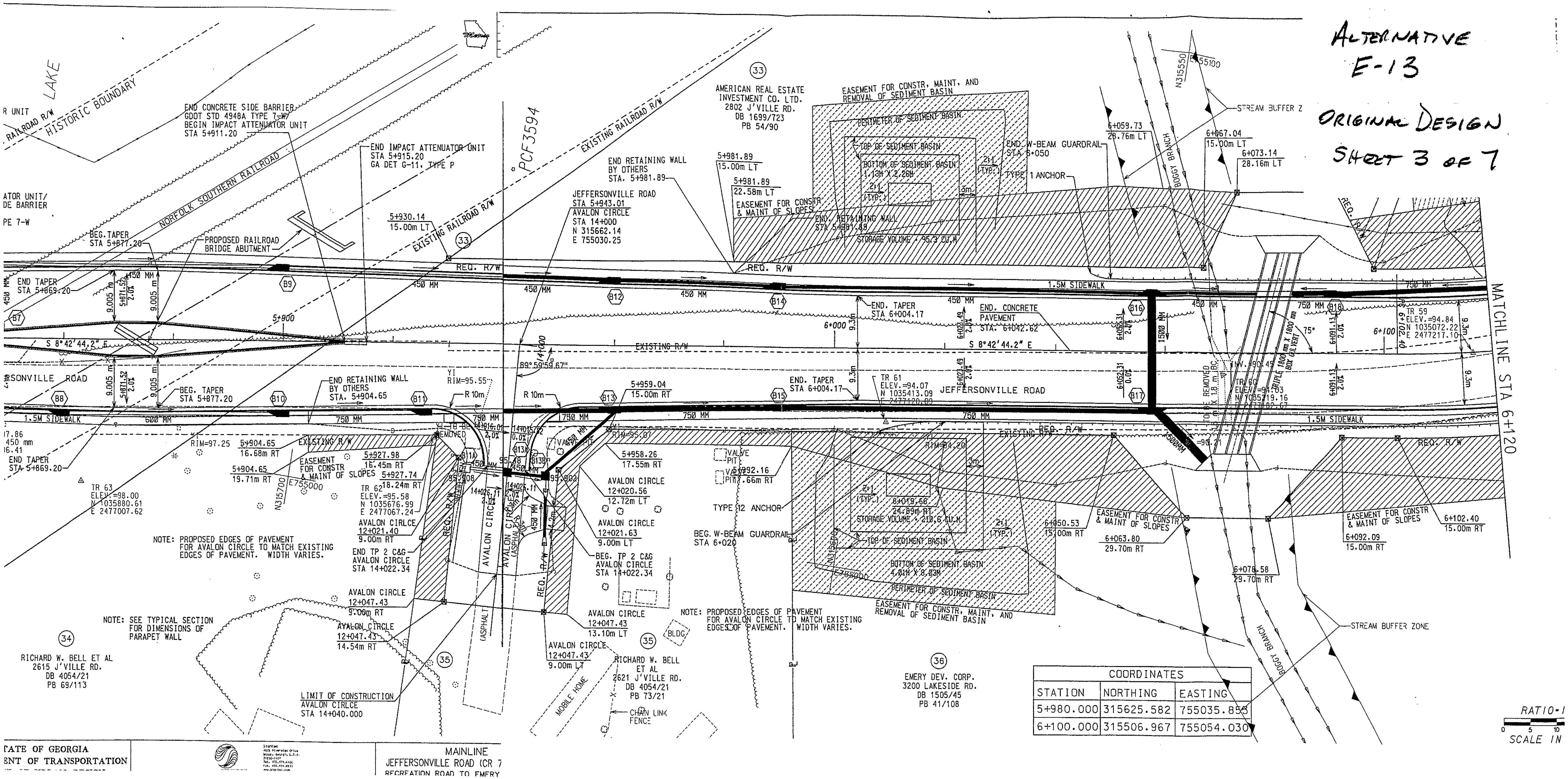
SHEET 2 OF 7



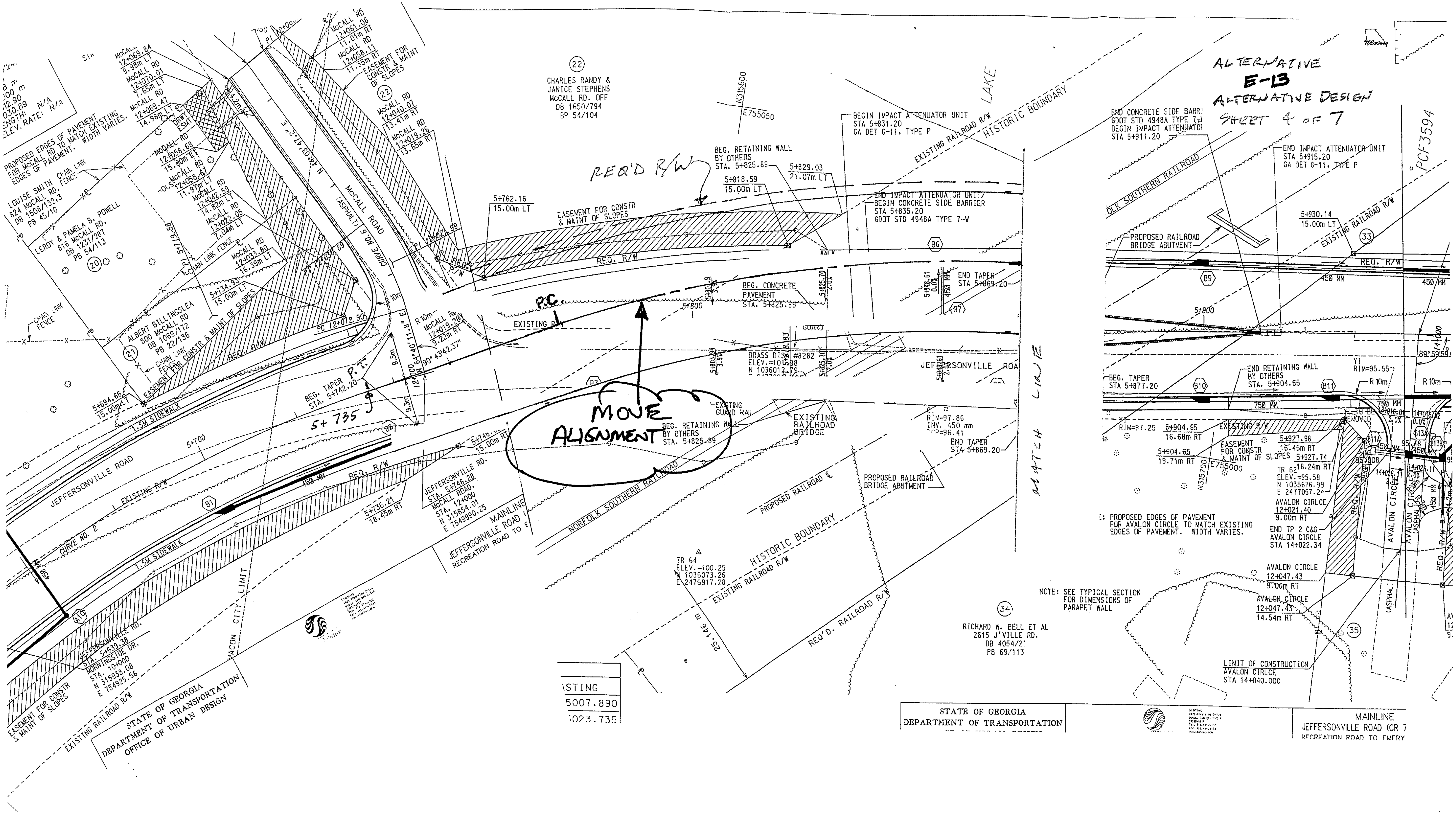
ALTERNATIVE E-13

ORIGINAL DESIGN

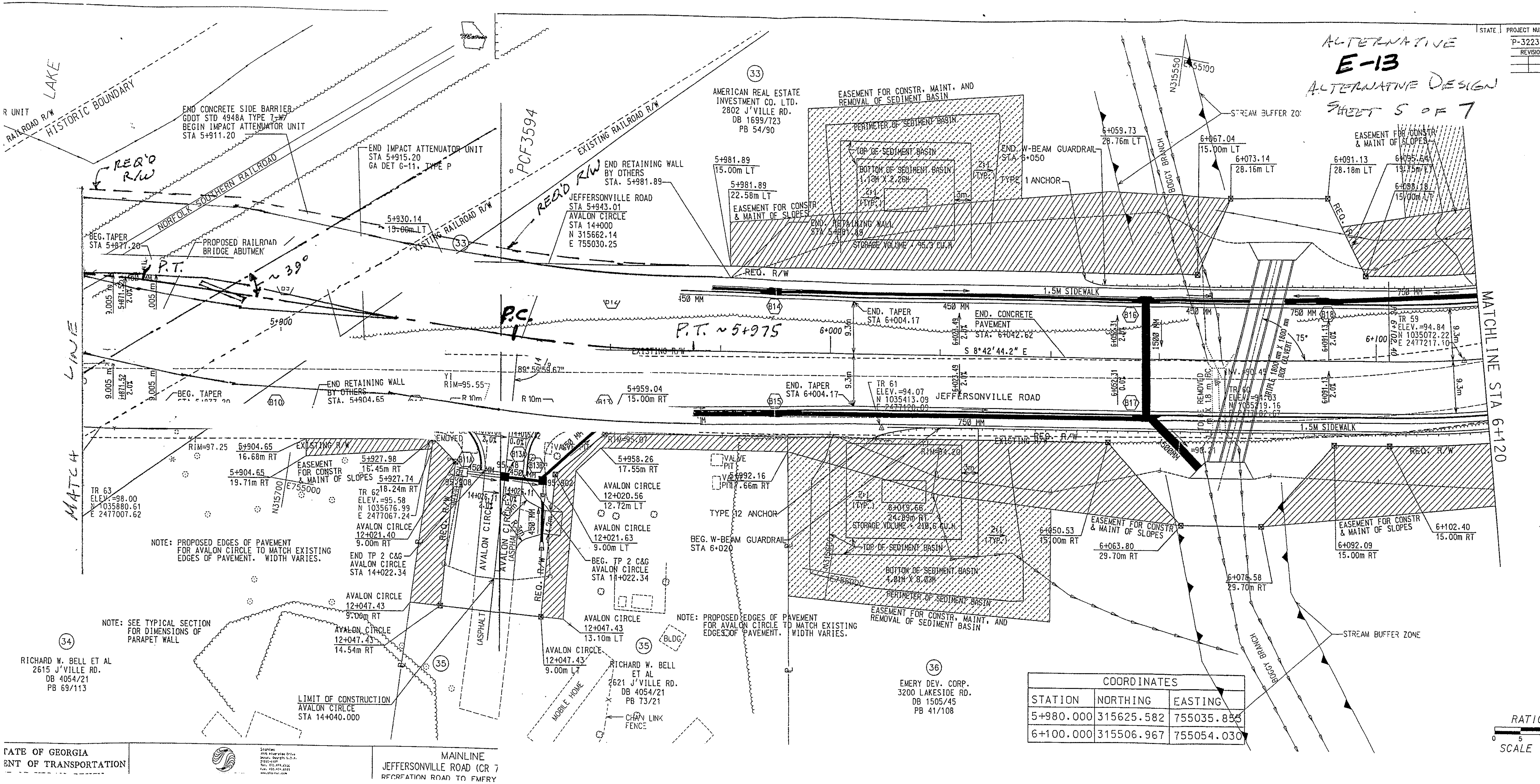
SHEET 3 OF 7



COORDINATES		
STATION	NORTHING	EASTING
5+980.000	315625.582	755035.855
6+100.000	315506.967	755054.030



ALTERNATIVE E-13
ALTERNATIVE DESIGN
SHEET 4 OF 7
REQ'D R/W
MOVE ALIGNMENT
P.C.
P.T.
5+735
CHARLES RANDY & JANICE STEPHENS McCALL RD. OFF DB 1650/794 BP 54/104
LOUISE SMITH 824 McCALL RD. DB 1508/132.3 PB 45/10
LEROY & PAMELA B. POWELL 816 McCALL RD. DB 1231/287 PB 54/113
ALBERT BILLINGSLEA 800 McCALL RD DB 1069/172 PB 22/136
RICHARD W. BELL ET AL 2615 J'VILLE RD. DB 4054/21 PB 69/113
PROPOSED EDGES OF PAVEMENT FOR McCALL RD TO MATCH EXISTING EDGES OF PAVEMENT. WIDTH VARIES.
McCALL ROAD (ASPHALT)
CURVE NO. 6
CURVE NO. 2
JEFFERSONVILLE ROAD
EASEMENT FOR CONSTR & MAINT OF SLOPES
BEGIN IMPACT ATTENUATOR UNIT STA 5+831.20 GA DET G-11, TYPE P
BEG. RETAINING WALL BY OTHERS STA. 5+825.89
END IMPACT ATTENUATOR UNIT/ BEGIN CONCRETE SIDE BARRIER STA 5+835.20 GDOT STD 4948A TYPE 7-W
BEG. CONCRETE PAVEMENT STA. 5+825.89
END TAPER STA 5+869.20
BEG. TAPER STA. 5+742.20
EXISTING RAILROAD BRIDGE
PROPOSED RAILROAD BRIDGE ABUTMENT
PROPOSED RAILROAD
NORFOLK SOUTHERN RAILROAD
HISTORIC BOUNDARY
EXISTING RAILROAD R/W
REQ'D. RAILROAD R/W
LAKE
MATCH LINE
MACON CITY LIMIT
NOTE: SEE TYPICAL SECTION FOR DIMENSIONS OF PARAPET WALL
END CONCRETE SIDE BARRIER GDOT STD 4948A TYPE 7 BEGIN IMPACT ATTENUATOR STA 5+911.20
END IMPACT ATTENUATOR UNIT STA 5+915.20 GA DET G-11, TYPE P
PROPOSED RAILROAD BRIDGE ABUTMENT
BEG. TAPER STA 5+877.20
END RETAINING WALL BY OTHERS STA. 5+904.65
PROPOSED EDGES OF PAVEMENT FOR AVALON CIRCLE TO MATCH EXISTING EDGES OF PAVEMENT. WIDTH VARIES.
LIMIT OF CONSTRUCTION AVALON CIRCLE STA 14+040.000
STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF URBAN DESIGN
MAINLINE JEFFERSONVILLE ROAD (CR 7) RECREATION ROAD TO EMERY
PCF3594



COORDINATES		
STATION	NORTHING	EASTING
5+980.000	315625.582	755035.853
6+100.000	315506.967	755054.030

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

MAINLINE
JEFFERSONVILLE ROAD (CR 7
RECREATION ROAD TO EMERY

CALCULATIONS

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-13**

SHEET NO.: **6 of 7**

Original Design:
Bridge length = 75.4 m
Skew angle = 30°

Alternative Design:
Skew angle = 39°
Bridge length = (75.4)(sin 30)/(sin 39) = 59.9 m
Reduced bridge area = 6.71(75.4 – 59.9) =104 m^2

Additional R/W:
Length of additional R/W = 5975 – 5735 = 240 m
Additional R/W = 240(10)(0.5) = 1200 m^2 = 13,000 SF

Bridge unit cost = \$2,636,024/[75.4(6.71)] = \$5,210/m^2

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION** ALTERNATIVE NO.: **E-13**

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia - Preliminary Engineering Submittal

SHEET NO.: **7 of 7**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Bridge Area	M2	104	5,210.00	541,840			
Construction Subtotal				541,840			
Const. markup @ 10%				54,184			
Construction Total				596,024			
Right-of-way	SF				13,000	0.75	9,750
Right-of-way Subtotal							9,750
Right-of-way Markup @ 148%							14,430
Right-of-way Total							24,180
Subtotal				596,024			24,180
Markup (%) at	**Included**						
TOTAL				596,024			24,180

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-16**

DESCRIPTION: **BUILD A THREE-LANE ROADWAY ON JEFFERSONVILLE ROAD WITH RURAL DITCH SECTION ON RIGHT-OF-WAY FOR FUTURE FIVE-LANE URBAN SECTION**

ORIGINAL DESIGN:

The original design proposes widening Jefferson Road from existing two lanes to a five-lane section including urban shoulder with curb and gutter.

ALTERNATIVE: (sketch attached)

Build a three-lane project along the full alignment of P.I. No. 351080 with a rural ditch section in lieu of curb and gutter on right-of-way, preserving right-of-way for a future urban five-lane section.

ADVANTAGES:

- Reduces construction cost
- Reduces construction time
- Preserves right-of-way for a future five-lane roadway
- Less maintenance of traffic due to reduced number of cross drains

DISADVANTAGES:

- Less traffic capacity initially
- Lower level of service
- Future construction phase required

DISCUSSION:

Build only three lanes with a ditch section on five lanes of right-of-way. The five lanes of right-of-way will provide enough area for the outside ditch section and preserve the right-of-way for a future five-lane widening project. Also a ditch section would save the urban drainage cost (longitudinal pipe and drainage structures). A future five-lane widening project would include the urban drainage system. Jeffersonville Road approaching Emery Highway would require the proposed five-lane section because of the higher traffic volumes. It will not be a problem ending the urban drainage system at this location since Jeffersonville Road is at a crest at this intersection. The ditch section would require side drain pipes under each driveway this cost was included in the cost comparison.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 984,656	—	$ 984,656
ALTERNATIVE	$ 41,627	—	$ 41,627
SAVINGS	$ 943,029	—	$ 943,029

Sketch 2/6

AH.E-16

COORDINATES		
STATION	NORTHING	EASTING
5+600.000	315961.082	754893.635
5+700.000	315893.780	754966.716

JEFFERSONVILLE RD. 5+700

5+600

5+500

5+800

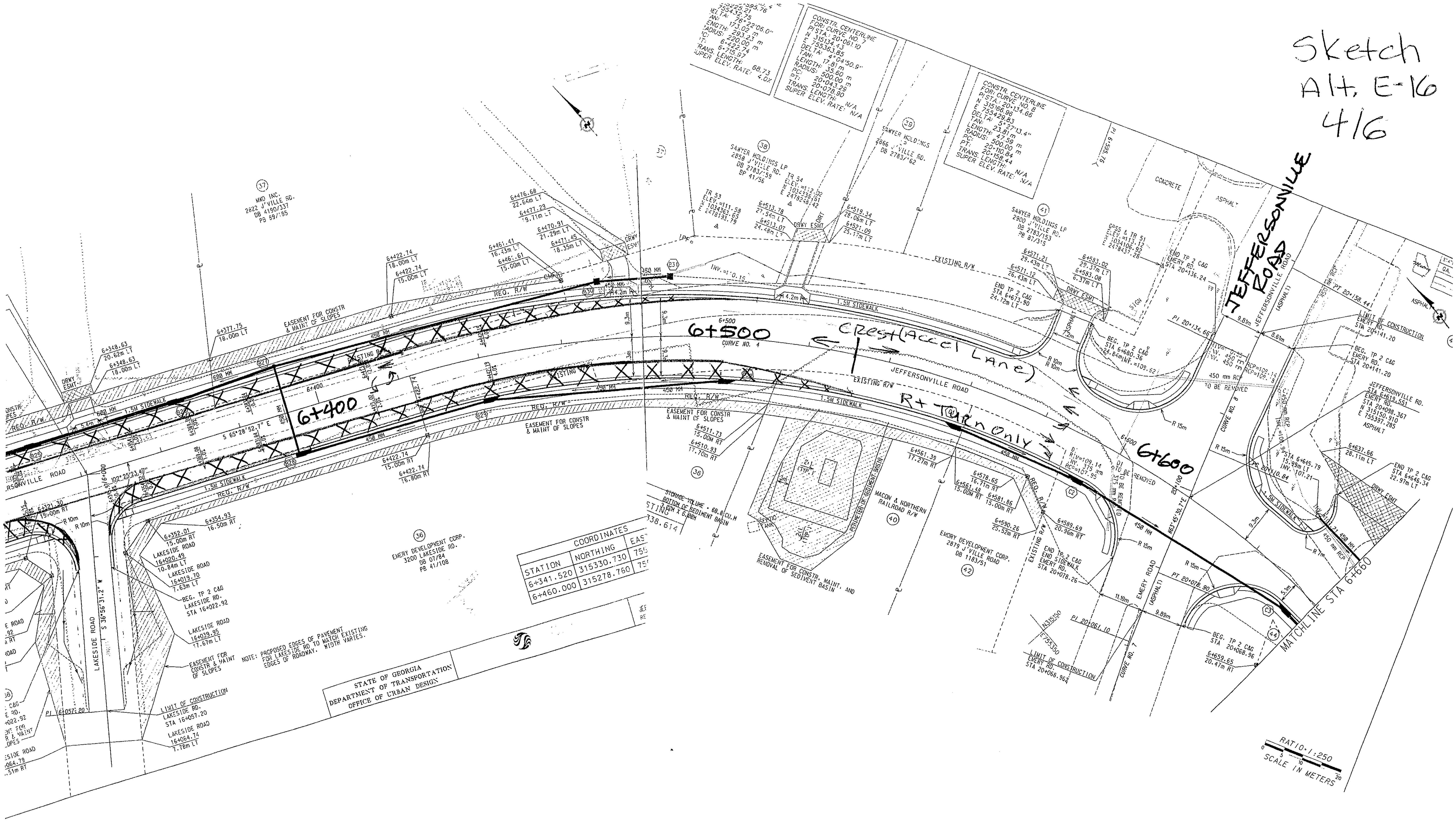
Sketch
AH. E-16
3/6

COORDINATES		
STATION	NORTHING	EASTING
5+980.000	315625.582	755035.853
6+100.000	315506.967	755054.030

COORDINATES		
STATION	NORTHING	EASTING

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

MAINLINE
JEFFERSONVILLE ROAD (SR 7
RECREATION ROAD TO EMERY


Sketch
Alt. E-16
4/6
JEFFERSONVILLE ROAD
6+400
6+500
6+600
Crest (Accel Lane)
Rt Turn only
JEFFERSONVILLE ROAD
LAKESIDE ROAD
EMERY ROAD
1.5M SIDEWALK
REQ. R/W
EXISTING R/W
EASEMENT FOR CONSTR & MAINT OF SLOPES
CURVE NO. 4
MACON & NORTHERN RAILROAD R/W
EMERY DEVELOPMENT CORP. 3200 LAKESIDE RD.
EMERY DEVELOPMENT CORP. 2879 J'VILLE ROAD
SAWYER HOLDINGS LP
MKD INC. 2822 J'VILLE RD.
NOTE: PROPOSED EDGES OF PAVEMENT FOR LAKESIDE RD TO MATCH EXISTING EDGES OF ROADWAY. WIDTH VARIES.
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN
COORDINATES
STATION | NORTHING
6+341.520 | 315330.730
6+460.000 | 315278.760
MATCHLINE STA 6+660
RATIO 1:250
SCALE IN METERS

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-16**

SHEET NO.: **5 of 6**

Original Design cost savings by implementing Alternate E-16 Design:

- Pavement area saved: 3.6m x 2 lanes x 1,100m = 7,920m2

Urban drainage saved:

Longitudinal Pipe:

- 905m of 450mm pipe
- 340m of 600mm pipe
- 285m of 750mm pipe

Drainage structures (catch basins and manholes) 34 each - saved

Length of curb and gutter saved: 1,100m x 2 sides = 2,200m

Earthwork would be approximately the same since there would be less because of building only 3-lanes, but there would be more because of the rural ditch section and some ditch protection.

Alternate Design added cost for driveway side drain pipes.

9 drives x 13m = 117m of 450mm pipe; 18 each flared end sections – 450mm

4 drives x 13m = 52m of 600mm 8 each flared end sections – 600mm

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION** ALTERNATIVE NO.: **E-16**

P.I. Nos. 342080, 351095, 351080, 0000835, 351090

Bibb County, Georgia - Preliminary Engineering Submittal

SHEET NO.: **6 of 6**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Original Cost saved							
Full-depth Pavement	m2	7,920	48.80	$386,496			
450mm pipe	m	905	136.98	$123,967			
600mm pipe	m	340	169.80	$57,732			
750mm pipe	m	285	231.31	$65,923			
Less Drainage Structures	ea	34	2,500.00	$85,000			
less Curb & Gutter	m	2,200	45.92	$101,024			
save 7.2m 1800mm x 900mm culvert	LS	1	25,000.00	$25,000			
save 7.2m 1800mm x 1800mm culver	LS	1	50,000.00	$50,000			
Alternate Added side drain pipe							
450mm pipe	m				117	136.98	$16,027
600mm pipe	m				52	169.80	$8,830
450mm - flared end section	ea				18	409.00	$7,362
600mm - flared end section	ea				8	703.00	$5,624
Subtotal				895,142			37,843
Markup (%) at 10%				89,514			3,784
TOTAL				984,656			41,627

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-17**

DESCRIPTION: **EXTEND CONCRETE PAVEMENT AT SPILLWAY AND RAILROAD TO IMPROVE SCOUR PROTECTION**

SHEET NO.: **1 of 1**

ORIGINAL DESIGN:

The concrete pavement below the railroad bridge begins at STA 5+826 and ends at STA 6+043.

ALTERNATIVE: (sketch attached)

Extend the concrete pavement below the railroad bridge to start at STA 5+760 and end it at STA 6+080.

ADVANTAGES:

- Concrete pavement extends for the length of area where the road acts as the emergency spillway
- Protects the roadway from scour

DISADVANTAGES:

- Additional cost of the concrete pavement
- Some coordination may be needed with the spillway design and hydraulic calculation

DISCUSSION:

The emergency spillway at the lake begins at STA 5+760 but the concrete pavement doesn't begin until 5+826. The other end of the concrete pavement ends at STA 6+043, for unknown reasons. The concrete pavement on the roadway should begin at STA 5+760 to match the beginning of the spillway at the lake and be extended to the low point near the culvert at STA 6+080. This longer area will provide additional protection to the roadway during emergency spillway operation and minimize potential scour damage to the pavement.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN			
ALTERNATIVE	DESIGN SUGGESTION		
SAVINGS			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-18**

DESCRIPTION: **REVISE DRAINAGE PIPING NETWORK BETWEEN STA 5+437 AND 5+742 TO REDUCE PIPING LENGTH AND NUMBER OF CATCH BASINS**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN:

Construct drainage pipes on the north as well as the south side of Jeffersonville Road.

ALTERNATIVE: (sketch attached)

Add two 450 mm cross drains and eliminate half of the pipe lengths on the south side of Jeffersonville Road.

ADVANTAGES:

- Reduces project cost
- Less trench length
- Eliminates unneeded cross drains

DISADVANTAGES:

- Jeffersonville Road will need two trenches crossing traffic

DISCUSSION:

The profile of Jeffersonville Road indicates crest at roughly STA 5+648, which is to the west of the 450mm RCP crossing the road. It makes more sense to move catch basin B-1 to the west and tie drop inlet A-11 to B-1 Also, since the cross slope of the road is zero at STA 5+540, move catch basin A-7 to STA 5+540 and tie it to catch basin A-4, eliminating the need to run pipes further west.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 40,948	—	$ 40,948
ALTERNATIVE	$ 25,512	—	$ 25,512
SAVINGS	$ 15,436	—	$ 15,436

E-18

Original Design

Sheet 2 of 5

CONSTR. CENTERLINE
FOR: CURVE NO. 1
P.I.STA.: 5+456.10
N 316038.77
E 754772.31
DELTA: -7° 12'19.9"
TAN: 64.867 m
LENGTH: 129.56 m
RADIUS: 1030.23 m
P.C.: 5+391.24
P.T.: 5+520.80
TRANS. LENGTH: 36.66 m
SUPER ELEV. RATE: 4.2%

CONSTR. CENTERLINE
FOR: CURVE NO. 2
P.I.STA.: 5+719.56
N 315896.61
E 754994.32
DELTA: 48° 39'18.1"
TAN: 113.02 m
LENGTH: 212.30 m
RADIUS: 250.000 m
P.C.: 5+606.53
P.T.: 5+818.83
TRANS. LENGTH: 67.58 m
SUPER ELEV. RATE: 3.9%

CONSTR. CENTERLINE
FOR: CURVE NO. 5
P.I.STA.: 10+036.640
N 315946.780
E 754961.160
DELTA: -47° 12'08.8"
TAN: 21.85 m
LENGTH: 41.19 m
RADIUS: 50.000 m
P.C.: 10+014.80
P.T.: 12+055.99
TRANS. LENGTH: N/A
SUPER ELEV. RATE: N/A

STATION	NORTHING	EASTING
5+600.000	315961.082	754893.635
5+700.000	315893.780	754966.716

CONSTR. CENTERLINE
FOR: CURVE NO. 6
P.I.STA.: 12+021.99
N 315863.420
E 755010.130
DELTA: 20° 36'24.6"
TAN: 9.09 m
LENGTH: 17.98 m
RADIUS: 50.000 m
P.C.: 12+012.90
P.T.: 12+030.89
TRANS. LENGTH: N/A
SUPER ELEV. RATE: N/A

NOTE: PROPOSED EDGES OF PAVEMENT FOR McCALL RD TO MATCH EXISTING EDGES OF PAVEMENT. WIDTH VARIES.

SILT CONTROL GATE TO BE INSTALLED ON PROPOSED CULVERT
EXISTING AREA TO BE USED AS TEMPORARY SEDIMENT BASIN.
PERIMETER OF SEDIMENT BASIN WILL BE 99.2M CONTOUR.
UPON REMOVAL OF SILT CONTROL GATE, AREA SHALL BE
REGRADED TO EXISTING CONDITIONS AND PERMANENTLY GRASSED.

AMERSON PROPERTIES LTD. 2320 J'VILLE RD. DB 4179/204

LEE B. BROWN 2400 J'VILLE RD. DB 1667/78 PB 15/170

MOSES JACKSON 2420 J'VILLE RD. DB 1585/487,9 PB 15/170

HENRY C. FICKLIN 2434 J'VILLE RD. DB 1350/500 PB 15/170

JOHN EUGENE LISTER ESTATE 2468 J'VILLE RD DB 2151/204

AUDREY FREDESIA (DEEDA) COLEMAN BROWN 2462 J'VILLE RD. DB 2151/204

CHARLES KIND 2476 J'VILLE RD. DB 2621/98 PB 15/170

OSGOOD MARION LOCKETT 2490 J'VILLE RD. DB 2596/318 PB 15/170

MICHAEL J GORDON 2508 J'VILLE RD. DB 4216/13 PB 43/90

LOUISE SMITH 824 McCALL RD. DB 1508/132,3 PB 45/10

LEROY & PAMELA B. POWELL 816 McCALL RD. DB 1231/287 PB 54/113

ALBERT BILLINGSLEA 800 McCALL RD DB 1069/172 PB 22/136

PARK INVESTORS I LTD. 2375 J'VILLE ROAD DB 2021/199

JEFFERSONVILLE ROAD

PERRY DRIVE

MORNINGSIDE DRIVE

McCALL ROAD

CURVE NO. 1

CURVE NO. 2

LIMIT OF CONSTRUCTION MORNINGSIDE DR. STA. 10+067.17

END TAPER BEG. TP 2 C&G MORNINGSIDE DR. STA. 10+067.17

END TAPER END TP 2 C&G STA. 10+067.17

BEGIN TP 2 C&G STA. 5+526.61

END TP 2 C&G STA. 5+519.81

BEG. TAPER STA. 10+051.17

PT 10+055.99

PI 10+036.64

PI 5+719.56

PT 5+606.53

BEG. TAPER STA. 5+742.20

END TAPER STA. 5+408.03

EASEMENT FOR CONSTR & MAINT OF SLOPES

EASEMENT FOR CONSTR & MAINT OF SLOPES

EASEMENT FOR CONSTR & MAINT OF SLOPES

EASEMENT FOR CONSTR & MAINT OF SLOPES

EASEMENT FOR CONSTR, MAINT, AND REMOVAL OF SEDIMENT BASIN

PERIMETER OF SEDIMENT BASIN

TOP OF SEDIMENT BASIN

BOTTOM OF SEDIMENT BASIN
1.13M X 2.26M
STORAGE VOLUME = 38.7 CU.M

TRIPLE 1800 mm X 900 mm BOX CULVERT

FLOW

EXISTING R/W

REQ. R/W

EXISTING RAILROAD R/W

1.5M SIDEWALK

450 MM

600 MM

C-AN LNK FENCE

CHAIN LINK FENCE

ASPHALT

HOUSE

BLDG

DRWY ESMT

COORDINATES		
STATION	NORTHING	EASTING
5+440.000	316049.985	754760.669
5+540.000	315993.437	754843.106

RATIO: 1 IN 5 0 10 SCALE

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

MAINLINE PLAN
JEFFERSONVILLE ROAD (CR 727) RECONSTRUCT
RECREATION ROAD TO EMERY ROAD (US 80, SR

E-18

Alternate Design

Sheet 3 of 5

CONSTR. CENTERLINE
FOR: CURVE NO. 1
PI STA.: 5+456.10
N 316038.77
E 754772.131
DELTA: -2° 12'19.9"
TAN: 64.867 m
LENGTH: 129.56 m
RADIUS: 1030.23 m
PC: 5+391.24
PT: 5+520.80
TRANS. LENGTH: 36.66 m
SUPER ELEV. RATE: 2.2%

CONSTR. CENTERLINE
FOR: CURVE NO. 2
PI STA.: 5+719.56
N 315896.61
E 754994.32
DELTA: 48°39'18.1"
TAN: 113.02 m
LENGTH: 212.30 m
RADIUS: 250.000 m
PC: 5+606.53
PT: 5+818.83
TRANS. LENGTH: 67.58 m
SUPER ELEV. RATE: 3.9%

CONSTR. CENTERLINE
FOR: CURVE NO. 5
PI STA.: 10+036.640
N 315946.780
E 754961.160
DELTA: -47° 12'08.8"
TAN: 21.85 m
LENGTH: 41.19 m
RADIUS: 50.000 m
PC: 10+014.80
PT: 12+055.99
TRANS. LENGTH: N/A
SUPER ELEV. RATE: N/A

CONSTR. CENTERLINE
FOR: CURVE NO. 6
PI STA.: 12+021.99
N 315863.420
E 755010.130
DELTA: -20° 36'24.6"
TAN: 9.09 m
LENGTH: 17.98 m
RADIUS: 50.000 m
PC: 12+012.90
PT: 12+030.89
TRANS. LENGTH: N/A
SUPER ELEV. RATE: N/A

STATION	NORTHING	EASTING
5+600.000	315961.082	754893.635
5+700.000	315893.780	754966.716

COORDINATES		
STATION	NORTHING	EASTING
5+440.000	316049.985	754760.669
5+540.000	315993.437	754843.106

NOTE: PROPOSED EDGES OF PAVEMENT FOR McCALL RD TO MATCH EXISTING EDGES OF PAVEMENT. WIDTH VARIES.

SILT CONTROL GATE TO BE INSTALLED ON PROPOSED CULVERT. EXISTING AREA TO BE USED AS TEMPORARY SEDIMENT BASIN. PERIMETER OF SEDIMENT BASIN WILL BE 99.2M CONTOUR. UPON REMOVAL OF SILT CONTROL GATE, AREA SHALL BE REGRADED TO EXISTING CONDITIONS AND PERMANENTLY GRASSED.

Eliminate

Eliminate

FLOW

450mm

600mm

AMERSON PROPERTIES LTD. 2320 J'VILLE RD. DB 4729/204

LEE B. BROWN 2400 J'VILLE RD. DB 1667/78 PB 15/170

MOSES JACKSON 2420 J'VILLE RD. DB 1585/487.9 PB 15/170

HENRY C. FICKLIN 2434 J'VILLE RD. DB 1350/500 PB 15/170

JOHN EUGENE LISTER ESTATE 2448 J'VILLE RD DB 2151/204

AUDREY FREDESIA (DEEDA) COLEMAN BROWN 2462 J'VILLE RD. DB 2151/204

CHARLES KIND 2476 J'VILLE RD. DB 4621/98 PB 15/170

OSGOOD MARION LOCKETT 2490 J'VILLE RD. DB 2596/318 PB 15/170

MICHAEL J GORDON 2508 J'VILLE RD. DB 4216/13 PB 43/90

LOUISE SMITH 824 McCALL RD. DB 1508/132.3 PB 45/10

LEROY & PAMELA B. POWELL 816 McCALL RD. DB 1231/287 PB 54/113

ALBERT BILLINGSLEA 800 McCALL RD DB 1069/172 PB 22/136

PARK INVESTORS I LTD. 2375 J'VILLE ROAD DB 2021/199

PERRY DRIVE (ASPHALT)

MORNINGSIDE DRIVE

JEFFERSONVILLE ROAD

CURVE NO. 1

CURVE NO. 5

EXISTING RAILROAD R/W

REQ. R/W

EXISTING R/W

1.5M SIDEWALK

4.5M SIDEWALK

TRIPLE 1800 mm x 900 mm CMP CULVERT

TOP OF SEDIMENT BASIN

PERIMETER OF SEDIMENT BASIN

EASEMENT FOR CONSTR. MAINT. AND REMOVAL OF SEDIMENT BASIN

BOTTOM OF SEDIMENT BASIN 1.13M X 2.26M STORAGE VOLUME = 38.7 CU.M

EASEMENT FOR CONSTR & MAINT OF SLOPES

EASEMENT FOR CONSTR & MAINT OF SLOPES (TYP.)

LIMIT OF CONSTRUCTION MORNINGSIDE DR. STA. 10+067.17

END TAPER BEG. TP 2 C&G MORNINGSIDE DR. STA. 10+067.17

END TAPER END TP 2 C&G STA. 10+067.17

BEG. TAPER STA. 10+057.17

BEG. TAPER STA. 5+742.20

END TAPER STA. 5+408.03

END TAPER STA. 5+408.03

END TP 2 C&G STA. 5+519.81

BEGIN TP 2 C&G STA. 5+526.61

JEFFERSONVILLE RD. STA. 5+639.38 MORNINGSIDE DR. STA. 10+000 N 315938.08 E 754925.56

McCALL ROAD STA. 12+000 N 315854.01 E 7549990.25

MACON CITY LIMIT

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF URBAN DESIGN

MAINLINE PLAN
JEFFERSONVILLE ROAD (CR 727) RECONSTRUC
RECREATION ROAD TO EMERY ROAD (US 80, SR

RATIO-1
0 5 10
SCALE IN

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

ALTERNATIVE NO.: E-18

SHEET NO.: 4 of 5

450 mm RCP :

Existing lengths from the triple Box Culvert to the east upto the catch basin 'B2' → 65 m (Box Culvert to CB. 'A5')
→ 80 m (C.B. 'A7' to C.B. 'A11')
→ 25 m (C.B. 'B1' to C.B. 'B2')

Total : 170 m of existing 450 mm RCP

Proposed lengths from the triple box culverts to the east upto Catch Basin 'B2' → 60 m (C.B. 'A4' to C.B. 'A9')
→ 53 m (C.B. 'A11' to original location of C.B. 'B2')

Total : 113 m of proposed 450 mm RCP

600 mm RCP :

Existing length from triple box culvert to the east upto the catch basin 'A7' → 80 m

Proposed length from triple box culvert to the east upto the catch basin 'A4' → 65 m

Eliminate catch basins 'A6' and 'A10'

COST WORKSHEET

PROJECT: **JEFFERSONVILLE ROAD RECONSTRUCTION**
P.I. Nos. 342080, 351095, 351080, 0000835, 351090
Bibb County, Georgia - Preliminary Engineering Submittal

ALTERNATIVE NO.: **E-18**

SHEET NO.: **5 of 5**

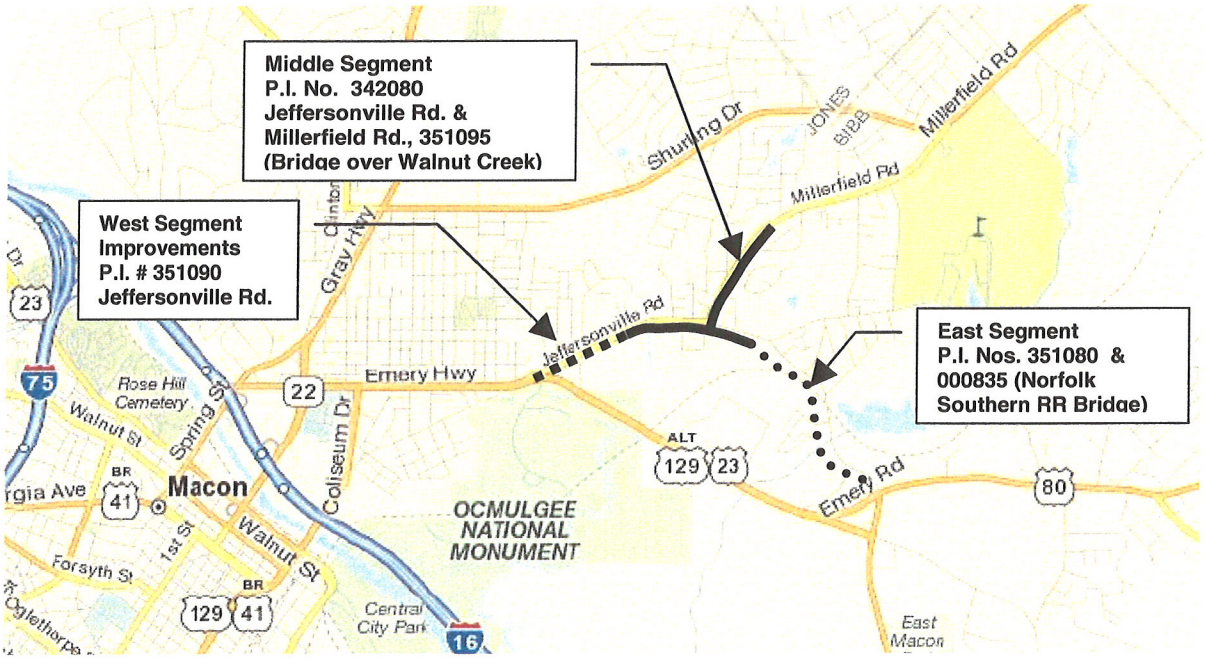
PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
450mm RCP Pipe	LM	170	120.87	20,548	113	120.87	13,658
600mm RCP Pipe	LM	80	146.69	11,735	65	146.69	9,535
Catch Basins	EA	2	2,471.01	4,942			
Subtotal				37,225			23,193
Markup (%) at 10%				3,723			2,319
TOTAL				40,948			25,512

PROJECT DESCRIPTION

The subject of the study was the Jeffersonville Road (CR 727) Reconstruction project located in Bibb County, comprising of the following project numbers:

- STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 3+109 to STA 1+852
- STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300, Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820
- BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek
- STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828
- STP00-0000-00(835), P.I. No. 000835 – Norfolk Southern Railway Bridge over Jeffersonville Road

Cunningham & Company Engineers is developing P.I. Nos. 342080 and 351090 to the preliminary design stage; Stantec is developing P.I. No. 351080; STV/Ralph Whitehead Associates, Inc. is designing the Norfolk Southern Railway Bridge, P.I. No. 000835; and GDOT in-house staff is designing the Walnut Creek Bridge, P.I. No. 351095. The total estimated construction cost for the combined 4.3km-long project is $29.1M plus an additional $9.3M for right-of-way purchase.



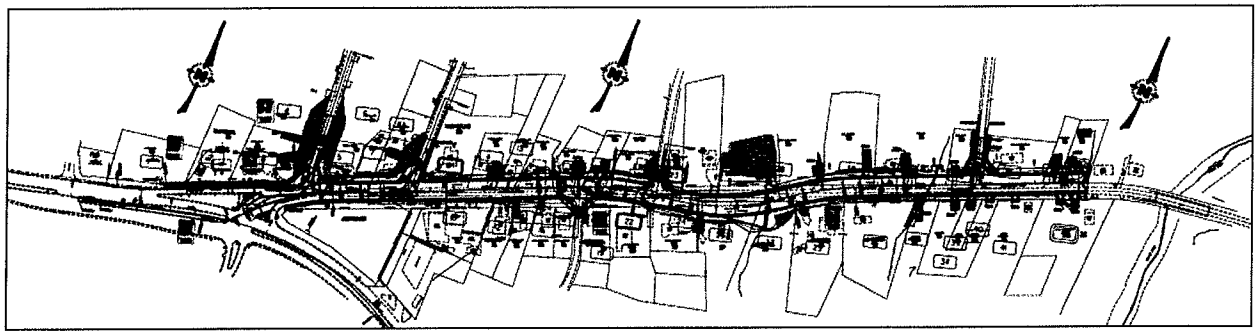
Project Segments

West Segment – P.I. #351090

Project STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 3+109 to STA 1+852, consists of the widening and reconstruction of Jeffersonville Road (CR727) from Emery Highway to Walnut Creek for a total length of 1.12 km. The existing route is a rural two-lane facility with 7.2m-wide pavement and 1.8m shoulders. The existing major structure is a narrow and structurally deficient 55.0m-long x 7.4m-wide bridge over Walnut Creek with a sufficiency rating of 21.7. Jeffersonville Road provides an alternate route to the congested US 129/Gray Highway corridor and provides relief for the congested Gray Highway/Shurling Drive intersection by allowing traffic between Milledgeville and Macon to bypass Gray Highway and this congested intersection. This project will result in an improved alternate route alleviating the current congested conditions on Gray Highway and provide an important connector to the Fall Line Freeway in east Macon. Safety in the corridor is also an issue with a total of 139 accidents occurring between the years 1993 and 1995. Of the 139 accidents, the vast majority were rear-end collisions.

The proposed project will improve the operational efficiency and capacity of the facility. The base year traffic (1999) varies from 12,220 vehicles per day (VPD) to 12,560 VPD and the design year traffic (2019) varies from 18,140 VPD to 21,380 VPD. The posted speed varies from 60 to 65km/h and the design speed is 70km/h.

Project STP00-3223-00(004), P.I. No. 351090, will widen Jeffersonville Road between the above termini from two to four 3.6m-wide lanes with a 4.2m-wide center turn lane and 1.525m-wide contiguous sidewalk on both sides. The proposed right-of-way is 30.0m-wide. No design exceptions are required to implement this project. Traffic will be maintained during the construction phase. Total estimated cost of construction is $1.7M.



WEST SEGMENT - JEFFERSONVILLE ROAD – P.I. No. 351090

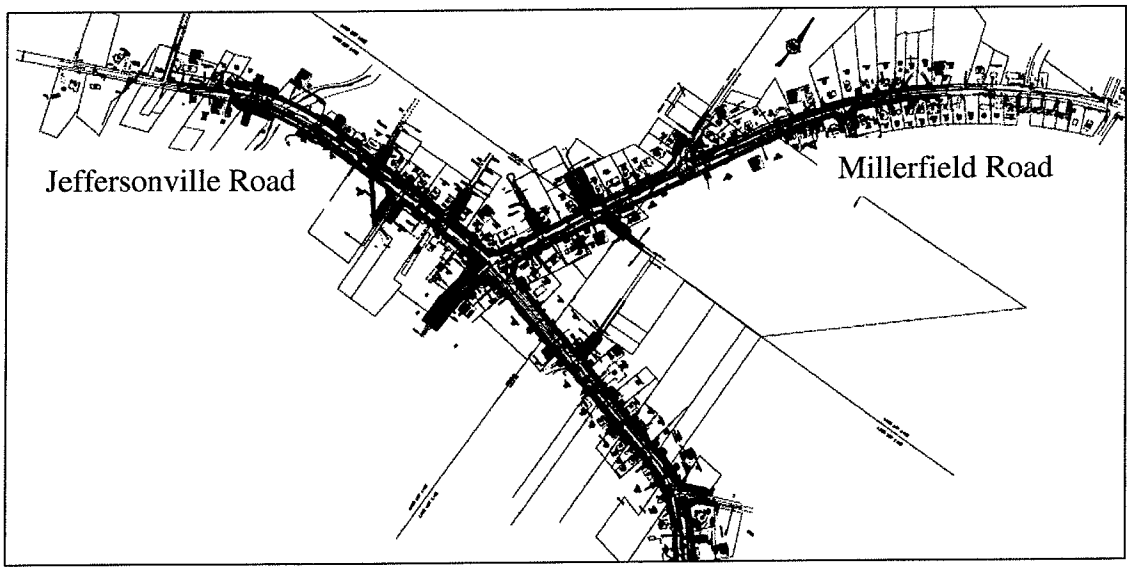
Middle Segment - P.I. No. 342080 and P.I. No. 351095 (Bridge over Walnut Creek)

Project STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300, and Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820 is a widening and reconstruction of Jeffersonville Road (CR 727) from Walnut Creek to Recreation Road and Millerfield Road (the continuation of CR 727) from Jeffersonville Road (CR 727) to Bristol Drive. The total project length is 1.76 km. The existing routes are rural two-lane facilities with a 7.2m total pavement width. Drainage ditches are located immediately adjacent to shoulders and often contain

utility poles in the back slopes. Jeffersonville Road and Millerfield Road provide an alternate route to the congested US 129/Gray Highway corridor.

The additional lane capacity is needed to accommodate future traffic growth along Jeffersonville and Millerfield Roads. The base year traffic (1999) varies from 12,220 VPD to 12,560 VPD and the design year traffic (2019) varies from 18,140 VPD to 21,380 VPD. The posted speed and the design speed vary from 60km/h to 65km/h. The proposed construction will provide four, 3.6m-wide lanes with a 4.2m-wide center turn lane and 1.525m-wide sidewalk on both sides for the entire project limit. The proposed right-of-way is 30.0m wide. The west terminus of this project ties to projects STP-3224(6) Bibb and BRMLB-3223(6) Bibb, with similar typical sections. The east terminus ties into a locally funded project to widen Millerfield Road from New Clinton Road to SR 49 to a three-lane urban section. An urban section is recommended for this project to reduce the impacts to adjoining properties and minimize right-of-way costs. Traffic will be maintained during construction. The terminus has been extended to encompass the Recreation Road intersection. Total construction cost for P.I. No. 342080 is $5.9M.

Project BRMLB-3223-00(006), P.I. No. 351095 will replace the existing bridge over Walnut Creek with a 77.5m-long x 25.0m-wide bridge at the existing bridge site. The new structure will span the wetlands of Walnut Creek. Traffic will be maintained during construction of the bridge. Total construction cost for P.I. No. 351095 is $2.6M.



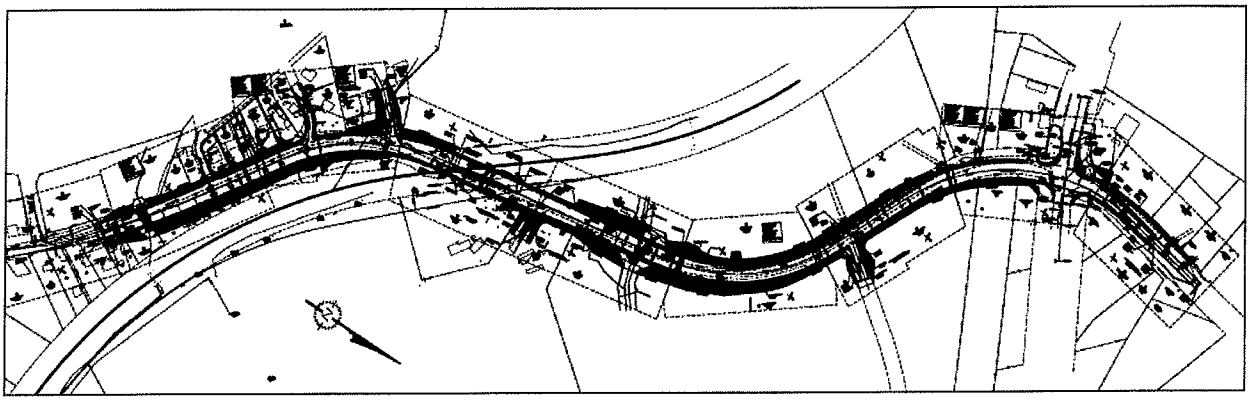
MIDDLE SEGMENT - JEFFERSONVILLE ROAD – P.I. Nos. 342080 and No. 351095

East Segment - P.I. Nos. 351080 and 000835 (Norfolk Southern RR Bridge)

Project STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828 includes improvements on Jeffersonville Road (CR 727) from Recreation Road to Fall Line Freeway (Emery Road, US 80, SR 19), widening from a two-lane rural section with 7.3m-wide pavement to a five-lane urban section with 18.6 m of asphaltic concrete pavement (four 3.6m-wide through lanes with a 4.2m two-way center turn lane) with curb and gutter, and 1.525m-wide contiguous sidewalk on both sides of the road from Recreation Road to Avalon Circle. The proposed shoulder is 3.6m

wide. Total length of the improvements is 1.42 km. Total construction cost for P.I. No. 351080 is $6.0M.

Project STP00-0000-00(835), P.I. No. 0000835 - Norfolk Southern Railway Bridge over Jeffersonville Road, replaces the Norfolk Southern Railway Bridge over Jeffersonville Road with a new bridge consisting of two 6.1m wide x 50m long spans. Sidewalks are to be included from Recreation Road to Avalon Circle on both sides. This project also includes improvements to the dam spillway and retaining walls adjacent to the bridge. Total construction cost for P.I. No. 000835 is $14.7M.



EAST SEGMENT - JEFFERSONVILLE ROAD – P.I. No. 351080

VALUE ANALYSIS AND CONCLUSIONS

GENERAL

This section describes the value analysis (VA) procedure used during the VE study conducted for GDOT by Lewis & Zimmerman Associates, Inc. on the Jeffersonville Road (CR 727) Reconstruction project in Bibb County. The workshop was performed at the preliminary design completion stage. The subject of the study was the Jeffersonville Road (CR 727) Reconstruction project located in Bibb County, comprising the following project numbers:

- STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 3+109 to STA 1+852
- STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300, Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820
- BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek
- STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828
- STP00-0000-00(835), P.I. No. 000835 – Norfolk Southern Railway over Jeffersonville Road

Cunningham & Company Engineers is developing P.I. Nos. 342080 and 351090 to the preliminary design stage; Stantec is developing P.I. No. 351080; STV/Ralph Whitehead Associates, Inc. is designing the Norfolk Southern Railway Bridge, P.I. No. 000835; and GDOT in-house staff is designing the Walnut Creek Bridge, P.I. No. 351095. GDOT has provided information for the VE team to use as the basis of the study. A systematic approach was used in the VE study, which was divided into three parts: (1) Preparation Effort, (2) Workshop Effort, and (3) Post-Workshop Effort. A task flow diagram outlining each of the procedures included in the VE study is attached for reference.

Following this description of the VA procedure, separate narratives and supporting documentation identify the following:

- VE workshop participants
- Economic data
- Cost model
- Function analysis
- Creative ideas and evaluations

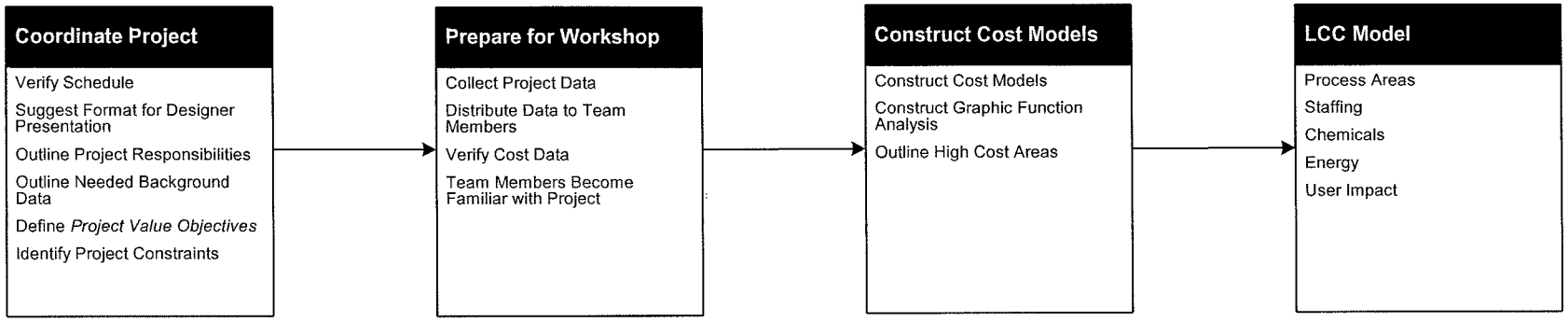
PREPARATION EFFORT

Preparation for the workshop consisted of scheduling workshop participants and tasks and gathering necessary project documents for team members to review before attending the workshop. Documents such as those listed below were used as the basis for generating VE alternatives and for determining the cost implications of the selected VE alternatives:

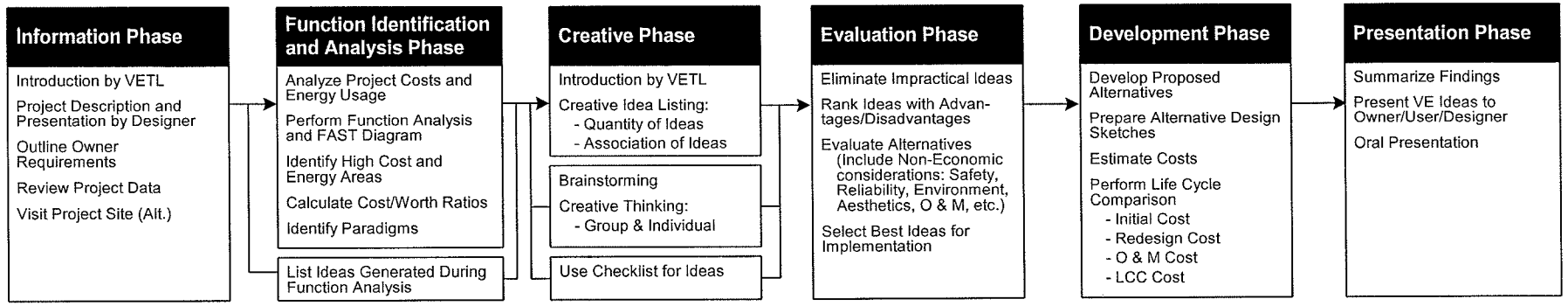
- STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 3+109 to STA 1+852 and STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300,

Value Engineering Study Task Flow Diagram

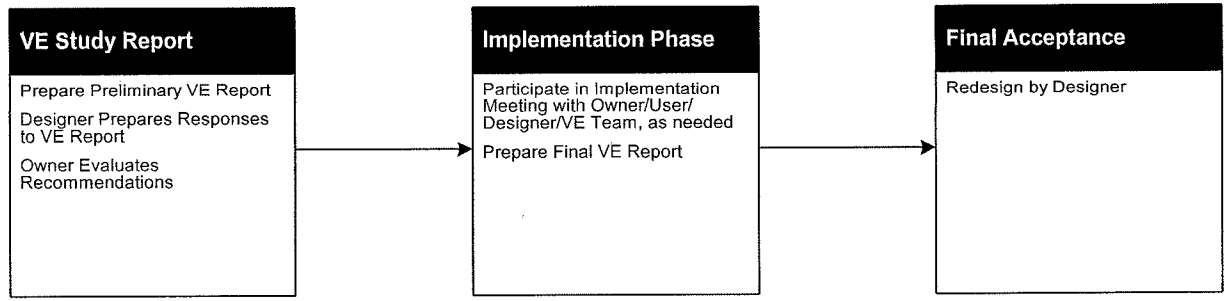
Preparation Effort



Workshop Effort



Post-Workshop Effort



Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820, Preliminary Design Drawings, dated December 2009, prepared by Cunningham & Company Engineers
- BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek, Preliminary Design Drawings, dated December 2009, prepared by GDOT
- STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828, Preliminary Design Drawings, dated December 2009, prepared by Stantec
- STP00-0000-00(835), P.I. No. 000835 - Norfolk Southern Railway over Jeffersonville Road, dated December 2009, prepared by STV/Ralph Whitehead Associates, Inc.

Information relating to the project's purpose and need, owner concerns, project stakeholder concerns, design criteria, project constraints, funding sources and availability, regulatory agency approval requirements, and the project's schedule and costs is very important as it provides the VE team with insight about how the project has progressed to its current state.

Project cost information provided by the designers is used by the VE team as the basis for a comparative analysis with similar projects. To prepare for this exercise, the VE team leader used the estimate reports, prepared by GDOT, to develop a cost model for the project. The model was used to distribute the total project cost among the various elements of the project. The VE team used this model to identify the high-cost elements that drive the project and the elements providing little or no value so that the team could focus on reducing or eliminating their impact.

VALUE ENGINEERING WORKSHOP EFFORT

The VE workshop was a three and one-half day effort beginning with an orientation/kickoff meeting on Monday, January 25, 2010, and concluding with the final VE Presentation on Thursday, January 28, 2010. During the workshop, the VE Job Plan was followed in compliance with the U.S. Federal Highway Administration guidelines for conducting a VE study. The Job Plan guided the search for alternatives to mitigate or eliminate high-cost drivers, secondary functions providing little or no value, and potential project risks. Alternatives to specifically address the owner's project concerns and enhance value by improving operations, reducing maintenance requirements, enhancing constructability, and providing missing functions were also considered. The Job Plan includes six phases:

- Information Phase
- Function Identification and Analysis Phase
- Creative/Speculation Phase
- Evaluation of Creative Ideas Phase
- Alternative Development Phase
- Presentation Phase

Information Phase

At the beginning of the study, the decisions that have influenced the project's design and proposed construction methods have to be reviewed and understood. For this reason, the workshop began with a presentation of the project by GDOT to the team. The presentation highlighted the information provided in the documentation reviewed by the VE team before the workshop and expanded on it to include a history of the project's development and any underlying influences that caused the design to develop to

its current state. During this presentation VE team members were given the opportunity to ask questions and obtain clarification about the information provided.

Function Identification and Analysis Phase

Having gained some information on the project the VE team proceeded to define the functions provided by the project, identifying the costs to provide these functions, and determining whether the value provided by the functions has been optimized. Function analysis is a means of evaluating a project to see if the expenditures actually perform the requirements of the project or if there are disproportionate amounts of money spent on support functions. Elements performing support functions add cost to the project but have a relatively low worth to the basic function.

Function is defined as the intended use of a physical or process element. The team attempted to identify functions in the simplest manner using measurable noun/verb word combinations. To accomplish this the team first looked at the project in its entirety and randomly listed its functions, which were recorded on Random Function Analysis Worksheets (provided in the Function Identification and Analysis section). Then the individual function(s) of the major components of the project depicted on the cost models were identified.

After identifying the functions, the team classified the functions according to the following:

Abbreviation	Type of Function	Definition
HO	Higher Order	The primary reason the project is being considered or project goal.
B	Basic	A function that must occur for the project to meet its higher order functions.
S	Secondary	A function that occurs because of the concept or process selected and may or may not be necessary.
R/S	Required Secondary	A secondary function that may not be necessary to perform the basic function but must be included to satisfy other requirements or the project cannot proceed.
G	Goal	Secondary goal of the project.
O	Objective	Criteria to be met
LO	Lower Order	A function that serves as a project input.

Higher order and basic functions provide value, while secondary functions tend to reduce value. The goal of the next job phase is to reduce the impact of secondary functions and thereby enhance project value.

To further clarify the impact of the various functions, the team assigned costs to provide the functions or group of functions indicated by a specific project element using the cost estimate and cost models. Where possible, they seek to find the lowest cost, or worth, to perform the function. This is accomplished using published data from other sources or team knowledge obtained from working on other similar projects to establish cost goals and then comparing them to the current costs. By identifying the cost and worth of a function or group of functions, cost/worth ratios were calculated. Cost/worth ratios greater than 1 indicated that less than optimum value was being provided. Those project functions or elements with high cost/worth ratios became prime targets for value improvement.

As well as looking at areas with high cost/worth ratios, the team used the cost models previously prepared to seek out the areas where most of the project funds are being applied. Because of the absolute magnitude of these high-cost elements or functions, they also became initial targets for value enhancement.

Overall, these exercises stimulated the VE team members to focus on apparently low-value areas and initially channel their creative idea development in these places.

Creative/Speculation Phase

This VE study phase involved the creation and listing of ideas. Starting with the functions or project elements with high cost/worth ratios, a high absolute cost compared to other elements in the project, and secondary functions providing little or no value and using the classic brainstorming technique, the VE team began to generate as many ideas as possible to provide the necessary functions at a lower total life cycle cost, or to improve the quality of the project. Ideas for improving operation and maintenance, reducing project risk, and simplifying constructability were also encouraged. At this stage of the process, the VE team was looking for a large quantity of ideas and free association of ideas. A Creative Idea Listing worksheet was generated and organized by the function or project element being addressed.

GDOT may wish to review these creative lists since they may contain ideas that were not pursued by the VE team but can be further evaluated for potential use in the design.

Evaluation Phase

Since the goal of the Creative/Speculation Phase was to conceive as many ideas as possible without regard for technical merit or applicability to the project goals, the Evaluation Phase focused on identifying those ideas that do respond to the project value objectives and are worthy of additional research and development before being presented to the owner. The selection process consisted of the VE team evaluating the ideas originated during the Creative/Speculation Phase based on GDOT's value objectives identified through conversations during the opening presentation. Based on the team's understanding of the owner's value objectives, each idea was compared with the present design concept, and the advantages and disadvantages of each idea were discussed. How well an idea met the design criteria was also reviewed.

Based on the results of these reviews, the VE team rated the idea by consensus using a scale of 1 to 5, with 5 or 4 indicating an idea with the greatest potential to be technically sound and provide cost savings or improvements in other areas of the project, 3 indicating an idea that provides marginal value but could be used if the project was having budget problems, 2 indicating an idea with a major technical flaw, and 1 indicating an idea that does not respond to project requirements. Generally, ideas rated 4 and 5 are pursued in the next phase and presented to the owner during the Presentation Phase.

The team also used the designation "DS" to indicate a design suggestion, which is an idea that may not have specific quantifiable cost savings but may reduce project risk, improve constructability, help to minimize claims, enhance operability, ease maintenance, reduce schedule time, or enhance project value in other ways. Design suggestions could also increase a project's cost but provide value in areas not currently addressed. These are also developed in the next phase of the VE process.

Development Phase

In this phase, each highly rated idea was expanded into a workable solution designated as a VE alternative. The development consisted of describing the current design and the alternative solution, preparing a life cycle cost comparison where applicable, describing the advantages and disadvantages of the proposed alternative solution, and writing a brief narrative to compare the original design to the proposed change and provide a rationale for implementing the idea into the design. Sketches and design calculations, where appropriate, were also prepared in this part of the study. The VE alternatives are included in the Study Results section of this report.

Design suggestions include the same information as the alternatives except that no cost analysis is performed. They too are included in the Study Results section.

Presentation Phase

The goals of the last phase of the workshop were to summarize the results of the study, to prepare draft Summary of Potential Cost Savings worksheets to hand out at the presentation, and to present the key VE alternatives to GDOT. The presentation was held on Thursday, January 28, 2010, at the GDOT Headquarters office in Atlanta, Georgia. The purpose of the meeting was to provide the attendees with an overview of the suggestions for value enhancement resulting from the VE study and afford them the opportunity to ask questions to clarify specific aspects of the alternatives presented. Procedures for implementing the results of the study were discussed, and arrangements were made for the reviewers of the VE report to contact the VE team in order to obtain further clarifications, if necessary. Draft copies of the Summary of Potential Cost Savings worksheets were given to the owner and design team to facilitate a timely review and speedy implementation of the selected ideas.

POST-WORKSHOP EFFORT

The post-workshop portion of the VE study consisted of the preparation of this VE Study Report. Personnel from GDOT will analyze each alternative and prepare a response, recommending incorporation of the alternative into the project, offering modifications before implementation, or presenting reasons for rejection. LZA is available at your convenience as you review the alternatives. Please do not hesitate to call on us for clarification or further information as you consider an implementation approach.

Upon completing their reviews GDOT will decide which alternatives to implement.

VALUE ENGINEERING WORKSHOP PARTICIPANTS

The VE team was organized to provide specific expertise in the unique project elements involved with the Jeffersonville Road (CR 727) Reconstruction project. The multidisciplinary team comprised professionals with highway design and construction experience and a working knowledge of VE procedures. The following lists the VE team members:

Participant	Specialization	Affiliation
Joe Leoni, PE	Highway Design	ARCADIS US, Inc.
John Tiernan, PE	Bridge Engineer	ARCADIS US, Inc.
Brian Sapp, PE	Highway Design	HNTB
Paresh J. Parikh, PE	Constructability	Delon Hampton Associates
David Hamilton, PE, CVS, CCE	VE Team Leader/Civil	Lewis & Zimmerman Associates

DESIGNER'S PRESENTATION

An overview of the project was presented on Monday, January 25, 2010, by representatives from GDOT and the design consultant teams. The purpose of this meeting, in addition to being an integral part of the Information Phase of the VE study, was to bring the VE team up-to-speed regarding the overall project specifics. Additionally, the meeting afforded the owner and design team the opportunity to highlight in greater detail those areas of the project requiring additional or special attention. An attendance list for the meeting is attached.

VALUE ENGINEERING TEAM'S PRESENTATION

A VE presentation was conducted by the VE team on Thursday, January 28, 2010 at the GDOT Headquarters office in Atlanta, Georgia, to review VE alternatives with the owner and representatives from the design team. Copies of the Draft Summary of Potential Cost Savings worksheet were provided to the attendees. Attendees checked off their names on the attendance list from the opening presentation.

VE STUDY SIGN-IN SHEET

Project No.: STP00-3223-00(002) (004) (005) STP00-00(835) & BRMLB-3223-00(006) **County: Bibb** **PI Nos.: 342080, 351080, 351080, 000835, 351095** **Date: Jan. 25 - 28, 2010**

NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS	In-briefing 1/25/10	Out-briefing 1/28/10
Lisa L. Myers	00244168	Engineering Services	404-631-1770	lmyers@dot.ga.gov	X	X
Matt Sanders	00284154	Engineering Services	404-631-1752	msanders@dot.ga.gov	X	X
Ron Wishon	00208180	Engineering Services	404-631-1753	rwishon@dot.ga.gov	X	X
Joe Leoni		ARCADIS-US	770-431-8666	joe.leoni@arcadis-us.com	X	X
David Hamilton		Lewis & Zimmerman	253-229-7703	dahamilton@lza.com	X	X
John P. Tiernan		ARCADIS-US	770-431-8666	john.tiernan@arcadis-us.com	X	X
Paresh Parikh		Delon Hampton	404-419-8434	pparikh@delonhampton.com	X	X
Brian Sapp		HNTB	404-946-5700	bsapp@hntb.com	X	X
Mitchell Greenway		Stantec	478-474-6100	mitchell.greenway@stantec.com	X	
Jason Mobley	00848279	Program Delivery	706-601-8015	jmobley@dot.ga.gov	X	X
Ken Werho	002858268	Traffic Safety & Design	404-635-8144	kiwherho@dot.ga.gov	X	
Doug Franks	00809138	GDOT - Bridge	404-631-1917	dfranks@dot.ga.gov	X	X
Margie Posin		STV/RWA	770-452-0797	margie.pozin@stvinc.com	X	
James Magnus	00208161	Construction	404-631-1971	jmagnus@dot.ga.gov	X	
Stephen Daniel		Bibb Co./MAAI	478-755-0000	sdaniel@maai.net	X	X
Cleve Cunningham		Cunningham & Co. Engr.	478-742-3616	cleve@cunningham-pe.com	X	
Michael Haithcock		GDOT	678-227-2434	mhaithcock@dot.ga.gov	X	
Lamar Pruitt, Jr.	00229230	District 3 Construction	706-646-6911	lpruitt@dot.ga.gov	X	
David Coleman	00226545	District 3 Area 4 Macon	478-757-2601	dcoleman@dot.ga.gov	X	
Kevin Ellis	00262623	District 3 Area 4 Macon	478-7572601	kellis@dot.ga.gov	X	
Van Ethridge		MAAI	478-755-0000	tdavis@maai.net	X	

VE STUDY SIGN-IN SHEET

Project No.: STP00-3223-00(002) (004) (005) STP00-00(835) & BRMLB-3223-00(006) **County: Bibb** **PI Nos.: 342080, 351080, 351080, 000835, 351095** **Date: Jan. 25 - 28, 2010**

NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS	In-briefing 1/25/10	Out-briefing 1/28/10
Ken Sheets		Bibb County	478-621-6660	ksheets@co.bibb.ga.us	X	
Bill Roundtree	00251237	District 3 GDOT	706-646-6987	broundtree@dot.ga.gov	X	
David Millen	00248693	District 3 GDOT	706-646-6900	dmillen@dot.ga.gov	X	
Melanie Nabble	00913836	Office of Enviro. Services	404-631-1174	mnable@dot.ga.gov		X

ECONOMIC DATA

The comparisons of life cycle costs between the VE alternatives and the current design solutions were performed on the basis of discounted present worth. To accomplish this the VE team developed economic criteria to use in its calculations based on information gathered from GDOT and the design team. The following parameters were used when calculating discounted present worth:

Year of Analysis:	2010
Right of Way Purchase	2015
Construction Completion Date:	2019
Planning Period (n):	30 years
Discount Rate (i):	3%

When computing capital costs, direct material, labor, and equipment costs are marked up using a composite markup of 10% that includes:

Engineering and Construction Inspection	10%

When computing right-of-way costs, a multiplier of 248% is used to account for the following:

Schedule Contingency (55% of net right-of-way cost)

Administrative/Court Costs (60% of net right-of-way cost plus schedule contingency)

Pavement Unit Price

The following square meter cost was developed by the VE team for all pavement work based on the values provided in the cost estimate:

Use 60 $kg/m^2/25$ mm to convert depths to weights
MG = mega grams (1,000 grams)

38 mm of 9.5mm Superpave @ \$74.63/MG = 60(38/25) = (91.2kg/m^2)(\$74.63)/1000 = \$6.81/m^2

50 mm of 19mm Superpave @ \$75.50/MG = 60(50/25) = (120kg/m^2)(\$75.50)/1000 = \$9.06/m^2

100 mm of 25mm Superpave @ \$66.01/MG = 60(100/25) = (240kg/m^2)(\$66.01)/1000= \$15.84/m^2

250 mm GAB @ \$19.68/MG - To convert #/ft^3 to kg/m^3 multiply by 16.02
(150 #/ft^3)(16.02) = 2403 kg/m^3 = 2.403 MG/m^3 = 0.25(1)(1)(2.403)(\$19.68/MG) = \$11.82/m^2

Total Pavement Unit Price = \$43.53/m^2

COST MODEL

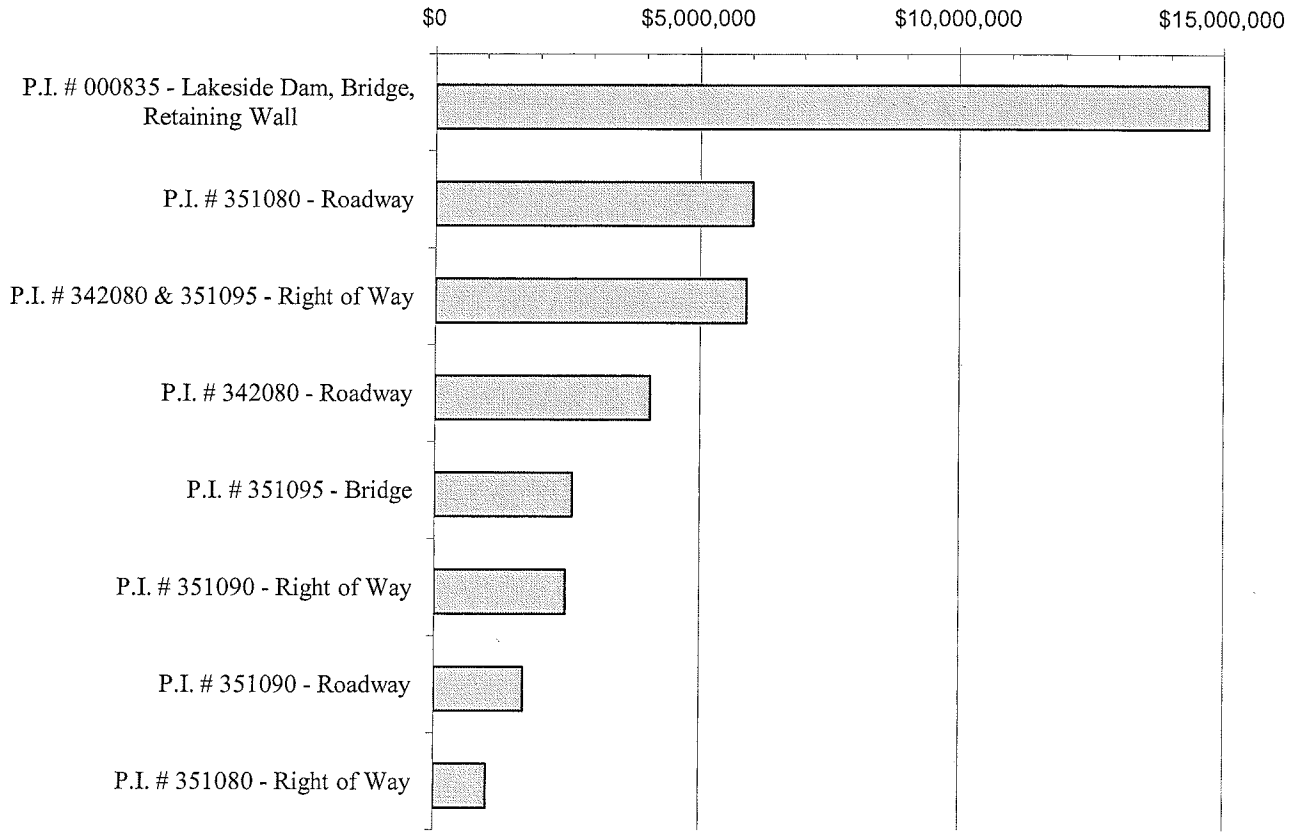
The VE team prepared a Pareto Chart, or Cost Histogram, for the project that follows this page. This Cost Histogram displays the major construction elements identified in the cost estimate prepared by the designer in descending order of magnitude and thus identifies the high cost areas in the project. The high cost elements provide the VE team with one focus for its work during the study.

The right-of-way cost is $9.3M compared to the project's construction cost of approximately $29.1M. Thus the team focused its efforts on reducing the right-of-way cost. With respect to the construction costs, traffic control, pavement, and drainage are the real cost drivers of the project.

COST HISTOGRAM

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION**
PI. #000835, 342080, 351080, 351090, 351095
Bibb County, Georgia – Preliminary Engineering Submittal

TOTAL PROJECT	COST	PERCENT	CUM. PERCENT
P.I. # 000835 - Lakeside Dam, Bridge, Retaining Wall	14,708,430	38.21%	38.21%
P.I. # 351080 - Roadway	6,006,460	15.60%	53.81%
P.I. # 342080 & 351095 - Right of Way	5,884,000	15.28%	69.10%
P.I. # 342080 - Roadway	4,065,570	10.56%	79.66%
P.I. # 351095 - Bridge	2,622,680	6.81%	86.47%
P.I. # 351090 - Right of Way	2,492,000	6.47%	92.94%
P.I. # 351090 - Roadway	1,703,815	4.43%	97.37%
P.I. # 351080 - Right of Way	1,013,000	2.63%	100.00%
Construction & Right of Way - Subtotal	***38,495,955***	100.00%	
TOTAL CONSTRUCTION & RIGHT OF WAY	**$ 38,495,955**	Comp Markup:	0.00%



FUNCTION ANALYSIS

A function analysis was performed to (1) understand the project purpose and need, (2) define the requirements for each project element, (3) ensure a complete and thorough understanding by the VE team of the basic function(s) needed to attain the given project purpose and need, (4) identify other public goals, and (5) identify secondary functions that should be addressed by the VE team. The Random Function Analysis worksheet completed by the team for the project in its entirety and the various elements follow.

RANDOM FUNCTION ANALYSIS

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** SHEET NO.: **1 of 1**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

DESCRIPTION	FUNCTION		
	VERB	NOUN	KIND
PROJECT *(Magnitude of Function Cost $$)*	***Increase***	***Capacity***	***B***
Bridge Improvements $$$$	***Eliminate***	***Deficiencies***	***B***
	Bypass	Town	RS
	Reroute	Traffic	B
$$	Relieve	Congestion	G
$	Reduce	Accidents	G
Traffic Improvements $$	Improve	LOS	G
	Increase	Speed	S
	Access	Properties	RS
$	Route	Storm water	RS
$$	Increase	Clearance	RS
$$	Meet	Criteria	G
	Promote	Growth	G
	Reduce	Delays	G
	Maximize	Safety	G
$$	Accommodate	Railroad	RS
Dam Improvements	Enhance	Dam	RS
	Enhance	Spillway	RS
Right of Way	Minimize	R/W	G
	Minimize	Disruption	G
	Control	Budget	G
$$$	Improve	Ridability	G
$$	Relocate	Utilities	RS

Function defined as: Action Verb, Measurable Noun

Kind: B = Basic, S = Secondary, RS = Required Secondary, HO = Higher Order, LO = Lower Order, G = Goal

CREATIVE IDEA LISTING AND EVALUATION OF IDEAS

During the Creative/Speculation Phase numerous ideas were generated for the project using conventional brainstorming techniques. These ideas were recorded and are shown with their corresponding ranking on the attached Creative Idea Listing Worksheets. For the convenience of tracking an idea through the VA process, the ideas were grouped into the following project elements and numbered according to the order in which they were conceived. The following letter prefixes were used to identify the project elements.

	PROJECT ELEMENTS AND P.I. NOS.	PREFIX
West Segment	• STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 1+852 to STA 3+109	W
Middle Segment	• BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek • STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300; Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+820	M
East Segment	• STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828 • STP00-0000-00(835), P.I. No. 000835 – Norfolk Southern Railway Bridge Over Jeffersonville Road	E

The ideas were ranked on a qualitative scale of 1 to 5 on how well the VE team believed the idea met the project purpose and need criteria. To assist the team in evaluating the creative ideas, the advantages and disadvantages of each new idea compared to the existing design solution were discussed based on the owner's value objectives for the project. The following are the top value objectives for this project:

- Enhance functionality
- Improve safety
- Maintain access during construction
- Reduce business and residential property impacts
- Reduce user impacts

After discussing each idea the team evaluated the ideas by consensus. This produced eight ideas rated 4 or 5 or design suggestions to research and develop into formal VE alternatives to be included in the Study Results section of the report. Highly rated ideas that were not developed further may have been combined with another related idea or discarded as a result of additional research indicating the concept as not being cost effective or technically feasible. The reader is encouraged to review the Creative Idea Listing and Evaluation worksheet since it may suggest additional ideas that can be applied to the design.

CREATIVE IDEA LISTING

PROJECT:	**JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** SHEET NO.: **1 of 2** *P.I. Nos. 342080, 351095, 351080, 000835, 351090* ***Bibb County, Georgia – Preliminary Engineering Submittal***

NO.	IDEA DESCRIPTION	RATING
WEST SEGMENT (W) • ***STP00-3223-00(004), P.I. No. 351090 – Jeffersonville Road - STA 1+852 to STA 3+109***		
W-1	Reduce the length of the improvements to the side streets.	5
W-2	Reduce the lane width on the side roads from 3.6 m to 3.3 m.	5
W-3	Reduce the mainline from five lanes to three lanes.	2
W-4	Close the right turn lane from Emery Hwy to Jeffersonville Road, use Indian Circle.	3
W-5	Minimize realignment at STA 1+500.	2
W-6	Eliminate curb and gutter.	1
W-7	Use three lanes in lieu of five lanes and use ditches instead of curb and gutter.	2
W-8	Use three lanes with a ditch, but purchase right of way for all five lanes.	2
W-9	Increase horizontal radius at STA 1+500 to minimize right-of-way.	2
W-10	Modify the drainage piping concept at STA 1+800; change direction of flow.	4
W-11	Use one larger storm pipe at STA 1+550 in lieu of the double pipe.	4
W-12	Use auxiliary lanes in lieu of the fourth lane.	3
W-13	Increase flush median width from 3.6 m to 4.2 m to be consistent with adjacent project.	DS
MIDDLE SEGMENT (M) • ***BRMLB-3223-00(006), P.I. No. 351095 – Bridge Over Walnut Creek*** • ***STP00-3223-00(002), P.I. No. 342080 – Jeffersonville Road - STA 1+980 to STA 3+300;*** • ***Millerfield Road – STA 10+000 to STA 10+140 and STA 5+000 to STA 5+8420***		
M-1	Reduce the length of the improvements on side streets.	5
M-2	Reduce width of side streets from 3.6 m to 3.3 m.	5
M-3	Use auxiliary lanes on Jeffersonville Road in lieu of the fourth lane east of Millerfield Road.	4
M-4	Reduce the width of the sidewalks on the Walnut Creek Bridge from 1.8 m to 1.7 m.	4
M-5	Use three lanes in lieu of five lanes east of Millerfield.	4
M-6	Use three lanes in lieu of five lanes with ditches in lieu of curb and gutter.	4
M-7	Use three lanes with ditch, but purchase right of way for all five lanes.	4
M-8	Shift the alignment north 5m at STA 2+140 (Walnut Creek Bridge).	3

Rating: 1→3 = Not to be developed 4 = Varying degrees of development potential 5 = Most likely to be developed
DS = Design suggestion ABD = Already being done

CREATIVE IDEA LISTING

PROJECT: **JEFFERSONVILLE ROAD (CR 727) RECONSTRUCTION** SHEET NO.: **2 of 2**
P.I. Nos. 342080, 351095, 351080, 000835, 351090
Bibb County, Georgia – Preliminary Engineering Submittal

NO.	IDEA DESCRIPTION	RATING
MIDDLE SEGMENT (M) (continued)		
M-9	Modify the drainage piping at STA 2+450 to 2+600.	2
M-10	Use twin pipes at STA 3+060 in lieu of different diameter pipes.	1
M-11	Modify the locations of the drain inlets and eliminate some inlets if possible.	4
M-12	Modify drainage piping layout. See W-10.	4
EAST SEGMENT (E) • ***STP00-3223-00(005), P.I. No. 351080 – Jeffersonville Road – STA 5+381 to STA 6+828*** • ***STP00-0000-00(835), P.I. No. 000835 – Norfolk Southern Railway Bridge Over Jeffersonville Road***		
E-1	See Alt. No. W-1; street improvements.	3
E-2	See Alt. No. W-2; lane widths.	5
E-3	See Alt. No. W-3; 3 lanes.	3
E-4	See Alt. No. W-6; eliminate curb and gutter.	1
E-5	See Alt. No. W-7; 3-lane.	2
E-6	See Alt. No. W-8; 3 lanes.	2
E-7	See Alt. No. W-10; drainage.	4
E-8	See Alt. No. W-12; auxiliary lanes.	4
E-9	Move the drop inlet, B-16 and B-17, and eliminate the 1500mm pipe; create low point at box culvert.	4
E-10	Reduce the lane width from 3.6m to 3.3m.	5
E-11	Reduce the shoulders from 3.6m to 3.0m.	5
E-12	At the railroad bridge, between the barriers, use 100mm thick concrete pavement in lieu of 450mm.	4
E-13	Reduce the skew at the railroad bridge.	4
E-14	Eliminate the ditches at Lakeside Road, extend the curb and gutters.	See E-1
E-15	Eliminate/reduce the number of temporary sediment ponds.	DS
E-16	See Alt. No. M-7; use a 3 lane section with ditch, but purchase 5 lanes of right-of-way.	4
E-17	Extend the concrete pavement to match that being used on the spillway.	DS
E-18	Revise drainage pipe layout between STA 5+437 and 5+742.	4

Rating: 1→3 = Not to be developed 4 = Varying degrees of development potential 5 = Most likely to be developed
DS = Design suggestion ABD = Already being done

VALUE ENGINEERING STUDY AGENDA

Lewis & Zimmerman Associates, Inc. (LZA) will facilitate a 30-hour value engineering (VE) study on the Preliminary Engineering Submittal for the **Jeffersonville Road (CR 727) Reconstruction**, Bibb County, Georgia. The project consists of multiple segments and P.I. numbers as presented below. The Georgia Department of Transportation (GDOT) project management and consultant design team will be available to formally present the project at the beginning of the workshop; attend a presentation of the VE alternatives at the conclusion of the VE study; and be available to answer questions during the VE study effort.

The VE study will follow the outline described below and be conducted January 25 - 28, 2010 at the offices of:

GDOT
600 West Peachtree Street
5th Floor, Engineering Services Conference Room
Atlanta, Georgia 30308

The point-of-contact is Ms. Lisa Myers, GDOT Value Engineering Coordinator, who may be reached at 404-631-1770, or Matt Sanders, AVS, GDOT Value Engineering Specialist, 404-631-1752.

PROJECT ELEMENTS

PI#	Project #	Length	Description
0000835	**STP00-0000-00(835)**	0.20 mi	CR 727/Jeffersonville Rd. @ Norfolk Southern R/R
351080-	**STP00-3223-00(005)**	1.20 mi	CR727/Jeffersonville Rd. from Recreation Rd. to Fall Line FWY/US 80
351090-	**STP00-3223-00(004)**	0.85 mi	CR727/Jeffersonville Rd. from SR19/Emery Hwy to Walnut Creek Bridge
351095-	**BRMLB-3223-00(006)**	0.22 mi	CR727/Jeffersonville Rd. @ Walnut Creek in NE Macon
342080-	**STP00-3223-00(002)**	0.86 mi	CR727/Jeffersonville Rd. from Walnut Creek Recreation Rd. & Miller to Bristol

VE STUDY AGENDA

Monday, January 25, 2010

8:00 am - 9:00 am — **VE Team Members Arrive and Review Documents**

9:00 am – 11:00 am — **Owner's/Designer's Presentation - *(5th Fl. Engr. Services Conf. Rm)***

GDOT District 3 design team will present information concerning the project including, but not limited to: the Purpose and Need for the project, rationale for design; criteria for specific areas of study, project constraints and the reasons for design decisions.

11:00 am – 12:00 noon **VE Team Reviews Project Documents**

12:00 noon - 1:00 pm **Lunch**

1:00 pm - 2:00 pm **Information Phase**

The VE team will continue their familiarization with the cost models and project data for each area of study. The cost models will be refined, as necessary. The VE team will define the function of each project element or system in the cost model, select the primary or basic functions, and determine the worth, or least cost, to provide the function. Cost/worth or value index ratios will be calculated, and high cost/low worth areas for study identified. In addition, the VE team will continue defining the function of each element/system to gain a thorough understanding of the projects' Purpose and Need.

2:00 pm – 3:00 pm **Function Analysis**

The team will identify all project functions required to meet the established purpose and need. Functions will be identified as to basic, required secondary, secondary, or project goals.

3:00 pm - 5:00 pm **Speculation Phase**

The VE team will conduct a brainstorming session and list as many ideas as possible for consideration. The aim is to obtain a large quantity of ideas through free association, by eliminating roadblocks to creativity and deferring judgment.

Tuesday, January 26, 2010

8:00 am - 10:00 am **Speculation Phase (cont.)**

The VE team will continue the brainstorming exercise to capture ideas to improve the project in terms of initial and life cycle cost, technical aspects, schedule, and constructibility issues.

10:00 am – 12:00 noon **Analysis Phase**

The VE team will analyze the ideas listed in the creative phase and select the best ideas for further development.

12:00 noon - 1:00 pm **Lunch**

1:00 pm - 5:00 pm **Development Phase**

VE team will develop creative ideas into alternate design solutions. Initial and life cycle cost estimates comparing original and proposed alternatives will be prepared. Selected alternatives for change will be developed and supported with sketches, calculations and written substantiation.

Wednesday, January 27, 2010

8:00 am – 12:00 noon **Development Phase (cont.)**

12:00 noon - 1:00 pm **Lunch**

1:00 pm - 5:00 pm **Development Phase (cont.)**

Upon completion of the Development Phase, the VE team leader will prepare the summary worksheets based on the alternatives developed by the VE team. The summary worksheets form the basis of the informal oral presentation to be made to GDOT, local representatives, and the District 3 design team representatives. The team will review all documentation and prepare for the presentation.

Thursday, January 28, 2010

8:00 am - 9:00 am **Development Phase and Preparation for Presentation**

9:00 am – 12:00 noon **Presentation Phase – *(5th Fl. Engr. Services Conf. Rm)***

Upon completion of the Development Phase, the VE team leader will prepare the summary worksheets based on the alternatives developed by the VE team. The summary worksheets form the basis of the informal oral presentation to be made to GDOT, local representatives, and the District 3 design team representatives. The team will review all documentation and prepare for the presentation.

Noon - Adjourn

POST-STUDY PHASE

Upon completion of the value engineering study, the VE team leader will prepare the Value Engineering Study Report and submit it to GDOT. The report will include the following material:

- Project description and design concept of project
- Cost models and graphic function analysis worksheets
- Value engineering alternatives: original design and proposed alternatives, including sketches, design calculations and initial and life cycle estimates
- Potential contract savings (capital construction and life cycle costs)

The GDOT design team will independently review the VE alternatives and classify them as accepted, accepted with modifications, needs further study, or rejected—accompanied by the reasons for rejection. A meeting with all stakeholders will then be convened to decide which VE alternatives to implement.

VE TEAM MEMBERS

David Hamilton, PE, CVS, CCE, LEED [AP]	VE Team Leader/Civil	Lewis & Zimmerman Assoc.
Joe Leoni, PE	Highway Design Engineer	ARCADIS
John Tiernan, PE	Structural Engineer	ARCADIS
Paresh Parikh, PE	Construction Engineer	Delon Hampton
Brian Sapp, PE	Highway Design Engineer	HNTB