

VALUE ENGINEERING STUDY

Project # STP00-0198-01(020) PI No. 132610-

SR60 Widening & Reconstruction in Murrayville
Hall County, Georgia

Prepared for:



One Georgia Center
600 West Peachtree NW
Atlanta, Georgia 30308

23 June 2011



1200 Abernathy Road, Building 600, Suite 950
Atlanta, Georgia 30328
770-481-1600 Fax 770-481-1640

1 July 2011

Mr. Matt Sanders, AVS
Value Engineering Specialist
GDOT - Engineering Services
One Georgia Center - 5th Floor
600 W. Peachtree Street NW
Atlanta, GA 30308

Re: V.E. Workshop - SR60 Widening and Reconstruction in Murrayville, Hall County, GA
Project #: STP00-0198-01(020) - PI#: 132610-

Dear Mr. Sanders:

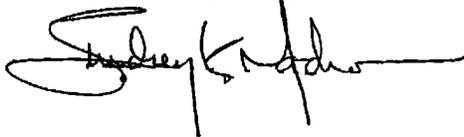
U.S. Cost, Inc. is pleased to submit two (2) hard copies and one (1) CD of the Value Engineering Study Report on the above referenced project. We appreciate the assistance and participation of the GDOT personnel as well as the Heath & Lineback Engineers, Inc. design team.

This Workshop resulted in the development of fifteen (15) value-enhancing proposals. We hope that incorporation of some of these value improvement alternatives provided herein results in an enhanced project in relation to cost, constructability and long-term performance of the project features.

Please feel free to contact either myself or Tom Orr to discuss any information within this report. We look forward to the next opportunity to be of service to the Georgia Department of Transportation.

Sincerely,

U.S. COST INCORPORATED



Lindsey Gardner, P.E., CVS-Life, FSAVE
V.E. Team Leader

CC: L. Myers, GDOT

VALUE ENGINEERING TEAM STUDY

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VALUE ENGINEERING STUDY

PROJECT DESCRIPTION

This Widening and Reconstruction of SR60 to CR 158 Murrayville project involves enhancements to an urban corridor in Hall County, Georgia. The improvements involve lane widening (2 to 4 Lanes), complete pavement replacement, replacement culvert with new bridge, sidewalks, and curb and gutter the entire length of corridor.

The proposed project would reconstruct SR 60 from a two-lane facility to a four-lane, median divided facility with curb, gutter, and sidewalks. The proposed typical section includes two 11-foot lanes in each direction, separated by a variable 6-foot to 20-foot raised median with curb, gutter, and five-foot sidewalks on both sides of the roadway. Median widths vary to reduce impacts to environmental resources or to accommodate turn lanes. The total shoulder width would be 10-feet wide and would include the sidewalks, curb and gutter, and a 1.5-foot wide grass strip separating the sidewalk from the curb. Generally, the typical section would require 150 feet of right-of-way, but it varies from 110 to 200 feet throughout the corridor to include auxiliary turn lanes and turn lanes at major intersections. Construction easements may also be required outside the proposed right-of-way limits.

A new 780-foot long bridge as well as an extension of the triple 10-foot by 10-foot box culvert are being considered to improve the existing Squirrel Creek/Lake Lanier culvert. All other culverts are expected to be extended or replaced to accommodate the widened roadway facility. Additional traffic signals would be added at three locations: Old Dahlonega Highway, Hubert Stephens Road, and Elrod Road.

Project components include:

- Current design of typical section is four lanes separated by a 20 foot raised median and 10 foot urban shoulder on each side.
- Replace existing Box Culvert with new 780-foot bridge
- Grades not to exceed 7%
- Entire corridor will have curb, gutter and five foot wide sidewalks
- No bike lanes or trails will be provided
- Purchase 50 additional feet of ROW for \$17,000,000
- Displacement of 30 properties

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Introduction

U.S. Cost conducted the Value Engineering Team Study on Widening and Reconstruction of SR60 to CR158. The V.E. study was conducted for three and ½ days, 20 - 23 June 2011, at the Georgia Department of Transportation 5th floor Conference Room in Atlanta, GA. The study team was furnished with the concept data dated April 2011. The following individuals were members of the V.E. team:

| Name | Firm | Discipline |
|----------------------------|-----------------|-----------------------|
| Lindsey Gardner, P.E., CVS | U.S. Cost, Inc. | VE Team Leader (VETL) |
| Jerry Brooks, P.E. | Kimley-Horn | Roadway Engineer |
| Bill Deyo, P.E. | KEA Group | Construction |

Value Engineering Study Process

The Value Engineering Study followed the Value Engineering Job Plan as certified by SAVE International as follows:

- Information Phase (Monday)
- Function Analysis Phase (Monday)
- Creative Phase (Monday)
- Evaluation Phase (Tuesday)
- Development Phase (Tuesday - Wednesday)
- Presentation Phase (Thursday AM)

Information Phase

The V.E. team was first briefed on the project design by Heath & Lineback Engineers, Inc. and Georgia DOT representatives in a Design Presentation the morning of the first day of the V.E. Study. The briefing included a review of the design requirements and rationale for the selection and arrangement of the major project features. Discussions regarding alternatives considered, adjacent properties/facilities, and project criteria and constraints were included in the design presentation.

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Project issues that were observed by the team from the pre-workshop document review and design briefing are as follows:

Observations

- Stream Buffer requirements may be required (PAR)
- Skew angles are included at side road intersections along corridor.
- Grade changes will cause additional fill at new bridge
- Proposed 780-foot bridge will be replacing 30' concrete box culvert
- Curb, gutter, sidewalks and raised median entire length of urban corridor
- Inside shoulders are adjacent to curb & gutter with drainage in various areas
- Raised median varies in width throughout the corridor
- Daily traffic count is 20,600 vehicles per day
- 8 % of current vehicle traffic count per day are trucks
- ROW cost is ±\$17,000,000 – 30 properties are being condemned
- Existing ROW is 100' and is being increased to 150' wide

Function Analysis

As a basic part of the V.E. process, the team conducted a Function Analysis session on the Widening and Reconstruction of SR60 to CR 158 Murrayville project to identify the needs and goals of the project and facilitate the creative idea session, by addressing functions as opposed to the specific design elements.

The Basic Function of the project is to “*Upgrade Corridor*” from rural to urban. A detailed project function analysis of the characteristics of the project and the project features is presented in the Appendix.

Project Design Criteria

During the meeting, project design criteria were identified. The following listing identifies the design criteria with which the project must comply:

- AASHTO Design Policies
- FHWA Design Policies
- Environmental Restrictions (EA Requirements)
- NOAA Requirements
- FEMA Requirements

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Project Constraints

Project constraints were also identified. The following is a listing of constraints for those actions or work requirements which must be included in the project:

- Historic Property (4F)
- Project must be constructed within ROW
- Stream Buffers
- Potential Wetland problems at stream buffers
- Practical Alternative Report (PAR) approval

Risk Analysis

The group identified the following project risk elements, which may impact the Widening and Reconstruction of SR60 to CR 158 Murrayville project. This exercise served as a catalyst for the Creative Phase of the study when several ideas were suggested which would mitigate these project construction risks.

Risk Elements

- Funding Problems
- Unapproved concept
- Impact to traffic flow on SR60
- Construction of bridge at box culvert location will have a degree of difficulty
- Underground unknowns/historic preservation
- NEPA problems
- Traffic control during construction
- Construction delays
- Historic classification of property 4F
- Minimum impacts on school

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Creative Phase

The Creative Phase of the V.E. study was initiated the afternoon of the first day of the study. A total of thirty four (34) creative ideas were generated for further investigation by the team. The creative ideas focused on areas of the project which the VE Team felt had the most opportunity for value improvement, including:

- limiting impacts on adjacent areas
- minimization of earthwork
- optimum construction phasing
- alternatives to new bridge

Additional ideas were generated reflecting alternative project components based on an understanding of local construction products and materials and the relative costs of installing them.

A listing of all creative ideas on this project is included in the Appendix.

Alternative Idea Evaluation Criteria

The session participants identified the characteristics for evaluating the V.E. ideas for which alternatives would be the most acceptable for incorporation in the project. The highest ranked ideas would satisfy several of these criteria. The evaluation criteria for V.E. ideas are as follows:

V.E. Idea Evaluation Criteria

Cost Impact
Reduces Construction Time
Improves Constructability
Simplifies Phasing and Traffic Control

Cost Impact/savings was also utilized as an objective evaluation criteria as described in the following section.

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Evaluation Phase

The ideas generated during the Creative Phase were reviewed and evaluated by the VE session participants during a session held on the morning of the second study day. The intent of the meeting was to allow the participants an opportunity to discuss and evaluate the ideas. A few of the V.E. ideas were dropped at that time as being conceptually unacceptable. The ranking system consisted of session participants assigning a 2-phase ranking for acceptability and cost impact to each idea. The Acceptability ranking was based on how each idea improves the value of the project when considered against the evaluation criteria listed previously. Those ideas, which the V.E. Team felt had the most promise were given a designation of 1-5 on acceptability and 0-5 on cost impact, for a maximum rating of 10 points. This is a time management tool to identify those proposals that have the greatest potential. Approximately fifteen (15) out of the original thirty-four (34) creative ideas were deemed promising for further investigation and analysis by the V.E. team.

The time management ranking system used by the VE team is as follows:

ACCEPTABILITY OF IDEA

- 5 points - Excellent Idea
- 4 points - Good Idea
- 3 points - Fair Idea
- 2 points - Marginal Idea
- 1 point - Do Not Develop

COST IMPACT

- 5 points - > \$ 1,000,000 cost savings
- 4 points - \$500,000 to 999,999 cost savings
- 3 points - \$300,000 to 499,999 cost savings
- 2 points - \$150,000 to 299,999 cost savings
- 1 point - \$0 to 149,999 cost savings
- 0 points – Cost Add

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Development Phase

The specific proposals found in the body of this report represent the positive results of investigations by the V.E. team on the Widening and Reconstruction of SR60 to CR 158 Murrayville project. Each proposal represents a quality enhancing or cost saving alternative, which is documented by words, drawings and numbers. The proposal format presents the idea, describes the original design element proposed for change and the proposed change, lists the perceived advantages and disadvantages of the proposed change and supports the idea with a detailed cost estimate for the original and proposed design. Where necessary for clarity, the proposal also includes thumbnail design drawings and supporting engineering calculations.

Presentation Phase

A presentation to Heath & Lineback representatives was conducted 23 June 2011 at 9AM.

Basis of V.E. Cost Savings

The cost information for proposals in this report are based on the cost data prepared by the design team, GDOT Item Means Summary (Dec. 2010), VE Team member experience, and discussions with vendors/Contractors. Overhead and profit are included in the GDOT Item Means. Therefore, no additional markups are applied. The savings presented in the proposals is a general order of magnitude (estimate of the potential savings) if the idea were to be accepted. These figures are solely intended to identify the most attractive design solution, and are not prepared to represent a net deduction to the overall project budget. The costs are in 2011 dollars. A three year contract duration is scheduled.

Evaluation of Alternatives

When reviewing the value engineering proposals, consider each part of an alternative on its own merit. There may be a tendency to disregard an entire alternative because of a concern about one aspect of it. We encourage partial acceptance of ideas; thus, each aspect of an alternative should be considered for incorporation into the design, even if the entire alternative is not implemented. Variations of these proposed alternatives are encouraged.

Several of these alternatives are either “mutually exclusive”/or have overlapping cost savings with other alternatives. These are indicated in the Proposal Summary Table. Items indicated as mutually exclusive indicates that acceptance of one alternative, precludes acceptance of the related proposal. Decision-makers are encouraged to evaluate these alternatives carefully in order to select the combination of alternatives that provides the greatest benefits to the project.

VALUE ENGINEERING STUDY

VALUE ENGINEERING RESULTS

The VE Team generated 34 creative ideas and developed 15 proposals for consideration by GDOT. The alternatives involve: optimizing construction phasing, alternative median designs limiting impacts on adjacent areas, and minimization of earthwork.

Proposal Highlights

R-1.0 - Eliminate constructing the new 780' foot bridge over Squirrel Creek by lowering proposed grade from Sta. 59+00 to 75+00 extending the existing triple 10' x 9' culverts, and complete PAR. The current design includes replacing the existing culverts with a bridge. The existing culverts are adequate to handle the water flows. Proposal R-1.0 proposes to extend the existing culverts and adjust the new roadway profile to 1' above the flood elevation of 1085'. This alternative will save \$4,115,000 in construction costs and reduce the schedule by 12-18 months due to simplified phasing and traffic control during construction.

R-2.0 - Revise the horizontal and vertical alignment of the proposed SR60 between stations 28+00 and 48+00 to reduce the earthwork and reduce the ROW impacts. In the current design from Stations 28+00 to 48+00, the horizontal alignment is shifted 100'± east of the existing centerline. Also, the vertical alignment is being raised as much as 25' to reduce the vertical grade from 9.0% to 7.0%. Proposal R-2.0 proposes to maintain the same horizontal and vertical alignment as the existing roadway which reduces the construction schedule by 1 month, minimizes impacts to properties, and results in a savings of \$1,800,000.

R-3.0 – End SR60 construction 1500 feet past the intersection of Yellow Creek Road in lieu of going 3350 feet past the intersection. (The intersection is the logical termini for the project.) In the current design, full-width construction is utilized 2,000 LF beyond the intersection of Yellow Creek Road, and from that point the road tapers down to the existing tie-in for a distance of 1,350 LF (at Sta. 297+50). In R-3.0, it is proposed to end full-width construction 600 LF beyond the intersection of Yellow Creek Road and include a 900 LF taper to a tie-in at Sta. 279+00. The VE team believes the intersection of SR60 and Yellow Creek Road is the logical termini for the project and construction beyond the intersection is of no benefit. This would save approximately \$1,200,000.

R-3.1 - Eliminate curb, gutter, and sidewalk from Sta. 284+00 to the end of project. Mutually exclusive to R-3.0 above. The current design constructs curb and gutter, median, closed drainage and sidewalk elements throughout the transition area from the four-lane divided to 2-lane undivided roadway. In R-3.1, it is proposed to eliminate the curb and gutter, median, closed drainage, and sidewalks within the transition zone. This alternative would save approximately \$225,000.

VALUE ENGINEERING STUDY

VALUE ENGINEERING RESULTS

R-3.2 - Realign the proposed roadway from Sta. 265+00 to Sta. 294+00 to stay on the existing roadway section without shifting west. This is mutually exclusive to 3.0 above. The current design of the roadway from Sta. 265+00 to Sta. 294+00 shifts the alignment west of the existing roadway to avoid the historical property near Sta. 285+00. In R-3.2, it is proposed to maintain the two northbound lanes at the same horizontal and vertical location as the existing two travel lanes. This can be performed without impact to the historical property. This alternative results in avoiding 3 property displacements and provides a project cost savings of \$750,000.

R-5.0 - Reduce ROW width from 150' to 100' for the entire length of 5 mile corridor. It appears that the existing 100' ROW is more than adequate for this widening and upgrade of SR60 to Yellow Creek Road. This will eliminate displacement of 17 properties. The proposal will save a total of \$5,647,228, of which \$1,397,228 is ROW acquisition, and \$4,250,000 is cost avoidance from not purchasing seventeen (17) properties.

R-7.0 & R-21.0 - Eliminate proposed retaining walls #1 and #2. These retaining walls appear to be unnecessary and elimination will save \$±462,000.

R-9.0 - Construct roundabout at Old Dahlonega & Kanady Road. The low volume of 22,000 vehicles per day makes a roundabout feasible and eliminates the need for a traffic light system. Traffic can move without delays waiting for a traffic light. The roundabout provides a slight cost savings of approximately \$50,000.

R-10.0 - Install corrugated median for Typical Section # 2 limits from Sta. 48+50 to Sta. 60+50 and Sta. 158+85 to Sta. 173+50 The current design includes a raised concrete median in superelevated areas from Sta. 48+50 to 60+50, and Sta. 158+85 + 173+50. In R-10.0, it is proposed to utilize a corrugated concrete median in lieu of the raised median. This alternative provides a savings of approximately \$14,000.

R-13.0 - Construct project with 5-lane flush 12' median in lieu of 4-lane divided with 20 foot raised median. The current design of the corridor is urban shoulders with four 11-foot travel lanes and a 20' raised grass median. In R-13.0, it is proposed to revise the typical section to 11-foot travel lanes with a 12' flush center lane. This reduces earthwork and provides improved access to properties. This alternative results in an increase in construction costs of approximately \$468,000.

R-14.0 - Redesign to keep new construction on existing roadway alignment Sta. 100+00 to Sta. 124+00 and Sta. 208+00 to Sta. 234+00, (six properties do not have to be relocated) Similar to the premise for R-3.2, proposal R-14.0 proposes to maintain alignment closer to the existing road from Sta. 100+00 to 124+00, and Sta. 208+00 to 234+00; also, Sta. 265+00. This alternative allows avoidance of acquiring 4 to 6 properties and a savings in ROW acquisition costs of approximately \$1,000,000.

VALUE ENGINEERING STUDY

VALUE ENGINEERING RESULTS

R-16.0 - Construct sidewalk on only one side instead of both sides of roadway. The current design includes sidewalks on both sides of the roadway for the entire length. It is proposed to only construct a sidewalk on the school side of the roadway. This alternative saves approximately \$321,000.

R-22.0 - Eliminate realignment of side roads: Jerry Burress Rd; Wahoo Rd.; Old Dahlonga Hwy.; Kanady Rd.; Hopewell Rd.; Bark Camp Rd; Elrod Rd.; Yellow Creek Rd. The current design realigns the side roads at Jerry Burress Rd., Wahoo Rd., Old Dahlonga Hwy., Kanady Rd., Hopewell Rd., Bark Camp Rd., Elrod Rd., and Yellow Creek Road. In R-22.0, it is proposed to eliminate the realignment at these 8 locations which reduces impacts to property owners and provides approximately \$1,367,000 in cost savings.

R-23.0 - Eliminate profile change on side roads intersecting SR 60 at Twin Oaks Lane, Marlow Road and Seminole Drive. The current design includes vertical profile changes on the side roads at Twin Oaks Lane, Marlow Road and Seminole Drive. In R-23.0, it is proposed to eliminate the profile changes on these side roads. It appears these changes are not required for the roadway widening project and elimination of this work would lessen property impacts. This proposal is estimated to save approximately \$792,000.

SUMMARY OF VALUE ENGINEERING PROPOSALS

Project # STP00-0198-01 (020) PI No. 132610-

**SR60 Widening & Reconstruction in Murrayville
Hall County, Georgia**

| IDEA NO. | PROPOSAL DESCRIPTION | CONSTRUCTION SAVINGS | RELATED PROPOSALS |
|----------|---|----------------------|---|
| | Note: Brackets mean additional cost | | |
| | ROADWAY (R) | | |
| R-1.0 | Eliminate constructing the 780' bridge over Squirrel Creek, lower the proposed grade from Sta. 59+00 to 75+00, extend the existing triple 10' x 9' culverts, complete PAR if necessary. | \$4,115,890 | |
| R-2.0 | Revise the horizontal and vertical alignment of the proposed SR60 between Stations 28+00 and 48+00 to reduce the earthwork and reduce the ROW impacts. | \$1,808,726 | |
| R-3.0 | End SR60 construction 1500 feet past the intersection of Yellow Creek Road in lieu of going 3350 feet past the intersection. (The intersection is the logical termini for the project.) | \$1,197,788 | Mutually exclusive with R-3.1 and R-3.2 |
| R-3.1 | Eliminate curb and gutter, closed drainage system, median and sidewalk in transition area from Sta. 284+00 to the end of project at Sta. 297+50 (1350lf). | \$227,193 | Mutually exclusive with R-3.0 and R-3.2 |
| R-3.2 | Realign the proposed roadway from Sta. 265+00 to Sta. 294+00 to stay on the existing roadway section without shifting west. | \$750,000 | Mutually exclusive with R-3.0 and R-3.1 |
| R-5.0 | Reduce ROW width from 150' to 100' for entire length of project. | \$5,647,228 | Savings overlap with other proposals with property impact reductions. |
| R-7.0 | Eliminate proposed retaining wall #1 located from Sta. 48+04 left to Sta. 52+09 left on SR60. | \$207,315 | |
| R-9.0 | Construct a roundabout at Old Dahlonga Highway and Kanady Road. | \$49,440 | |

SUMMARY OF VALUE ENGINEERING PROPOSALS

Project # STP00-0198-01 (020) PI No. 132610-

**SR60 Widening & Reconstruction in Murrayville
Hall County, Georgia**

| IDEA NO. | PROPOSAL DESCRIPTION | CONSTRUCTION SAVINGS | RELATED PROPOSALS |
|-----------------|---|-----------------------------|--------------------------|
| | Note: Brackets mean additional cost | | |
| R-10.0 | Install corrugated median for Typical Section # 2 limits from Sta. 48+50 to Sta. 60+50 and Sta. 158+85 to Sta. 173+50 | \$13,905 | |
| R-13.0 | Construct project with 5-lane flush 12' median in lieu of 4-lane divided with 20 foot raised median. | (\$467,859) | |
| R-14.0 | Redesign to keep new construction on existing roadway alignment Sta. 100+00 to Sta. 124+00 and Sta. 208+00 to Sta. 234+00, and Sta. 265+00. | \$1,000,000 | |
| R-16.0 | Construct sidewalk on only one side instead of both sides of roadway. | \$321,353 | |
| R-21.0 | Eliminate proposed retaining wall #2 located from Sta 54+42 left to Sta. 57+45 left on SR60. | \$155,103 | |
| R-22.0 | Eliminate realignment of side roads: Jerry Burress Rd; Wahoo Rd.; Old Dahlonega Hwy. and Kanady Rd.; Hopewell Rd. ; Bark Camp Rd; Elrod Rd.; Yellow Creek Rd. | \$1,367,420 | |
| R-23.0 | Eliminate profile change on side roads intersecting SR 60 at Twin Oaks Lane, Marlow Road, Seminole Drive. | \$792,419 | |

VALUE ENGINEERING PROPOSAL

| | | | |
|-------------------------|-------|---------------------|--------|
| PROPOSAL NUMBER: | R-1.0 | PAGE NUMBER: | 1 of 8 |
|-------------------------|-------|---------------------|--------|

| | |
|------------------------|-----------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
| PROJECT TITLE: | SR 60 in Murrayville, Hall County |

| | |
|------------------------------|--|
| PROPOSAL DESCRIPTION: | ELIMINATE CONSTRUCTING THE PROPOSED 780' BRIDGE OVER SQUIRREL CREEK, LOWER THE PROPOSED GRADE FROM STA. 59+00 TO 75+00, EXTEND THE EXISTING TRIPLE 10' X 9' CULVERTS, COMPLETE PAR IF NECESSARY. |
|------------------------------|--|

ORIGINAL DESIGN: The current design for SR60 includes a new 4-lane bridge with a 6' median from Sta. 60+50 to Sta. 68+30, a length of 780 feet (cover sheet and profile sheets show different bridge stations). Proposed profile in area of bridge is raised to approximate elevation of 1097.3' to allow 1' of freeboard between structure (depth of structure is unknown) and flood elevation of 1085' (elevation of flood provided by design consultant). Existing roadway is approximate elevation of 1082.5'.

PROPOSED CHANGE: The proposed recommendation is to eliminate the new bridge over Squirrel Creek and widen SR60 on fill by extending the existing triple 10' x 9' culvert. Adjust the proposed profile of SR60 to keep the roadway subgrade 1' above the flood elevation of 1085'. Impacts to stream buffer may result in the need for a Practical Alternatives Report (PAR).

JUSTIFICATION: Construction time can be shortened 12 to 18 months by not having to build a 780' structure in two stages to maintain traffic. Construction cost will be reduced.

ADVANTAGES:

- Construction cost savings
- Construction time savings (12-18 months)
- Reduces traffic control during construction

DISADVANTAGES:

- Stream impacts
- May require a PAR

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 5,121,000 | | \$ 5,121,000 |
| PROPOSED CHANGE: | \$ 1,005,110 | | \$ 1,005,110 |
| SAVINGS: | \$ 4,115,890 | | \$ 4,115,890 |

COST ESTIMATING WORKSHEET

| | | | |
|-------------------------|-------|---------------------|--------|
| PROPOSAL NUMBER: | R-1.0 | PAGE NUMBER: | 2 of 8 |
|-------------------------|-------|---------------------|--------|

| | |
|------------------------|------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
|------------------------|------------------------------|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|--------|-----------|--------------------|
| 780' x 70' Bridge | 1 | SF | 54,600 | 85.00 | 4,641,000 |
| Construction overhead | 7 | MO | 12 | 40,000 | 480,000 |
| SUBTOTAL – COST TO PRIME | | | | | 5,121,000 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$5,121,000 |

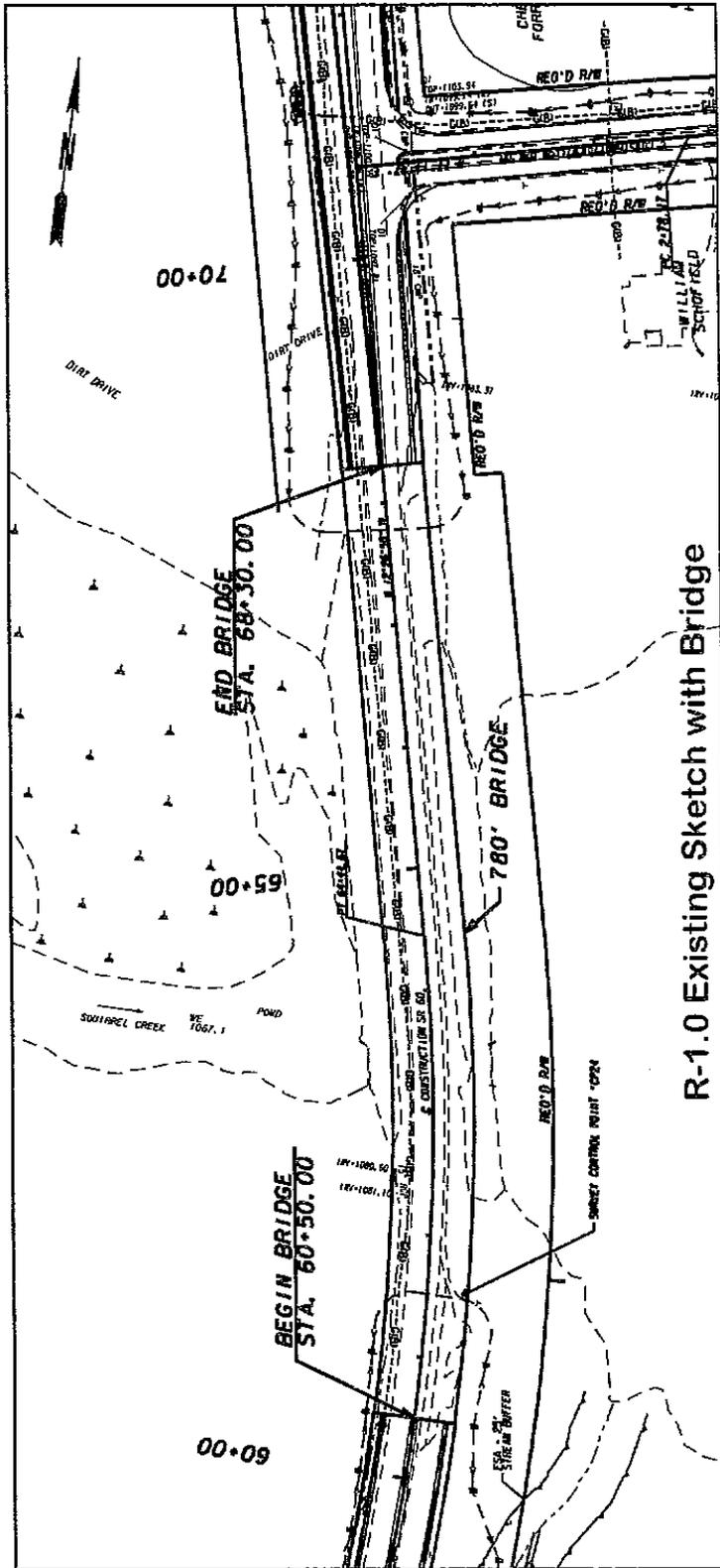
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-------|--------|-----------|--------------------|
| Cl A Conc | 3 | CY | 513.3 | 364.32 | 187,005 |
| Bar Reinf Steel | 3 | Lb | 67,541 | 0.63 | 42,551 |
| Tp II Backfill | 3 | CY | 404 | 35.88 | 14,496 |
| In Place Embankment | 3 | CY | 63434 | 4.82 | 305,752 |
| Mitigation Credits | 1 | Units | 17.28 | 12,500 | 216,000 |
| 402-3131 9.5 mm asph | 3 | T | 315 | 53.84 | 16,960 |
| 402-3190 19mm asph | 3 | T | 419 | 63.71 | 26,694 |
| 402-3121 25mm asph | 3 | T | 838 | 56.63 | 47,456 |
| 310-5120 12" GAB | 3 | SY | 3812 | 18.30 | 69,760 |
| 441-6222 C&G 8"x30" Tp 2 | 3 | LF | 1560 | 14.58 | 22,745 |
| 441-6740 C&G 8"x30" Tp 7 | 3 | LF | 1560 | 10.79 | 16,832 |
| 441-0106 Conc S/W 6" | 3 | SY | 887 | 43.81 | 38,859 |
| SUBTOTAL – COST TO PRIME | | | | | 1,005,110 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$1,005,110 |

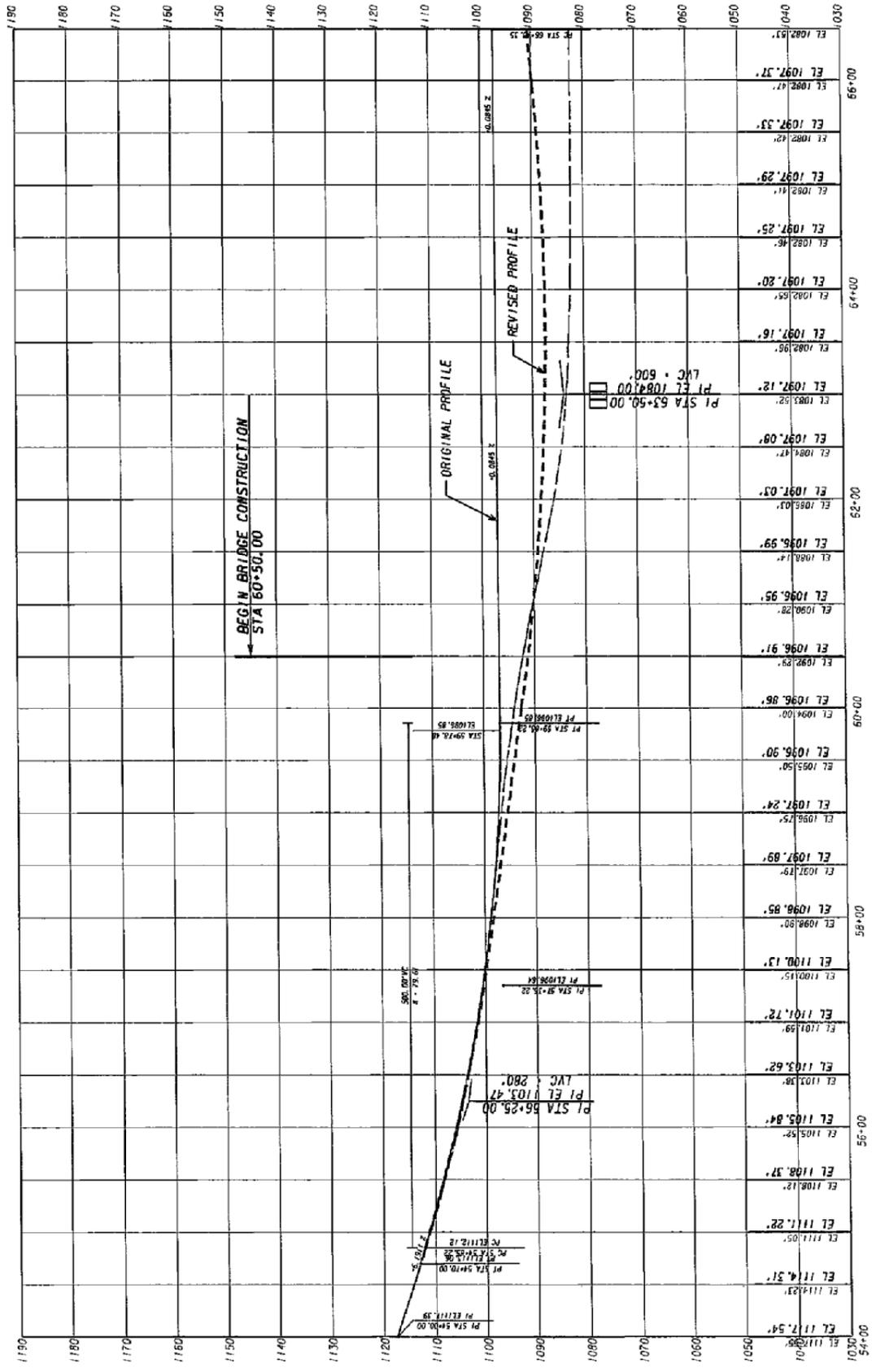
Difference [Original-Proposed] **\$4,115,890**

SOURCES

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. See Calcs |
|--|--|



R-1.0 Existing Sketch with Bridge



R-1.0 PROFILE 1 of 2

CALCULATIONS

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 7 of 8

PROJECT #/PI #: STP00-0198-01(020) / 132610-

1. Bridge Option Cost Estimate:

Begin Bridge Sta.: 60+50.00

End Bridge Sta.: 68+30.00

Bridge Length= 780' Bridge Width= 70' Bridge Area= 780' x 70'=54,600 (sf)

Bridge cost= 85 \$/sf Total Bridge Cost= 54,600 x 85.00 = **\$4,641,000**

2. Culvert Option Cost Estimate:

L (Total Length of Extension)= 42'(left)+49'(Right) = 91'

2.1. Culvert Reinf. = 700 (lbs./lf)

Wing walls and Parapets Reinf.=3841 (lbs.)

Total Reinf.= 700x91+3841=67541 (lbs.)

2.2. Culvert Concrete= 5.073 (cy/lf)

Wing walls and Parapets Concrete=51.66 (cy)

Total Concrete= 5.073*91+51.66=513.3 (cy)

2.3. Type II Backfill vol.= 4'x91'x30'=404 (cy)

2.4. Backfill= 63,434 (cy) (Based of EW Report from Heath & Lineback)

Reinf.=67,541 x \$0.63 = \$42,551

Concrete= 513.3 x \$364.32 = \$187,005

Type II backfill = 404 x \$35.88 = \$14,496

Backfill = 63,434 x \$4.82 =\$305,752

mitigation required at Squirrel Creek = 17.28 credits x \$12,500 = \$216,000

Total Culvert Cost Estimate = **\$765,804**

Earthwork Summary:

Option 1 – Bridge:

Begin of Project to Begin of Bridge:

CUT= 55056 cy

FILL=81591 cy

CUT-FILL= -26,535 cy

End of Project to End of Bridge:

CUT= 91003 cy

FILL=108562 cy

CUT-FILL= -17,559 cy

Total= -44,094 cy

Option 2 – Culvert:

Begin of Project to End of Project::

CUT= 146,059 cy

FILL=253,587 cy

CUT-FILL= -107,528 cy

Total= -107,528 cy Difference (107,528 – 44,094) = 63,434 cy

CALCULATIONS

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 8 of 8

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Pavement Quantities:

Sta. 60+50 to Sta. 68+30 = 780LF

780 LF x 44' = 34320 SF / 9 = 3813 SY pavement area

9.5mm @ 165#/SY = 315T

12 mm @ 220#/SY = 419T

25mm @ 440#/SY = 838T

12" GAB = 3813 SY

Sidewalk

780 LF x 2 sides x 5' = 7800 SF / 9 = 887 SY

C&G Tp 2 = 780 LF x 2 = 1560 LF

C&G Tp 7 = 780 LF x 2 = 1560 LF

Overhead Cost Calculations:

Assume field overhead @ 4.0% and office overhead @2.0%

Total OH % = 1.04 x 1.02 = 1.0608, or 6.08%

Total OH cost = \$22,452,619 x 0.0608 = \$1,365,000

Assuming 36-mo. construction period

Monthly OH cost = 1,365,000 ÷ 36 mos. = 38,000, say \$40,000

VALUE ENGINEERING PROPOSAL

| | |
|-------------------------------|----------------------------|
| PROPOSAL NUMBER: R-2.0 | PAGE NUMBER: 1 of 7 |
|-------------------------------|----------------------------|

| | |
|------------------------|--|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
| PROJECT TITLE: | SR 60 in Murrayville, Hall County |

| | |
|------------------------------|--|
| PROPOSAL DESCRIPTION: | REVISE THE HORIZONTAL AND VERTICAL ALIGNMENT OF THE PROPOSED SR60 BETWEEN STA. 28+00 AND 48+00 TO REDUCE THE EARTHWORK AND REDUCE THE ROW IMPACTS. |
|------------------------------|--|

ORIGINAL DESIGN: In the current the design the horizontal alignment of SR60 is shifted to the East beginning at Sta 28+00 and ending at Sta 48+00. At the approximate midpoint of the shift, the proposed centerline is 100' +/- east of the original centerline. The vertical grade from the PVI Sta. 27+80 to PVI Sta. 34+60 is proposed at 7.00%. The existing roadway is approximately 9%. Three side roads tie into SR60 within this section (Eades Dr., Fraser Cir., Fairmont St). The proposed roadway is being raised as much as 25 feet above the existing roadway. Five residential displacements are indicated as a result of this horizontal and vertical alignment. Approximately 20 parcels are impacted by ROW acquisition in this station range.

PROPOSED CHANGE: The proposed recommendation is to revise the horizontal and vertical alignments from Sta. 28+00 to Sta. 48+00 to keep the two southbound lanes of SR60 at the current horizontal and vertical location of the existing SR60 travel lanes. The proposed vertical grade will be 9.000% and a design exception will be required.

JUSTIFICATION: Existing SR60 grade is 9% and AASHTO allows 9% grades on urban arterials in mountainous terrain. Reduces construction time by not requiring 25+/- feet of fill on the existing roadway. Simplified traffic control to side streets. Reduces number of displacements by 5 parcels and reduce the number of acquisitions by 10 parcels.

ADVANTAGES:

- Avoids ROW acquisition from 10 parcels
- Reduces construction cost
- Avoids five displacements
- Easier to maintain traffic on side streets
- Reduces schedule by 1 month
- Geotech (BFI) investigation not required

DISADVANTAGES:

- A design exception is required for a grade over 7% on a 45mph urban arterial in a rolling terrain
- Impacts the 25' stream buffer

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 1,898,300 | | \$ 1,898,300 |
| PROPOSED CHANGE: | \$ 89,574 | | \$ 89,574 |
| SAVINGS: | \$ 1,808,726 | | \$ 1,808,726 |

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 2 of 7

PROJECT #/PI #: STP00-0198-01(020) / 132610-

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|------------------------------|-------------|-----|-------|-----------|--------------------|
| ROW Displacement | 7 | EA | 5 | 250,000 | 1,250,000 |
| ROW Acquisition | 7 | EA | 10 | 50,000 | 500,000 |
| 208-0100 In Place Embankment | 3 | CY | 22469 | 4.82 | 108,300 |
| Overhead costs (per month) | 8 | MO | 1 | 40,000 | 40,000 |
| SUBTOTAL – COST TO PRIME | | | | | 1,898,300 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$1,898,300 |

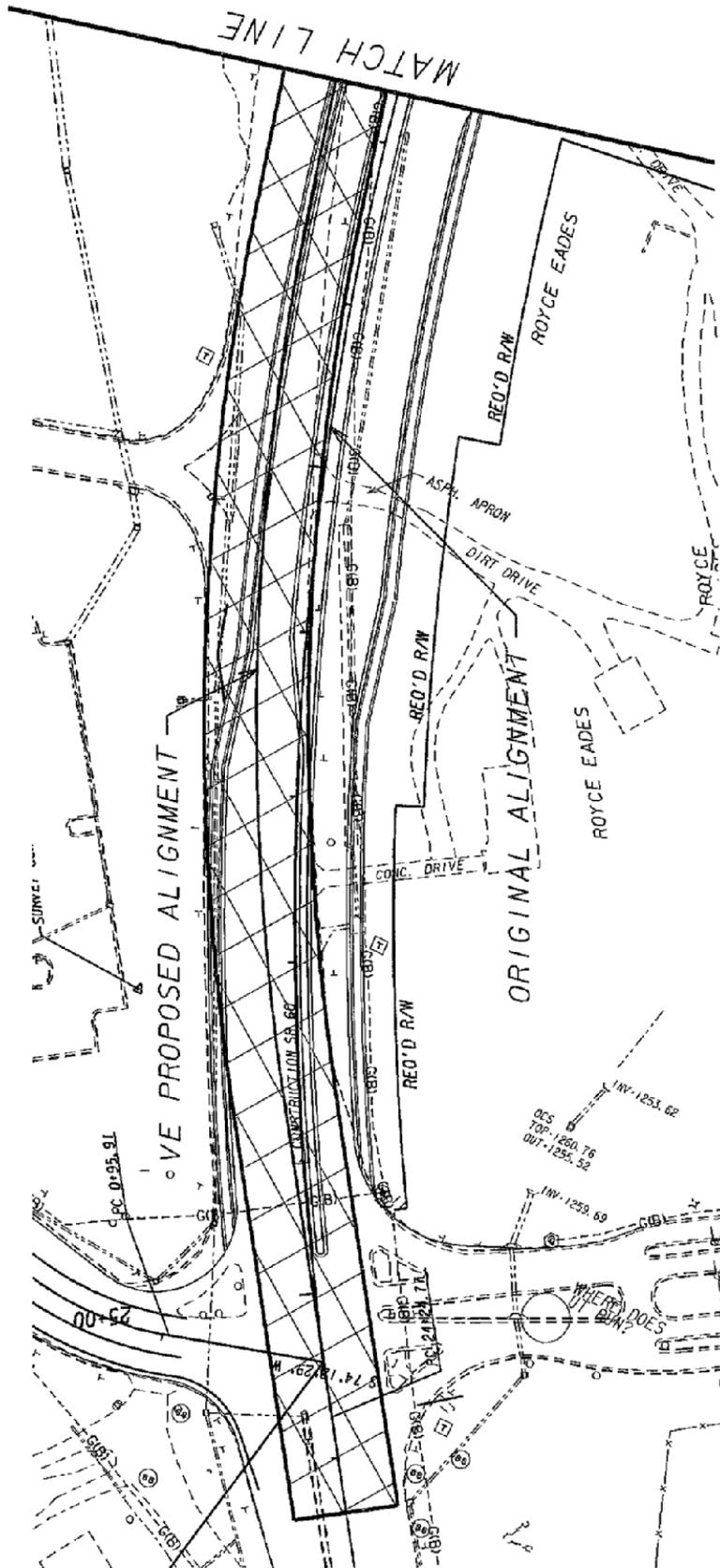
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|------------------------------|-------------|-----|------|-----------|-----------------|
| 208-0100 In Place Embankment | 3 | CY | 5617 | 4.82 | 27,074 |
| Stream impact credits | | EA | 5 | 12,500 | 62,500 |
| SUBTOTAL – COST TO PRIME | | | | | 89,574 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$89,574 |

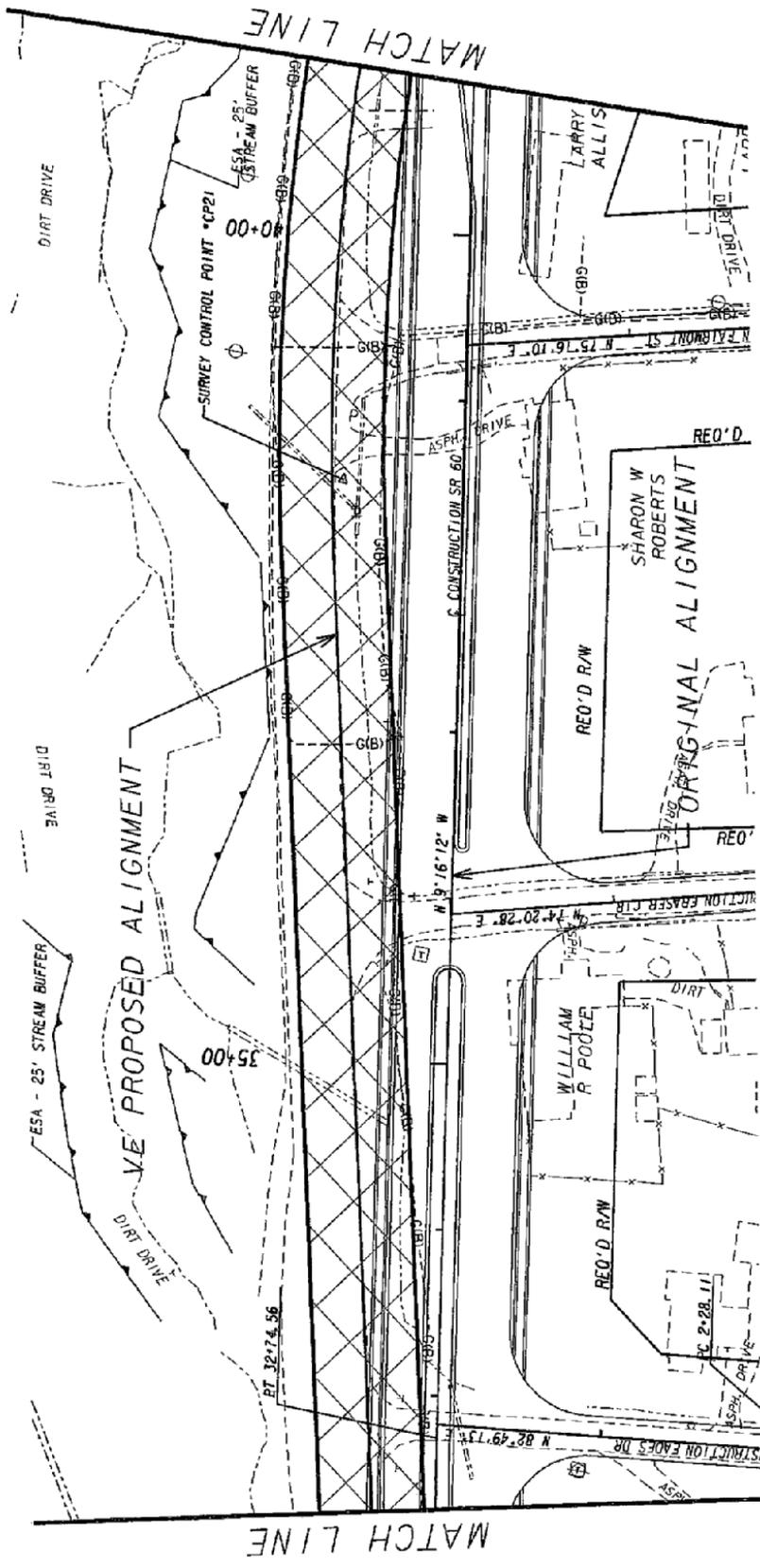
Difference [Original-Proposed] **\$1,808,726**

SOURCES

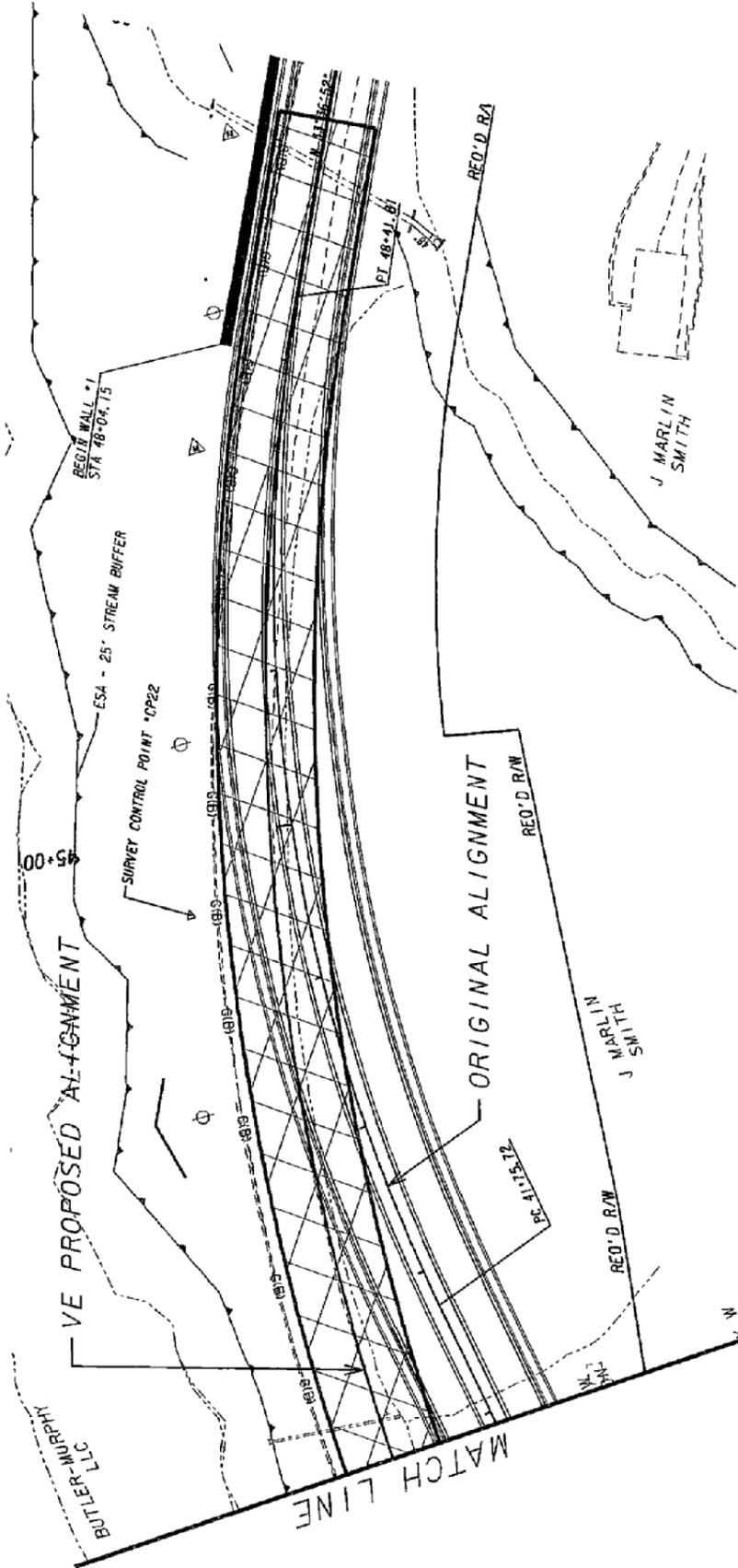
- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Mean Item Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. Average based on ROW cost estimate 8. See Calcs for R-1.0 |
|--|---|



R-2.0 Plan View 1 of 3



R-2.0 Plan View 2 of 3



R-2.0 Plan View 3 of 3

CALCULATIONS

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 7 of 7

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Marked residential displacements in station range 28+00 TO 48+00:

Sta. 34+00 RT Eades

Sta. 35+00 RT Poole

Sta. 39+00 RT Roberts

Sta. 40+00 RT Allison(1)

Sta. 40+00 RT Allison(2)

Displacement costs: (data from ROW cost estimate dated 6/10/11):

Residential land = 1,500,000 SF @ \$0.80/SF = \$1,200,000

\$1,200,000 + 55% contingency + 60% Adm/court costs = \$2,976,000

Relocations = 16 properties @\$40,000 each = \$640,000

\$640,000 + 55% contingency + 60% Adm/court costs = \$1,587,200

Cost/property = (\$2,976,000 + \$1,587,200) ÷ 16 = \$285,200, say \$250,000

5 fewer displacements @ \$250,000 = **\$1,250,000**

Assume \$50,000 per parcel for acquisitions

10 fewer parcels @ \$50,000 = **\$500,000**

Roadway pavement and drainage quantities unchanged.

Original earthwork from End Area file provided by Heath & Lineback:

@Sta. 28+00 mass haul = 1160.073 CY

@ Sta. 48+00 mass haul = -21309.915 CY

Difference = -22469 CY therefore 22469 CY of in-place embankment required in this station range.

Assume lower profile will reduce earthwork volume by 75%.

22469CY x 75% = 16852 CY reduction in fill.

22469 - 16852 = 5617CY

Assume stream impact credits required to be 5 at \$12,500 per credit

5 x \$12,500 = \$62,500

Overhead cost calculation: See R-1.0

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-3.0

PAGE NUMBER: 1 of 4

PROJECT #/PI #: STP00-0198-01(020) / 132610-
PROJECT TITLE: SR 60 in Murrayville, Hall County

PROPOSAL DESCRIPTION: END SR60 CONSTRUCTION 1500 FEET PAST THE INTERSECTION OF YELLOW CREEK ROAD IN LIEU OF GOING 3350 FEET PAST THE INTERSECTION. (THE INTERSECTION IS THE LOGICAL TERMINI FOR THE PROJECT.)

ORIGINAL DESIGN: The original design proposes to carry full width construction of SR60 beyond the intersection of Yellow Creek Road at Sta. 264+00 to Sta. 284+00 (2000LF) and then taper to the two lane existing at Sta. 297+50 (1350LF).

PROPOSED CHANGE: It is proposed to end full width construction at Sta. 270+00 in lieu of Sta. 284+00 and taper to the existing by Sta. 279+00 in lieu of Sta. 297+50.

JUSTIFICATION: The intersection of SR60 and Yellow Creek Road is the logical termini for the project and construction beyond the intersection is of no benefit to the project. Two relocations can be avoided.

ADVANTAGES:

- Reduction in construction cost
- Reduction in ROW cost
- Avoid two relocations

DISADVANTAGES:

- None apparent

| | INITIAL COST | OPERATING COST | TOTAL LIFE- CYCLE COST |
|-------------------------|-----------------|-------------------|---------------------------|
| ORIGINAL DESIGN: | \$ 1,197,788 | | \$ 1,197,788 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 1,197,788 | | \$ 1,197,788 |

COST ESTIMATING WORKSHEET

| | | | |
|-------------------------|-------|---------------------|--------|
| PROPOSAL NUMBER: | R-3.0 | PAGE NUMBER: | 2 of 4 |
|-------------------------|-------|---------------------|--------|

| | |
|------------------------|------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
|------------------------|------------------------------|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|------|-----------|--------------------|
| 441-6222 C&G 8"x30" Tp 2 | 3 | LF | 5500 | 14.58 | 80,190 |
| 441-6740 C&G 8"x30" Tp 7 | 3 | LF | 3600 | 10.79 | 38,844 |
| 441-0106 Conc S/W 6" | 3 | SY | 3055 | 43.81 | 133,839 |
| 550-1180 Storm Drain 18" | 3 | LF | 2100 | 28.22 | 59,262 |
| 668-1100 Catch Basin | 3 | EA | 7 | 2031.11 | 14,218 |
| 402-3131 9.5 mm asph | 3 | T | 726 | 53.84 | 39,088 |
| 402-3190 19mm asph | 3 | T | 968 | 63.71 | 61,671 |
| 402-3121 25mm asph | 3 | T | 1936 | 56.63 | 109,636 |
| 310-5120 12" GAB | 3 | SY | 8800 | 18.30 | 161,040 |
| Displacements | 7 | EA | 2 | 250,000 | 500,000 |
| SUBTOTAL – COST TO PRIME | | | | | 1,197,788 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$1,197,788 |

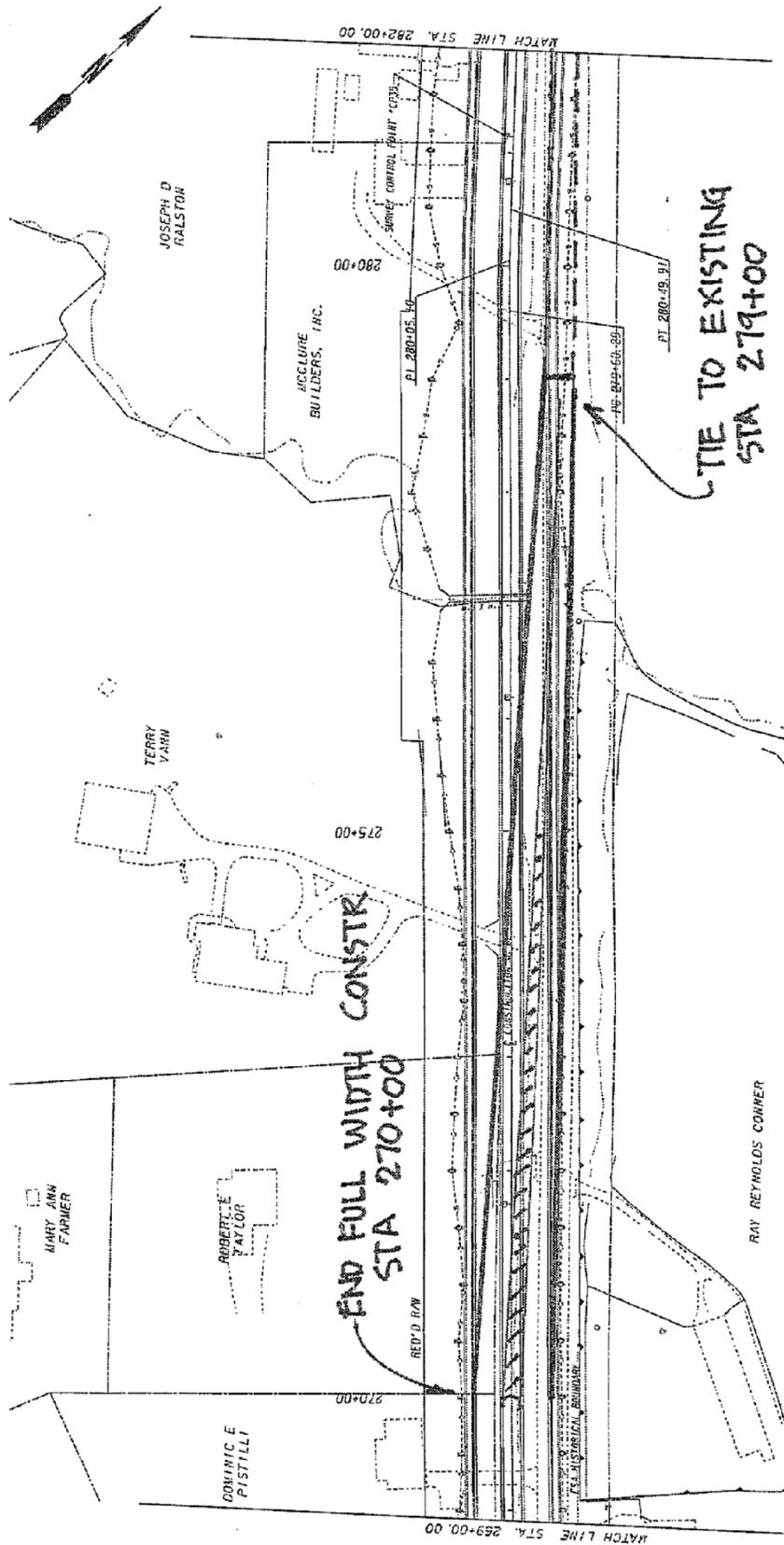
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|-------------|
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | -- |
| TOTAL CONTRACT COST | | | | | 0.00 |

Difference [Original-Proposed] **\$1,197,788**

SOURCES

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. ROW Estimate (See Calcs in R-2.0) |
|--|--|



R-3.0 Proposed Change Sketch 1 of 1

CALCULATIONS

PROPOSAL NUMBER: R-3.0

PAGE NUMBER: 4 of 4

PROJECT #/PI #: STP00-0198-01(020) / 132610-

QUANTITY REDUCTIONS:

Tp 2 C&G Sta. 270+00 to 297+50 = 2750LF

Two sides = 2750LF x 2 = 5500LF

Tp 7 C&G Sta. 270+00 to 288+00 = 1800LF

Two sides = 1800LF x 2 = 3600LF

Sidewalk Sta. 270+00 to 297+50 = 2750LF

Two sides = 2750LF x 2 = 5500LF

5500LF x 5' wide = 27500SF / 9 = 3055SY

Assume 18" storm drain = 2100LF

Assume Catch Basins @ 300' = 2100LF / 300 = 7EA

Pavement area = 1800LF x 44' wide = 79200SF / 9 = 8800SY

9.5mm @ 165#/SY = 726T

12 mm @ 220#/SY = 968T

25mm @ 440#/SY = 1936T

Displacements:

Sta. 281+00 Left - McClure

Sta. 283+00 Left - Ralston

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-3.1

PAGE NUMBER: 1 of 7

PROJECT #/PI #: STP00-0198-01(020) / 132610-
PROJECT TITLE: SR 60 in Murrayville, Hall County

PROPOSAL DESCRIPTION: ELIMINATE CURB AND GUTTER, CLOSED DRAINAGE SYSTEM, MEDIAN AND SIDEWALK IN TRANSITION AREA FROM STA. 284+00 TO THE END OF PROJECT AT STA. 297+50 (1350LF).

ORIGINAL DESIGN: The design proposes to construct curb and gutter, median, closed drainage and sidewalk elements throughout the transition area from four lane divided to two lane undivided from Sta. 284+00 to 297+50.

PROPOSED CHANGE: It is proposed to eliminate curb and gutter, median, closed drainage and sidewalk from the transition area from full width to existing from Sta. 284+00 to the end of the project at Sta. 297+50.

JUSTIFICATION: These items would be removed in subsequent improvements beyond Sta. 284+00 and are therefore temporary. This area is beyond the logical termini of the project which is Yellow Creek Road.

ADVANTAGES:

- Cost savings
- Construction time savings of 1 month
- Saves on demolition In future projects

DISADVANTAGES:

- None apparent

| | INITIAL COST | OPERATING COST | TOTAL LIFE- CYCLE COST |
|-------------------------|-----------------|-------------------|---------------------------|
| ORIGINAL DESIGN: | \$ 227,193 | | \$ 227,193 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 227,193 | | \$ 227,193 |

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER: R-3.1

PAGE NUMBER: 2 of 7

PROJECT #/PI #: STP00-0198-01(020) / 132610-

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|------|-----------|------------------|
| 441-6222 C&G 8"x30" Tp 2 | 3 | LF | 2700 | 14.58 | 39,366 |
| 441-6740 C&G 8"x30" Tp 7 | 3 | LF | 800 | 10.79 | 8,632 |
| 441-0106 Conc S/W 6" | 3 | SY | 1500 | 43.81 | 65,715 |
| 550-1180 Storm Drain 18" | 3 | LF | 2100 | 28.22 | 59,262 |
| 668-1100 Catch Basin | 3 | EA | 7 | 2031.11 | 14,218 |
| Overhead costs | 7 | MO | 1 | 40,000 | 40,000 |
| SUBTOTAL – COST TO PRIME | | | | | 227,193 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$227,193 |

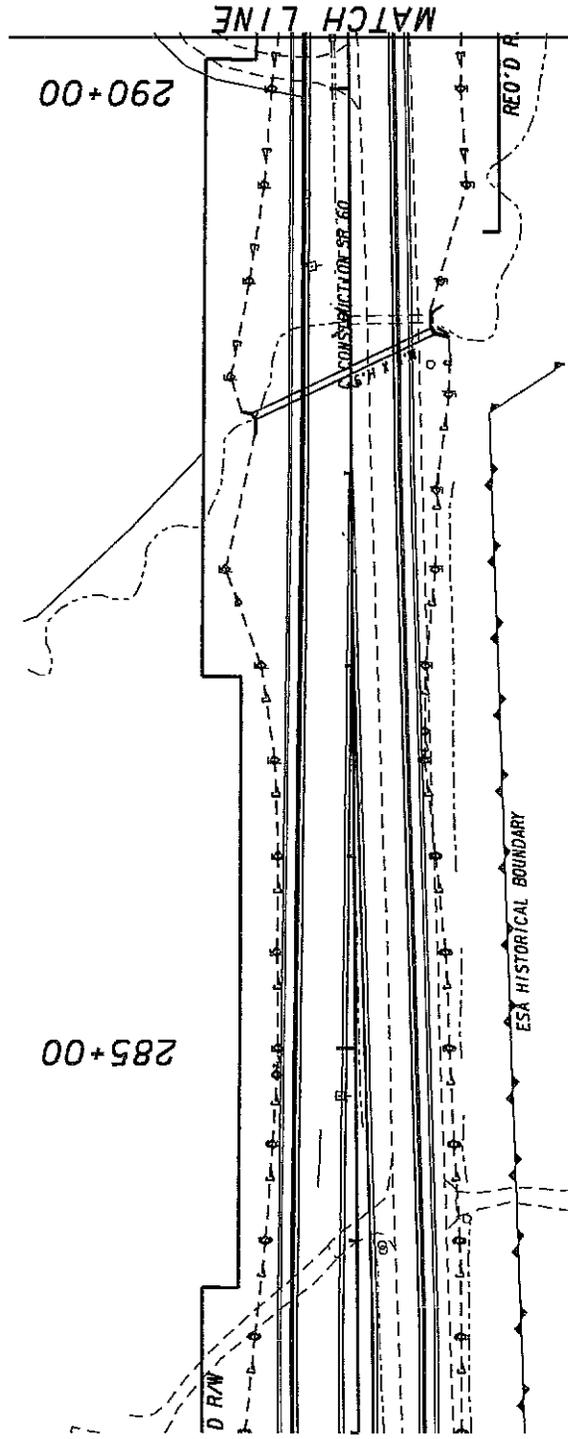
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|-------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | -- |
| TOTAL CONTRACT COST | | | | | 0.00 |

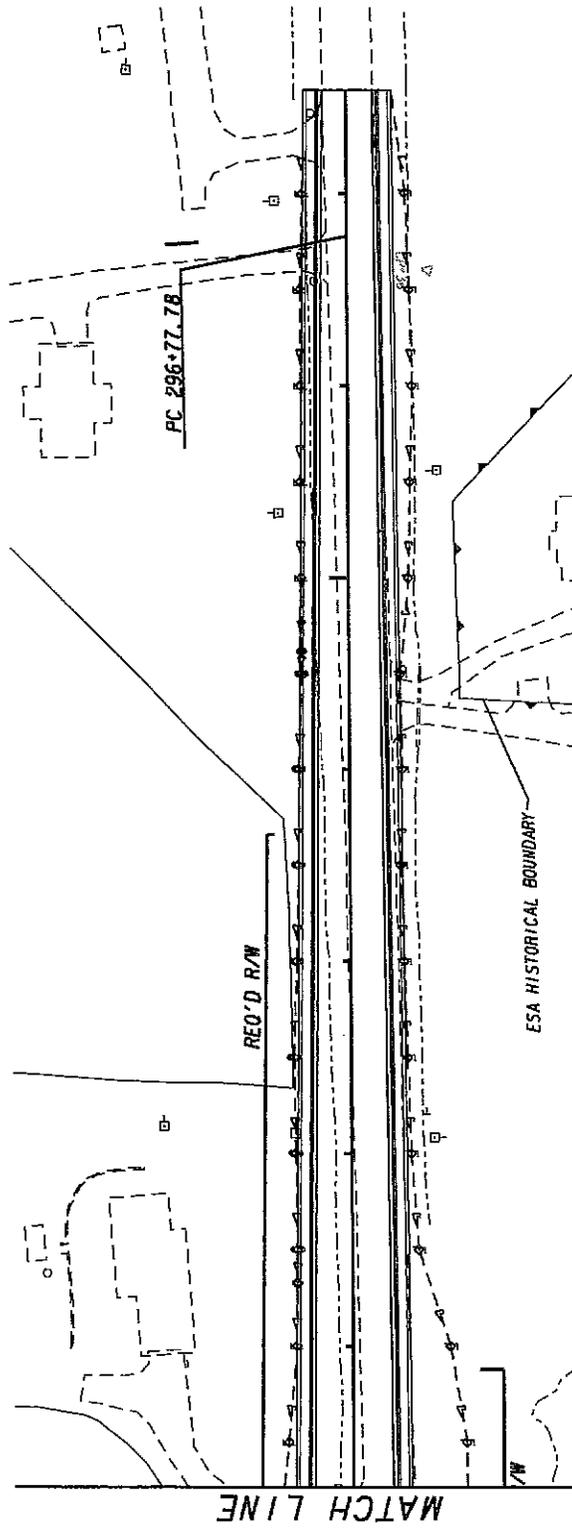
Difference [Original-Proposed] **\$227,193**

SOURCES

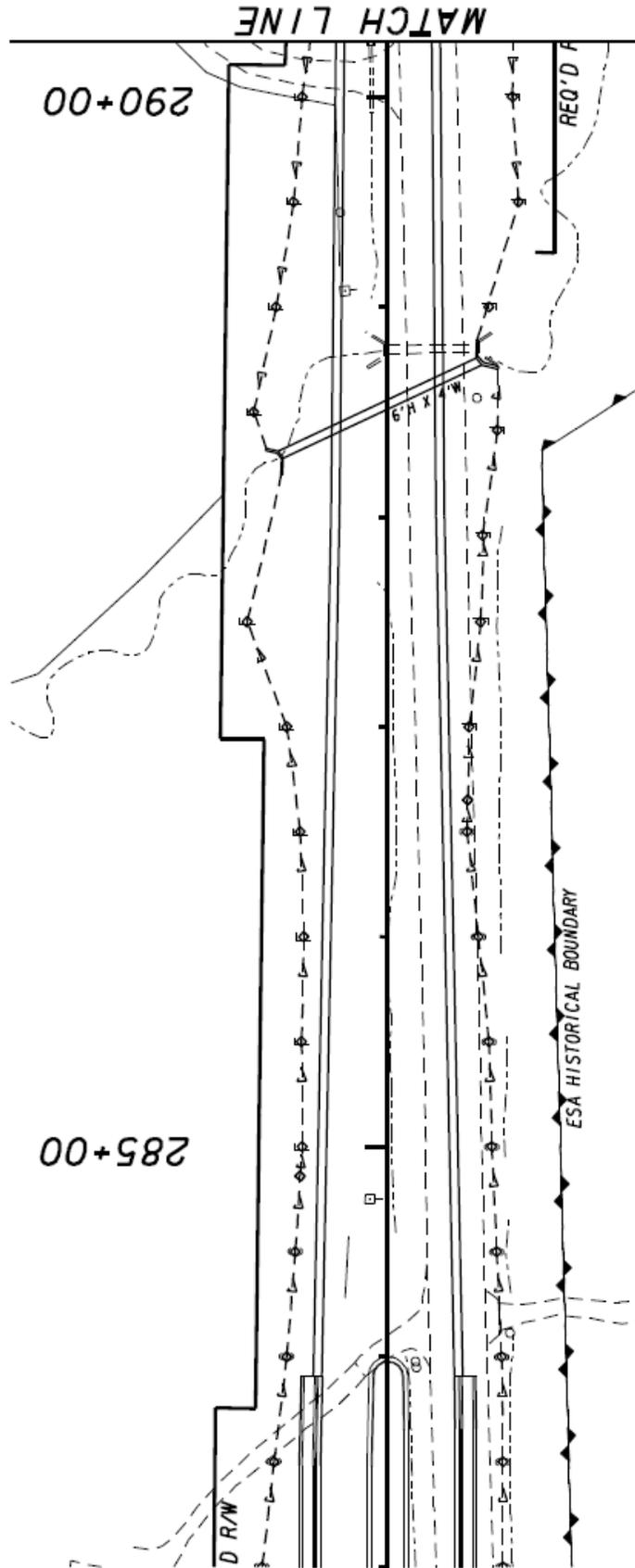
- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. See R-1.0 Calcs |
|--|--|



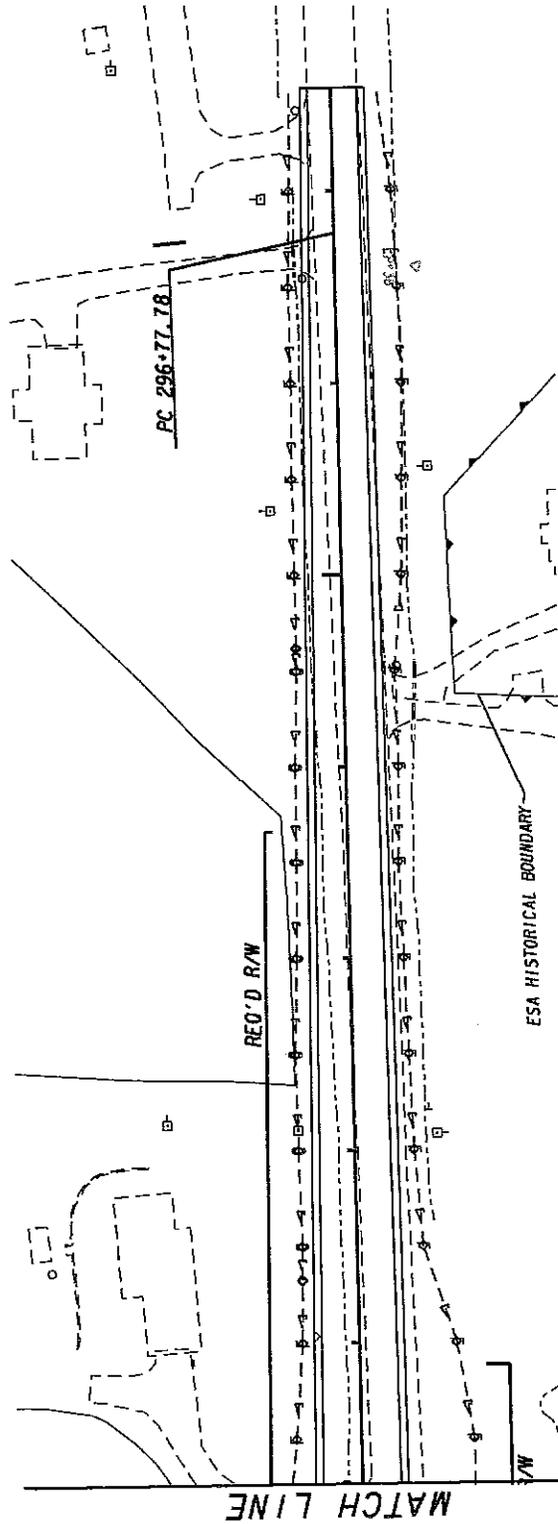
R-3.1 Current Design 1 of 2



R-3.1 Current Design 2 of 2



R-3.1 Proposed Change 1 of 2



R-3.1 Proposed Change 2 of 2

CALCULATIONS

PROPOSAL NUMBER: R-3.1

PAGE NUMBER: 7 of 7

PROJECT #/PI #: STP00-0198-01(020) / 132610-

C&G Tp 2: Sta. 297+50 to 284+00 = 1350LF

C&G on 2 sides = $1350 \times 2 = 2700\text{LF}$

Median w/Tp 7 C&G Sta. 288+00 to 284+00 = 400LF

C&G on 2 sides = $400 \times 2 = 800\text{LF}$

Sidewalk 1350LF on 2 sides = $1350 \times 2 = 2700\text{LF}$

$2700\text{LF} \times 5' \text{ wide} = 13500\text{SF} / 9 = 1500\text{SY}$

Assume 2100LF 18" storm drain

Assume Catch Basin @ 300' = $2100 / 300 = 7\text{EA}$

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-3.2

PAGE NUMBER: 1 of 4

PROJECT #/PI #: STP00-0198-01(020) / 132610-
PROJECT TITLE: SR 60 in Murrayville, Hall County

PROPOSAL DESCRIPTION: REALIGN THE PROPOSED ROADWAY FROM STA. 265+00 TO STA. 294+00 TO STAY ON THE EXISTING ROADWAY SECTION WITHOUT SHIFTING WEST.

ORIGINAL DESIGN: The original design proposes to shift the roadway west and away from the historical property located near Sta. 285+00.

PROPOSED CHANGE: The proposed recommendation is to maintain the two northbound lanes at the same horizontal and vertical location of the existing two travel lanes.

JUSTIFICATION: An alignment that maintains the existing horizontal and vertical alignment of the existing can be constructed without impact to the adjacent historical property near Sta. 285+00. Three displacements can be avoided by staying on existing alignment.

ADVANTAGES:

- Cost savings
- Three fewer displacements

DISADVANTAGES:

- None apparent

| | INITIAL COST | OPERATING COST | TOTAL LIFE- CYCLE COST |
|-------------------------|-----------------|-------------------|---------------------------|
| ORIGINAL DESIGN: | \$ 750,000 | | \$ 750,000 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 750,000 | | \$ 750,000 |

COST ESTIMATING WORKSHEET

| | |
|-------------------------------|----------------------------|
| PROPOSAL NUMBER: R-3.2 | PAGE NUMBER: 2 of 4 |
|-------------------------------|----------------------------|

| |
|---|
| PROJECT #/PI #: STP00-0198-01(020) / 132610- |
|---|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|--------------------------|-------------|-----|-----|-----------|------------------|
| Displacements | 7 | EA | 3 | 250,000 | 750,000 |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 750,000 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$750,000 |

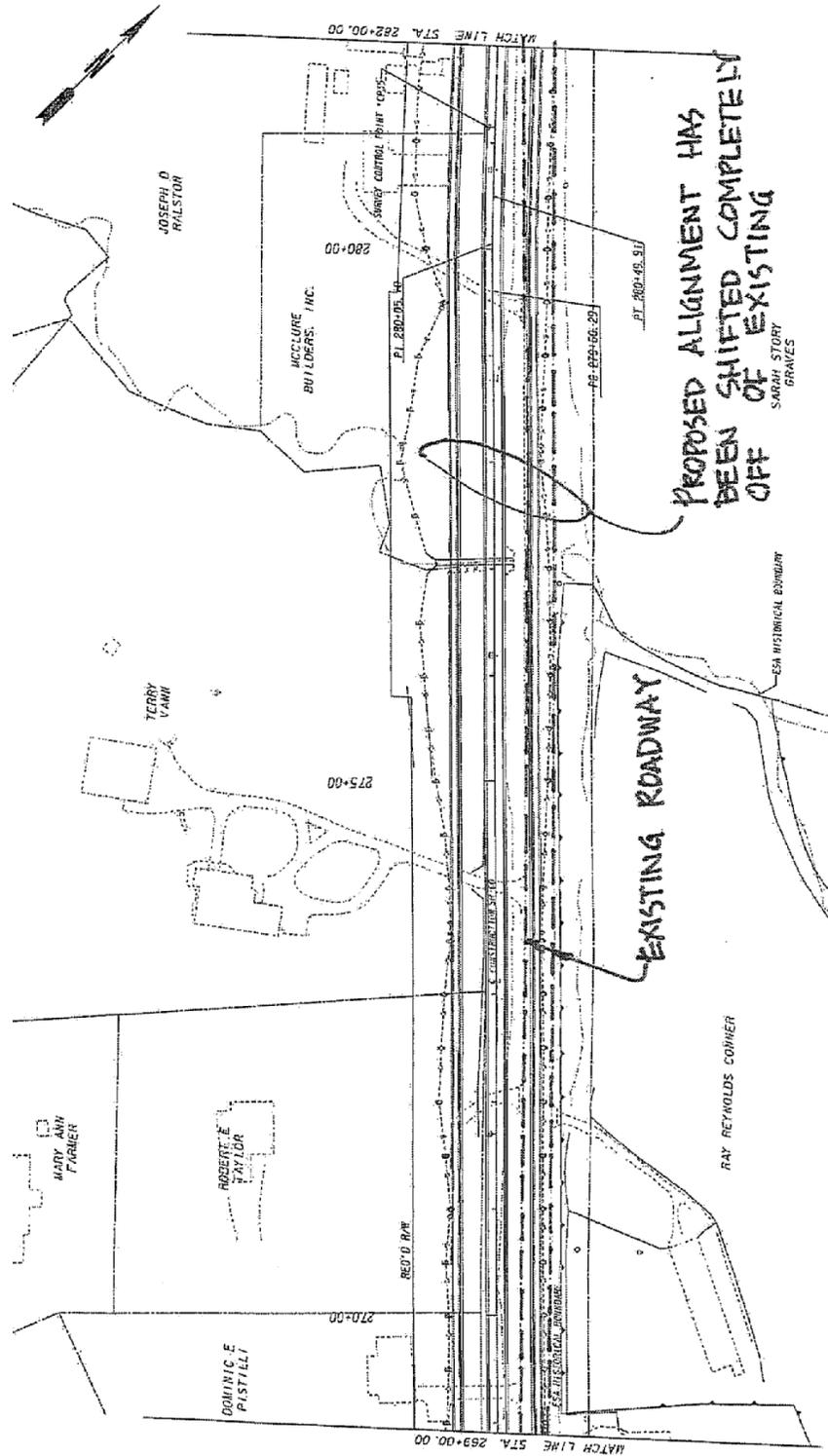
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|--------------------------|-------------|-----|-----|-----------|-------------|
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | -- |
| TOTAL CONTRACT COST | | | | | 0.00 |

Difference [Original-Proposed] **\$750,000**

SOURCES

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. ROW estimate (See Calcs in R-2.0) |
|--|--|



R-3.2 Plan View 1 of 1

CALCULATIONS

PROPOSAL NUMBER: R-3.2

PAGE NUMBER: 4 of 4

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Roadway items are unchanged.

Proposed ROW displacements:

Pistilli Sta. 269+00 left

McClure Sta. 281+00 left

Ralston Sta. 283+00 left

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-5.0

PAGE NUMBER: 1 of 3

PROJECT #/PI #: STP00-0198-01(020) / 132610-
PROJECT TITLE: SR 60 in Murrayville, Hall County

PROPOSAL DESCRIPTION: REDUCE ROW WIDTH FROM 150' TO 100' FOR ENTIRE LENGTH OF PROJECT.

ORIGINAL DESIGN: This project proposes minimum 150' ROW throughout the urban corridor length on the current drawings. All construction limits are within the ROW.

PROPOSED CHANGE: The proposed recommendation is to reduce the ROW width from 150' to 100' for the 5.17 miles. Currently 100'-00" ROW is the standard for this urban corridor. Use easement for construction limits which are beyond the ROW.

JUSTIFICATION: Adequate ROW for all roadway components is provided with a minimum 100' width and eliminates relocations. This is typical GDOT policy in urban areas and provides a significant savings in ROW acquisition costs.

ADVANTAGES:

- Reduces ROW acquisition cost.
- Reduces environmental impact
- Cost savings

DISADVANTAGES:

- None apparent

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 5,647,228 | | \$ 5,647,228 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 5,647,228 | | \$ 5,647,228 |

COST ESTIMATING WORKSHEET

| | |
|-------------------------------|----------------------------|
| PROPOSAL NUMBER: R-5.0 | PAGE NUMBER: 2 of 3 |
|-------------------------------|----------------------------|

| |
|---|
| PROJECT #/PI #: STP00-0198-01(020) / 132610- |
|---|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|---------|-----------|--------------------|
| ROW land acquisition | 7 | SF | 1364880 | 1.0237 | 1,397,228 |
| 17 Properties purchase | 8 | EA | 17 | 250,000 | 4,250,000 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 5,647,228 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$5,647,228 |

PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|-------------|
| ROW land acquisition | 1 | SF | 0 | | 0 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | -- |
| TOTAL CONTRACT COST | | | | | 0.00 |

Difference [Original-Proposed] **\$5,647,250**

SOURCES

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. ROW estimate 8. See R-2.0 Calcs |
|--|---|

CALCULATIONS

PROPOSAL NUMBER: R-5.0

PAGE NUMBER: 3 of 3

PROJECT #/PI #: STP00-0198-01(020) / 132610-

$5.17 \text{ miles} \times 5,280 \text{ LF/mile} = 27297.6 \text{ LF} \times 50 \text{ FT. ROW WIDTH} = 1,364,880 \text{ SF}$

$\$2,093,500 / 2045000 \text{ SF} = \$1,0237,164 / \text{SF}$

$1,364,880 \text{ SF} \times \$1.0237164/\text{SF} = \$ 1,397,250.00$

17 relocations eliminated @ \$250,000 each = \$4,250,000

Item Total \$5,647,250.00

VALUE ENGINEERING PROPOSAL

| | |
|-------------------------------|----------------------------|
| PROPOSAL NUMBER: R-7.0 | PAGE NUMBER: 1 of 5 |
|-------------------------------|----------------------------|

| | |
|------------------------|--|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
| PROJECT TITLE: | SR 60 in Murrayville, Hall County |

| | |
|------------------------------|---|
| PROPOSAL DESCRIPTION: | ELIMINATE PROPOSED RETAINING WALL #1 LOCATED FROM STA. 48+04 LEFT TO STA. 52+09 LEFT ON SR60. |
|------------------------------|---|

ORIGINAL DESIGN: In the current design a retaining wall is proposed from Sta. 48+04 left to Sta. 52+09 left to avoid stream buffer impacts to flowing drainage ditch. (The type and height of wall is not provided in the plans and wall is not shown on the cross sections.)

PROPOSED CHANGE: The recommendation is to eliminate the proposed 405' wall and construct fill slopes as per the proposed typical section. Also extend the existing 48" cross drain at Sta. 49+25+/-.

JUSTIFICATION: Placement of fill in lieu of constructing a wall would only impact the stream buffer an estimated 50 feet at this location and would save the construction cost of the wall.

ADVANTAGES:

- Construction cost savings
- Ease of construction
- Geotechnical (WFI) investigation not required

DISADVANTAGES:

- Impact to stream buffer.

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 207,315 | | \$ 207,315 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 207,315 | | \$ 207,315 |

COST ESTIMATING WORKSHEET

| | |
|-------------------------------|----------------------------|
| PROPOSAL NUMBER: R-7.0 | PAGE NUMBER: 2 of 5 |
|-------------------------------|----------------------------|

| |
|---|
| PROJECT #/PI #: STP00-0198-01(020) / 132610- |
|---|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|-----------------------------|-------------|-----|-------|-----------|------------------|
| 500-3201 CI B Conc Ret Wall | 3 | CY | 607.5 | 341.26 | 207,315 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 207,315 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$207,315 |

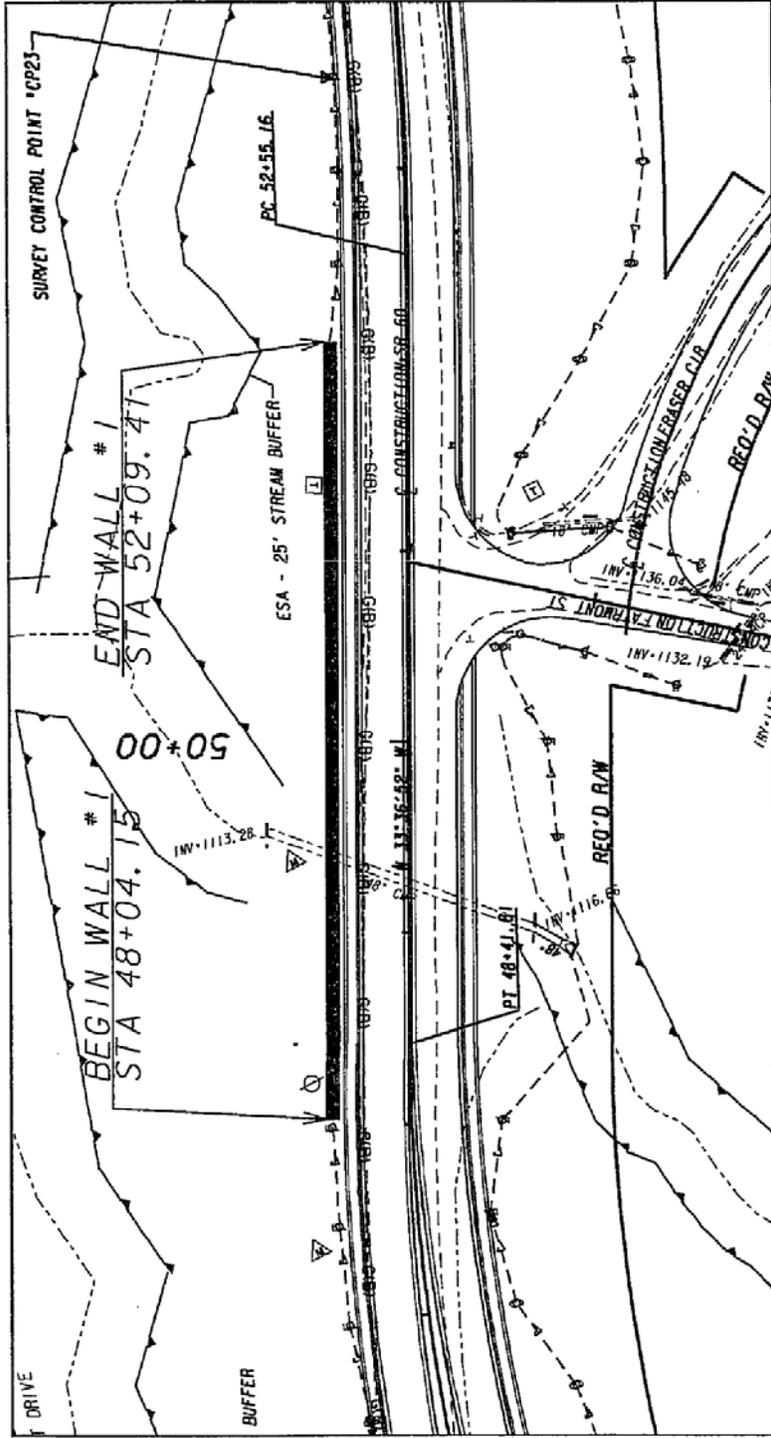
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|-------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | |
| TOTAL CONTRACT COST | | | | | 0.00 |

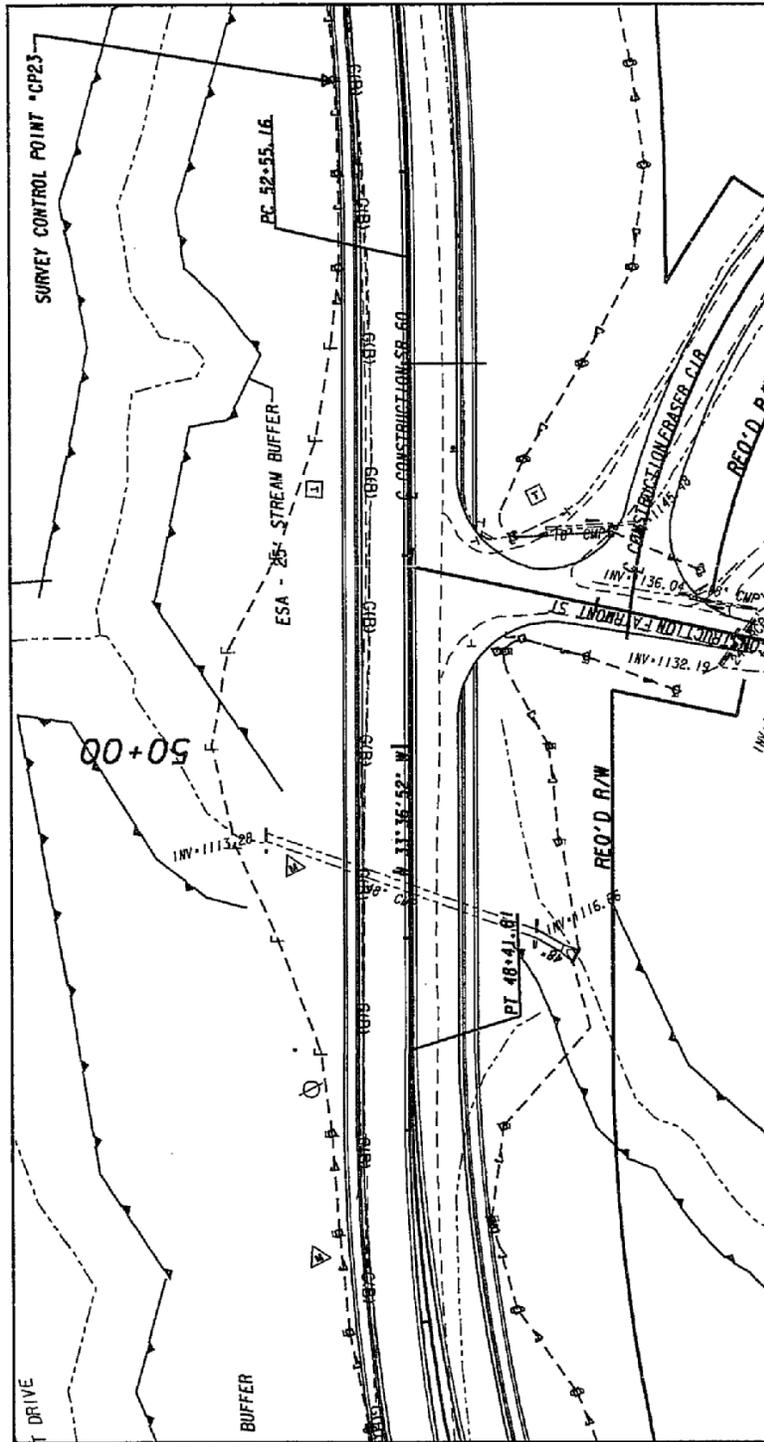
Difference [Original-Proposed] **\$207,315**

SOURCES

- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ul style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. Other |
|--|--|



R-7.0 Current Design 1 of 1



R-7.0 Proposed Change 1 of 1

CALCULATIONS

PROPOSAL NUMBER: R-7.0

PAGE NUMBER: 5 of 5

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Assume a 10' tall CIP wall.
Assume 1.5 CY of Class B Conc per LF of wall
Length of wall 405'
Conc \$341.26/CY
 $405 \text{ LF} \times 1.5 \text{ CY/LF} = 607.5 \text{ CY}$
 $607.5 \text{ CY} \times \$341.26 = \mathbf{\$207,315}$

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-9.0

PAGE NUMBER: 1 of 5

PROJECT #/PI #: STP00-0198-01(020) / 132610-
PROJECT TITLE: SR 60 in Murrayville, Hall County

PROPOSAL DESCRIPTION: CONSTRUCT A ROUNDABOUT AT OLD DAHLONEGA HIGHWAY AND KANADY ROAD.

ORIGINAL DESIGN: The current design has proposed to install traffic signal at Old Dahlonega Highway and Kanady Road. Current traffic count is 22,000 vehicles per day.

PROPOSED CHANGE: The proposed recommendation is to replace the traffic signal with a roundabout at the intersection of Dahlonega Highway and Kanady Road.

JUSTIFICATION: A roundabout can handle the low volume of traffic in this urban corridor (22,000 vehicles/day), and have a calming affect on traffic flow in this urban area. This will have a calming effect on drivers making the transition from a four lane divided to a two lane rural road.

ADVANTAGES:

- Calming affect
- Enhancement to corridor
- Prevents any delays in traffic flow
- Not affected by power outages
- Can be a landmark for the community

DISADVANTAGES:

- Requires additional land (210' diameter)

| | INITIAL COST | OPERATING COST | TOTAL LIFE- CYCLE COST |
|-------------------------|-----------------|-------------------|---------------------------|
| ORIGINAL DESIGN: | \$ 369,390 | | \$ 369,390 |
| PROPOSED CHANGE: | \$ 319,950 | | \$ 319,950 |
| SAVINGS: | \$ 49,440 | | \$ 49,440 |

COST ESTIMATING WORKSHEET

| | |
|-------------------------------|----------------------------|
| PROPOSAL NUMBER: R-9.0 | PAGE NUMBER: 2 of 5 |
|-------------------------------|----------------------------|

| |
|---|
| PROJECT #/PI #: STP00-0198-01(020) / 132610- |
|---|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|---|-------------|-----|------|-----------|------------------|
| New traffic signal | 3 | EA | 1 | 125,000 | 125,000 |
| Transition from 4 lanes to two lanes 80' wide x 200' | 3 | SY | 1777 | 70.00 | 124,390 |
| Curb, Gutter, and sidewalk | 3 | LF | 400' | 50.00 | 20,000 |
| Re-work Intersection | 3 | EA | 2 | 50,000.00 | 100,000 |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 369,390 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$369,390 |

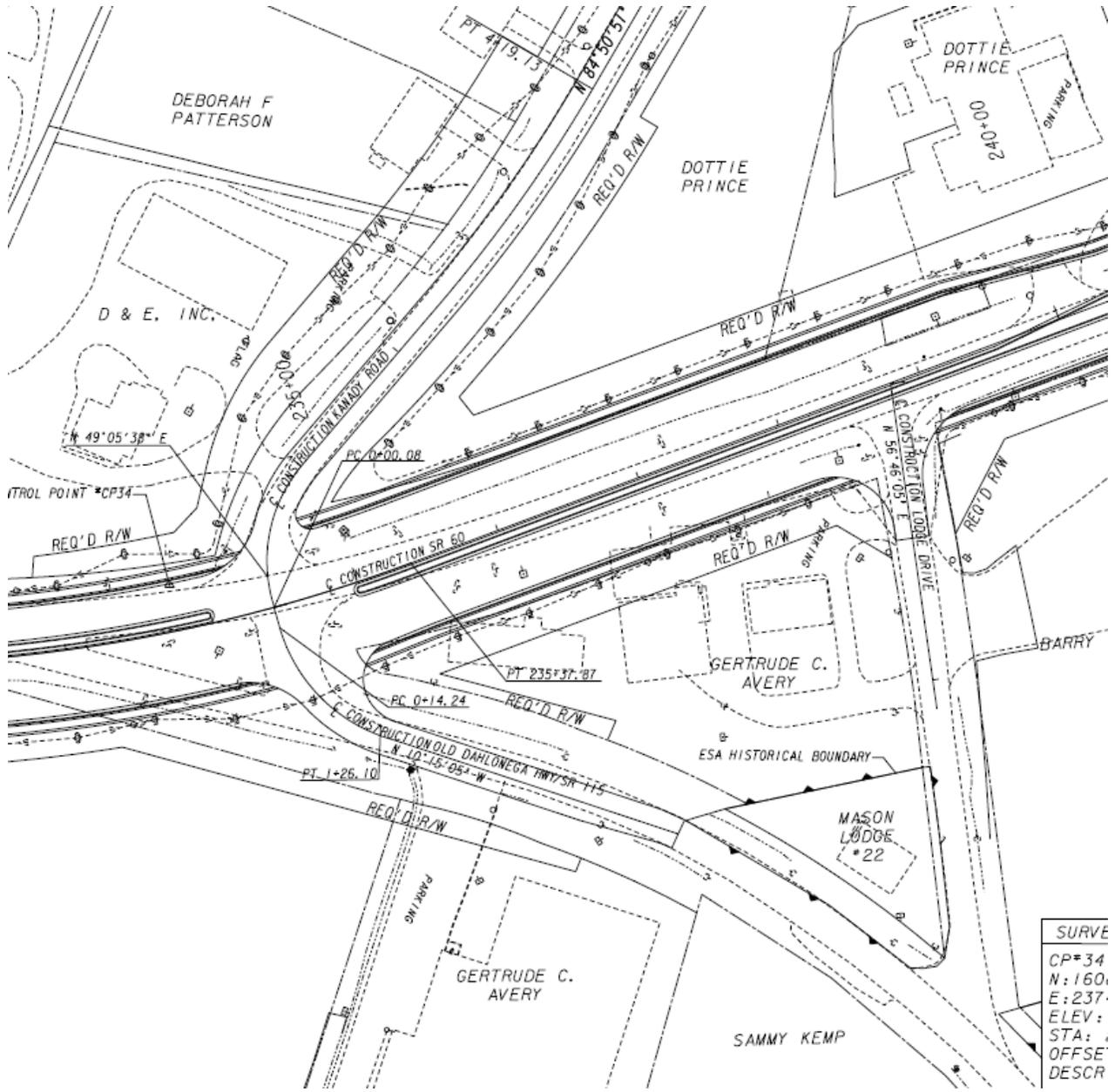
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|---|-------------|-----|------|-----------|------------------|
| 50' diameter Round About with landscape, & signs | 2 | EA | 1 | 100,000 | 100,000 |
| Curb and gutter & sidewalk | 2 | LF | 879 | 50.00 | 43,950 |
| 4 lane AC pavement | 2 | SY | 1600 | 70.00 | 112,000 |
| 2 lane AC pavement beyond circle | 2 | SY | 200 | 70.00 | 14,000 |
| Re-work Intersection | 3 | EA | 2 | 25,000 | 50,000 |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 319,950 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$319,950 |

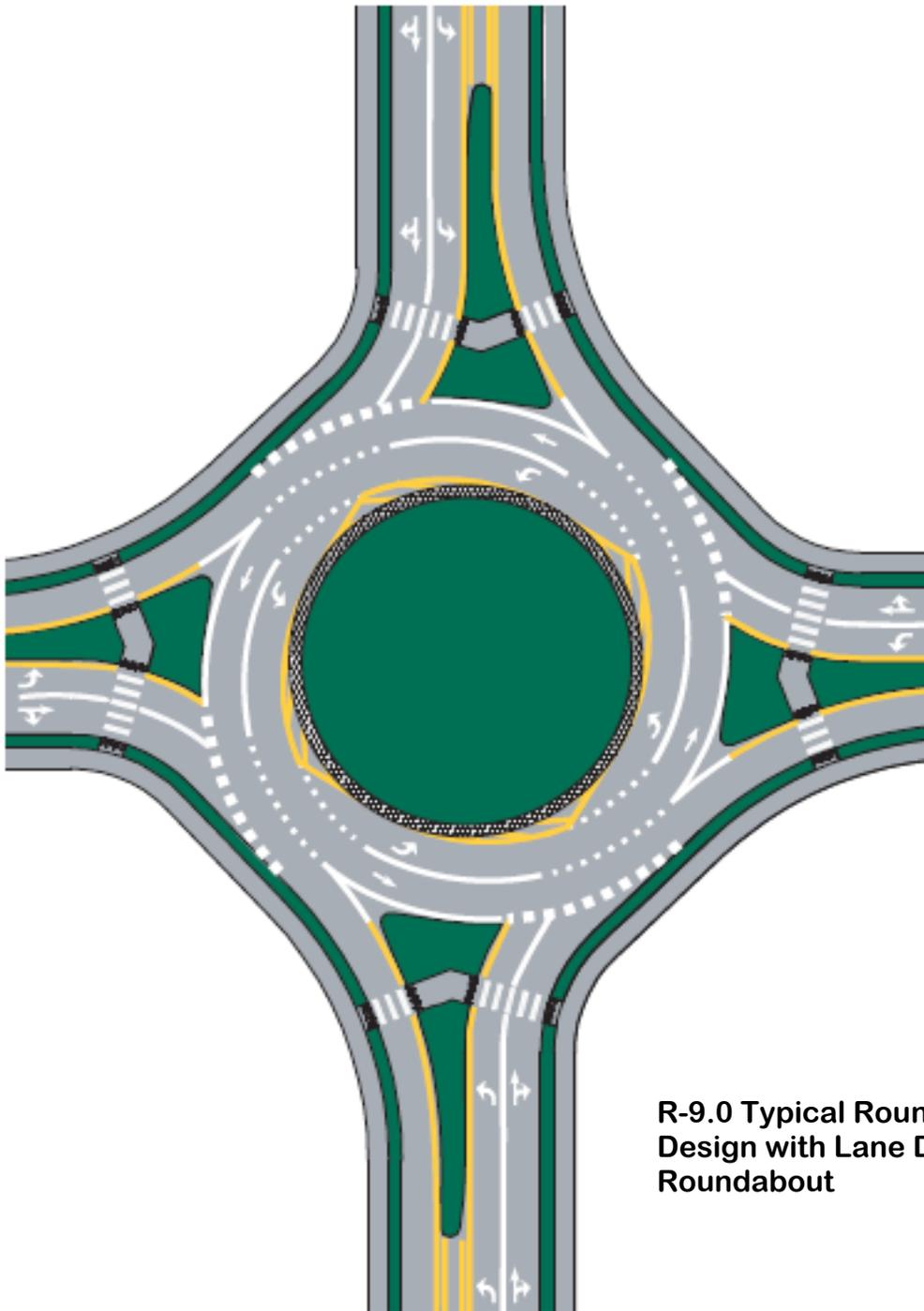
Difference [Original-Proposed] **\$49,440**

SOURCES

- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ul style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. Other |
|--|--|



R-9.0 Current Design 1 of 1



**R-9.0 Typical Roundabout
Design with Lane Drop within
Roundabout**

CALCULATIONS

PROPOSAL NUMBER: R-9.0

PAGE NUMBER: 5 of 5

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Assumption of Round About Size:

Inter Circle 50 FT diameter

Outer Circle 210 FT diameter – two lanes in each direction with curb, gutter, & sidewalk

$A = 3,142 (100)^2 \text{ minus } 3.142 (75)^2 = 13750 \text{ sf or } 1600 \text{ sy}$

Outer Circle length; $3.142 \times 200'$ minus $(80+80+30+30) + 628-220 = 408 \text{ LF}$

Inner Circle length : $3.142 \times 159' = 471 \text{ LF}$

Total inner + outer = $471 \text{ LF} + 408 \text{ LF} = 879 \text{ LF}$ of curb and gutter.

Existing Road Section Assumption :

80 FT. wide approach mainline

30 FT wide side road approaches to mainline

Area of Work: 80 FT wide by 200 FT length = $\pm 16,000 \text{sf}$ or 1777 sy

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-10.0

PAGE NUMBER: 1 of 4

PROJECT #/PI #: STP00-0198-01(020) / 132610-
PROJECT TITLE: SR 60 in Murrayville, Hall County

PROPOSAL DESCRIPTION: INSTALL CORRUGATED MEDIAN FOR TYPICAL SECTION # 2 LIMITS FROM STA. 48+50 TO STA 60+50 AND STA 158+85 TO STA 173+50.

ORIGINAL DESIGN: The current design provides a raised concrete median in the superelevated areas Sta. 48+50 to Sta. 60+50 and Sta. 158+85 to Sta. 173+50.

PROPOSED CHANGE: The proposed recommendation is to construct a corrugated concrete median (standard detail) in lieu of the raised concrete median.

JUSTIFICATION: Proposed change facilitates drainage across the roadway and eliminates need for gutter inlets in the median area, while also providing a savings in construction costs.

ADVANTAGES:

- Cost savings
- Reduces environmental impact

DISADVANTAGES:

- None apparent

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 71,153 | | \$ 71,153 |
| PROPOSED CHANGE: | \$ 57,247 | | \$ 57,247 |
| SAVINGS: | \$ 13,905 | | \$ 13,905 |

COST ESTIMATING WORKSHEET

| | |
|--------------------------------|----------------------------|
| PROPOSAL NUMBER: R-10.0 | PAGE NUMBER: 2 of 4 |
|--------------------------------|----------------------------|

| |
|---|
| PROJECT #/PI #: STP00-0198-01(020) / 132610- |
|---|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|--------------------------------|-------------|-----|------|-----------|-----------------|
| Concrete median, 8" (441-0756) | 3 | SY | 296 | 46.09 | 13643 |
| C&G Tp 7 (441-6740) | 3 | LF | 5330 | 10.79 | 57510 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 71,153 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$71,153 |

PROPOSED CHANGE

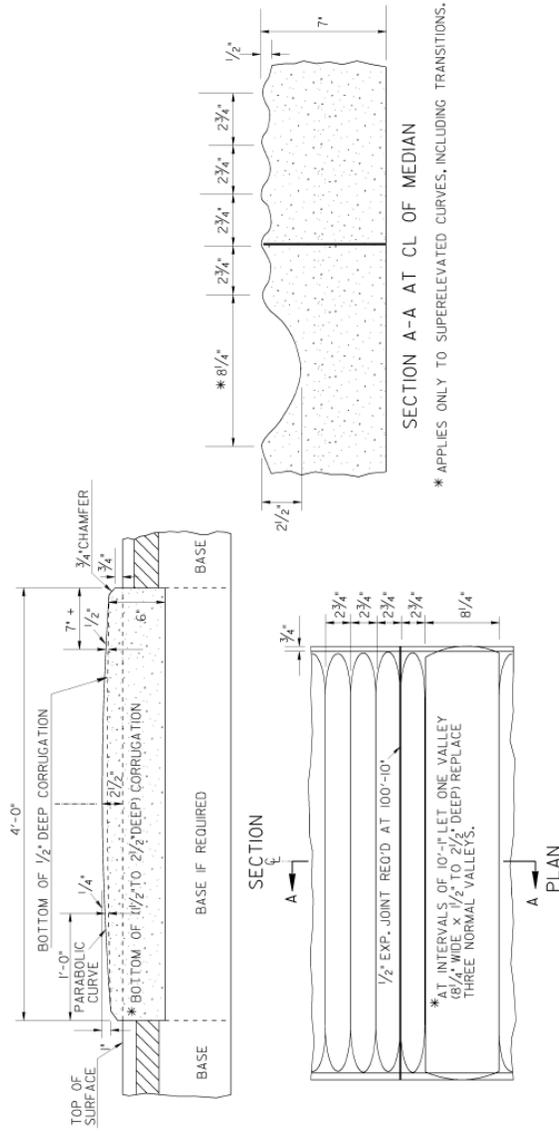
| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|------------------------------------|-------------|-----|------|-----------|-----------------|
| Concrete median, 7-1/2" (441-0754) | 3 | SY | 1185 | 48.31 | 57,247 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 57,247 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$57,247 |

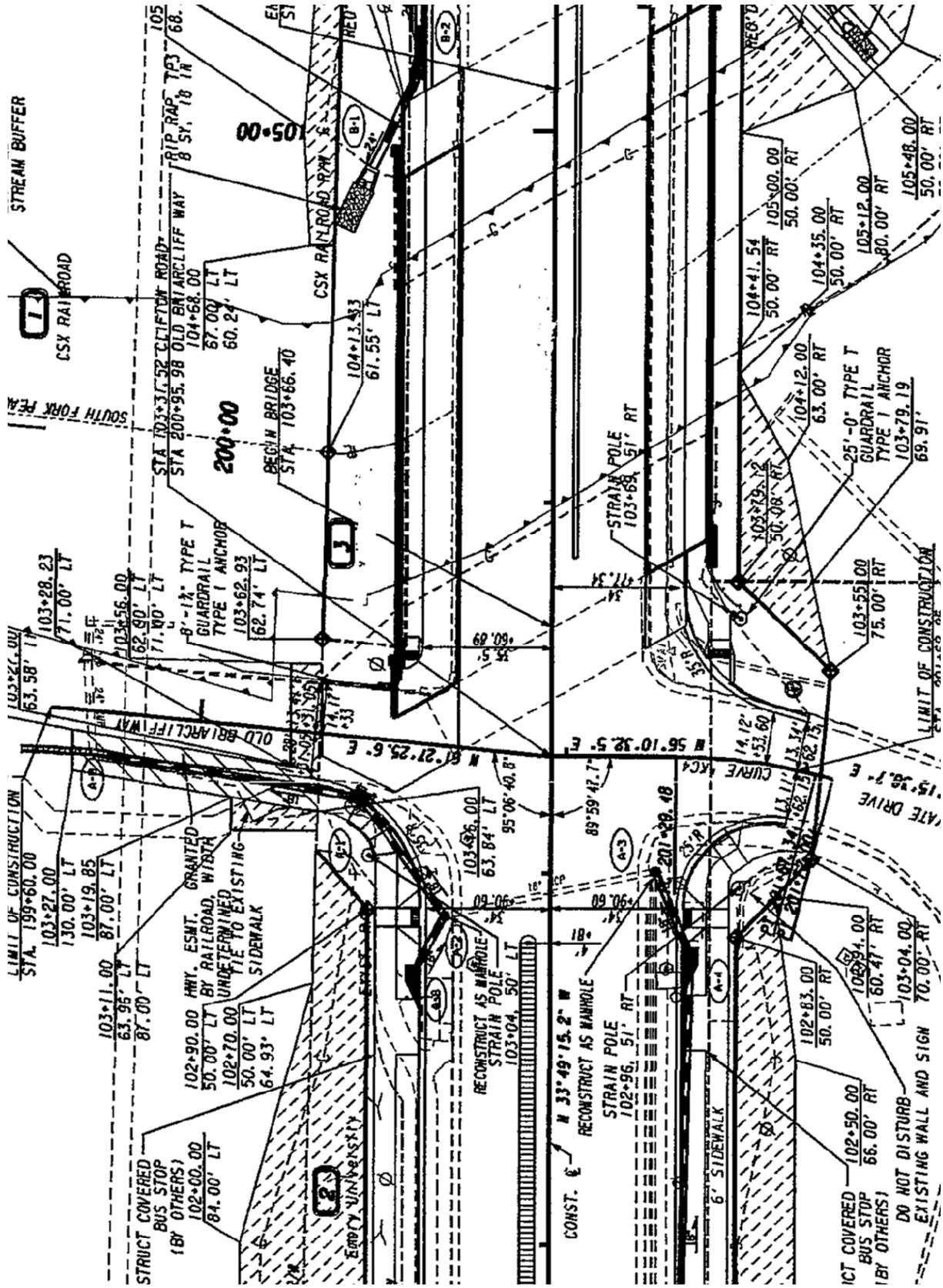
Difference [Original-Proposed] **\$13,905**

SOURCES

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. Other |
|--|--|

DETAIL OF 4' CORRUGATED CONCRETE MEDIAN





R-10.0 Typical Use of Corrugated Median

VALUE ENGINEERING PROPOSAL

| | |
|--------------------------------|----------------------------|
| PROPOSAL NUMBER: R-13.0 | PAGE NUMBER: 1 of 5 |
|--------------------------------|----------------------------|

| | |
|------------------------|--|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
| PROJECT TITLE: | SR 60 in Murrayville, Hall County |

| | |
|------------------------------|--|
| PROPOSAL DESCRIPTION: | CONSTRUCT PROJECT WITH 5-LANE FLUSH 12' MEDIAN IN LIEU OF 4-LANE DIVIDED WITH 20 FOOT RAISED MEDIAN. |
|------------------------------|--|

ORIGINAL DESIGN: The current typical section of the project is urban shoulders with four 11-foot travel lanes and a 20' raised grass median. The median is reduced to 6' in critical areas. (Sta. 48+50 to 60+50 and Sta. 158+85 to 173+50). Existing right of way corridor for SR60 is 100' at most locations along project.

PROPOSED CHANGE: The proposed recommendation is to revise the typical section to four 11-foot travel lanes with a 12' flush center turn lane. The median will still be reduced to 6' in critical areas. (Sta. 48+50 to 60+50 and Sta. 158+85 to 173+50). Keep right of way corridor at 100 feet.

JUSTIFICATION: This alternative allows better access to driveways and side roads and meets AASHTO guidelines.

ADVANTAGES:

- Reduction in earthwork
- Better access to driveways
- Less drainage maintenance
- More desirable for direct turns into stores or properties

DISADVANTAGES:

- Possible conflicting left turn movements

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 2,576,447 | | \$ 2,576,447 |
| PROPOSED CHANGE: | \$ 3,044,306 | | \$ 3,044,306 |
| SAVINGS: | \$ (467,859) | | \$ (467,859) |

COST ESTIMATING WORKSHEET

| | | | |
|-------------------------|--------|---------------------|--------|
| PROPOSAL NUMBER: | R-13.0 | PAGE NUMBER: | 2 of 5 |
|-------------------------|--------|---------------------|--------|

| | |
|------------------------|------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
|------------------------|------------------------------|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|---------|-----------|--------------------|
| 441-6740 C&G 8"x30" TP 7 | 3 | LF | 49270 | 10.79 | 531,623 |
| 550-1180 Storm Drain 18" | 3 | LF | 3700 | 28.22 | 104,414 |
| 668-1100 Catch Basin | 3 | EA | 12 | 2,032.11 | 24,385 |
| Easement | 7 | SF | 73905 | 1.00 | 73,905 |
| 205-0001 Unclass Excav | 1 | CY | 1428000 | 1.29 | 1,842,120 |
| SUBTOTAL – COST TO PRIME | | | | | 2,576,447 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$2,576,447 |

PROPOSED CHANGE

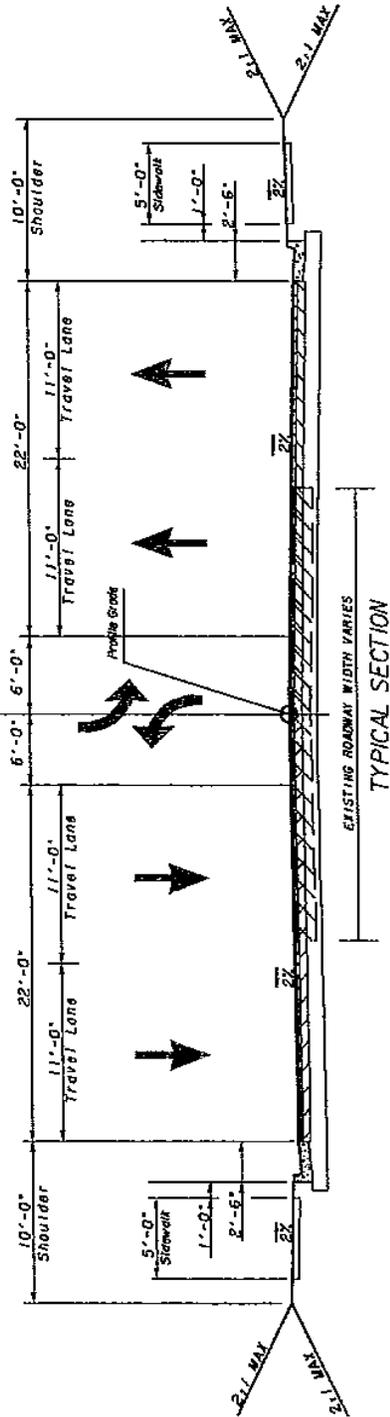
| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|---------|-----------|--------------------|
| 402-3131 9.5 mm asph | 3 | T | 2710 | 53.84 | 145,906 |
| 402-3190 19mm asph | 3 | T | 3613 | 63.71 | 230,184 |
| 402-3121 25mm asph | 3 | T | 7226 | 56.63 | 409,208 |
| 310-5120 12" GAB | 3 | SY | 32847 | 18.30 | 601,100 |
| 205-0001 Unclass Excav | 1 | CY | 1285200 | 1.29 | 1,657,908 |
| SUBTOTAL – COST TO PRIME | | | | | 3,044,306 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$3,044,306 |

Difference [Original-Proposed] **(\$467,859)**

SOURCES

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. ROW Estimate |
|--|---|

CONSTRUCTION SR 60/THOMPSON BRIDGE ROAD



R-13.0 Proposed Change 1 of 1

CALCULATIONS

PROPOSAL NUMBER: R-13.0

PAGE NUMBER: 5 of 5

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Begin project Sta. 24+50 to 48+50 = 2400 LF
Sta. 60+50 to 158+85 = 9835 LF
Sta. 173+50 to end project Sta. 297+50 = 12400 LF

Total = 24635 LF to change median from raised to flush.

Assume pavement section of 165#/sy 9.5 mm asph, 220#/sy 19mm asph, 440#/sy 25mm asphalt and 12'' GAB

24635LF x 12' median = 295620 SF = 32847 SY

32847 SY x 165# = 2710T

32847 SY x 220# = 3613T

32847 SY x 440# = 7226T

Median curb and gutter 24635LF x 2-way = 49270 LF

Median drainage in super-elevated sections assume 18'' pipe for 15% length

24635lf x 15% = 3695LF say 3700LF of pipe

Catch basin at 300' = 3700/300 = 12.3 say 12 EA Catch Basin

Assume 6 foot of easement reduction for 50% of 12 median.

24635 x 50% = 12317.5 LF x 6' = 73905 SF easement reduction

Assume easement cost at \$1.00 SF

73905 SF x \$1.00 = \$73,905

Assume 10% reduction in earthwork

1,428,000CY x 10% = 142,800CY reduction = 1,285,200CY required

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-14.0

PAGE NUMBER: 1 of 4

PROJECT #/PI #: STP00-0198-01(020) / 132610-
PROJECT TITLE: SR 60 in Murrayville, Hall County

PROPOSAL DESCRIPTION: REDESIGN TO KEEP NEW CONSTRUCTION ON EXISTING ROADWAY ALIGNMENT STA. 100+00 TO STA. 124+00, AND STA. 208+00 TO STA. 234+00: AND STA. 265 + 00.

ORIGINAL DESIGN: The current alignment as shown shifts roadway towards existing residences and commercial parcels at Sta. 100 + 00 to Sta. 124 +00; and Sta. 208 + 00 to Sta. 234 + 00; Washburn Sta. 220+00 right, Parks 225+00 right, Bingham Sta. 105+00 left and Truelove Sta. 118+00 left.

PROPOSED CHANGE: The proposed recommendation is to redesign and maintain existing alignment for roadway Sta. 100 + 00 to 124 + 00 and Sta. 208 + 00 to Sta. 234 + 00. This will avoid condemning (acquiring) a minimum of 4 properties, and as many as 6 properties.

Note: This is based on the assumption that earthwork and roadwork is basically the same cost for both current design and proposed recommendation.

JUSTIFICATION: There is no apparent need to shift road towards the existing residences and commercial property. This alternative results in a reduction of ROW acquisition efforts and costs.

ADVANTAGES:

- Cost savings
- Reduces ROW acquisition cost
- Ease of construction

DISADVANTAGES:

- None apparent

| | INITIAL COST | OPERATING COST | TOTAL LIFE- CYCLE COST |
|-------------------------|-----------------|-------------------|---------------------------|
| ORIGINAL DESIGN: | \$ 1,000,000 | | \$ 1,000,000 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 1,000,000 | | \$ 1,000,000 |

COST ESTIMATING WORKSHEET

| | | | |
|-------------------------|--------|---------------------|--------|
| PROPOSAL NUMBER: | R-14.0 | PAGE NUMBER: | 2 of 5 |
|-------------------------|--------|---------------------|--------|

| | |
|------------------------|------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
|------------------------|------------------------------|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|--------------------|
| Washburn Property Sta. 220 | 7 | ea | 1 | 250,000 | 250,000 |
| Parks Property Sta. 225 | 7 | ea | 1 | 250,000 | 250,000 |
| Bingham Property Sta. 105 | 7 | ea | 1 | 250,000 | 250,000 |
| Truelove Property Sta. 118 | 7 | ea | 1 | 250,000 | 250,000 |
| SUBTOTAL – COST TO PRIME | | | | | 1,000,000 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$1,000,000 |

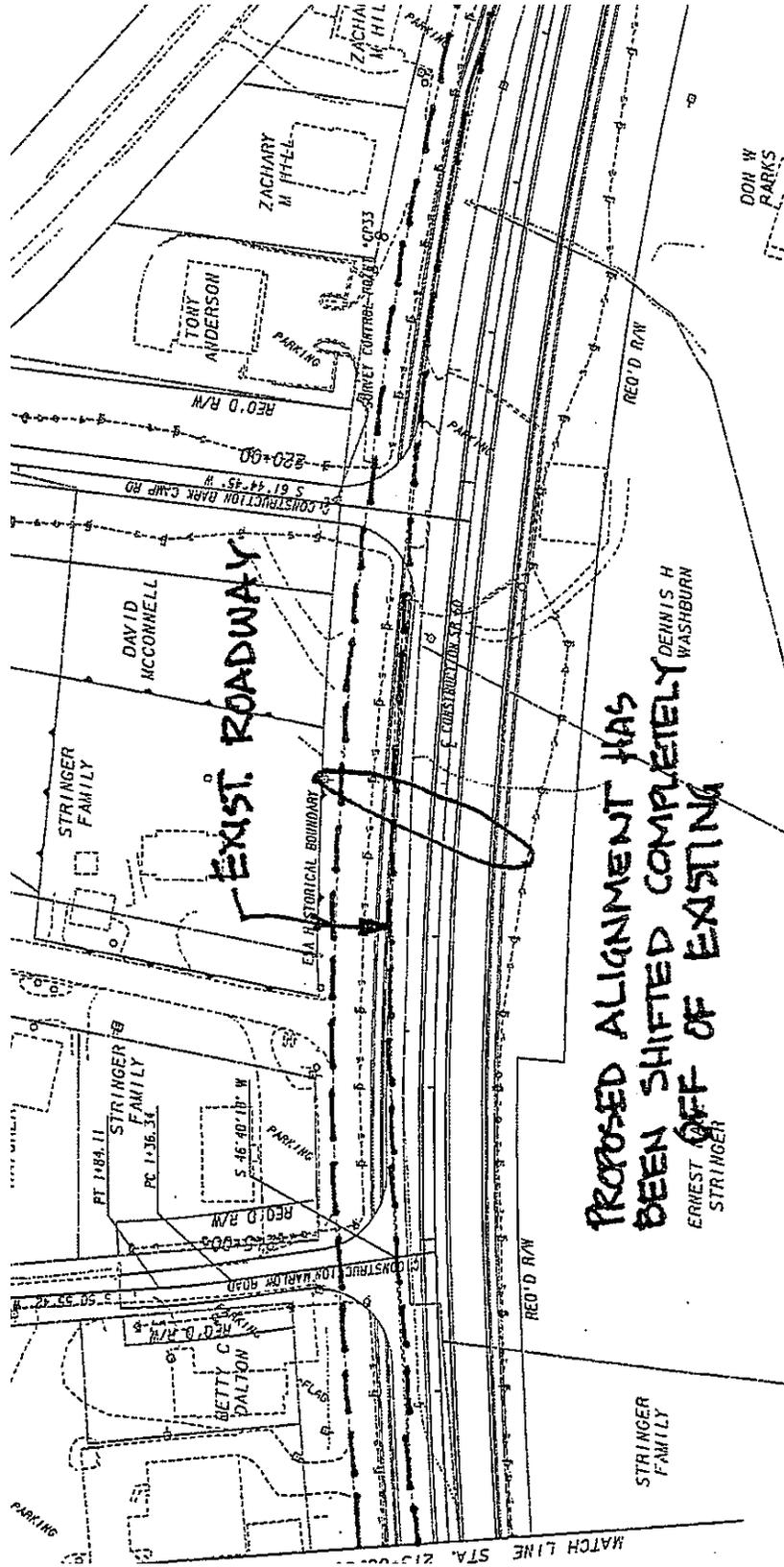
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|-------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | -- |
| TOTAL CONTRACT COST | | | | | 0.00 |

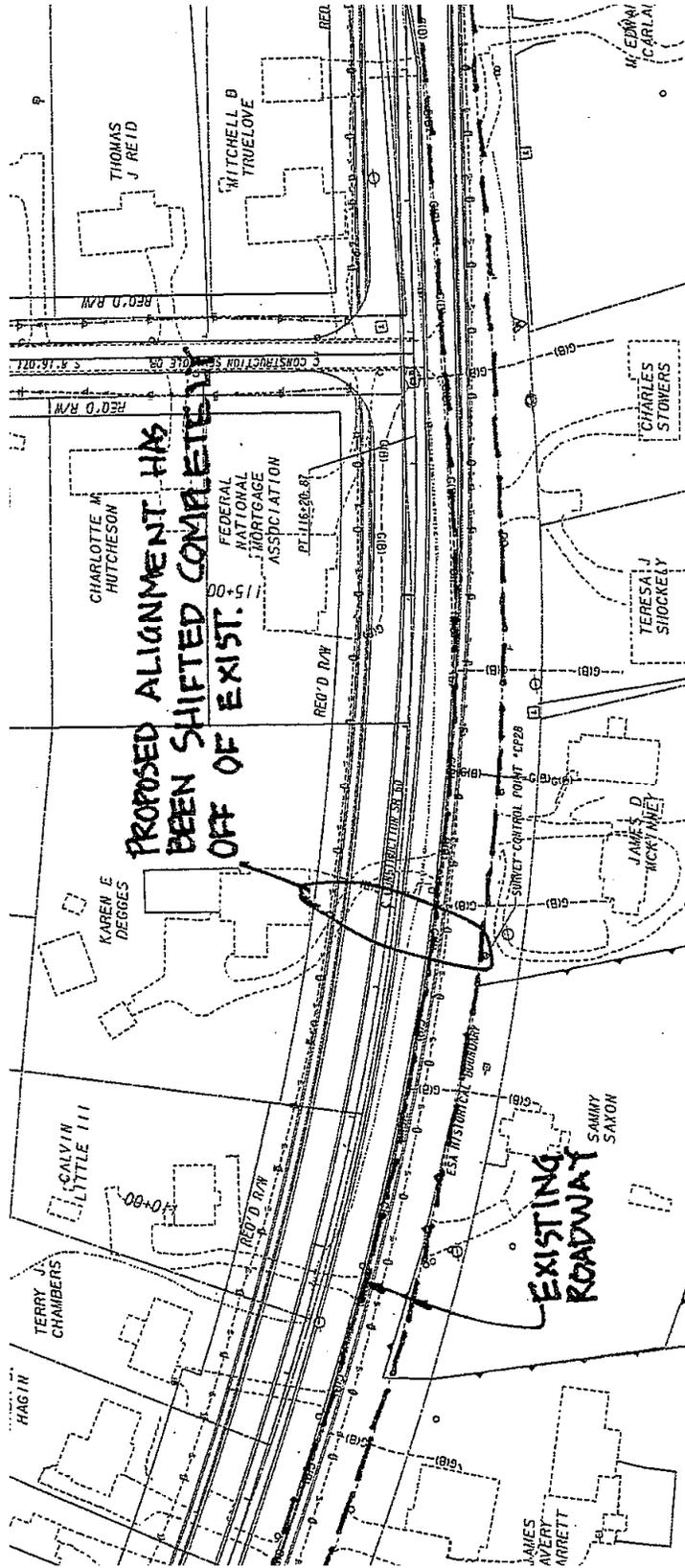
Difference [Original-Proposed] **\$1,000,000**

SOURCES

- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ul style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. See R-2.0 Calcs |
|--|--|



R-14.0 Proposed Change



R-14.0 Proposed Change

VALUE ENGINEERING PROPOSAL

| | |
|--------------------------------|----------------------------|
| PROPOSAL NUMBER: R-16.0 | PAGE NUMBER: 1 of 3 |
|--------------------------------|----------------------------|

| | |
|------------------------|--|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
| PROJECT TITLE: | SR 60 in Murrayville, Hall County |

| | |
|------------------------------|--|
| PROPOSAL DESCRIPTION: | CONSTRUCT SIDEWALK ON ONLY ONE SIDE INSTEAD OF BOTH SIDES OF ROADWAY. |
|------------------------------|--|

ORIGINAL DESIGN: The current concept drawings are providing anew 5' sidewalks on both sides of this curbed four lane divided roadway.

PROPOSED CHANGE: The proposed recommendation is to eliminate the sidewalk from one side of the 5.17 mile corridor and provide the sidewalk on the school side of the roadway.

JUSTIFICATION: No sidewalk presently exists. Providing a sidewalk on one side will be a marked improvement for pedestrians. Sidewalks can be provided on both sides within one mile of the school for walks.

ADVANTAGES:

- Cost savings
- Reduces impact to property owners
- Acceptable construction technique.
- Reduced impervious area

DISADVANTAGES:

- Does not meet GDOT Policy
- Pedestrians cross roadway to access sidewalk

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 642,706 | | \$ 642,706 |
| PROPOSED CHANGE: | \$ 321,353 | | \$ 321,353 |
| SAVINGS: | \$ 321,353 | | \$ 321,353 |

COST ESTIMATING WORKSHEET

| | | | |
|-------------------------|--------|---------------------|--------|
| PROPOSAL NUMBER: | R-16.0 | PAGE NUMBER: | 2 of 3 |
|-------------------------|--------|---------------------|--------|

| | |
|------------------------|------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
|------------------------|------------------------------|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|------------------------------|-------------|-----|----------|-----------|------------------|
| Concrete sidewalk (441-0106) | 1 | SY | 30330.66 | 21.19 | 642,706 |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 642,706 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$642,706 |

PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|------------------------------|-------------|-----|----------|-----------|------------------|
| Concrete sidewalk (441-0106) | 1 | SY | 15165.33 | 21.19 | 321,353 |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 321,353 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$321,353 |

Difference [Original-Proposed] **\$321,353**

SOURCES

- | | |
|--|--|
| <ul style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ul style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. Other |
|--|--|

CALCULATIONS

PROPOSAL NUMBER: R-16.0

PAGE NUMBER: 3 of 3

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Eliminate Sidewalk on one side.

5.17 miles X 5280 LF/MI X 5 /9 = 15165.33 SY

VALUE ENGINEERING PROPOSAL

| | | | |
|-------------------------|--------|---------------------|--------|
| PROPOSAL NUMBER: | R-21.0 | PAGE NUMBER: | 1 of 5 |
|-------------------------|--------|---------------------|--------|

| | |
|------------------------|-----------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
| PROJECT TITLE: | SR 60 in Murrayville, Hall County |

| | |
|------------------------------|---|
| PROPOSAL DESCRIPTION: | ELIMINATE PROPOSED RETAINING WALL #2 LOCATED FROM STA. 54+42 LEFT TO STA. 57+45 LEFT ON SR60. |
|------------------------------|---|

ORIGINAL DESIGN: In the current design a retaining wall is proposed from Sta. 54+42 left to Sta. 57+45 left to avoid stream buffer impacts to flowing drainage ditch. (The type and height of wall is not provided in the plans and wall is not shown on the cross sections.)

PROPOSED CHANGE: The recommendation is to eliminate the proposed 303' wall, and construct fill slopes as per the proposed typical section. Also extend the existing 7' x 6' RCBC at Sta. 57+50+/-.

JUSTIFICATION: Placement of fill in lieu of constructing a wall would only impact the stream buffer an estimated 200 feet at this location and would save the construction cost of the wall. According to the current plans, this culvert is being extended on the east side and the stream is being relocated.

ADVANTAGES:

- Construction cost savings
- Ease of construction
- Geotechnical (WFI) investigation not required

DISADVANTAGES:

- Impact to stream buffer.

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 155,103 | | \$ 155,103 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 155,103 | | \$ 155,103 |

COST ESTIMATING WORKSHEET

| | | | |
|-------------------------|--------|---------------------|--------|
| PROPOSAL NUMBER: | R-21.0 | PAGE NUMBER: | 2 of 5 |
|-------------------------|--------|---------------------|--------|

| | |
|------------------------|------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
|------------------------|------------------------------|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|-----------------------------|-------------|-----|-------|-----------|------------------|
| 500-3201 CI B Conc Ret Wall | 3 | CY | 454.5 | 341.26 | 155,103 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 155,103 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$155,103 |

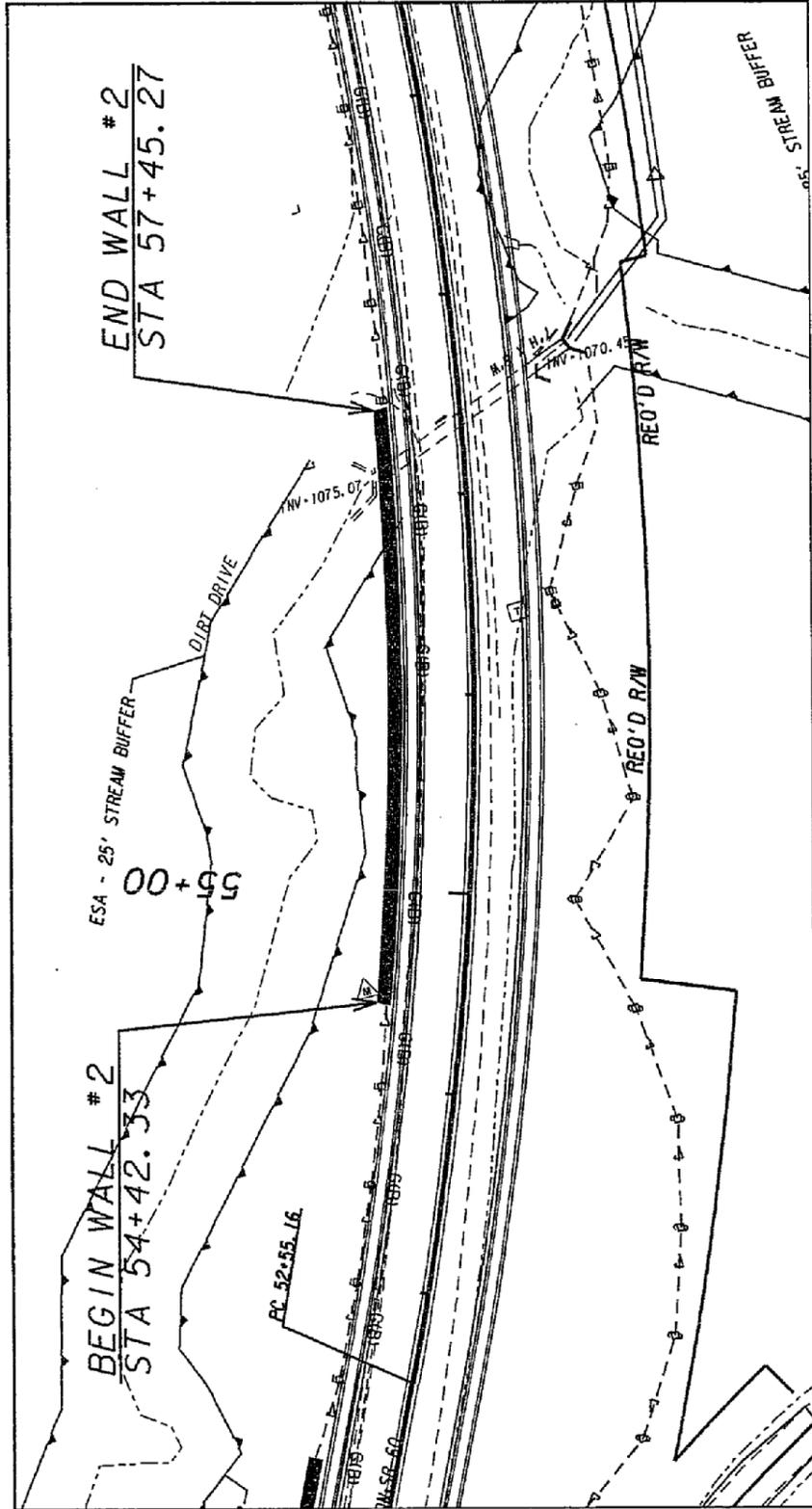
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|-------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | -- |
| TOTAL CONTRACT COST | | | | | 0.00 |

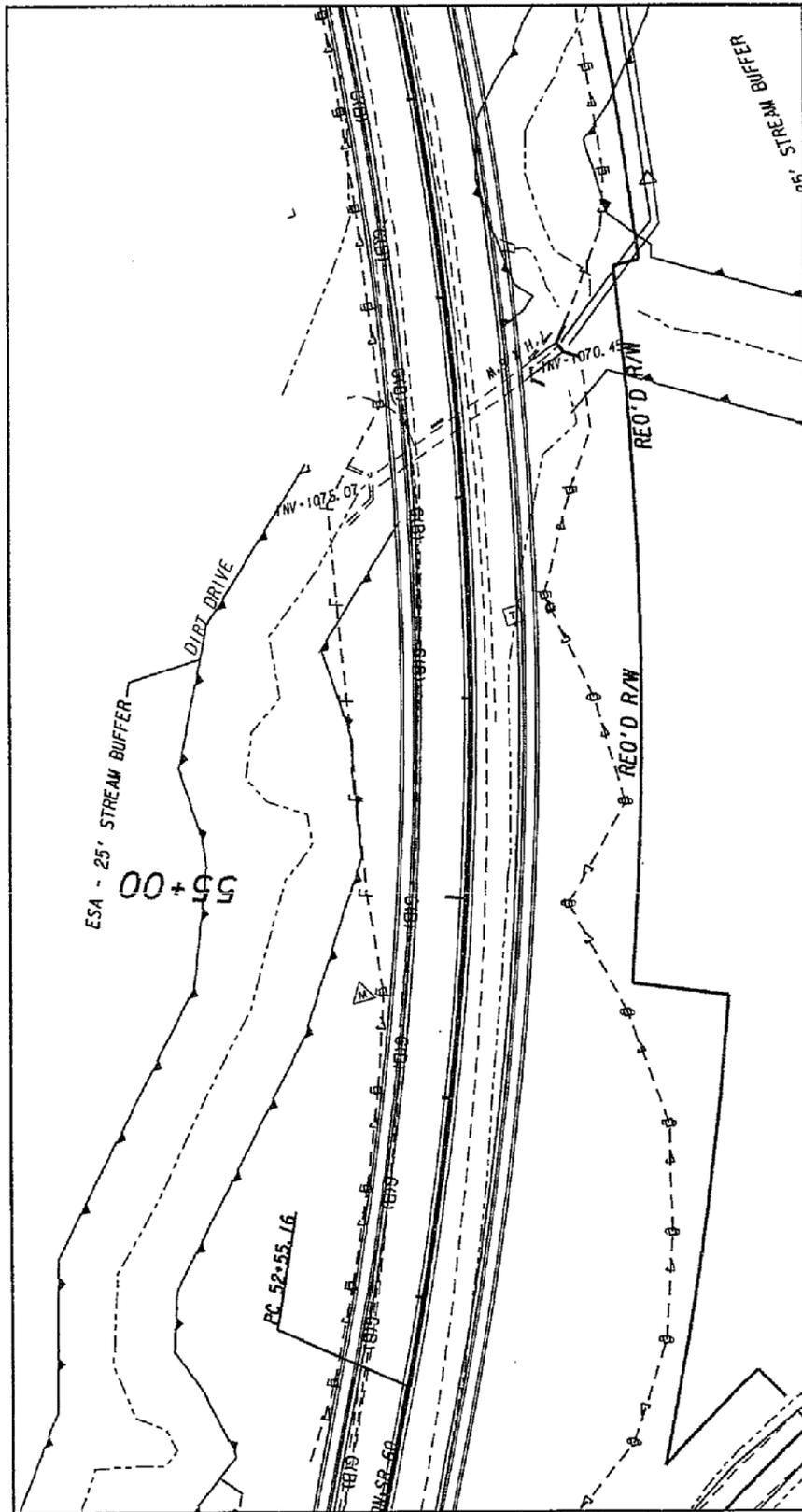
Difference [Original-Proposed] **\$155,103**

SOURCES

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. Other |
|--|--|



R-21.0 Current Design 1 of 1



R-21.0 Proposed Change 1 of 1

CALCULATIONS

PROPOSAL NUMBER: R-21.0

PAGE NUMBER: 5 of 5

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Assume a 10' tall CIP wall.
Assume 1.5 CY of Class B Conc per LF of wall
Length of wall 303'
Conc \$341.26/CY
 $303 \text{ LF} \times 1.5 \text{ CY/LF} = 454.5 \text{ CY}$

VALUE ENGINEERING PROPOSAL

| | | | |
|-------------------------|--------|---------------------|---------|
| PROPOSAL NUMBER: | R-22.0 | PAGE NUMBER: | 1 of 11 |
|-------------------------|--------|---------------------|---------|

| | |
|------------------------|-----------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 13 2610- |
| PROJECT TITLE: | SR 60 in Murrayville, Hall County |

PROPOSAL DESCRIPTION: ELIMINATE REALIGNMENT OF SIDE ROADS: JERRY BURRESS RD; WAHOO RD.; OLD DAHLONEGA HWY. AND KANADY RD.; HOPEWELL RD.; BARK CAMP RD.; ELROD RD.; YELLOW CREEK RD.

ORIGINAL DESIGN: The current design provides for realignment of existing side roads Jerry Burress Rd., Wahoo Rd., Old Dahlonega Hwy, Kanady Rd., Hopewell Rd, Bark Camp Rd., Elrod Rd., and Yellow Creek Rd.

PROPOSED CHANGE: The proposed recommendation is to eliminate realignment of existing side roads Jerry Burress Rd., Wahoo Rd., Old Dahlonega Hwy, Kanady Rd., Hopewell Rd, Bark Camp Rd., Elrod Rd., Yellow Creek Rd.

JUSTIFICATION: Eliminate of these realignments lessens the impacts on the property owners adjacent to the project and significantly reduces the number of relocations.

ADVANTAGES:

- Avoids relocations
- Maintains existing drives and side roads
- Provides cost savings
- Reduces impacts to property owners

DISADVANTAGES:

- None apparent

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 1,367,420 | | \$ 1,367,420 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 1,367,420 | | \$ 1,367,420 |

COST ESTIMATING WORKSHEET

| | | | |
|-------------------------|--------|---------------------|---------|
| PROPOSAL NUMBER: | R-22.0 | PAGE NUMBER: | 2 of 11 |
|-------------------------|--------|---------------------|---------|

| | |
|------------------------|------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
|------------------------|------------------------------|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|---------------------------------|-------------|-----|---------|-----------|--------------------|
| Unclass excav (205-001) | 1 | CY | 7444.44 | 1.29 | 9,603 |
| 6" Aggr Base (310-5060) | 1 | SY | 7444.44 | 9.51 | 70,797 |
| Rec Asph Conc 9.5 mm (402-3131) | 1 | TN | 617 | 60.00 | 37,020 |
| Property Displacements | 7 | EA | 5 | 250,000 | 1,250,000 |
| SUBTOTAL – COST TO PRIME | | | | | 1,367,420 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$1,367,420 |

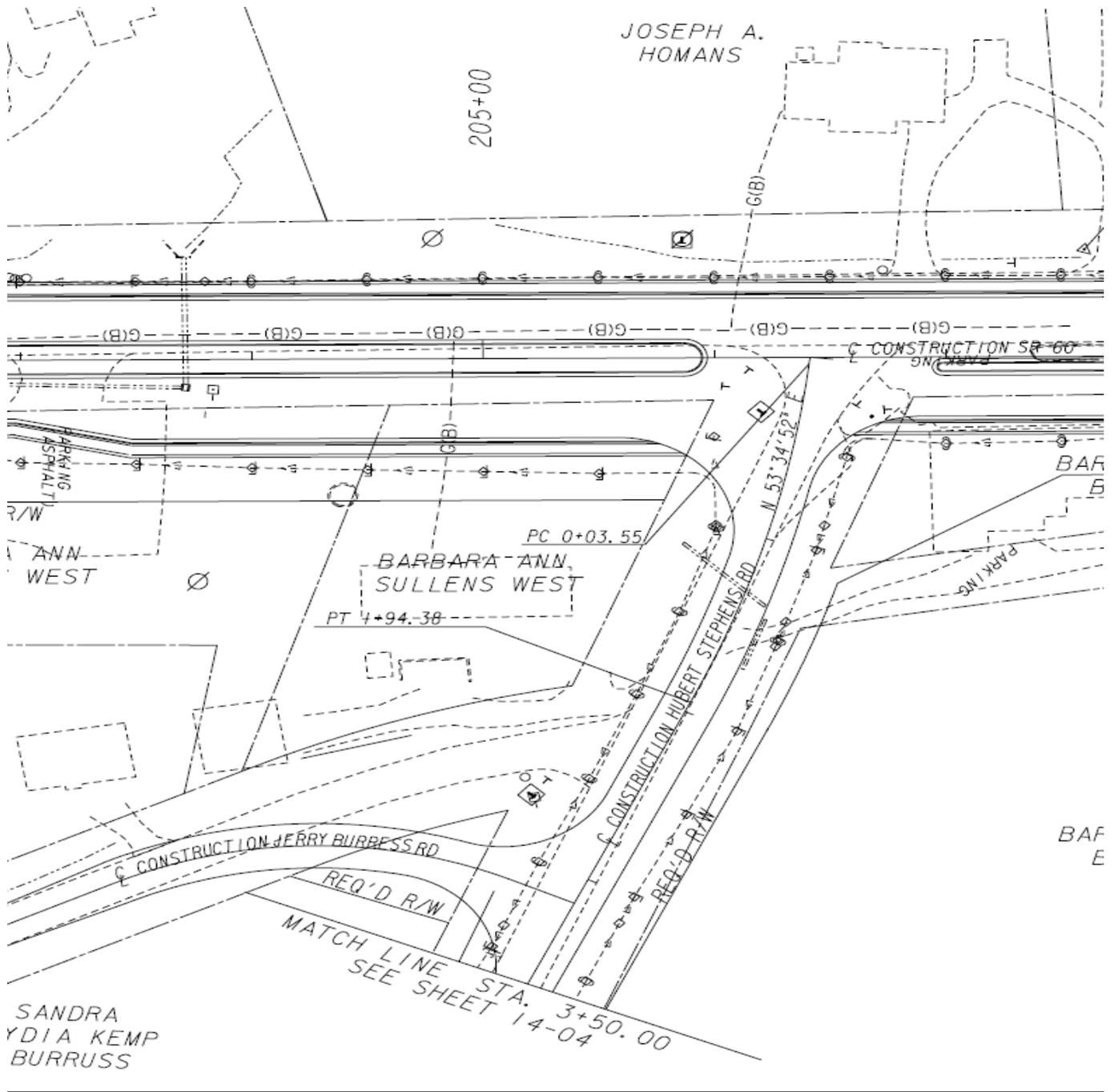
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|-------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | -- |
| TOTAL CONTRACT COST | | | | | 0.00 |

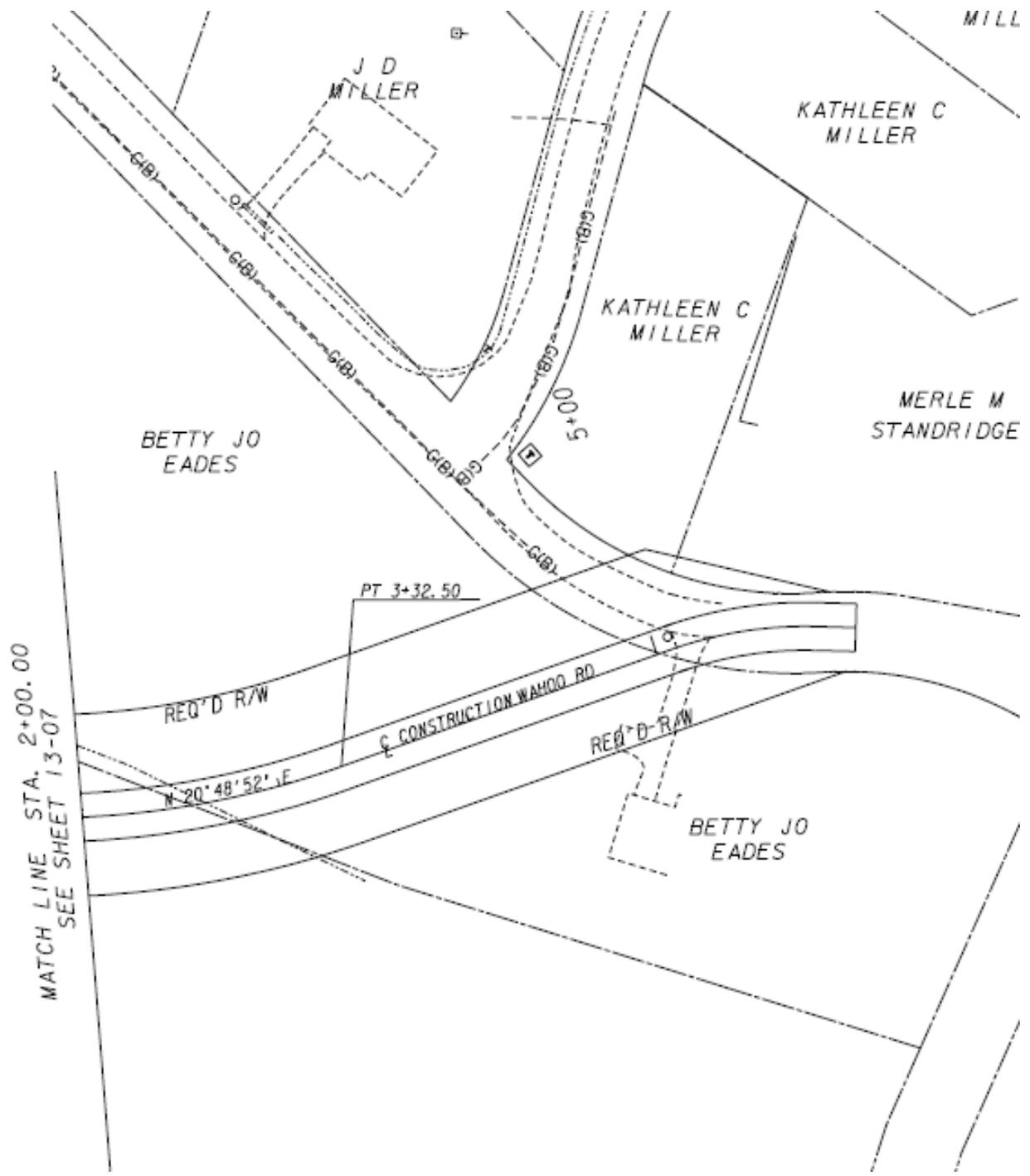
Difference [Original-Proposed] **\$1,367,420**

SOURCES

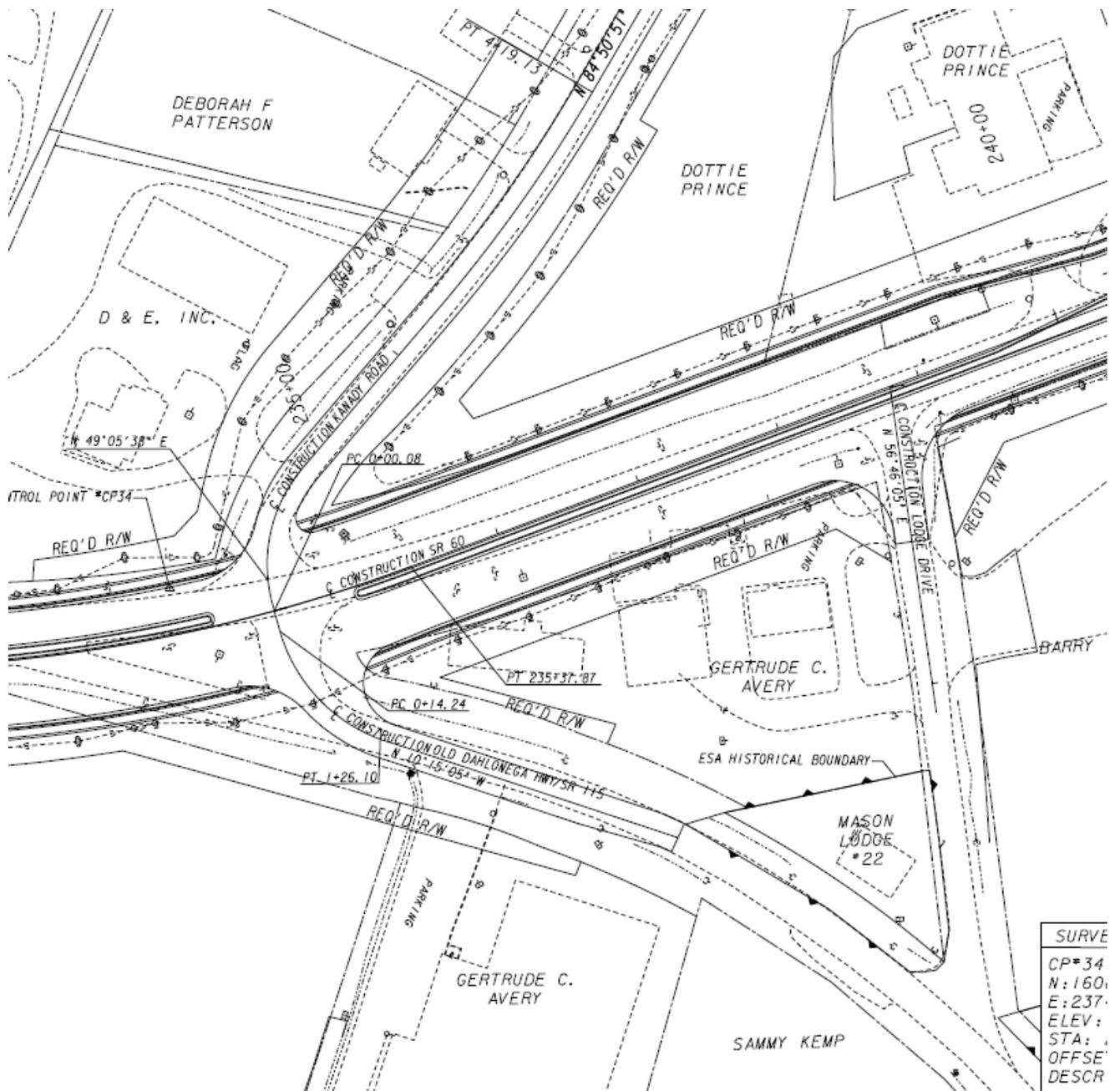
- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. See R-2.0 Calcs |
|--|--|



R-22.0 Current Design Jerry Burress Road Intersection

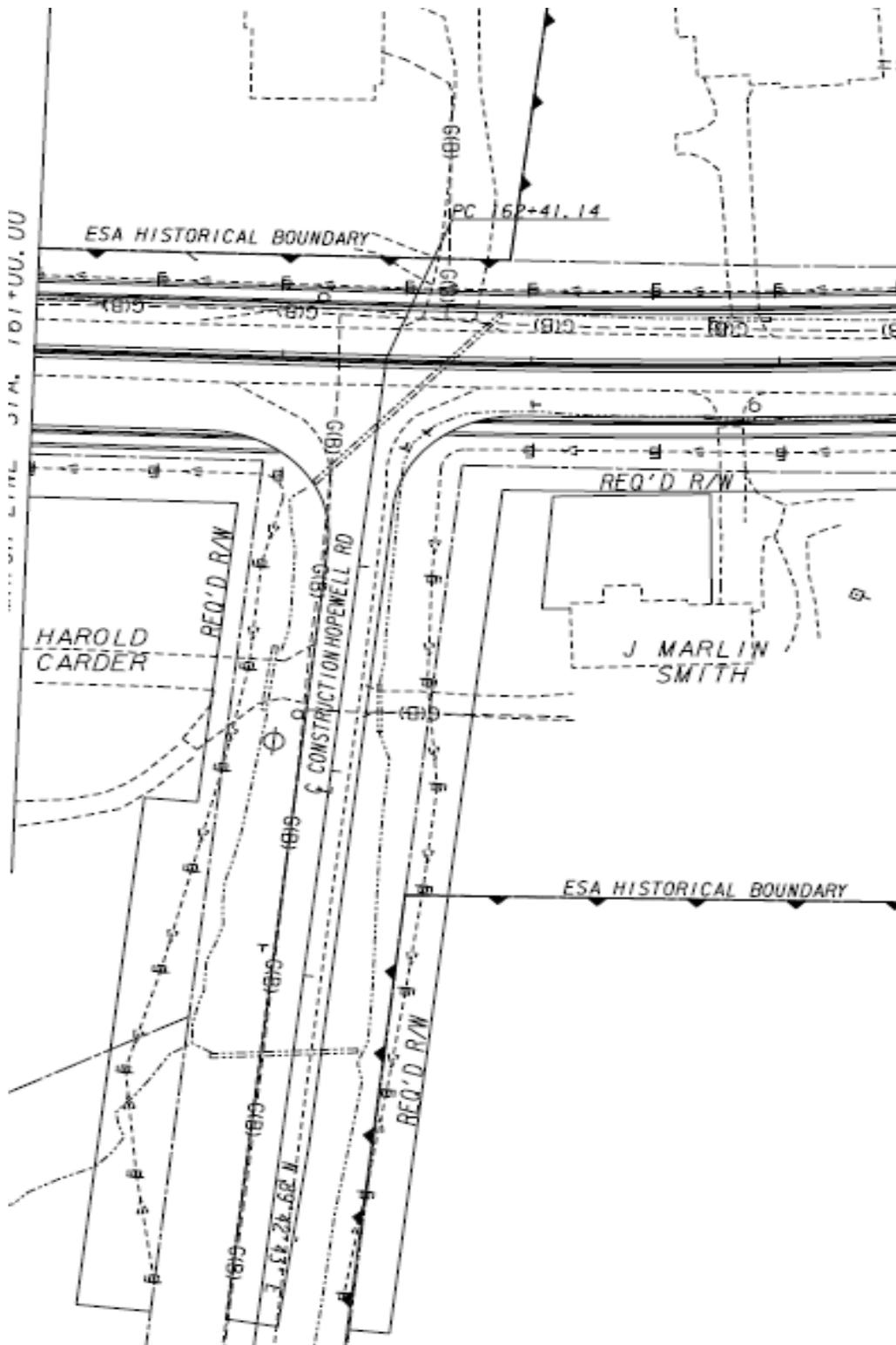


R-22.0 Current Design Wahoo Road Intersection 1 of 2

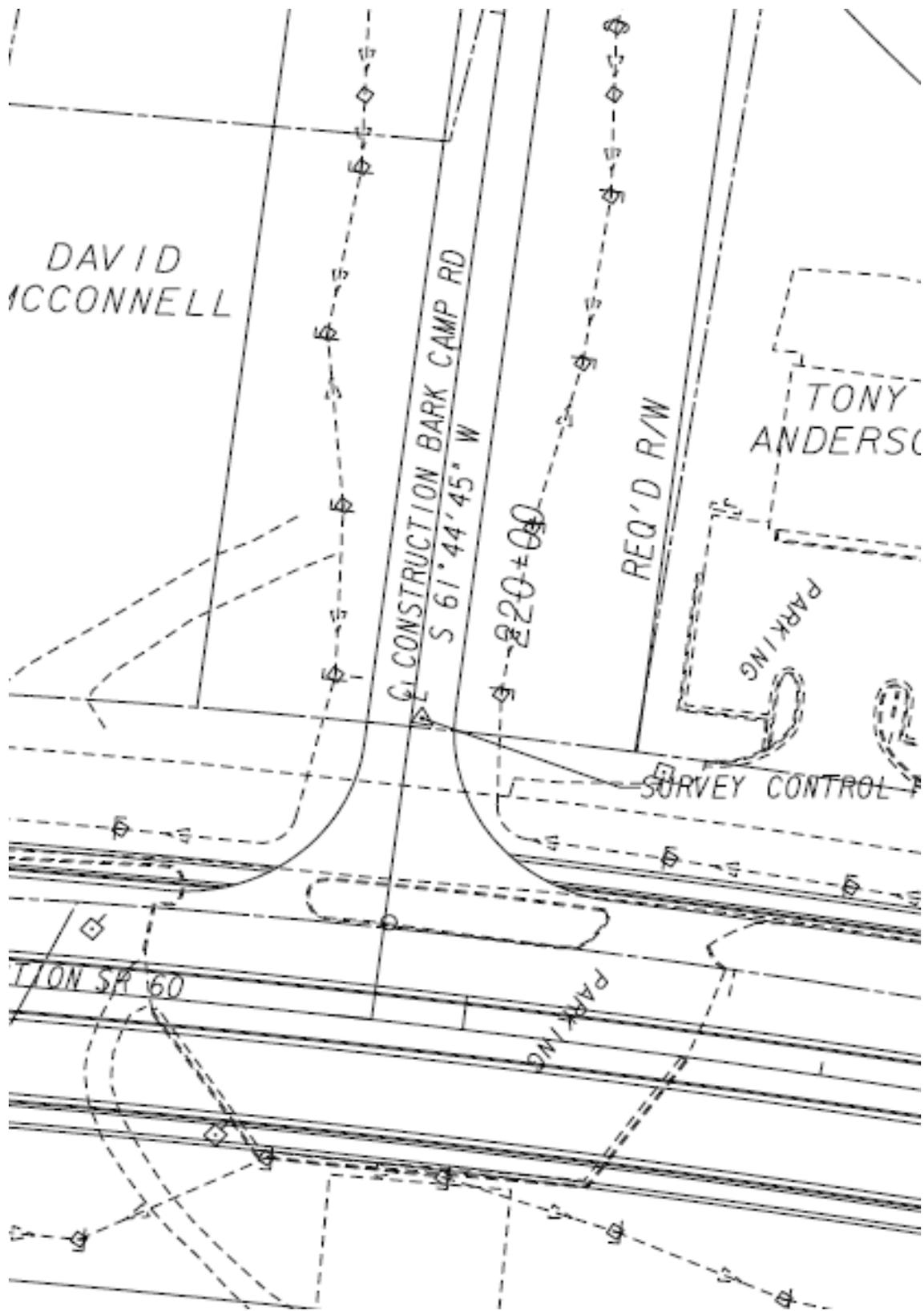


| SURVE | |
|---------|--|
| CP#34 | |
| N: 160. | |
| E: 237. | |
| ELEV: | |
| STA: | |
| OFFSE | |
| DESCR | |

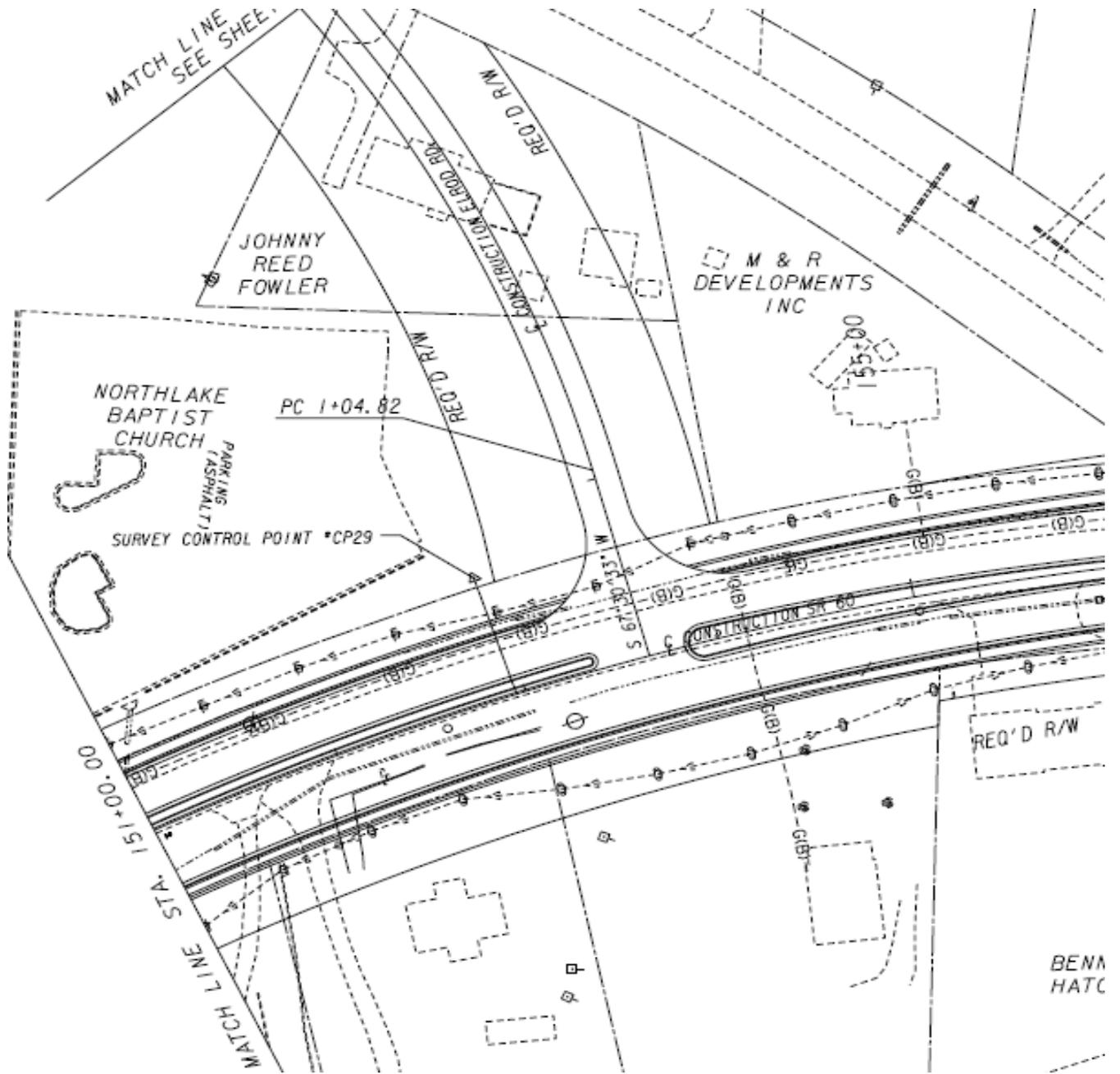
R-22.0 Current Design Old Dahlonga Hwy and Kanady Road Intersection



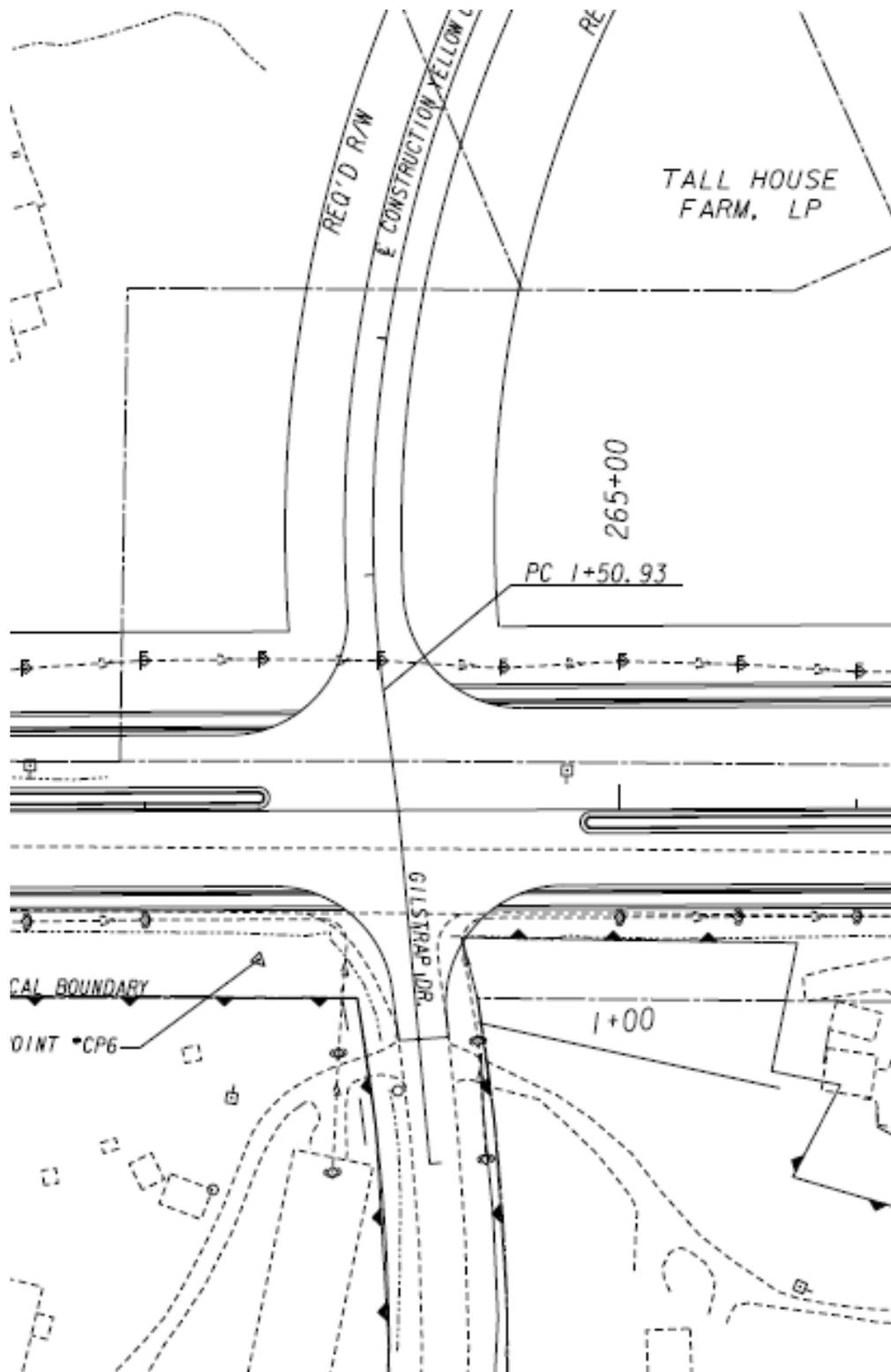
R-22.0 Current Design Hopewell Road Intersection



R-22.0 Current Design Bark Camp Road Intersection



R-22.0 Current Design Elrod Road Intersection



R-22.0 Current Design Yellow Creek Road Intersection

CALCULATIONS

PROPOSAL NUMBER: R-22.0

PAGE NUMBER: 11 of 11

PROJECT #/PI #: STP00-0198-01(020) / 132610-

ASSUMPTIONS:

All pavements are 20' wide 1.5" asphalt on 2' high embankments at 30' width.

Lengths estimated: Jerry Burress Rd-400 lf; Wahoo Rd-400 lf; Kanady Rd. -500 lf; Old Dahlonega Hwy – 250 lf; Bark Camp Rd—500 lf; Yellow Creek Rd – 500 lf; Hopewell Rd – 400 lf; Elrod Rd – 400lf. (Total 3350 lf)

$$(3350 \text{ lf} \times 20 \text{ ft})/9 \times (\$9.51) + (3350 \text{ lf} \times 30 \text{ ft} \times 2 \text{ ft})/27 \times (\$1.29) + 617 \times (\$60) =$$

$$70797 + 9603 + 37020 = \$117420$$

ROW RELOCATIONS eliminated 5 at \$250,000 each = \$1,250,000.

Total \$1,367,420

VALUE ENGINEERING PROPOSAL

| | | | |
|-------------------------|--------|---------------------|--------|
| PROPOSAL NUMBER: | R-23.0 | PAGE NUMBER: | 1 of 9 |
|-------------------------|--------|---------------------|--------|

| | |
|------------------------|-----------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
| PROJECT TITLE: | SR 60 in Murrayville, Hall County |

| | |
|------------------------------|---|
| PROPOSAL DESCRIPTION: | ELIMINATE PROFILE CHANGE ON SIDE ROADS INTERSECTING SR 60 AT TWIN OAKS LANE, MARLOW ROAD, SEMINOLE DRIVE. |
|------------------------------|---|

ORIGINAL DESIGN: The current concept design proposes to change profile on side roads to affect a minimum width ROW that will require relocations in some instances.

PROPOSED CHANGE: The proposed recommendation is to eliminate profile changes on Twin Oaks Lane, Marlow Road, Seminole Drive.

JUSTIFICATION: Changing profiles of these roads is not required due to the widening of the existing SR 60 roadway.

ADVANTAGES:

- Reduces ROW acquisition costs
- Reduces impacts to property owners
- Reduces environmental impact

DISADVANTAGES:

- None apparent

| | INITIAL COST | OPERATING COST | TOTAL LIFE-CYCLE COST |
|-------------------------|--------------|----------------|-----------------------|
| ORIGINAL DESIGN: | \$ 792,419 | | \$ 792,419 |
| PROPOSED CHANGE: | \$ 0 | | \$ 0 |
| SAVINGS: | \$ 792,419 | | \$ 792,419 |

COST ESTIMATING WORKSHEET

| | | | |
|-------------------------|--------|---------------------|--------|
| PROPOSAL NUMBER: | R-23.0 | PAGE NUMBER: | 2 of 9 |
|-------------------------|--------|---------------------|--------|

| | |
|------------------------|------------------------------|
| PROJECT #/PI #: | STP00-0198-01(020) / 132610- |
|------------------------|------------------------------|

ORIGINAL DESIGN

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|---------------------------------|-------------|-----|---------|-----------|------------------|
| Unclass excav (205-0001) | 3 | CY | 4179 | 1.29 | 5,390 |
| 6" Aggr Base (310-5060) | 3 | SY | 2555.55 | 9.51 | 24,303 |
| Rec Asph Conc 9.5 mm (402-3131) | 3 | TN | 212.11 | 60 | 12,726 |
| Property Displacements | 7 | EA | 3 | 250,000 | 750,000 |
| SUBTOTAL – COST TO PRIME | | | | | 792,419 |
| MARKUP | | | | | Incl. |
| TOTAL CONTRACT COST | | | | | \$792,419 |

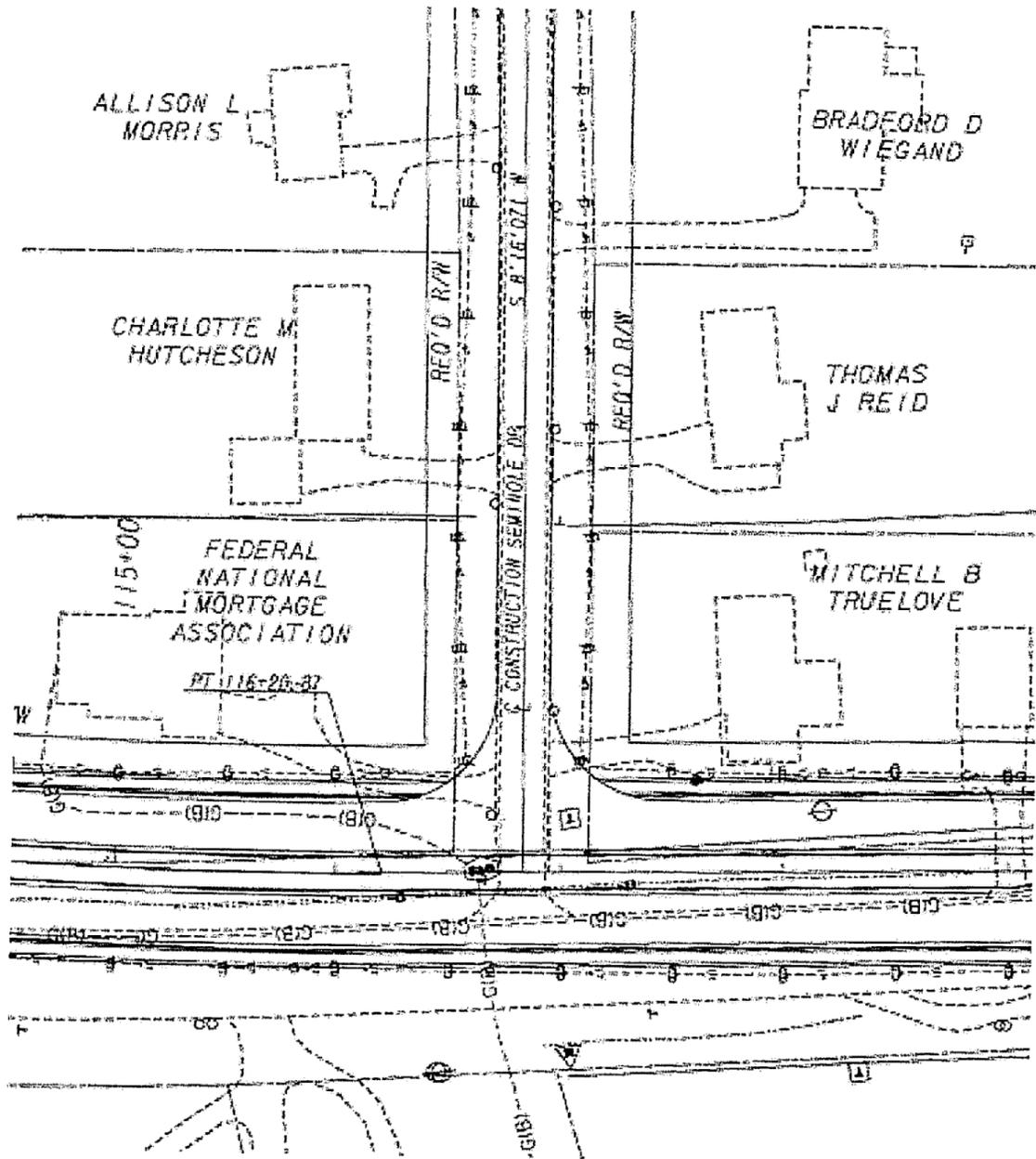
PROPOSED CHANGE

| ITEM | SOURCE CODE | U/M | QTY | UNIT COST | TOTAL COST |
|----------------------------|-------------|-----|-----|-----------|-------------|
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| SUBTOTAL – COST TO PRIME | | | | | 0.00 |
| MARKUP | | | | | -- |
| TOTAL CONTRACT COST | | | | | 0.00 |

Difference [Original-Proposed] **\$792,419**

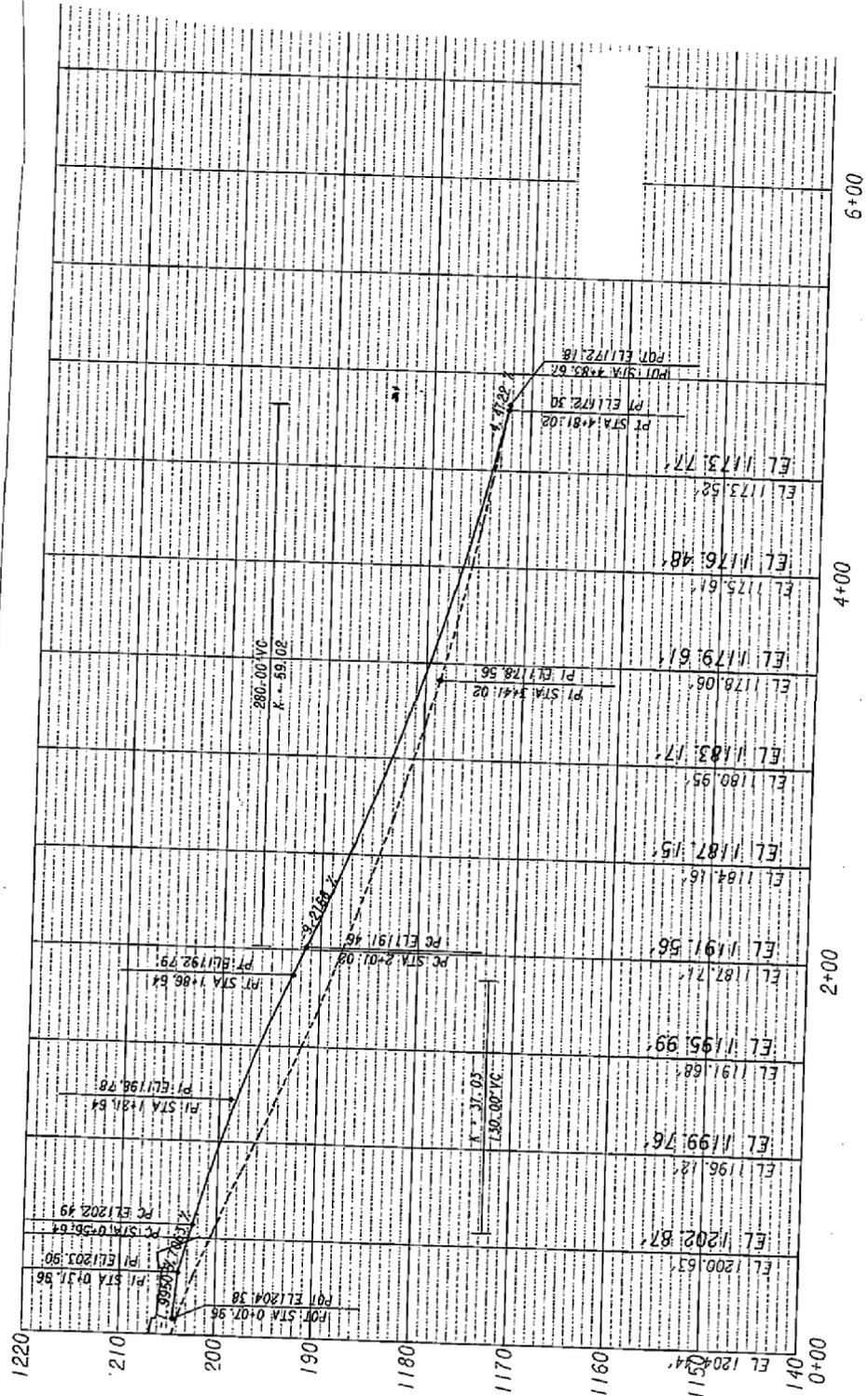
SOURCES

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 2010 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor 7. See R-2.0 Calcs |
|--|--|

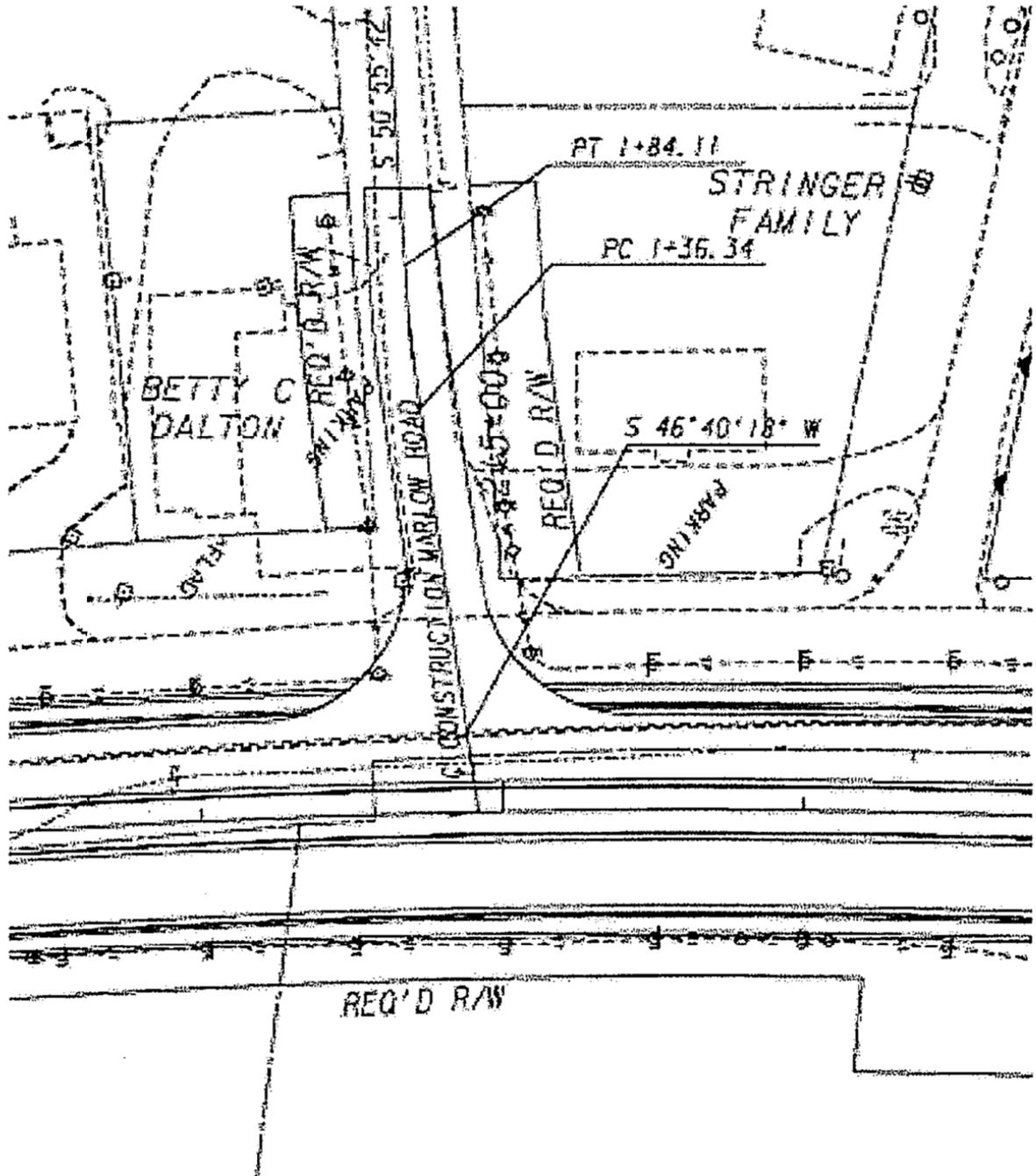


R-23.0 Current Design Seminole Road Intersection

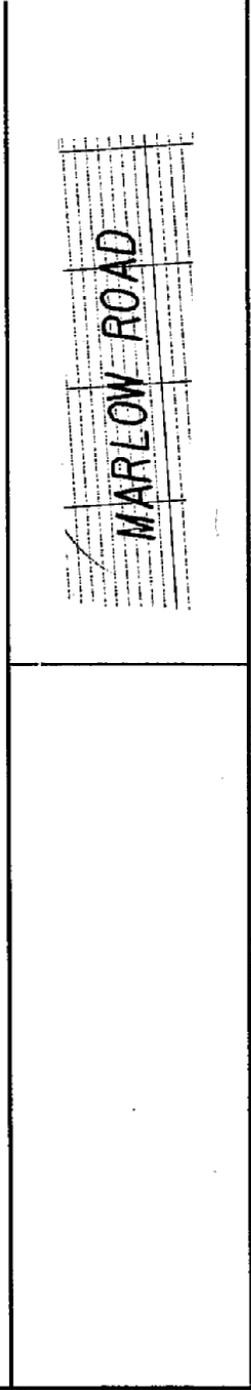
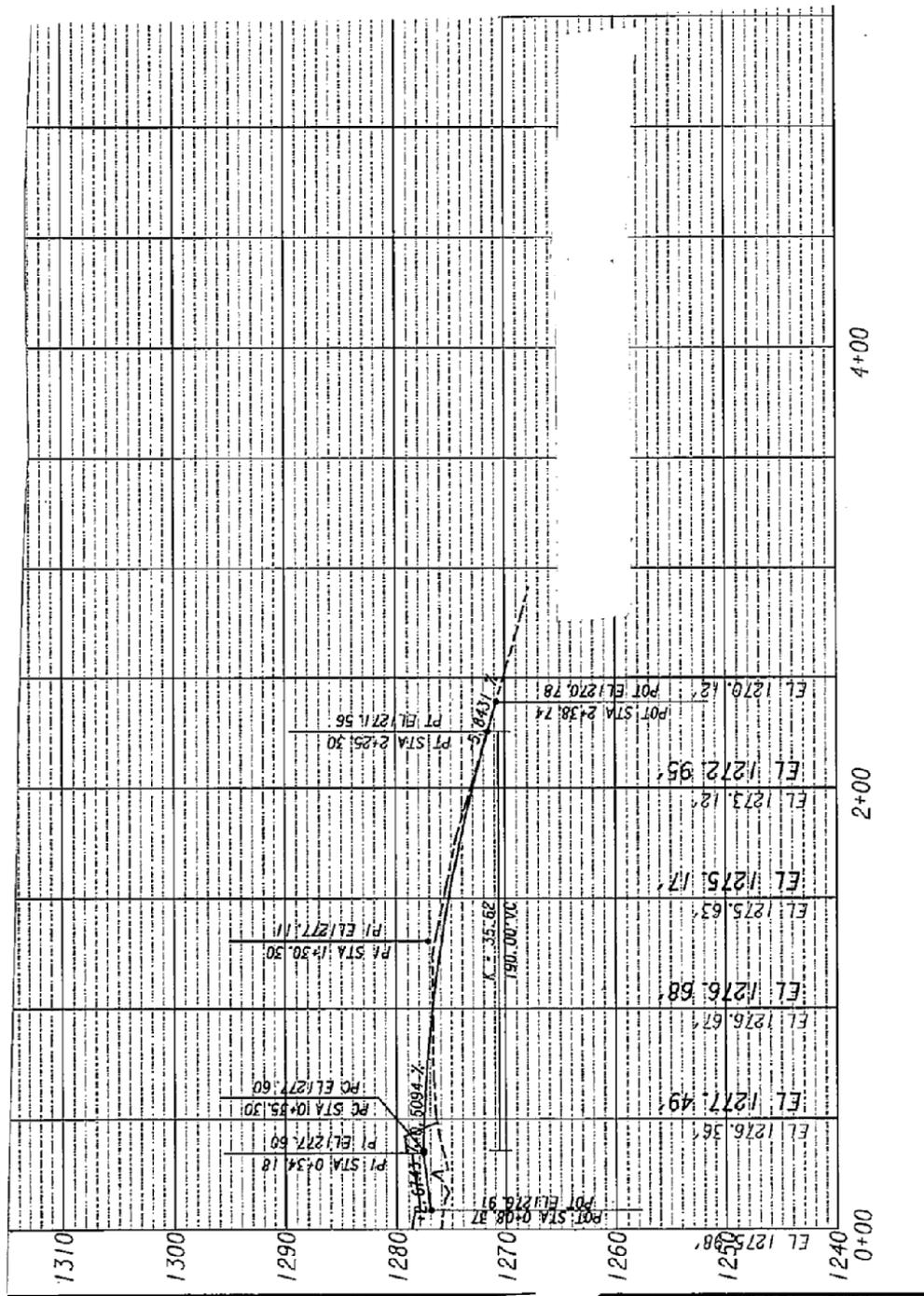
SEMINOLE DRIVE



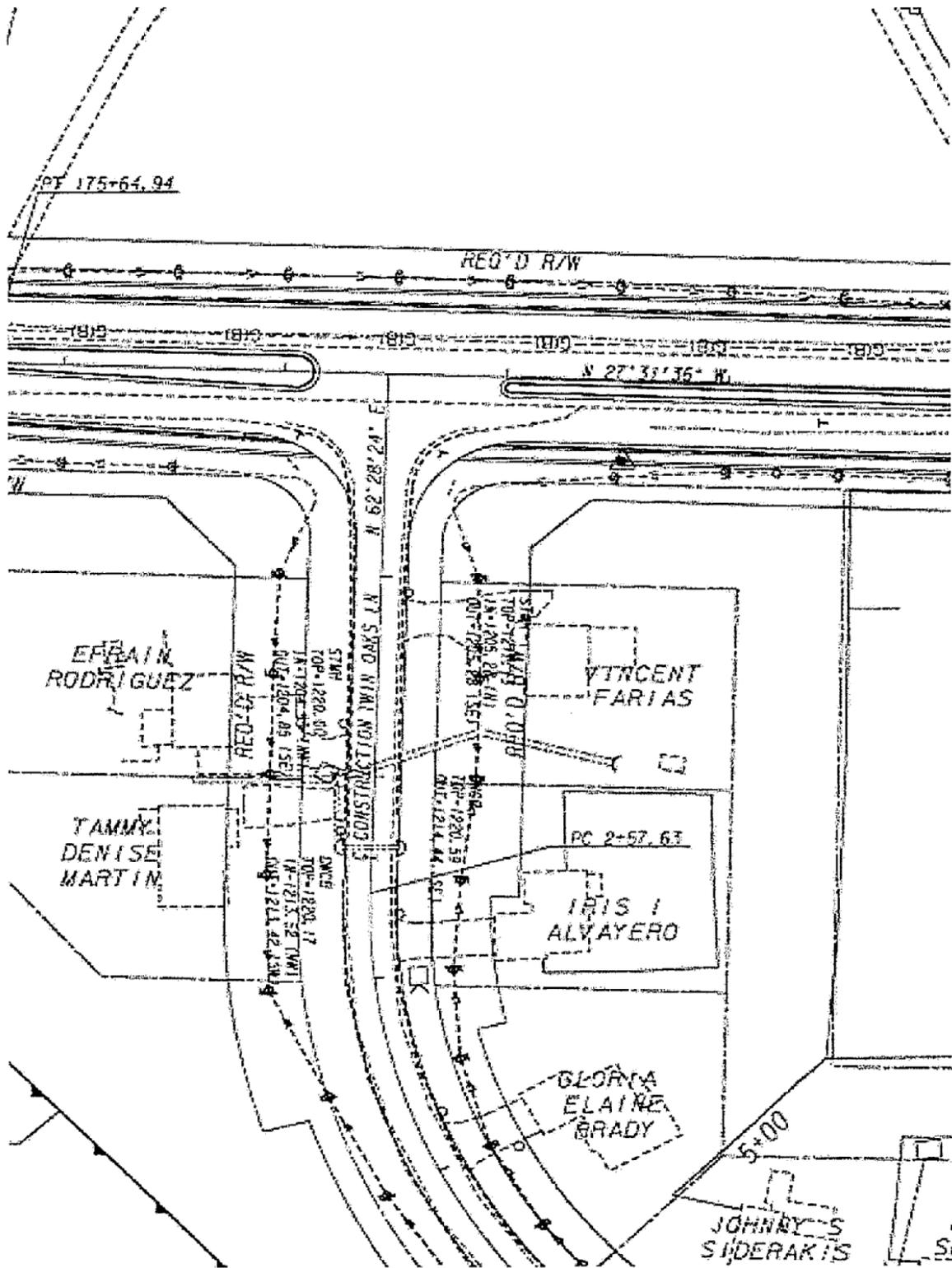
R-23.0 Proposed Change
Eliminate Profile Change Seminole Drive



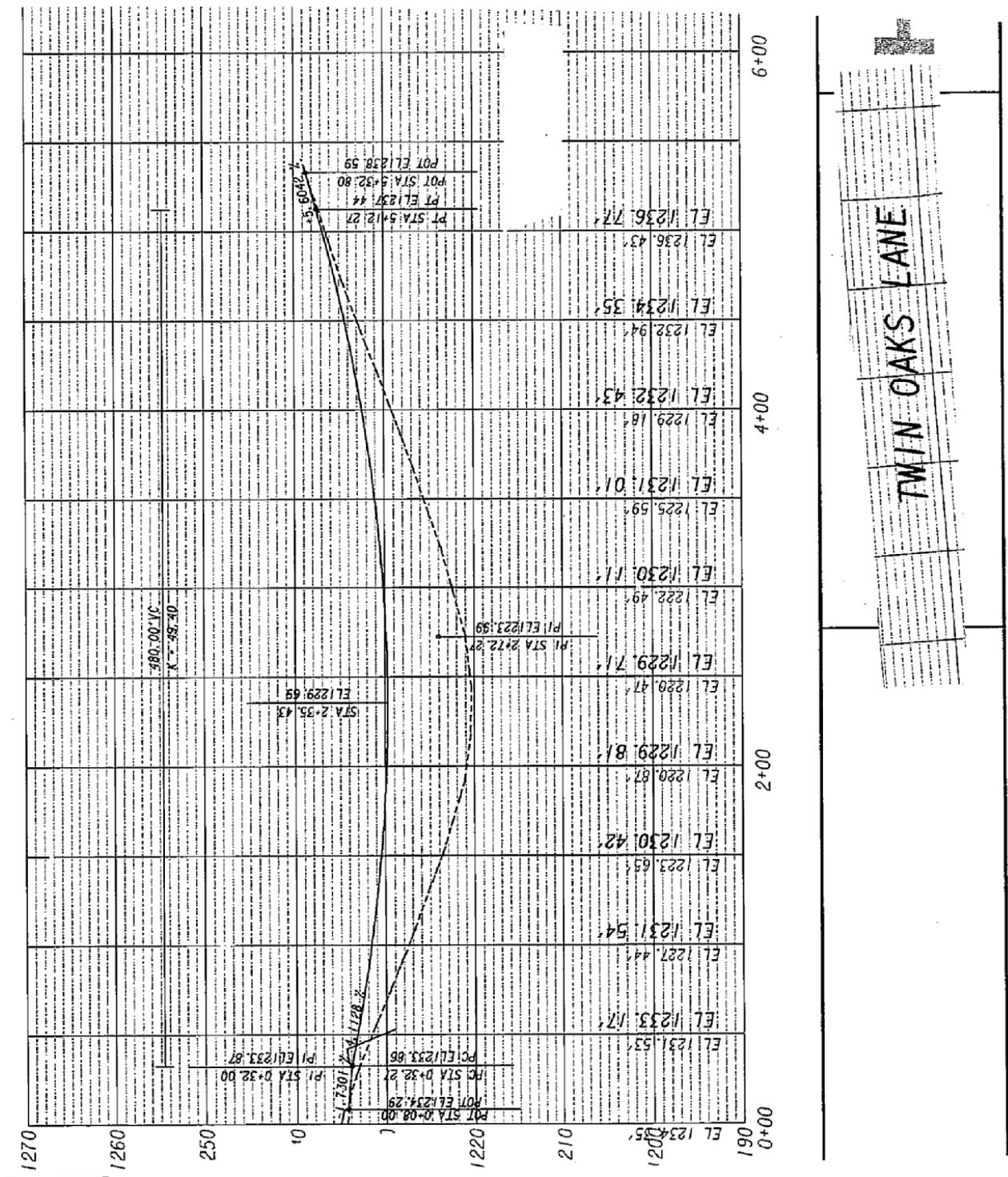
R-23.0 Current Design Marlow Road Intersection



**R-23.0 Proposed Change
Eliminate Profile Change Marlow Road**



R-23.0 Current Design Twin Oaks Lane Intersection



R-23.0 Proposed Change
Eliminate Profile Change Twin Oaks Lane

CALCULATIONS

PROPOSAL NUMBER: R-23.0

PAGE NUMBER: 9 of 9

PROJECT #/PI #: STP00-0198-01(020) / 132610-

Seminole Drive

- Embankment + base and paving + relocations

$$(948 \text{ CY} \times \$1.29) + (1000 \text{ SY} \times \$9.51) + (83 \text{ TN} \times \$60) + \$250,000 \text{ ROW} \\ = \$ 265,712.92$$

Marlow Road

- Embankment + base and paving + relocations

$$(231 \text{ CY} \times \$1.29) + (555.55 \text{ SY} \times \$9.51) + (46.11 \text{ TN} \times \$60) + \$250,000 \text{ ROW} = \\ \$258,347.92$$

Twin Oaks Lane

- Embankment + base and paving + relocations

$$(3000 \text{ CY} \times \$1.29) + (1000 \text{ SY} \times \$9.51) + (83 \text{ TN} \times \$60) + \$250,000 \text{ ROW} = \\ \$268,360.00$$

VE STUDY SIGN-IN SHEET

Project No.: STP00-0198-01(020)

County: Hall

PI No.: 132610-

Date: June 20-23, 2011,

Days

| FIRST | LAST | NAME | EMPLOYEE ID NO. | DOT OFFICE OR COMPANY | PHONE NUMBER | EMAIL ADDRESS |
|-------|------|---------------------------|-----------------|-------------------------|-------------------------|-------------------------------|
| | | | | | | |
| ✓ | ✓ | Lisa L. Myers | | Engineering Services | 404-631-1770 | lmyers@dot.ga.gov |
| ✓ | ✓ | Matt Sanders | | Engineering Services | 404-631-1752 | msanders@dot.ga.gov |
| ○ | ○ | Melissa Harper | | Construction | 404-631-1971 | mharper@dot.ga.gov |
| ✓ | ○ | Ken Werho | | Traffic Operations | 404-635-8144 | kwerho@dot.ga.gov |
| ✓ | ✓ | Ron Wishon | | Engineering Services | 404-631-1753 | rwishon@dot.ga.gov |
| ✓ | ✓ | JERRY BROOKS | | KIMLEY-HORN | 678-502-1864 | jerry.brooks@kimley-horn.com |
| ✓ | ✓ | Bill Deyo | | KEA Group | 850-499-7147 | bdeyo@keagroup.com |
| ✓ | ✓ | LINDSEY GARDNER | | U.S. COST | 757-496-3055 | LGARDNER@USCOST.COM |
| ✓ | ✓ | FAHIM ATTAR | | HEATH & LINEBACK ENG. | 770-424-1668 | fattar@heath-lineback.com |
| ✓ | ✓ | JAMES F. HARRY | | CONSTRUCTION | 404-326-6235 | JHARRY@DOT.GA.GOV |
| ✓ | ✓ | OTIS CLARK | | DOT OPD | 404-631-1577 | OCLARK@DOT.GA.GOV |
| ✓ | ○ | STANLEY HILL | | DOT OPD | 404-631-1560 | sthill@dot.ga.gov |
| ✓ | ○ | Sam Pugh | | DOT OES | 404.631.1167 | spugh@dot.ga.gov |
| ✓ | ○ | Aaron Caldwell | | Mulkey | 678-795-3626 | acaldwell@mulkeyinc.com |
| ✓ | ○ | Heather Perrin | | Mulkey | 678-795-3605 | hperrin@mulkeyinc.com |
| ✓ | ✓ | Mark Holmberg | | H&L | 770-424-1668 | mholmberg@heath-lineback.com |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

✓ Check all that attended

○ = Did Not Attend

15 Attended Project Overview (Day 1)

10 Attended Project Presentation (Day 4)

VALUE ENGINEERING STUDY

FUNCTION ANALYSIS

The following functions for the Widening and Reconstruction of SR60 to CR 158 Murrayville project were identified during discussions with the VE participants on the first day of the study. These two-word functions consist of an active verb, and a quantifiable (measurable) noun. The functions represent the proposed capital improvement expenditures of the project, and assist the V.E. team in becoming familiar with the needs and long-term goals for the project. The Basic Function of the project is to “Upgrade Corridor”. The following are considered by the V.E. team to be Secondary and Supporting Functions.

| Verb | Noun | | Verb | Noun |
|-------------|----------------|--|--------------|---------------|
| Replace | Box Culvert | | Balance | Earthwork |
| Construct | Bridge (780') | | Re-establish | Vegetation |
| Increase | Capacity | | Control | Costs |
| Control | Traffic | | Support | Commerce |
| Establish | Staging | | Award | Contract |
| Maintain | Passage | | Excavate | Earth |
| Span | Water | | Widen | Median |
| Change | Classification | | Control | Erosion |
| Connect | Centers | | Drain | Site |
| Separate | Lanes | | Realign | Intersections |
| Maintain | Traffic | | Re-cycle | Asphalt |
| Purchase | ROW | | Realign | Horizontally |
| Install | Signage | | Realign | Vertically |
| Buffer | Streams | | Relocate | Utilities |
| Install | Signals | | | |

VALUE ENGINEERING STUDY

COST MODEL/DISTRIBUTION

**SR 60 Widening & Reconstruction in Murrayville
Hall County, Georgia**

| ITEM | COST \$ | % OF TOTAL |
|--|--------------------|-----------------------|
| TOTAL PROJECT | | |
| RECYCLE AC (9.5 MM, 19 MM, 25 MM, & LEVELING COURSE) | 6,371,814 | 28.38% |
| CONSTRUCTION OF BRIDGE COMPLETE (NOT IN VE STUDY) | 3,737,025 | 16.64% |
| CLEARING AND GRUBBING | 3,111,183 | 13.86% |
| CURB GUTTER | 2,221,542 | 9.89% |
| EXCAVATION | 1,853,344 | 8.25% |
| GRAVEL AGGR BS CRS 6" & 8" THICK | 1,831,083 | 8.15% |
| MISC. | 880,000 | 3.92% |
| STORMWATER PIPE, INLETS, END SECTIONS & ETC | 738,921 | 3.29% |
| TEMPORARY GRASSING AND MULCH | 401,754 | 1.79% |
| MAINT. SILT, DITCHES, TRAPS, SLOPE, EROSION, BARRIERS | 315,866 | 1.41% |
| TRAFFIC CONTROL | 282,792 | 1.26% |
| SIDEWALK - 6" THICK | 229,521 | 1.02% |
| PER GRASS, LIME, FERTILIZER GEN, FERTILIZER NITROGEN | 142,014 | 0.63% |
| CLASS A CONCRETE | 110,090 | 0.49% |
| AGGREGATE SURFACE CRS | 103,074 | 0.46% |
| STRIPING-SOLID, THERMO, RAISED MARKERS, ARROW | 69,334 | 0.31% |
| REBAR \$14,5k, ROW MARKERS \$28,7K, INDENT STRIPS \$110K | 53,262 | 0.24% |
| TOTAL - PROJECT | 22,452,619 | 100.00% |

VALUE ENGINEERING STUDY

BRAINSTORMING OR SPECULATION IDEAS

PROJECT TITLE: WIDENING AND RECONSTRUCTION OF SR60

PROJECT LOCATION: HALL COUNTY, GEORGIA

| NO. | IDEA | RANK |
|------|---|------------------------|
| | ROADWAY (R) | |
| 1.0 | Eliminate constructing the new 780 lf bridge, extend the existing culverts, complete PAR if necessary | 5/5 |
| 2.0 | Reduce the amount of fill from Sta. 28+00 to Sta. 48+00 & Revise the horizontal alignment from 28+00 to Sta. 48+00 to reduce ROW impact | 5/5 |
| 3.0 | End raised median and taper to existing @ Yellow Creek Road ilo going 2000 lf past intersection. | 5/3 |
| 4.0 | Eliminate 1'0" grass strip between the new curb and gutter and new sidewalk. (Eliminates need to cut grass with weed eater equipment) | 0/4 See 16 below |
| 5.0 | Reduce ROW width from 150'-0" to 100'-00" for entire length of project. | 5/4 |
| 6.0 | Reduce sidewalk thickness shown from 6" thick to 4" thick, with no rebar or base course | 2/5 |
| 7.0 | Eliminate GDOT Cast-in-Place concrete wall from Sta. 48+04 to Sta. 52+09 | 2/4 |
| 8.0 | Eliminate curb, gutter, & sidewalk from Sta. 284+00 to end of project beyond Yellow Creek Road | 2/5 |
| 9.0 | If existing culvert is retained; Lower grade (fill) from Sta. 59+00 to 75+00 at bridge location ($\pm 10'$ of fill) | 2/5 |
| 10.0 | Install corrugated median for typical Detail/Section #2 from Sta. 48+50 to Sta. 60+50 and Sta. 158+85 to Sta. 173+50 | 1/3 |
| 11.0 | Reduce/eliminate 2:1 slopes with 4 to 1 slopes in fill less than 6'-0" | 2/5 |
| 12.0 | Purchase 5'-6" of additional earthwork (ROW) beyond the sidewalk when guardrail is required | 0/5 |
| 13.0 | Construct a 5 lane flush road and eliminate raised median. (Plus savings in stormwater) | 2/2 |
| 13.1 | Construct a 16' raised median for entire length of project ilo typical 20'-0" median | 2/3 |
| 14.0 | Realign and reuse existing roadway sections at Sta. 100+00 to Sta. 124+00. (Depends on condition of existing road). | 2/2 |
| 15.0 | Place styrofoam fill over existing culvert ilo 10 of earth fill, (weight reduction) | dropped |

VALUE ENGINEERING STUDY

BRAINSTORMING OR SPECULATION IDEAS

PROJECT TITLE: WIDENING AND RECONSTRUCTION OF SR60

PROJECT LOCATION: HALL COUNTY, GEORGIA

| NO. | IDEA | RANK |
|------------|--|-------------|
| | ROADWAY (RW) | |
| 16.0 | Construct a 5'-0" side walk, 4" thick and eliminate the 1'-0" grass median. Both sides of corridor | 0/4 |
| 16.1 | Construct a 5'-0" side walk on one side of road in lieu of sidewalks on both sides. | 2/4 |
| 17.0 | Construct MSE or concrete retaining walls in lieu of providing 2:1 earthen slope and need for guard rail (reduces easement width and ROW cost) | 2/4 |
| 18.0 | Realign from Sta. 265+00 to 294+00 to stay on existing roadway section | 3/4 |
| 19.0 | Lower road profile from Sta. 271+00 to Sta. 280+00 ± 10'-00" | 1/3 |
| 20.0 | Lower road profile from Sta. 285+00 to Sta. 293+00 ± 5'-00" | 1/3 |
| 21.0 | Eliminate wall #2 from Sta. 54+42 to Sta. 57+45 | 2/4 |
| 22.0 | Do not realign Jerry Burress Rd. at the tie in to Stephens Rd. near Sta. 205+00 | 2/3 |
| 23.0 | Maintain existing profile on Twin Oaks Lane (reduces impact on many houses) | 3/4 |
| 24.0 | Do not re-align Wahoo Road near Sta. 100+00 | 2/3 |
| 25.0 | Keep/retain present alignment of side roads at Old Dahlonega Highway and Kanady Road | 3/4 |
| 26.0 | Do not realign Hopewell Church Road near Sta. 154+00 | 2/3 |
| 27.0 | Do not realign Bark Camp Road near Sta. 220+00 | 2/3 |
| 28.0 | Do not realign Elrod Road near Sta. 154+00 | 2/3 |
| 29.0 | Do not realign Yellow Creek Road near Sta. 256+00 | 2/2 |
| 30.0 | Eliminate profile change on side roads at Marlow Road and Seminole Drive Sta. 117+00 | 1/3 |
| 31.0 | Maintain existing ROW on side streets and use easement where required. | 5/4 |
| 32.0 | Realign from Sta. 208+00 to Sta. 234+00 to stay on existing roadway section | 2/3 |

VALUE ENGINEERING WORKSHOP AGENDA

For GEORGIA DEPARTMENT OF TRANSPORTATION

**Project #: STP00-0198-01(020) - PI#: 132610-
SR 60 from SR136 to CR158/Yellow Creek Rd. in Murrayville
HALL COUNTY, GEORGIA**

28 HOUR - V.E. STUDY

20-23 June 2011

The value engineering workshop for the subject project will be conducted for 3-1/2 days from 20-23 June 2011, **in the Engineering Services Conference Room (5CR1L2) on the 5th floor of the GDOT General Office Facility located at 600 W. Peachtree Street NW, Atlanta GA 30308; POC – Matt Sanders @ (404)631-1752 voice**

Pre-workshop Activities

The V.E. Team Leader coordinates logistics with the Owner, and confirms project objectives and any unique requests, and develops a cost model for the project. The V.E. Team receives and reviews all project documents.

MONDAY

0800 - 0900

V.E. Team Introduction Phase

Lindsey Gardner, P.E., CVS
Team Leader, U.S. Cost, Inc.
(V.E. Team Only)

The VETL will review previous events along with activities planned for the week and outline several areas which may be investigated by the V.E. team.

The team members will discuss their initial impression and understanding of the project with other team members based on their pre-study review of the project plans, cost estimates, and available calculations. The V.E. Team Leader will provide cost models, and cost bar graphs to help the team identify the high-cost features of the project.

0900 - 1100

Project Design Briefing

V.E. Team; A/E, GDOT

The A/E project design manager will discuss the project constraints/requirements and the proposed design solution(s) in detail. The V.E. team members will ask questions as appropriate to completely understand the project requirements and the proposed design solution (both alternatives considered and those recommended by the design team).

MONDAY (CONTINUED)

1100 - 1200 **Function Analysis Phase** V.E. Team

The V.E. team will discuss the required functions of the project. The project cost model will be analyzed to identify functions provided by all project features.

1200 - 1300 **Lunch**

1300 - 1600 **Creative Phase** V.E. Team

The V.E. team will creatively review, Brainstorm, and tabulate possible design alternatives for the project. While the designer's solution will serve as the "baseline", the team will identify alternatives not in the recommended solution, but deserving of further investigation. Each project feature will be carefully analyzed with the basic questions in mind:

What is the system/item?

What does it do(what is its basic function)?

What must it do?

What does it cost?

What is the item worth?

What else will do the same, or a better job?

What does that alternative cost?

During the creative phase, the team will not judge the ideas. The essential requirements for the project, however, must always be considered.

1600 - 1700 **Analysis Phase** V.E. Team

During this phase, all of the ideas or alternatives will be ranked according to their potential for life-cycle (25-year) cost reduction and the potential for acceptance by GDOT, Engineering Designers, and other appropriate parties.

TUESDAY

0800 - 1700 **Development Phase** V.E. Team

During the development phase, each team member will gather information and prepare written proposals for those ideas assigned to him/her. These may require additional discussions with the designer, GDOT representatives, outside contractors and suppliers, and other specialists to fully define the alternative. The team members will prepare sketches, perform calculations and develop other data to support each proposal. In addition, each team member will prepare estimates of costs for each alternative as originally designed, and as proposed by the V.E. team.

WEDNESDAY

0800 - 1200 **Development Phase** V.E. Team

1200 - 1300 Lunch

1300 - 1500 **Development Phase & Quality Review** V.E. Team

THURSDAY

8:00 – 9:00 **Prepare for Presentation** V.E. Team

9:00 – 10:00 **V.E. Presentation** V.E. Team Members, Design Team & GDOT Reps

The Value Engineering Team will present the proposals developed in the course of the study to the design team representatives and any participating stakeholders. The intent of the presentation is to give a clear understanding of the basis of the proposals rather than to reach a conclusion as to their acceptability. A summary table of results will be distributed at the presentation. The formal V.E. Reports will be issued within 8 business days of the workshop conclusion.