DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: STP-012-1(71) & STP-0002-00(626) Bartow
P. I. Nos.: 621350 & 0002626
S.R. 3/U.S. 41 & S.R. 6/U.S. 411 Interchange

OFFICE: Engineering Services

DATE: January 29, 2008

FROM: Brian Summers, P.E., Project Review Engineer REW

TO: Kent Sager, District Engineer, Cartersville

SUBJECT: **IMPLEMENTATION OF VALUE ENGINEERING STUDY ALTERNATIVES**

Recommendations for implementation of Value Engineering Study Alternatives are indicated in the table below. Incorporate alternatives recommended for implementation to the extent reasonable in the design of the project.

ALT No.	Description	Savings PW & LCC	Implement	Comments
S.R. 20 ROADWAY (RD)				
RD-1	Use 24' Raised Median and use 16' shoulders	$1,287,200	No	With the anticipated development, this corridor will require a six lane section which would be accommodated with the proposed typical section (44' depressed grassed median).
RD-4	Use Type A Median Opening	$193,433	No	The Type B Median Opening shown provides additional sight distance than does the Type A Median Opening.
RD-6	Use an Urban Section from Sta. 100+00 to Sta. 133+00	$198,408	No	The proposed typical section would accommodate the future widening.
RD-8	Relocate one sidewalk to the other side of the road and combine with the other creating a Multi-Use Trail	$1,211,894	No	Sidewalks were added at the request of FHWA during their review of the Environmental Assessment for this project.
RD-10	Bifurcate up to 1.5' differential	$255,320	No	The profile grade was set to allow for future widening.

ALT No.	Description	Savings PW & LCC	Implement	Comments
RD-13	Extend existing S.R. 20 directly west and tie in to U.S. 41 using a fly-over	-$4,170,840 (cost increase)	No	Results in a substantial cost increase.
RD-16	Extend S.R. 20 westerly from U.S. 411 and tie-in to U.S. 41 avoiding downtown	Design Suggestion	No	The Environmental Process would need to be re-opened and would cause delays to the project's schedule.
RD-19	Delete outside Curb and Gutters	$680,682	No	Would require modification of the front slope and ditch to meet Clear Zone which could end up requiring that more Right of Way be acquired. This would nullify any savings.
RD-20	Use existing pavement	$2,284,288	Yes	This should be done.
U.S. 41/411 INTERCHANGE BRIDGE (BR-ITX)				
BR-ITX-1	Build one new 33' structure in between the two existing bridges, route traffic onto new bridge; construct new bridges north and south	$22,328	No	After a more detailed investigation, there is not enough room between the two existing bridges to build a 33' structure.
BR-ITX-3	Use an 8' and 2' shoulders	$206,712	No	The 2' inside shoulder does not meet the AASHTO minimum width for the inside shoulder within the median across the bridge.
BR-ITX-4	Use 6'-6" and 2' shoulders	$284,229	No	The 2' inside shoulder and the 6'-6" outside shoulder does not meet the AASHTO minimum width for the inside and outside shoulders.
U.S. 41 RAILROAD BRIDGE (BRRR)				
BRRR-1	Use an 8' and 2' shoulder	$178,200	No	The 2' inside shoulder does not meet the AASHTO minimum width for the inside shoulder within the median across the bridge.

ALT No.	Description	Savings PW & LCC	Implement	Comments
U.S. 41 RAILROAD BRIDGE (BRRR) - continued				
BRRR -2	Reduce length by eliminating end spans	$2,584,734	No	Based on a more detailed cost estimate and additional supporting information provided by the Design Consultant, it will actually be more expensive in this case to use the MSE Wall Abutments.
BRRR -3	Use 6'-6" and 2' shoulders	$245,025	No	The 2' inside shoulder and the 6'-6" outside shoulder does not meet the AASHTO minimum width for the inside and outside shoulders.
BRRR -4	Build one new 21' structure in between the two existing bridges, route traffic onto new bridge; construct new bridges north and south	$112,303	No	After a more detailed investigation, there is not enough room between the two existing bridges to build a 21' structure.
U.S. 41 CREEK BRIDGE (BRCR)				
BRCR -1	Use an 8' and 2' shoulder	$122,760	No	The 2' inside shoulder does not meet the AASHTO minimum width for the inside shoulder within the median across the bridge.
BRCR -2	Build one new 33' structure in between the two existing bridges, route traffic onto new bridge; construct new bridges north and south	$63,246	No	After a more detailed investigation, there is not enough room between the two existing bridges to build a 33' structure.
BRCR -3	Use 6'-6" and 2' shoulders	$168,795	No	The 2' inside shoulder and the 6'-6" outside shoulder does not meet the AASHTO minimum width for the inside and outside shoulders.
U.S. 41 ROADWAY (RD)				
RD-2	Recycle existing pavement on U.S. 41/S.R. 3	$906,007	Yes	This should be done.

A meeting was held on January 23, 2008 to discuss the above recommendations. Ed Culican with JJ & G, DeWayne Comer and Joseph Ciavarro with District 6 Preconstruction and Brian Summers, Ron Wishon and Lisa Myers with Engineering Services were in attendance.

The results above reflect the consensus of those in attendance and those who provided input.

Approved: _____ **Date:** 2/13/08
Gerald M. Ross, P. E., Chief Engineer

BKS/REW

Attachments

c: Gus Shanine
Todd Long
Paul Liles
James Magnus
Kenny Beckworth
Stephen Lively
Steve Gaston
DeWayne Comer
David Moore
Joseph Ciavarro
Ken Werho
Nabil M. Raad
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December 19, 2007

Ms. Lisa Myers
Design Review Engineer Manager
Georgia Department of Transportation
No. 2 Capitol Square, Room 266
Atlanta, Georgia 30334

RE: Value Engineering Study Responses
STP-01201(71); PI No. 621350; SR 20 Widening and Relocation
STP-0002-00(626); PI No. 0002626; US 41 Interchange Improvements
Bartow County

Dear Ms. Myers:

JJG has received the Value Engineering Study Report for the referenced project. We have reviewed the report findings and have prepared responses to each of the recommended alternatives. Transmitted herewith are our responses to the proposed recommendations.

As always, JJG appreciates the opportunity to serve the Georgia Department of Transportation and Bartow County on these very important projects. If you have any questions or require any additional information please do not hesitate to call me at (770) 287-1650.

Sincerely,
JORDAN, JONES AND GOULDING, INC.

Edward F. Culican, Jr., P.E.
Project Manager

c: DeWayne Comer, P.E., GDOT District 6
David Moore, GDOT District 6
Joe Ciavarro, GDOT District 6
Steve Bradley, Bartow County
Dan Guill, P.E.
Ken Anderson, P.E.
Wayne Mote, P.E.

Jordan Jones & Goulding

MEMORANDUM

DATE: December 14, 2007

TO: File

FROM: Ed Culican

REFERENCE: VE Study Responses
SR 20 Roadway Widening; STP-012-1(71); PI 621350
US 41/SR 3 at US 411/SR 61 Interchange; STP-0002-00(626); PI 0002626
Bartow County, GA

This project memorandum has been prepared as a response to the VE Study Recommendations for the referenced projects. For these projects, a VE Study was held on October 16-19, 2007. The VE Study Report of findings and recommendations was prepared and distributed on November 19, 2007. This report was received by JJG on November 21, 2007. A summary of the study recommendations with back up calculations were contained in this report. JJG has reviewed the comments and offers the following responses to these recommendations:

SR 20 Widening and Relocation – STP-012-1(71); PI No. 621350; Bartow County

Alternative No. RD-1
Recommendation: Use 24' raised medians and use 16' shoulders for a cost savings of $1,287,200.
Response: The typical section used for this project was selected to secure the right way to allow for widening the roadway to the inside median for future traffic capacity in this urban situation. It is anticipated that with the future traffic projected for this corridor that a 6-lane section will be needed and this typical section secures the right-of-way and will easily accommodate a 6-lane future project. The corridor is a mixed use of residential and commercial properties and is rapidly developing. Significant development in the corridor has occurred recently including a Walmart development, a new college campus, and the commercial developments near I-75 have resulted in significant increases in the traffic volumes in the corridor. Further, it is anticipated that additional development will occur within the project corridor further increasing the traffic demands of the roadway. Due to the development experienced as well as the future developments anticipated in this corridor, it is anticipated that the property values will rise which will result in higher right-of-way costs for a future widening project. Additionally, when a future widening project is needed, the construction cost of that project would be greatly increased. That project would require significant grading to the outside for the new lanes, significant modifications to the drainage system, reconstruction of the sidewalks, and modifications to the traffic signal systems, including relocations of poles, cabinets, and pull boxes. Therefore, due to the reasons noted above it is recommended to keep the typical section as designed.

Note: Calculations were reviewed for this recommendation, but not challenged due to the nature of this response (typical secures right-of-way for future widening project). There are issues in the calculation of quantities and costs that would need to be addressed to realize the actual cost differential, which would

be much less than documented with this alternative. The cost estimate does not factor in the need for concrete median pavement and U-turn pavement at median openings and does not account for the additional drainage required for a curb and gutter median section. Also, the earthwork calculations do not seem right. It is unclear why the earthwork was reduced twice.

Alternative No. RD-4
Recommendation: Use Type A median crossovers for a cost savings of $193,433.
Response: Type A median crossovers are not appropriate for this project due to safety concerns. This project experiences high traffic volumes – ADT for this project is 46000 for 2023. The Type B crossover is expected for drivers in urban type developed areas for safety. This type of median crossover provides additional sight distance, storage capacity for turning vehicles, and provides a better median crossing option from a safety and operational standpoint. In fact, District 6 is currently building Type B median crossovers as a retrofit to other projects in the area for safety purposes. Also, with the Type A median crossover, 18-wheelers cannot perform the turning movement as easily, and cannot get out of the traveled way as easily with the Type B crossover. Additionally, of the four locations where Type A median crossovers are proposed, two locations are in place for a future development per negotiation, so the actual cost saving would only be half the amount shown for this alternative. Further, the cost savings noted would be negated by only one accident at locations implementing Type A crossovers. Per the Office of Traffic Safety and Design, one accident with injuries costs the department approximately $280,000, and fatality accidents costs over $3,000,000. Therefore, for safety purposes it is recommended that Type B median crossovers remain at all locations.

Alternative No. RD-6
Recommendation: Use an urban section from Sta. 100+00 to Sta. 133+00 for a cost savings of $198,408.
Response: The typical section used on the project was selected to secure the right-of-way for a future inside widening project. Narrowing the median would require additional right-of-way for a future widening project. Further, narrowing the median will not reduce the stream relocation impacts; it would increase stream relocation impacts. Using either typical section, the stream will require relocation. Using the current typical section will relocate and mitigate the stream relocation once with this project. With the narrow typical section, the department would have to relocate and mitigate the stream with this project, and then relocate and mitigate the stream a second time with a future widening project. Therefore, we feel that using the current typical section, stream relocation impacts will be much less for the department. Also, we disagree with the opportunities with this alternative. A reduction in median drainage will not be experienced, and would increase with this alternative since half of the section is in superelevation. A drainage line item was not included in the cost worksheet so it may have been determined that the drainage was not a savings item. Also, the reduction in the earthwork are minor once the differences in the median fill and outside excavation are realized. Further, costs for concrete median pavement and u-turn pavement at median openings were not included as cost increase items for this alternative. Therefore, it is recommended that this alternative not be implemented and the current typical section be utilized in this section of the project.

Alternative No. RD-8
Recommendation: Relocate one sidewalk to the other side of the roadway and combine with a multi-use trail for a cost savings of $1,211,894.

Response: During FHWA's review of the Environmental Assessment for this project, it was requested to provide sidewalks on each side of the roadway to link the residential areas with the college and commercial developments. This project corridor is becoming increasingly commercial; the new college, Walmart, the businesses near I-75 and future developments planned along the relocation piece of the project indicates the need for pedestrian facilities on this project to safely travel in the project corridor. Providing sidewalks on each side of the road allows pedestrians walk safely to intersections where they can cross the road to their destinations. Because residential areas and commercial destinations are on each side of the road, providing sidewalks on both sides will allow for pedestrian traffic to safely travel in the corridor. For this reason, we recommend that this alternative not be implemented, and the current typical section remains as designed with sidewalk on each side of the road.

Other issues to consider include utility relocations, clear zone, minimum standards for shoulder width and others. Providing 18-foot shoulders on each side allows for utility relocations on each side. Providing an 8-foot shoulder on one side of the road will not allow for utility relocations to that side of the road, which could cause a conflict with all utilities trying to be placed on one side of the road. Also, an 8-foot shoulder does not minimum standards for shoulder width on urban roadways. An 8-foot shoulder also does not provide adequate clear zone, and additional guardrail will be required. These issues further show that this alternative should not be implemented.

Alternative No. RD-10
Recommendation: Bifrucate up to 1.5' differential for a cost savings of $255,320.
Response: The proposed profile was designed and intended to allow for a future widening project to the inside median. As such, we will review the profile and revise where feasible while still accommodating a future widening project to the inside median. However, we do not agree that this alternative will increase or maintain ditch capacity; this alternative will reduce ditch capacity. This alternative will also impact cross road profiles and existing median openings. Also, this alternative may impact the ability to put in future median openings. Also, the calculations for the reduction of earthwork are not accurate. Based on the assumptions documented (1-foot of fill over 75-feet of width over 25% of the project length), the correct reduction in borrow on the project is approximately (1' * 75' * ((133+83 – 20+00) * 0.25) / 27 cf/cy) 7900 CY of borrow @ $5.36/CY results in a construction cost savings of $46,608. Costs for redesign of the profile, cross sections, median drainage, drainage profiles and quantities will not completely offset the cost savings documented.

Alternative No. RD-13
Recommendation: Extend existing SR 20 directly west and tie in to US 41 using a fly-over for a cost increase of $4,926,692.
Response: Two multi-level interchange alternatives similar to what is described in this alternative were investigated in detail as part of the Environmental Assessment. One was a three level interchange as described in this recommendation, and a four level interchange. Documentation from the EA has been provided for reference. Both were rejected due to higher construction costs. The three level interchange as you describe in this alternative was estimated to increase the construction cost between $6-8 million several years ago. With the rise on construction costs experienced over the last three years, it is anticipated that the cost differential would be significantly greater than the $6-8 million figure documented in the EA. Also, the recommendation would require the displacement of the existing hospital near the interchange due to inadequate access to the emergency facilities. The cost of the

relocation of the hospital did not factor into the cost increase and would need to be applied. Therefore, it is recommended that this alternative not be implemented.

Alternative No. RD-16
Recommendation: Extend SR 20 westerly from US 411 and tie in to US 41 avoiding downtown.
Response: While responses to Design Suggestions are not required, several issues with this Design Suggestion most notably determining where to tie back into US 41. There are several issues with the tie back point including CSX Railroad, Pettit Creek, GA Transmission Power Lines, numerous commercial developments, and intersecting roadways that would make the connection back to existing challenging. Also, this alternative limits access to the hospital. Further, this alternative reopens the design and environmental process and would delay the project.

Alternative No. RD-19
Recommendation: Delete outside curb and gutter for a cost savings of $680,682.
Response: There are several concerns with this alternative. This project is located in an urban situation, and the corridor experiences high traffic volumes. The ADT projected for this project is 46000 for 2023. Current and future planned developments also show that this area is a rapidly developing and the need for pedestrian facilities to safely move pedestrian traffic in the corridor are warranted. Providing sidewalk behind the curb and gutter section provides safety for pedestrians and meets ADA requirements for pedestrian traffic. Second, the typical section used for this project was selected to allow for widening the roadway to the inside median for future traffic capacity and secures the right-of-way for future widening project. This typical does not allow for a future widening to the inside median. Third, comments from FHWA's review of the Environmental Assessment for this project, it was requested to provide sidewalks on each side of the roadway to link the residential areas with the college and commercial developments. The typical section shown on the illustration does not provide sidewalk for pedestrian traffic. Also, there are questions regarding the typical section in the illustration. The typical shown does not meet clear zone, will create a drainage issues, and could result in maintenance concerns. In order to meet clear zone, the typical section must provide 26-feet from the edge of travel to the front edge of the ditch. In order to accomplish this, the front slope of the ditch will need to be increased to a minimum of 16-feet. This will result in additional right-of-way width, which will also increase the cost of the project. Drainage issues may also result with this shallow ditch section especially in superelevated section where drainage structures are required in the median which drain to the outside ditches. The ditches in these locations will have to be deeper in order to allow the pipe to daylight. This may also result in deeper ditches than the typical shown so that the ditches can flow to outfall locations. This will result in additional right-of-way costs. Also, with the shallow ditch there is a maintenance concern. This shallow ditch section does not provide sufficient ditch capacity to keep the depth of flow in the ditch below the pavement structure. Over time, this may result in premature pavement base failure. Also, concerning the cost savings calculations, there are issues that need to be addressed. In the proposed estimate, there is not a line item for the additional GAB needed for the additional shoulder pavement. Second, we disagree that all the drainage items shown in our estimate will be eliminated. Under this alternative, drainage structures will be required in the median specifically in superelevated sections. Over 60% of the mainline of SR 20 has pavement sloping towards the median, and drainage structures in these areas will be required to drain the pavement. We have recalculated the cost difference for this alternative accounting for the above items. Based on these calculations, we have found that this alternative will actually result in a construction and right-of-way cost increase of $1,663,984, and will require significant

redesign efforts further increasing the cost of this alternative if implemented. Therefore, it is recommended that this alternative not be implemented and the curb and gutter remain as designed.

Alternative No. RD-20
Recommendation: Use existing pavement for a cost savings of $2,284,288.
Response: We will recycle the existing pavement where feasible. The profile was designed to accommodate an overlay of the existing pavement. An existing pavement evaluation has not been received to date to confirm that the existing pavement structure is suitable for overlay. Once confirmed that the existing pavement is sufficient for overlay, we will incorporate the overlay into the design.

US 41 Interchange Improvements – STP-0002-00(626); PI No. 0002626; Bartow County

Alternative No. BR-ITX-1
Recommendation: Build one new 33' structure in between the two existing bridges; route traffic onto new bridge; construct new bridges north and south for a cost savings of $22,328.
Response: This option was investigated as part of the design of the project, and it was determined that there was not enough width in between the two existing structures to build a portion of the bridge wide enough to use for maintenance of traffic. There is only 26.5 feet of width between the barriers of the existing bridges, which will not accommodate two lanes of traffic and barriers needed to divert traffic in a maintenance of traffic scheme. Further, with the profile adjustments planned in this location to provide minimum vertical clearance, the slopes for the fill sections leading up to the new structure will encroach onto the existing roadway, which would require a shift of the existing traffic outside, would require additional temporary pavement, and would require widening the existing bridges to accommodate the traffic in its new location. Therefore, it is recommended that this alternative not be implemented.

Alternative No. BR-ITX-3
Recommendation: Use 8' and 2' shoulders for a cost savings of $206,712.
Response: The technical write up for this alternative does not correctly describe the original design for the bridge layout in this location. The original design calls for the replacement of the existing substandard twin bridges with new twin bridges. The new bridges will accommodate three 12' lanes, 4' inside shoulders and 10' outside shoulders. The alternative proposes construction of the twin bridges using 8' outside and 2' inside shoulders. All other geometry will be the same as in the original design. The shoulder widths for these bridges were selected in accordance with GDOT Bridge and Structures Design Policy Manual (DPM). Per section 2.9.1 of the Bridge and Structures DPM, shoulders for bridges in a multi-lane rural divided situation, the bridge width should be the pavement width + 14 feet (4 feet inside shoulders and 10 feet outside shoulders). The shoulder widths are based on AASHTO's "A Policy on Geometric Design of Highways and Streets", 2004 edition (Green Book), which states that in a rural divided arterial situation, "The width of usable outside shoulders should be at least 8-feet." (page 455). With a 10-foot outside shoulder on the bridge we will provide an 8-foot usable shoulder width since the 2-feet adjacent to the barrier is considered unusable. Reducing the width of the outside shoulders would not meet the minimum criteria for usable shoulder width across the bridge. For the inside shoulders, the Green Book states "On divided arterials with two lanes in each direction, a paved shoulder strip 4-feet wide should satisfy the needs for a shoulder within the median." (page 455). Reducing the width of the inside shoulders would not meet the minimum criteria for paved shoulder width within the median across the bridge. Providing less width on the shoulders would create a safety issue at this bridge location and

would also violate AASHTO and GDOT Bridge and Structures DPM requirements. Per the DPM, page 2-62, "The shoulder widths are based on AASHTO clear zone requirements and exceptions to the widths are almost non-existent." Therefore, it is recommended to maintain the shoulder widths on the bridge as currently designed.

Alternative No. BR-ITX-4

Recommendation: Use 6'-6" and 2' shoulders for a cost savings of $284,229.

Response: The technical write up for this alternative does not correctly describe the original design for the bridge layout in this location. The original design calls for the replacement of the existing substandard twin bridges with new twin bridges. The new bridges will accommodate three 12' lanes, 4' inside shoulders and 10' outside shoulders. The alternative proposes construction of the twin bridges using 6'-6" outside and 2' inside shoulders. All other geometry will be the same as in the original design. The shoulder widths for these bridges were selected in accordance with GDOT Bridge and Structures Design Policy Manual (DPM). Per section 2.9.1 of the Bridge and Structures DPM, shoulders for bridges in a multi-lane rural divided situation, the bridge width should be the pavement width + 14 feet (4 feet inside shoulders and 10 feet outside shoulders). The shoulder widths are based on AASHTO's "A Policy on Geometric Design of Highways and Streets", 2004 edition (Green Book), which states that in a rural divided arterial situation, "The width of usable outside shoulders should be at least 8-feet." (page 455). With a 10-foot outside shoulder on the bridge we will provide an 8-foot usable shoulder width since the 2-feet adjacent to the barrier is considered unusable. Reducing the width of the outside shoulders would not meet the minimum criteria for usable shoulder width across the bridge. For the inside shoulders, the Green Book states "On divided arterials with two lanes in each direction, a paved shoulder strip 4-feet wide should satisfy the needs for a shoulder within the median." (page 455). Reducing the width of the inside shoulders would not meet the minimum criteria for paved shoulder width within the median across the bridge. Providing less width on the shoulders would create a safety issue at this bridge location and would also violate AASHTO and GDOT Bridge and Structures DPM requirements. Per the DPM, page 2-62, "The shoulder widths are based on AASHTO clear zone requirements and exceptions to the widths are almost non-existent." Therefore, it is recommended to maintain the shoulder widths on the bridge as currently designed.

Alternative No. BRRR-1

Recommendation: Use 8' and 2' shoulders for a cost savings of $178,200.

Response: The technical write up for this alternative does not correctly describe the original design for the bridge layout in this location. The original design calls for the replacement of the existing substandard twin bridges with new twin bridges. The new bridges will accommodate three 12' lanes, 4' inside shoulders and 10' outside shoulders. The alternative proposes construction of the twin bridges using 8' outside and 2' inside shoulders. All other geometry will be the same as in the original design. The shoulder widths for these bridges were selected in accordance with GDOT Bridge and Structures Design Policy Manual (DPM). Per section 2.9.1 of the Bridge and Structures DPM, shoulders for bridges in a multi-lane rural divided situation, the bridge width should be the pavement width + 14 feet (4 feet inside shoulders and 10 feet outside shoulders). The shoulder widths are based on AASHTO's "A Policy on Geometric Design of Highways and Streets", 2004 edition (Green Book), which states that in a rural divided arterial situation, "The width of usable outside shoulders should be at least 8-feet." (page 455). With a 10-foot outside shoulder on the bridge we will provide an 8-foot usable shoulder width since the 2-feet adjacent to the barrier is considered unusable. Reducing the width of the outside shoulders would

not meet the minimum criteria for usable shoulder width across the bridge. For the inside shoulders, the Green Book states "On divided arterials with two lanes in each direction, a paved shoulder strip 4-feet wide should satisfy the needs for a shoulder within the median." (page 455). Reducing the width of the inside shoulders would not meet the minimum criteria for paved shoulder width within the median across the bridge. Providing less width on the shoulders would create a safety issue at this bridge location and would also violate AASHTO and GDOT Bridge and Structures DPM requirements. Per the DPM, page 2-62, "The shoulder widths are based on AASHTO clear zone requirements and exceptions to the widths are almost non-existent." Therefore, it is recommended to maintain the shoulder widths on the bridge as currently designed.

Alternative No. BRRR-2
Recommendation: Reduce length by eliminating end spans for a cost savings of $2,581,734.
Response: The technical write up and calculations for this recommendation are not correct. We have several issues with the calculations including the cost savings (our original estimate for this bridge was only $2,400,000). The cost savings calculations are in error, and the unit costs are not current. Plus, we disagree that the temporary bridge can be reduced with this alternative. See the following attached sheets showing the corrections in the costs developed in this alternative, the additional costs not factored into this change, and other backup material. Based on these calculations, we show that this alternative will result in a cost increase of $267,680. Therefore it is recommended that this alternative not be implemented and the current bridge layout should remain as designed.

Alternative No. BRRR-3
Recommendation: Use 6'-6" and 2' shoulders for a cost savings of $245,025.
Response: The technical write up for this alternative does not correctly describe the original design for the bridge layout in this location. The original design calls for the replacement of the existing substandard twin bridges with new twin bridges. The new bridges will accommodate three 12' lanes, 4' inside shoulders and 10' outside shoulders. The alternative proposes construction of the twin bridges using 6'-6" outside and 2' inside shoulders. All other geometry will be the same as in the original design. The shoulder widths for these bridges were selected in accordance with GDOT Bridge and Structures Design Policy Manual (DPM). Per section 2.9.1 of the Bridge and Structures DPM, shoulders for bridges in a multi-lane rural divided situation, the bridge width should be the pavement width + 14 feet (4 feet inside shoulders and 10 feet outside shoulders). The shoulder widths are based on AASHTO's "A Policy on Geometric Design of Highways and Streets", 2004 edition (Green Book), which states that in a rural divided arterial situation, "The width of usable outside shoulders should be at least 8-feet." (page 455). With a 10-foot outside shoulder on the bridge we will provide an 8-foot usable shoulder width since the 2-feet adjacent to the barrier is considered unusable. Reducing the width of the outside shoulders would not meet the minimum criteria for usable shoulder width across the bridge. For the inside shoulders, the Green Book states "On divided arterials with two lanes in each direction, a paved shoulder strip 4-feet wide should satisfy the needs for a shoulder within the median." (page 455). Reducing the width of the inside shoulders would not meet the minimum criteria for paved shoulder width within the median across the bridge. Providing less width on the shoulders would create a safety issue at this bridge location and would also violate AASHTO and GDOT Bridge and Structures DPM requirements. Per the DPM, page 2-62, "The shoulder widths are based on AASHTO clear zone requirements and exceptions to the widths are almost non-existent." Therefore, it is recommended to maintain the shoulder widths on the bridge as currently designed.

Alternative No. BRRR-4

Recommendation: Build one new 21' structure in between the two existing bridges, route traffic onto new bridge, construct new bridges north and south for a cost savings of $112,303.

Response: There are several issues with this alternative, most notably the theory of this alternative. Construction of a 21-foot wide bridge does not provide enough width to shift two lanes of traffic and provide enough width for barriers. Under this alternative, one direction of traffic would have to be split during construction; one lane on new bridge, one lane on existing bridge, which would create a safety concern. Further, with the profile adjustments planned in this location to provide minimum vertical clearance, the slopes for the fill sections leading up to the new structure will encroach onto the existing roadway, which would require a shift of the existing traffic outside, would require additional temporary pavement, and would require widening to the existing bridges to accommodate the traffic in its new location. This situation, a split directional traffic shift during construction in a location where a profile grade change is taking place will result in several issues including constructability concerns, safety issues, and will also cause an additional stage of construction. The constructability issues include slopes encroaching onto the existing roadway for the approaches leading to the new 21' structure, partial demolition of the existing bridge, and bolting a temporary barrier to the existing deck which may result in a barrier on an overhang situation. Safety issues include splitting directional traffic during staging, additional end treatments needed at directional splits, structural concerns with a partial bridge demolition, and barrier locations and treatments on a partial demolition bridge. Also, we disagree with the calculations of the cost calculations. The unit cost and area developed for the temporary bridge are questionable. The unit cost referenced 5 pay items which all were for 24' wide bridges of varying lengths. Assuming that the width and length in the pay item description and using the lump sum costs for each of these pay items in the latest item mean summaries, the average cost per square foot is $63.40/SF. Also, the area used to develop the unit cost was based on a 24' wide bridge to derive a unit cost per SF area. Therefore, when developing the area to evaluate the temporary bridge cost on this project, 24' wide should also be used. This would give us an area of 5400 SF, and the cost savings from the original estimate would become $342,360. This would result in a cost increase to the project of at least $117,179. Please see the attached documentation for further details. Also, it is anticipated that additional costs for traffic control in a split directional MOT plan would also be realized. For the reasons noted above and because this alternative would ultimately result in a cost increase of at least $117,179 if implemented, it is recommended that this alternative not be implemented and the bridges remain as designed.

Alternative No. BRCR-1

Recommendation: Use 8' and 2' shoulders for a cost savings of $122,760.

Response: The technical write up for this alternative does not correctly describe the original design for the bridge layout in this location. The original design calls for the replacement of the existing substandard twin bridges with new twin bridges. The new bridges will accommodate three 12' lanes, 4' inside shoulders and 10' outside shoulders. The alternative proposes construction of the twin bridges using 8' outside and 2' inside shoulders. All other geometry will be the same as in the original design. The shoulder widths for these bridges were selected in accordance with GDOT Bridge and Structures Design Policy Manual (DPM). Per section 2.9.1 of the Bridge and Structures DPM, shoulders for bridges in a multi-lane rural divided situation, the bridge width should be the pavement width + 14 feet (4 feet inside shoulders and 10 feet outside shoulders). The shoulder widths are based on AASHTO's "A Policy on

Geometric Design of Highways and Streets", 2004 edition (Green Book), which states that in a rural divided arterial situation, "The width of usable outside shoulders should be at least 8-feet." (page 455). With a 10-foot outside shoulder on the bridge we will provide an 8-foot usable shoulder width since the 2-feet adjacent to the barrier is considered unusable. Reducing the width of the outside shoulders would not meet the minimum criteria for usable shoulder width across the bridge. For the inside shoulders, the Green Book states "On divided arterials with two lanes in each direction, a paved shoulder strip 4-feet wide should satisfy the needs for a shoulder within the median." (page 455). Reducing the width of the inside shoulders would not meet the minimum criteria for paved shoulder width within the median across the bridge. Providing less width on the shoulders would create a safety issue at this bridge location and would also violate AASHTO and GDOT Bridge and Structures DPM requirements. Per the DPM, page 2-62, "The shoulder widths are based on AASHTO clear zone requirements and exceptions to the widths are almost non-existent." Therefore, it is recommended to maintain the shoulder widths on the bridge as currently designed.

Alternative No. BRCR-2
Recommendation: Build one new 33' structure in between the two existing bridges; route traffic onto new bridge; construct new bridges north and south for a cost savings of $63,246.
Response: This option was investigated as part of the design of the project, and it was determined that there was not enough width in between the two existing structures to build a portion of the bridge wide enough to use for maintenance of traffic. There is only 26.5 feet of width between the barriers of the existing bridges, which will not accommodate two lanes of traffic and barriers needed to divert traffic in a maintenance of traffic scheme. Therefore, it is recommended that this alternative not be implemented.

Alternative No. BRCR-3
Recommendation: Use 6'-6" and 2' shoulders for a cost savings of $168,795.
Response: The technical write up for this alternative does not correctly describe the original design for the bridge layout in this location. The original design calls for the replacement of the existing substandard twin bridges with new twin bridges. The new bridges will accommodate three 12' lanes, 4' inside shoulders and 10' outside shoulders. The alternative proposes construction of the twin bridges using 6'-6" outside and 2' inside shoulders. All other geometry will be the same as in the original design. The shoulder widths for these bridges were selected in accordance with GDOT Bridge and Structures Design Policy Manual (DPM). Per section 2.9.1 of the Bridge and Structures DPM, shoulders for bridges in a multi-lane rural divided situation, the bridge width should be the pavement width + 14 feet (4 feet inside shoulders and 10 feet outside shoulders). The shoulder widths are based on AASHTO's "A Policy on Geometric Design of Highways and Streets", 2004 edition (Green Book), which states that in a rural divided arterial situation, "The width of usable outside shoulders should be at least 8-feet." (page 455). With a 10-foot outside shoulder on the bridge we will provide an 8-foot usable shoulder width since the 2-feet adjacent to the barrier is considered unusable. Reducing the width of the outside shoulders would not meet the minimum criteria for usable shoulder width across the bridge. For the inside shoulders, the Green Book states "On divided arterials with two lanes in each direction, a paved shoulder strip 4-feet wide should satisfy the needs for a shoulder within the median." (page 455). Reducing the width of the inside shoulders would not meet the minimum criteria for paved shoulder width within the median across the bridge. Providing less width on the shoulders would create a safety issue at this bridge location and would also violate AASHTO and GDOT Bridge and Structures DPM requirements. Per the DPM, page 2-62, "The shoulder widths are based on AASHTO clear zone requirements and exceptions to the widths

are almost non-existent." Therefore, it is recommended to maintain the shoulder widths on the bridge as currently designed.

Alternative No. RD-2

Recommendation: Recycle existing pavement on US 41/SR 3 for a cost savings of $906,007.

Response: We will recycle the existing pavement where feasible. The profile was designed to accommodate an overlay of the existing pavement where grade corrections are not needed. An existing pavement evaluation has not been received to date to confirm that the existing pavement structure is suitable for overlay. Once confirmed that the existing pavement is sufficient for overlay, we will incorporate the overlay into the design. Also, in areas of profile grade adjustments where full depth pavement is required, it is routine for the contractor to remove the existing pavement and base for recycling in these situations.

PROJECT:	Georgia Department of Transportation				ALTERNATIVE NO.: **RD-10**		
	SR 20 Widening and Relocation STP-012-1(71); PI No. 621350; Bartow County						
DESCRIPTION:	VERTICALLY BIFRUCATE THE ROADWAY TO REDUCE EARTHWORK				SHEET NO.:		
CONSTRUCTION ITEM		**ORIGINAL ESTIMATE**			**PROPOSED ESTIMATE**		
ITEM	UNITS	NO. UNITS	COST/UNIT	TOTAL	NO. UNITS	COST/UNIT	TOTAL
BORROW REDUCTION							
Assume 1' differential							
assume fill area 75' in width							
assume this can be applied to 25% of the project							
1' * 75' * ((133+83 - 20+00) * 0.25) / 27CF/CY = 7905							
BORROW	CY	7905	$ 5.36	$ 42,370.80	0	$ 5.36	$ -
REDESIGN EFFORTS	LS				1	$ 15,000.00	$ 15,000.00
SUB-TOTAL				$ 42,370.80			$ 15,000.00
MARKUP AT	10%			$ 4,237.08			$ 1,500.00
TOTAL				$ 46,607.88			$ 16,500.00
ESTIMATED SAVINGS:							**$ 30,107.88**

PROJECT:	Georgia Department of Transportation	ALTERNATIVE NO.: RD-19
	SR 20 Widening and Relocation STP-012-1(71); PI No. 621350; Bartow County	
DESCRIPTION:	DELETE OUTSIDE CURB AND GUTTER	SHEET NO.:

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. UNITS	COST/UNIT	TOTAL	NO. UNITS	COST/UNIT	TOTAL
CONC SIDEWALK	SY	15300	$ 38.38	$ 587,214.00	0	$ 38.38	$ -
SOTRM DRAIN 18"	LF	8000	$ 41.05	$ 328,400.00	4800	$ 41.05	$ 197,040.00
STORM DRIAN 24"	LF	800	$ 52.59	$ 42,072.00	480	$ 52.59	$ 25,243.20
CATCH BASIN	EA	100	$ 2,326.85	$ 232,685.00	60	$ 2,326.85	$ 139,611.00
CATCH BASIN ADDL DEPTH	LF	20	$ 237.07	$ 4,741.40	12	$ 237.07	$ 2,844.84
DROP INLET	EA	45	$ 433.98	$ 19,529.10	27	$ 433.98	$ 11,717.46
DROP INLET ADDL DEPTH	LF	10	$ 277.64	$ 2,776.40	6	$ 277.64	$ 1,665.84
MANHOLE	EA	10	$ 65.32	$ 653.20	6	$ 65.32	$ 391.92
MANHOLD ADDL DEPTH	LF	10	$ 287.81	$ 2,878.10	6	$ 287.81	$ 1,726.86
12.5 mm SUPERPAVE	TN	0	$ 75.00	$ -	1370	$ 75.00	$ 102,750.00
19 mm SUPERPAVE	TN	0	$ 70.00	$ -	1827	$ 70.00	$ 127,890.00
25 mm SUPERPAVE	TN	0	$ 72.00	$ -	3654	$ 72.00	$ 263,088.00
GAB	TN	0	$ 21.39	$ -	11243	$ 21.39	$ 240,487.77
RIGHT-OF-WAY	LS	0	$ 385,000.00	$ -	3.65	$ 385,000.00	$ 1,405,250.00
UNCLASS EXCAV	CY	0	$ 5.00	$ -	42791	$ 5.00	$ 213,955.00
SUB-TOTAL				$ 1,220,949.20			$ 2,733,661.89
MARKUP AT	10%			$ 122,094.92			$ 273,366.19
TOTAL				$ 1,343,044.12			$ 3,007,028.08
ESTIMATED SAVINGS:							**$ (1,663,983.96)**

PROJECT:	Georgia Department of Transportation	ALTERNATIVE NO.: BRRR-2
	US 41 Interchange Improvements STP-0002-00(626); PI No. 0002626; Bartow County	
DESCRIPTION:	REDUCE LENGTH BY ELIMINATING END SPANS AND PROVIDING WALLED ABUTMENTS	SHEET NO.:

Several issues with the technical discussion and calculations for this alternative need to be addressed:

Temporary bridge of reduced length - We disagree with this statement. The temporary bridge will span the existing railroad and connect the existing terrain on opposite sides. Using MSE walls will not reduce the span length required for the temporary bridge. Therefore, this cost savings documented will not be realized.

Area of reduced bridge surface is calculated incorrectly. Actual values are shown below:
Original bridge surface (LT): 225' x 65.25' = 14682 SF
Original bridge surface (RT): 225' x 53.25' = 11982 SF
Alternative bridge surface (LT): 100' x 65.25' = 6525 SF
Alternative bridge surface (RT): 100' x 53.25' = 5325 SF
Reduced bridge surface (LT): 14682-6525 = 8157 SF
Reduced bridge surface (RT): 11982-5325 = 6657 SF
Total Reduced bridge surface : 8157+6657 = 14814 SF

We also applied the MSE Wall Geometry to the database to give actual dimensions of the Wall. The following are those dimensions:
MSE Wall: 160' long in front of abutments; 30' high; 6' full height to wrap around abutments, then tapers at 2:1 back 60'
MSE Wall Area: [(30'*172') + (30' * 60' * 0.5) + (30' * 60' * 0.5)] * 2 sides = 13920 SF
Coping for MSE Wall: equal to top perimeter of MSE Wall: (160+6+6+60+60)*2 sides = 584 LF
Barrier for MSE Wall: equal to length parallel to mainline: (6+60+6+60) * 2 sides = 264 LF
MSE Backfill: Special backfill for MSE Wall placed a distance of 0.7 * wall height behind MSE Wall
{(160*30*(0.7*30))+((45*22.5*0.5*(.7*22.5))+((45*22.5*0.5*(.7*22.5))] * 2 sides / 27CF/CY) = 8647 CY

MSE Wall Unit costs: The unit costs we used for the MSE Wall costs were from bid tabs for a MSE Wall situation similar to this project. Project No. CSSTP-0006-00(952); PI No. 0006952; Fulton County was let in June 07 and is similar to the Alt proposed - MSE wall abutments over CSX Railroad, so we feel that the bid price unit costs are comprable. Therefore use the following:
MSE Wall: $78/SF; Coping: $72/LF; Barrier: $250/LF; Additional MSE Backfill: $33/CY

Additional pavement for reduction in bridge length: LT - 121 * 56.5 = 760 SY; RT - 121 * 44.5 = 600 SY: Total Area = 1360 SY
12.5 mm Superpave: 165#/SY * 1360 SY / 2000 #/Ton = 115 tons
19 mm Superpave: 330#/SY * 1360 SY / 2000 #/Ton = 225 tons
25 mm Superpave: 880#/SY * 1360 SY / 2000 #/Ton = 600 tons
GAB: (121 * (56.5 + 2)+(44.5 + 2) * 12/12)/27CF/CY = 470 CY * 2 ton/CY = 940 ton

SUB-TOTAL		$ 3,060,310.00		$ 3,303,655.60
MARKUP AT 10%		$ 306,031.00		$ 330,365.56
TOTAL		$ 3,366,341.00		$ 3,634,021.16
ESTIMATED SAVINGS:				**$ (267,680.16)**

PROJECT:	Georgia Department of Transportation				ALTERNATIVE NO.: BRRR-2		
	US 41 Interchange Improvements STP-0002-00(626); PI No. 0002626; Bartow County						
DESCRIPTION:	REDUCE LENGTH BY ELIMINATING END SPANS AND PROVIDING WALLED ABUTMENTS				SHEET NO.:		
CONSTRUCTION ITEM		**ORIGINAL ESTIMATE**			**PROPOSED ESTIMATE**		
ITEM	UNITS	NO. UNITS	COST/UNIT	TOTAL	NO. UNITS	COST/UNIT	TOTAL
BRIDGE	SF	26663	$ 95.00	$ 2,532,985.00	11850	$ 95.00	$ 1,125,750.00
TEMP BRIDGE	SF	7031	$ 75.00	$ 527,325.00	7031	$ 75.00	$ 527,325.00
MSE WALLS	SF	0	$ 78.00	$ -	13920	$ 78.00	$ 1,085,760.00
COPING	LF	0	$ 72.00	$ -	584	$ 72.00	$ 42,048.00
BARRIER	LF	0	$ 250.00	$ -	264	$ 250.00	$ 66,000.00
MSE BACKFILL	CY	0	$ 30.00	$ -	8647	$ 33.00	$ 285,351.00
12.5 mm SUPERPAVE	TON	0	$ 75.00	$ -	115	$ 75.00	$ 8,625.00
19 mm SUPERPAVE	TON	0	$ 70.00	$ -	225	$ 70.00	$ 15,750.00
25 mm SUPERPAVE	TON	0	$ 72.00	$ -	600	$ 72.00	$ 43,200.00
GAB	TON	0	$ 21.39	$ -	940	$ 21.39	$ 20,106.60
				$ -			$ -
REDESIGN COSTS	LS	0		$ -	1	$ 58,740.00	$ 58,740.00
WFI COSTS	LS	0		$ -	1	$ 25,000.00	$ 25,000.00
				$ -			$ -
				$ -			$ -
				$ -			$ -
				$ -			$ -
				$ -			$ -
				$ -			$ -
				$ -			$ -
				$ -			$ -
				$ -			$ -
				$ -			$ -
SUB-TOTAL				$ 3,060,310.00			$ 3,303,655.60
MARKUP AT	10%			$ 306,031.00			$ 330,365.56
TOTAL				$ 3,366,341.00			$ 3,634,021.16
ESTIMATED SAVINGS:							**$ (267,680.16)**

TABULATION OF BIDS

CALL ORDER : 018 CONTRACT ID : B12715-07-000-1 COUNTIES : FULTON
LETTING DATE : 06/22/07 DISTRICT : 77703

LINE NO / ITEM CODE / ALT ITEM DESCRIPTION	QUANTITY		(1) 2PI780 PITTMAN CONSTRUCTION COMPAN UNIT PRICE	AMOUNT	(2) 2AR060 ARCHER WESTERN CONTRACTORS, UNIT PRICE	AMOUNT	(3) 2MA850 C. W. MATTHEWS CONTRACTING CO., UNIT PRICE	AMOUNT
640 500-3107 CLASS A CONCRETE, RETAINING WALL	22.000	CY	750.00000	16500.00	1325.00000	29150.00	737.11000	16216.42
645 511-1000 BAR REINF STEEL	3062.000	LB	2.00000	6124.00	0.67000	2051.54	1.46000	4470.52
650 627-1000 MSE WALL FACE, 0 - 10 FT HT, WALL NO -	269.000	SF	78.00000	20982.00	38.10000	10248.90	67.61000	18187.09
655 627-1000 MSE WALL FACE, 0 - 10 FT HT, WALL NO -	93.000	SF	73.50000	6835.50	38.10000	3543.30	65.80000	6119.40
660 627-1010 MSE WALL FACE, 10 - 20 FT HT, WALL NO - 2	1044.000	SF	78.00000	81432.00	41.50000	43326.00	67.61000	70584.84
665 627-1010 MSE WALL FACE, 10 - 20 FT HT, WALL NO - 3	372.000	SF	73.50000	27342.00	41.50000	15438.00	65.80000	24477.60
670 627-1020 MSE WALL FACE, 20 - 30 FT HT, WALL NO - 2	1708.000	SF	78.00000	133224.00	62.50000	106750.00	67.61000	115477.88
675 627-1020 MSE WALL FACE, 20 - 30 FT HT, WALL NO - 3	2926.000	SF	73.50000	215061.00	62.50000	182875.00	65.80000	192530.80
680 627-1030 MSE WALL FACE, GTR THAN 30 FT HT, WALL NO - 2	4522.000	SF	78.00000	352716.00	66.75000	301843.50	67.61000	305732.42
685 627-1100 COPING A, WALL NO - 2	323.000	LF	72.00000	23256.00	90.00000	29070.00	58.77000	18982.71
690 627-1100 COPING A, WALL NO - 3	148.000	LF	72.00000	10656.00	90.00000	13320.00	58.77000	8697.96
695 627-1180 ADDITIONAL MSE BACKFILL	331.000	CY	33.00000	10923.00	42.50000	14067.50	33.00000	10923.00
SECTION TOTALS			$	905,051.50	$	751,683.74	$	792,400.64
SECTION 0003 BRIDGE NO 1 - OVER NORFOLK SOUTHERN RAILROAD								
700 211-0200 BRIDGE EXCAVATION, GRADE SEPARATION	100.000	CY	30.00000	3000.00	100.00000	10000.00	22.13000	2213.00
705 500-0100 GROOVED CONCRETE	1849.000	SY	5.25000	9707.25	1.50000	2773.50	6.41000	11852.09
710 500-1006 SUPERSTR CONCRETE, CL AA, BR NO - 1	762.000	LS	885000.00000	885000.00	640000.00000	640000.00	504019.28000	504019.28
715 500-3002 CLASS AA CONCRETE	278.000	CY	820.00000	227960.00	1180.00000	328040.00	702.67000	195342.26

PROJECT:	Georgia Department of Transportation				ALTERNATIVE NO.: BRRR-4		
	US 41 Interchange Improvements STP-0002-00(626); PI No. 0002626; Bartow County						
DESCRIPTION:	BUILD ONE NEW STRUCTURE (21' WIDER IN THE MIDDLE) TO FACILITATE CONSTRUCTION IN-LIEU OF USING TEMP. BRIDGES				SHEET NO.:		
CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. UNITS	COST/UNIT	TOTAL	NO. UNITS	COST/UNIT	TOTAL
Temporary Bridge Unit Cost Determination							
Using items no. 541-5419, 5420, 5428, 5438 & 5470 as noted and using summary from 1-06 to 12-06 to determine unit cost							
Use the length and width in the pay item description to determine the area of the temporary bridge to derive a SF cost from the LS item bid							
		Length	Width	Area	LS bid	$/SF	Use
541-5419: DETOUR BRIDGE 24'x95'		95	$ 24.00	$ 2,280.00	276009	$ 121.06	$ 1.00
541-5420: DETOUR BRIDGE 24'x100'		100	$ 24.00	$ 2,400.00	109250	$ 45.52	$ 1.00
541-5428: DETOUR BRIDGE 24'x140'		140	$ 24.00	$ 3,360.00	173663	$ 51.69	$ 5.00
541-5438: DETOUR BRIDGE 24'x200'		200	$ 24.00	$ 4,800.00	182517	$ 38.02	$ 3.00
541-5470: DETOUR BRIDGE 24'x360'		360	$ 24.00	$ 8,640.00	620500	$ 71.82	$ 1.00
Average				$ 21,480.00	1361939	$ 63.40	
Weighted Average				$ 44,520.00	$ 2,421,625.00	$ 54.39	
BRIDGE	SF	0	$ 95.00	$ -	4725	$ 95.00	$ 448,875.00
TEMP BRIDGE	SF	5400	$ 63.40	$ 342,360.00	0	$ 63.40	$ -
	SUB-TOTAL			$ 342,360.00			$ 448,886.00
MARKUP AT	10%			$ 34,236.00			$ 44,888.60
	TOTAL			$ 376,596.00			$ 493,774.60
ESTIMATED SAVINGS:							**$ (117,178.60)**

ITEM CODE	ITEM DESCRIPTION	QUANTITY	USE	UM	MEAN	WTD AVG
20-2224	PILING, PSC, 24 IN SQ	2110.00	2	LF	89.00	80.44
20-3214	TEST PILE, PSC, 14 IN SQ	20.00	12	EA	5745.39	5682.23
20-3216	TEST PILE, PSC, 16 IN SQ	44.00	12	EA	7133.33	7292.61
20-3218	TEST PILE, PSC, 18 IN SQ	13.00	8	EA	8051.58	8417.32
20-3220	TEST PILE, PSC, 20 IN SQ	4.00	2	EA	7750.00	6875.00
20-3224	TEST PILE, PSC, 24 IN SQ	4.00	2	EA	7635.00	8452.50
20-4104	LOAD TEST, STEEL H, HP 10 X 42	10.00	9	EA	173.48	156.13
20-4125	LOAD TEST, STEEL H, HP 12 X 53	31.00	15	EA	0.73	0.42
20-4147	LOAD TEST, STEEL H, HP 14 X 73	34.00	22	EA	98.70	63.95
20-4151	LOAD TEST, STEEL H, HP 14 X 89	9.00	8	EA	75.78	67.47
20-4173	LOAD TEST, STEEL H, HP 14 X 102	3.00	2	EA	1.00	1.00
20-4179	LOAD TEST, STEEL H, HP 14 X 117	2.00	2	EA	1.00	1.00
20-4214	LOAD TEST, PSC, 14 IN SQ	26.00	13	EA	462.39	1385.35
20-4216	LOAD TEST, PSC, 16 IN SQ	24.00	12	EA	500.76	1500.59
20-4218	LOAD TEST, PSC, 18 IN SQ	14.00	8	EA	750.75	1714.85
20-4220	LOAD TEST, PSC, 20 IN SQ	3.00	2	EA	3000.50	4000.33
20-4224	LOAD TEST, PSC, 24 IN SQ	4.00	2	EA	3000.51	3000.51
20-4316	LOAD TEST, METAL SHELL, 16 IN OD	2.00	2	EA	1.07	1.07
20-4318	LOAD TEST, METAL SHELL, 18 IN OD	2.00	2	EA	1.07	1.07
20-5000	PILOT HOLES	1045.00	5	LF	576.93	314.69
20-9000	COMPOSITE MARINE PILING -	7628.00	2	LF	140.00	142.02
21-1000	PATCHING CONCRETE BRIDGE DECK	3225.00	6	SF	69.48	31.26
21-3000	PATCHING CONCRETE BRIDGE	90.00	1	SF	80.00	80.00
22-1000	SHORING	2.00	2	LS	121892.50	121892.50
24-0010	DRILLED CAISSON -	55781.00	8	LF	1257.47	926.45
24-0300	LOAD TEST, CAISSON -	1.00	1	EA	320000.00	320000.00
24-0350	TEST CORING	1150.00	2	LF	294.00	296.34
24-0360	LOAD TEST, CAISSON, 60 IN	1.00	1	EA	340000.00	340000.00
24-0500	DEMONSTRATION TEST, CAISSON -	2.00	2	EA	415000.00	415000.00
25-1000	COFFERDAM	58.00	12	EA	18128.77	19676.50
27-0010	STEEL KEEPER RING AND WASHER RETROFIT	288.00	1	EA	5320.00	5320.00
27-0020	PROTECTIVE BOOT RETROFIT	288.00	1	EA	2100.00	2100.00
27-0030	HEAT STRAIGHTENING OF STEEL ANCHOR PIPE	36.00	1	EA	3625.00	3625.00
27-0040	STEEL ANCHOR PIPE CRACK REPAIR	6.00	1	EA	7500.00	7500.00
27-0050	CABLE STAY PROTECTIVE TAPE REPAIR	120.00	1	LF	480.00	480.00
27-0060	TIE DOWN BOOT REPAIR	4.00	1	EA	7100.00	7100.00
27-0070	MISCELLANEOUS CONCRETE REPAIR	160.00	1	SF	675.00	675.00
27-0080	MISCELLANEOUS ELECTRICAL REPAIR	1.00	1	LS	72000.00	72000.00
28-0500	EPOXY PRESSURE INJECTION OF CONCRETE CRACKS, BR NO -	2.00	2	LS	25000.00	25000.00
28-0750	EPOXY SEALING OF CONCRETE CRACKS	26222.00	6	LF	16.54	5.51
29-1000	NAVIGATION LIGHTING, BR NO -	4.00	4	LS	19650.00	19650.00
30-0105	WATERPROOFING	46.00	2	SY	74.50	65.71
31-1000	DAMPPROOFING	648.00	1	SY	11.00	11.00
35-1005	PAINT EXIST STEEL STRUCTURE, STA NO -	9.00	9	LS	239130.97	239130.97
35-1105	PAINT EXIST STEEL STRUCTURE, BR ID -	8.00	8	LS	182175.00	182175.00
40-1101	REMOVAL OF EXISTING BR, STA NO -	53.00	53	LS	125542.28	125542.28
40-1102	REMOVAL OF EXISTING BR, BR NO -	15.00	15	LS	221542.24	221542.24
40-1201	REMOVAL OF PARTS OF EXISTING BR, STA NO -	10.00	10	LS	190635.89	190635.89
40-1202	REMOVAL OF PARTS OF EXISTING BRIDGE, BR NO -	33.00	33	LS	339008.09	339008.09
41-0001	DETOUR BRIDGE -	5.00	5	LS	497000.00	497000.00
41-5416	DETOUR BRIDGE, 24 FT X 80 FT, STA -	3.00	3	LS	84000.00	84000.00
41-5419	DETOUR BRIDGE, 24 FT X 95 FT, STA -	1.00	1	LS	276009.78	276009.78

ITEM CODE	ITEM DESCRIPTION	QUANTITY	USE	UM	MEAN	WTD AVG
541-5420	DETOUR BRIDGE, 24 FT X 100 FT, STA -	1.00	1	LS	109250.00	109250.00
541-5424	DETOUR BRIDGE, 24 FT X 120 FT, STA -	3.00	3	LS	126854.91	126854.91
541-5425	DETOUR BRIDGE, 24 FT X 125 FT, STA -	1.00	1	LS	120000.00	120000.00
541-5428	DETOUR BRIDGE, 24 FT X 140 FT, STA -	5.00	5	LS	173663.99	173663.99
541-5438	DETOUR BRIDGE, 24 FT X 200 FT, STA -	3.00	3	LS	182517.50	182517.50
541-5446	DETOUR BRIDGE, 24 FT X 240 FT, STA -	1.00	1	LS	192000.00	192000.00
544-1000	DECK DRAIN SYSTEM, BR NO -	3.00	3	LS	53653.38	53653.38
547-2012	PILE ENCASEMENT, 12 IN PILE	465.00	4	LF	176.24	190.39
547-2014	PILE ENCASEMENT, 14 IN PILE	1389.00	12	LF	166.99	167.33
547-2018	PILE ENCASEMENT, 18 IN PILE	3852.00	1	LF	320.00	320.00
550-1120	STORM DRAIN PIPE, 12 IN, H 1-10	2100.00	2	LF	34.07	43.05
550-1150	STORM DRAIN PIPE, 15 IN, H 1-10	9579.00	12	LF	66.92	43.94
550-1180	STORM DRAIN PIPE, 18 IN, H 1-10	273003.00	63	LF	53.59	41.56
550-1181	STORM DRAIN PIPE, 18 IN, H 10-15	2598.00	12	LF	47.48	37.28
550-1182	STORM DRAIN PIPE, 18 IN, H 15-20	481.00	3	LF	67.85	50.47
550-1183	STORM DRAIN PIPE, 18 IN, H 20-25	509.00	3	LF	72.96	45.99
550-1240	STORM DRAIN PIPE, 24 IN, H 1-10	48156.00	48	LF	60.02	53.56
550-1241	STORM DRAIN PIPE, 24 IN, H 10-15	1569.00	8	LF	57.78	51.97
550-1242	STORM DRAIN PIPE, 24 IN, H 15-20	260.00	3	LF	62.25	59.32
550-1243	STORM DRAIN PIPE, 24 IN, H 20-25	479.00	4	LF	71.77	68.32
550-1244	STORM DRAIN PIPE, 24 IN, H 25-30	70.00	1	LF	119.25	119.25
550-1300	STORM DRAIN PIPE, 30 IN, H 1-10	12303.00	38	LF	74.43	67.67
550-1301	STORM DRAIN PIPE, 30 IN, H 10-15	2202.00	7	LF	74.08	73.17
550-1302	STORM DRAIN PIPE, 30 IN, H 15-20	570.00	3	LF	64.13	65.46
550-1303	STORM DRAIN PIPE, 30 IN, H 20-25	171.00	2	LF	77.82	74.30
550-1304	STORM DRAIN PIPE, 30 IN, H 25-30	260.00	1	LF	72.00	72.00
550-1307	STORM DRAIN PIPE, 30 IN, H 40-50	364.00	1	LF	74.00	74.00
550-1309	STORM DRAIN PIPE, 30 IN, H 60-70	372.00	1	LF	69.29	69.29
550-1360	STORM DRAIN PIPE, 36 IN, H 1-10	9452.00	29	LF	90.23	79.72
550-1361	STORM DRAIN PIPE, 36 IN, H 10-15	1221.00	6	LF	88.08	99.51
550-1362	STORM DRAIN PIPE, 36 IN, H 15-20	398.00	3	LF	91.48	100.14
550-1363	STORM DRAIN PIPE, 36 IN, H 20-25	128.00	1	LF	333.00	333.00
550-1364	STORM DRAIN PIPE, 36 IN, H 25-30	204.00	1	LF	110.00	110.00
550-1366	STORM DRAIN PIPE, 36 IN, H 35-40	176.00	1	LF	76.40	76.40
550-1420	STORM DRAIN PIPE, 42 IN, H 1-10	3365.00	15	LF	115.80	118.40
550-1421	STORM DRAIN PIPE, 42 IN, H 10-15	385.00	4	LF	110.18	94.38
550-1422	STORM DRAIN PIPE, 42 IN, H 15-20	200.00	1	LF	92.20	92.20
550-1423	STORM DRAIN PIPE, 42 IN, H 20-25	248.00	1	LF	100.00	100.00
550-1480	STORM DRAIN PIPE, 48 IN, H 1-10	3082.00	11	LF	140.70	130.17
550-1481	STORM DRAIN PIPE, 48 IN, H 10-15	918.00	5	LF	140.16	121.19
550-1482	STORM DRAIN PIPE, 48 IN, H 15-20	260.00	1	LF	112.00	112.00
550-1484	STORM DRAIN PIPE, 48 IN, H 25-30	250.00	2	LF	185.00	188.00
550-1485	STORM DRAIN PIPE, 48 IN, H 30-35	280.00	1	LF	123.00	123.00
550-1540	STORM DRAIN PIPE, 54 IN, H 1-10	822.00	4	LF	167.56	118.03
550-1543	STORM DRAIN PIPE, 54 IN, H 20-25	232.00	1	LF	143.00	143.00
550-1600	STORM DRAIN PIPE, 60 IN, H 1-10	1121.00	2	LF	170.23	131.95
550-1601	STORM DRAIN PIPE, 60 IN, H 10-15	240.00	1	LF	144.00	144.00
550-1603	STORM DRAIN PIPE, 60 IN, H 20-25	260.00	1	LF	176.00	176.00
550-1605	STORM DRAIN PIPE, 60 IN, H 30-35	50.00	1	LF	292.00	292.00
550-1607	STORM DRAIN PIPE, 60 IN, H 40-50	732.00	1	LF	200.00	200.00
550-1720	STORM DRAIN PIPE, 72 IN, H 1-10	88.00	1	LF	265.00	265.00
550-1900	STORM DRAIN PIPE, 90 IN, H 1-10	168.00	1	LF	540.00	540.00