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HNTB

To: Staci Nester
Richard L. Johnson, PE

From: Luis Diaz, PE

Date: April 14, 2015

Subject: Interstate 4 from 1 Mile East of State Road 434 to Volusia County Line Value Engineering Study Recommendation Dispositions

FM: 242592-4

Dear Mr. Johnson,

Please see below for our management action dispositions for the recommendations found on Table 1.4-1 of the Value Engineering Study Report for I-4 from 1 Mile East of State Road 434 to Volusia County Line.

Recommendation 1: Provide an additional floodplain compensation alternative in Basin 300 as FPC 300-A is impacted by a billboard

Not Accepted. The third floodplain compensation alternative in Basin 300 is FPC 300-C. FPC 300-C is an option that was recommended by the Value Engineering Study due to the impacts to an existing billboard within the FPC 300-A parcel. The potential pond site is located within the floodplain of Lake Grace, just east of Pond 300. After receiving additional topographic survey for the site, it was determined that it is not a feasible option. The existing ground elevation for the majority of the potential site is lower than the floodplain elevation of 67.00 ft NAVD. After this alternative was eliminated, FPC 300-A was reconfigured around the existing billboard as not to impact it.

Recommendation 2: Increase the size of the Pond 303-A1 and incorporate the entire lot that is for sale

Not Accepted. This pond site can be shown to take the entire property that is for sale, which would result in a joint use pond or two ponds under FDOT control. This pond alternative (Pond 303-A1) could be the preferred option if the billboard cannot be relocated on the other pond alternative site (Pond 303-B2).

Recommendation 3: Make Pond 303-B2 the preferred pond by relocating the billboard within the site

Accepted. Currently, central office is evaluating the billboard on this site for relocation. If the billboard can be relocated on this site, this pond will be the preferred alternative (Pond 303-B2).

Recommendation 4: Maintain the design variation in the Ultimate section though the entire corridor

Accepted. The design variation will be used throughout the section.

Recommendation 5: Consider concrete express lanes

Accepted. The use of concrete pavement will be considered for the construction of the express lanes.

Recommendation 6: Relocate the sidewalk off of back of curb at the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations

Accepted. Costly utility relocation could be avoided by moving the sidewalk back outside of the right of way.

Recommendation 7: Don't build the 6-ft. sidewalk on the south side of the bridge at EE Williamson Road

Not Accepted. The EE Williamson Road Bridge will be replaced and sidewalks will be provided on both sides to maintain consistency with the approaches on each side of the bridge.

Recommendation 8: Add direct connect ramps to the express lanes at EE Williamson

Not Accepted. Coordination with Seminole County occurred, as well as a public meeting to local residents, and this idea was dismissed due to significant opposition. A traffic study was also performed to evaluate the operations, and the results were there was little benefit to the operations of I-4.

Recommendation 9: Modify the eastbound Lake Mary Blvd. to eastbound I-4 ramp to begin before the interchange signal on the west side of I-4

Not Accepted. Concerned that everyone heading for I-4 will have limited room or distance to get to the ramp.

Recommendation 11: Provide a grade separated intersection at Lake Mary Blvd & Primera Blvd/Lake Emma Rd.

Not Accepted. A grade separated intersection at this location would cause numerous access issues to the east of the intersection. In the current year and the future design year, traffic does not back up onto the I-4 mainline.

Recommendation 12: Corridor improvements on Lake Mary Blvd. from the I-4 interchange to Rinehart Rd.

Accepted. The traffic modelers are looking at what kind of improvements can be made throughout the corridor.

Recommendation 14: Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary Blvd.

Not accepted. It may be possible to tunnel under the ramps, but then the sidewalk would need to get up and over I-4 all while still meeting ADA requirements.

Recommendation 17: Eliminate the right turn lane at International Parkway and CR 46A because the outside lane becomes a right turn lane at the intersection

Accepted. The additional right turn lane at International Parkway will be removed.

Recommendation 18: Start the second eastbound left to eastbound I-4 after the westbound I-4 on ramp so the shift is under and before the overpass

Accepted. We will revise the amount of turn lane storage and model it to make sure there are no issues.

Recommendation 21: Modify the 17-92 Alternative 1 to better accommodate traffic by modifying Alt 1 to taper the US 17-92 SB to I-4 WB to eliminate the hard right and to add a third lane to Monroe Blvd and to add dual rights with stop control.

Accepted. The addition of the SB free flow ramp to WB I-4 provide some relief to SB 17/92, and the addition of the third lane and stop control at the intersection of Monroe Rd will add relief to motorist heading WB on 17/92 as head south on Monroe Rd to get to I-4 EB.

Recommendation 22: Consider a skewed 4-leg Orange Ave. intersection that eliminates the left turn off of Monroe Road as a straight movement through the skewed intersection.

Not accepted. This was modeled to evaluate the operations, and because of the additional leg added to the intersection, at an at-grade railroad crossing, it was determined that there would not be an operational benefit.

Recommendation 30: Construct a tight urban diamond interchange at the US 17/92 & I-4 Interchange.

Accepted. The US 17-92 interchange will be modified to be a TUDI.

In summary, the design team accepts 9 recommendations, does not accept 8 recommendations.

Thank You,

Luis Diaz, P.E.
Project Manager

Value Engineering
For Transportation Improvements

Interstate 4 from 1 Mile East of State Road 434 to Volusia County Line

Value Engineering Study Draft Report

FM Number:	242592-4
Fed. Aid Project:	Yes
Project Description:	I-4 from 1 Mile East of State Road 434 to Volusia County Line
Study Dates:	March 31 – April 4, 2014

Project Development Phase									**Study Identification Number**		
PD&E	Design	Other							VE Item No.		
HNTB, Inc.									Yr.	Dist.	No.
									14	005	06

This study has been performed in accordance with current applicable FDOT Value Engineering Procedures and Techniques

Richard L. Johnson, CVS No. 20030201, PE No. 38681

Date: March 18, 2014

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EXECUTIVE SUMMARY 1

1.1 INTRODUCTION

A Value Engineering (VE) Study was held, during March 31 – April 4, 2014 using the VE methodology to improve the Interstate 4 (I-4) from One Mile East of State Road 434 to Volusia County Line project. The VE study analyzed value improvements for improving the interchanges, and improving mobility within the region. I-4 serves as the primary corridor in the movement of people and freight between major population, employment and activity centers in the Central Florida region. When the entire Interstate was fully opened in the early 1960's, it was designed to serve intrastate and interstate travel by providing a critical link between the east and west coasts of Central Florida. Although this role continues to be a crucial transportation function of I-4, the highway also serves large volumes of local and commuter traffic with shorter trip distances. Since I-4 is the only north-south limited access facility that is centrally located between the predominant employment centers and the major suburbs to the north, it has become the primary commuting corridor in the Central Florida metropolitan area.

FDOT is proposing to reconstruct and widen I-4 as part of the I-4 Ultimate concept. This involves the build-out of I-4 to its ultimate condition through Central Florida, including segments in Polk, Osceola, Orange, Seminole, and Volusia Counties. The concept design proposes the addition of two (2) new express lanes in each direction, resulting in a total of ten (10) dedicated lanes. The study area in this section from east of SR 434 to east of US 17/92 includes the interchanges at Lake Mary Boulevard, CR 46A, SR 417/Wekiva Parkway, SR 46 and US 17/92 and provides for the required stormwater treatment with eighteen (18) pond sites along the corridor. The typical section will ensure that the design will be contained within the existing right-of-way with the exception of the pond sites and interchange improvements.

The project limits are within an approximate ten (10) mile segment of I-4 which extends from east of SR 434 to east of US 17/92, from milepost 4.050 to 14.221 in Seminole County (herein referred to as I-4, Segment 3) and as shown in Figure 1. Although, the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 3. The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. The existing roadway typical section generally has three 12-foot travel lanes with a 10-foot paved outside shoulder, and a 10-foot paved inside shoulder in each direction separated by a center median of variable width (40 ft. – 164 ft.). The existing right of way width varies, but is typically 300 feet. The typical section in the proposed condition will be three, 12-foot general use travel lanes with 12-foot inside shoulder and 12-foot outside shoulder, two 12-foot express lanes with 6-foot inside shoulder and 10-foot outside shoulder and a barrier wall separating the express lanes from the travel lanes. The proposed right of way width is 300 feet minimum.

The project location may be found on the **Figure 1.1 - 1 Project Location Map**. The typical sections and segment drawings for the roadway alternatives were shown on the concept drawings included in the PD&E documents. By building this project, the Florida Department of Transportation (FDOT) will improve mobility in the region and the level of service for the ultimate I-4 Express Lanes design throughout the corridor. The project will provide improved level of service and operations in the area.

Table 1.1-1 Preliminary Cost Estimate on page 3 shows the preliminary estimated construction costs for the improvements for the alternative being studied. The proposed improvements are to enhance regional mobility and level of service in the design year.

1.2 GOALS AND OBJECTIVES

The objective of the study was to identify opportunities and recommend concepts that may improve value in terms of capital cost, constructability, maintenance of traffic, and the basic functional requirements of the project. This report documents the value engineering analysis performed to support decisions related to the planned project alternatives. Additionally, it summarizes existing conditions, documents the purpose and need for the project as well as documents other engineering, environmental, and social data related to preliminary Project Development & Environment (PD&E) concepts.

Although several issues and pre-existing conditions were stated during the initial briefing at the beginning of the VE study, the VE team had three major project constraints:

1. SunRail at the Orange Boulevard – Monroe Road intersection
2. Omit the Wekiva Parkway/SR 417 Interchange
3. No impacts to the Ford Dealership right of way

Figure 1.1 – 1
Project Location Map

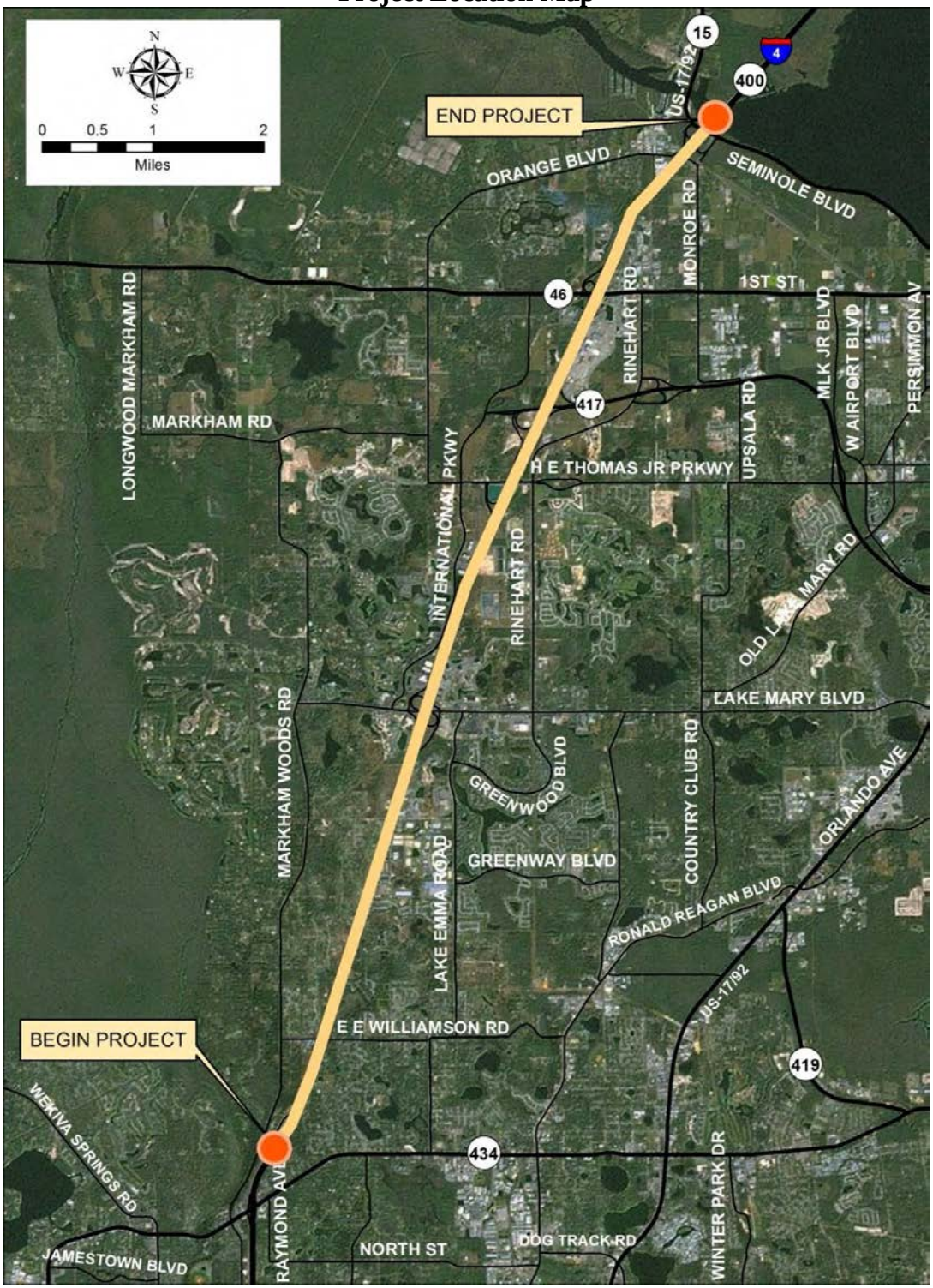


Table 1.1 – 1

Preliminary Cost Estimate
PD&E Alternate 1

Item	Description	Unit	Unit Cost	Total Cost
0110 1 1	Clearing & Grubbing	AC	$ 7,724	$9,616,893
0110 3	Removal of Existing Structure	SF	$ 24	$5,118,033
160 4	Stabilization Type B LBR 40	SY	$ 2.90	$3,808,683
285 706	Base optional (base group 6) ML	SY	$ 13.69	$6,161,025
285 712	Base optional (base group 12) ML	SY	$ 14.02	$12,103,474
334 1 12	Superpave asphaltic concrete (Traff B)	TN	$ 87.28	$4,320,728
334 1 14	Superpave asphaltic concrete (Traff D)	TN	$ 87.21	$12,422,593
334 1 24	Superpave asphaltic concrete (Traff D-PG 76-22)	TN	$ 89.64	$8,512,489
337 7 22	Asphaltic Conc friction course (FC-5) (PG 76-22)	TN	$ 117.20	$4,173,627
521 1	Barrier Wall	LF	$ 113	$26,890,158
	Thermoplastic, White, Striping	NM	$ 3,178	$502,000
	Vehicle Impact Attenuator	EA	$ 18,327.63	$274,914
	Fencing	LF	$ 10.00	$1,326,940
	Embankment	CY	$ 5.94	$7,548,605
	MSE wall	SF	$ 34.00	$16,435,397
	Bridges	SF	$ 160.00	$99,627,360
	Subtotal Cost	LS		$218,842,918
	Compensable Utility Relocation (5%)	LS		$11,096,131
	Mobilization (10%)	LS		$22,192,262
	Maintenance of Traffic (MOT) (20%)	LS		$44,384,524
	Lighting (5%)	LS		$11,096,131
	Signage (5%)	LS		$11,096,131
	Drainage (20%)	LS		$44,384,524
	ITS (5%)	LS		$11,096,131
	Erosion Control (1%)	LS		$2,219,226
	Construction Subtotal	LS		$376,407,977
	Contingency (20%)	LS		$75,281,595
	Subtotal			$451,689,572
	Right of Way	LS		$9,700,000
	Grand Total			**$ 461,389,572**

Reference: Preliminary Cost Estimate prepared by HNTB, dated March 20, 2014

The basic project functions are to reconstruct the interchange, improve connectivity and improve traffic operations within the regional transportation system. As shown in **Section 5**, the Functional Analysis System Techniques (FAST) Diagram illustrates the functions as determined by the VE team.

1.3 RESULTS OF THE STUDY

The VE team generated 30 ideas and five were determined to be design suggestions during the Creative Ideas phase of the VE Job Plan. The ideas were then evaluated based on the evaluation criteria for this project. The object of this evaluation was to identify ideas with the most promise to achieve savings while preserving functions or improving operations.

The team began the evaluation process of scoring the PD&E documents concept and the individual creative ideas. During this process it was agreed that we had various ideas, but certain ideas having the greatest potential value improvement were carried forward for further development. The remaining ideas either became design suggestions (many specific to a particular component within the project) or were eliminated as duplicate, not appropriate or improbable for acceptance. The VE team ultimately categorized nine ideas as recommendations for the designers to consider. The developed ideas maintain the required functions while improving overall costs, constructability, minimizing time, minimizing utility conflicts and right-of-way issues, minimizing environmental impacts, as well as addressing regional connectivity issues, aesthetics and drainage. The ideas and how they rated on a weighted scoring evaluation are listed in the table in **Section 6**. Those ideas that were eliminated are shown with strikeout font.

The design suggestions identified by the VE team are shown in **Section 6**. The VE team presents design suggestions for FDOT's consideration. No specific action is normally required to accept or not accept the suggestions, though it is often helpful, for documentation purposes, to formally list those suggestions that will be acted upon by FDOT.

1.4 RECOMMENDED ALTERNATIVES

The recommendations for further consideration are shown in **Table 1.4-1**, **Summary of Highest Rated Recommendations.** Potential cost savings are shown in present day dollars.

The recommendations in the following table indicate the anticipated initial cost, operation and maintenance cost, future cost and Life Cycle Cost (costs shown indicate initial capital costs as the LCC are similar to the original design) of the proposed recommendations. The Present Worth (PW) Life Cycle Cost also includes the initial cost, and the other above mentioned costs over the anticipated useful life of the facility. Acceptance of these recommendations would improve the value and be incorporated in the design of the facility. These recommendations appear to be the most cost effective way to provide the required functions. All of the recommendations can be taken with others, there are no mutually exclusive recommendations.

The recommendations developed by the VE study team will directly affect the existing project design. The recommended alternatives have been presented to FDOT, and no fatal flaws with the proposed recommendations were indicated at the presentation. It is understood that further analysis of these recommendations may be needed in order to make a final decision to accept them. FDOT will determine the acceptability of each recommendation. Each recommendation may be implemented individually or partially.

1.5 MANAGEMENT ACCEPTANCE & IMPLEMENTATION

Management action on each of the recommendations taken at the subsequent resolution meeting will be included in **Table 1.4 – 1** in the "Management Action" column. The FDOT Project Manager must ensure that all accepted recommendations are implemented and all pending actions are resolved for inclusion in the project design. Close coordination with the District Value Engineer is encouraged to insure timely resolution of management action.

Management Action Legend: A=Accepted, NA=Not Accepted, FS=Further Study

TABLE 1.4 – 1 SUMMARY OF HIGHEST RATED RECOMMENDATIONS				
		PRESENT WORTH (PW) OF COST (FUTURE COST)		
Rec. No.	**Description**	**Management Action**	**Comments**	**Potential Cost Savings (Value Added)**
1	Provide an additional floodplain compensation alternative in Basin 300 as FPC 300-A is impacted by a billboard			$1,145,000
2	Increase the size of the Pond 303-A1 and incorporate the entire lot that is for sale			($214,000)
3	Make Pond 303-B2 the preferred pond by relocating the billboard within the site			$1,400,000
4	Maintain the design variation in the Ultimate section though the entire project			$9,106,000
5	Consider concrete express lanes			$1,750,000 LCC Savings
6	Relocate the sidewalk off of back of curb at the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations			($238,000)
7	Don't build the 6-ft. sidewalk on the south side of the bridge			$851,000
8	Add direct connect ramps to the express lanes at EE Williamson			($3,902,000)
9	Modify the eastbound Lake Mary Blvd. to eastbound I-4 ramp to begin before the interchange signal on the west side of I-4			($822,000)
11	Separate grade at Lake Mary Blvd. and Primera Blvd./Lake Emma Road			($60,192,000)
12	Corridor improvements on Lake Mary Blvd. to Rinehart Road			($6,238,000)
14	Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary			($30,210,000)

TABLE 1.4 – 1 SUMMARY OF HIGHEST RATED RECOMMENDATIONS				
		PRESENT WORTH (PW) OF COST (FUTURE COST)		
Rec. No.	**Description**	**Management Action**	**Comments**	**Potential Cost Savings (Value Added)**
17	Eliminate the right turn lane at International Drive because the outside lane becomes a right turn lane at the intersection			$62,000
18	Start the second eastbound left to eastbound I-4 after the westbound I-4 on ramp so the shift is under and before the overpass			$164,000
21	Modify Alt. 1 to taper the US 17-92 southbound to I-4 westbound to eliminate the hard right turn and add a third southbound lane to US 17-92 to accommodate a continuous I-4 westbound off ramp weaving with I-4 eastbound on ramp traffic along with US 17-92 southbound and make the free flow dual rights metered onto southbound Monroe Rd.			$3,117,000
22	Consider a skewed 4-leg Orange Ave. intersection that eliminates the left turn off of Monroe Road as a straight movement through the skewed intersection. Leave the off ramp as-is			($818,000)
30	Modify the US 17/92 Alternate 5 Interchange			($12,127,000)

VALUE ENGINEERING METHODOLOGY 2

2.1 GENERAL

This section describes the value analysis procedure used during the VE study. A systematic approach was used in the VE study and the key procedures involved were organized into three distinct parts: 1) pre-study preparations, 2) VE workshop study, and 3) post-study.

2.2 PRE-STUDY PREPARATIONS

Pre-study preparations for the VE effort consisted of scheduling study participants and tasks; reviews of documents; gathering necessary background information on the project; and compiling project data into a cost model. Information relating to the design, construction, and operation of the facility is important as it forms the basis of comparison for the study effort. Information relating to funding, project planning, operating needs, systems evaluations, basis of cost, production scheduling, and construction of the facility was also a part of the analysis.

2.3 VE WORKSHOP STUDY

The VE workshop was a five day effort. During the workshop, the VE job plan was followed. The job plan guided the search for high value areas in the project and included procedures for developing alternative solutions for consideration while at the same time considering efficiency. It includes these phases:

- Information Gathering Phase
- Function Identification and Cost Analysis Phase
- Creative Phase
- Evaluation Phase
- Development Phase
- Presentation and Reporting Phase

2.3.1 Information Phase

At the beginning of the study, the conditions and decisions that have influenced the development of the project must be reviewed and understood. For this reason, the Design Consultant Project Manager provided design information about the project to the VE team. Following the presentation, the VE team discussed the project using the documents listed in **Section 3.3**.

2.3.2 Function Identification and Cost Analysis Phase

Based on the Preliminary cost estimate, historical and background data, a cost model was developed for this project organized by major construction elements. It was used to distribute costs by project element in order to serve as a basis for alternative functional categorization. The VE team identified the functions of the various project elements and subsystems and created a Function Analysis System Technique Diagram (FAST) to display the relationships of the functions.

2.3.3 Creative Phase

This VE study phase involved the creation and listing of ideas. During this phase, the VE team developed as many ideas as possible to provide a creative atmosphere and to help team members to "think outside the box." Judgment of the ideas was restricted at this point to insure vocal critics did not inhibit creativity. The VE team was looking for a large quantity of ideas and association of ideas.

The FDOT and the design team may wish to review the creative design suggestions that are listed in **Section 6**, because they may contain ideas, which can be further evaluated for potential use in the design.

2.3.4 Evaluation Phase

During this phase of the workshop, the VE team judged the ideas generated during the creative phase. Advantages and disadvantages of each idea were discussed and a matrix developed to help determine the highest-ranking ideas. Ideas found to be irrelevant or not worthy of additional study were discarded. Those that represented the greatest potential for cost savings or improvement to the project were "carried forward" for further development.

The creative listing was re-evaluated frequently during the process of developing ideas. As the relationship between creative ideas became more clearly defined, their importance and ratings may have changed, or they may have been combined into a single idea. For these reasons, some of the originally high-rated ideas may not have been developed.

2.3.5 Development Phase

During the development phase, each highly rated idea was expanded into a workable solution. The development consisted of a description of the idea, life cycle cost comparisons, where applicable, and a descriptive evaluation of the advantages and disadvantages of the proposed ideas. Each idea was written with a brief narrative to compare the original design to the proposed change. Sketches and design calculations, where appropriate, were also prepared in this part of the study. The developed VE ideas are summarized in the section entitled **Section 7 – Recommendations**.

2.4 POST STUDY

The post-study portion of the VE study includes the draft and final preparation of this Value Engineering Study Report and the discussions and resolution meetings with FDOT personnel. The Planning and Environmental Management team should analyze each alternative and prepare a short response, recommending incorporating the idea into the project, offering modifications before implementation, or presenting reasons for rejection. The VE team is available for consultation after the ideas are reviewed. Please do not hesitate to call on us for clarification or further information for considerations to implement any of the presented ideas.

2.4.1 Presentation and Reporting Phase

The final phase of the VE Study began with the presentation of the ideas on the last day of the VE Study. The VE team screened the VE ideas before draft copies of the report were prepared. The initial VE ideas were arranged in the order indicated to facilitate cross-referencing to the final recommendations for revision to the Contract Documents.

2.4.2 Final Report

The acceptance or rejection of ideas described in this report is subject to FDOT's review and approval. The VE team is available to address any final draft report comments for incorporation into the final report.

WORKSHOP PARTICIPANTS AND PROJECT INFORMATION 3

3.1 PARTICIPANTS

On March 31, 2014, representatives from HNTB Corporation (HNTB) presented an overview of the project in the PD&E Documents for Interstate 4 from one mile east of State Road 434 to Volusia County line. The purpose of this meeting was to acquaint the study team with the overall project and what the main areas the VE team needed to focus on during this VE study.

The VE facilitator also reviewed and explained the Value Engineering improvement study agenda. He acquainted the team with the goals for the study based upon the study methodology that would be applied to improve the project. The study team included the following experts who participated in the study:

Participant Name	Role	Affiliation
Bagher Pourtadayoun	Roadway Design	FDOT, District 5
Michael Dollery	Right of Way	FDOT, District 5
Jay Williams, EI	Traffic Operations	FDOT, District 5
Kim Navarro,	Construction/Operations/Maintenance	FDOT, District 5
Lori Stanfill, PE	Drainage	Balmoral Group
Marianne Saunders, PE	Structures	FDOT, District 5
Andrew Meisheid, EI	Geotechnical	FDOT, District 5
Gene Varano	Project Management	FDOT, District 5
Steven Buck, EI	Constructability	FDOT, District 5
Jack Crahan, MAI	Right of Way	FPC-Group
Ty Garner	District VE Coordinator	FDOT, District 5
Rick Johnson, PE, CVS	VE Team Leader	PMA Consultants LLC

3.2 PROJECT INFORMATION

The purpose of the project orientation meeting, on March 31, 2014, in addition to being an integral part of the Information Gathering Phase of the VE study, was to bring the VE team "up-to-speed" regarding the overall project scope.

3.3 LIST OF VE STUDY MATERIAL REVIEWED

1. Preliminary Engineering Report, Segment 3: East of SR 434 to East of US 17/92 – Seminole County, FL, prepared by HNTB Corporation, dated March, 2014
2. Air Quality Analysis Technical Memorandum, Segment 3: East of SR 434 to East of US 17/92, prepared by Stantec, dated February, 2014
3. Pond Siting Report, Segment 3: East of SR 434 to East of US 17/92 – Seminole County, FL, prepared by HNTB Corporation, dated February 2014
4. Report of Preliminary Geotechnical Engineering Investigation for Ponds – Segment 3 , prepared by Geotechnical and Environmental Consultants, Inc., dated February 21, 2014
5. Wetland Evaluation Report (WER), Segment 3: East of SR 434 to East of US 17/92 – Seminole County, FL, prepared by 3E Consultants. Inc., dated March, 2014
6. Preliminary Cost Estimate, prepared by HNTB Corporation, provided March 20, 2014

7. Technical Memorandum: Cultural Resource assessment Survey of Proposed Improvements to Segment 3: East of SR 434 to East of US 17/92 – Seminole County, FL, prepared by Southeastern Archaeological Research, Inc., dated February, 2014
8. Location Hydraulic Report, Segment 2: SR 528 to SR 435 (Kirkman Road), prepared by HNTB Corporation, dated September , 2013
9. Contamination Screening Evaluation Report, Segment 3: East of SR 434 to East of US 17/92 – Seminole County, FL, prepared by Stantec, dated October, 2013
10. Pavement Type Selection Report, Segment 3: East of SR 434 to East of US 17/92 – Seminole County, FL, prepared by HNTB Corporation, dated February 14, 2014
11. Endangered Species Biological Assessment, Segment 3: East of SR 434 to East of US 17/92 – Seminole County, FL, prepared by Stantec, dated February 2014
12. Aerial Plan Board of Segment 3 Improvements, Project Development & Environment (PD&E) Study, prepared by HNTB Corporation, undated
13. Aerial Plan Board of SR-400 (I-4) Segment 3, EE Williamson Road/I-4 Alternative 1, prepared by HNTB Corporation, undated
14. Aerial Plan Board of SR-400 (I-4) Segment 3, EE Williamson Road/I-4 Alternative 2, prepared by HNTB Corporation, undated
15. Aerial Plan Board of SR-400 (I-4) Segment 3, Lake Mary Blvd./I-4 Alternative 1, prepared by HNTB Corporation, undated
16. Aerial Plan Board of SR-400 (I-4) Segment 3, Lake Mary Blvd./I-4 Alternative 2 (SPUI), prepared by HNTB Corporation, undated
17. Aerial Plan Board of SR-400 (I-4) Segment 3, Lake Mary Blvd./I-4 Alternative 3 (DDI SEPARATED), prepared by HNTB Corporation, undated
18. Aerial Plan Board of SR-400 (I-4) Segment 3, CR 46A/I-4 Alternative 1, prepared by HNTB Corporation, undated
19. Aerial Plan Board of SR-400 (I-4) Segment 3, SR 46/I-4 Alternative 1, prepared by HNTB Corporation, undated
20. Aerial Plan Board of SR-400 (I-4) Segment 3, US 17/92 Alternative 1 (INTERSECTION IMPROVEMENTS), prepared by HNTB Corporation, undated
21. Aerial Plan Board of SR-400 (I-4) Segment 3, US 17/92 Alternative 2 (DIAMOND), prepared by HNTB Corporation, undated
22. Aerial Plan Board of SR-400 (I-4) Segment 3, US 17/92 Alternative 3 (DIAMOND/LOOP), prepared by HNTB Corporation, undated
23. Aerial Plan Board of SR-400 (I-4) Segment 3, US 17/92 Alternative 4 (SPUI), prepared by HNTB Corporation, undated
24. Aerial Plan Board of SR-400 (I-4) Segment 3, US 17/92 Alternative 5 (SPUI/T-INTERSECTION), prepared by HNTB Corporation, undated

3.4 SUMMARY OF GENERAL PROJECT INPUT - OBJECTIVES, POLICIES, DIRECTIVES, CONSTRAINTS, CONDITIONS & CONSIDERATIONS

The following is a summary of general project input, including the goals, objectives, directives, policies, constraints, conditions and considerations presented to the study team. Any "element" specific input is indicated by parentheses around the elements, disciplines and interests (i.e., right-of-way, roadway, environmental). Representatives from the FDOT and the Design team provided a project background, on the first day of the study.

*3.4.1 Project Functions, Goals & Objectives (what the project should do as determined at the kickoff meeting and subsequent Workshops)***:**

1. Reconstruct Traffic
2. Connect Roadways
3. Add Overpass
4. Build Project
5. Establish Elevation
6. Maintain Traffic
7. Span Obstacle
8. Acquire Right of Way
9. Provide Land
10. Replace Impacts
11. Permit Project
12. Manage Water
13. Accommodate Pedestrians
14. Separate Traffic
15. Control Traffic
16. Inform Motorists
17. Meet Criteria
18. Design Project
19. Minimize Maintenance
20. Collect Data
21. Review Plans
22. Estimate Costs
23. Calculate Quantities
24. Recommend Solutions
25. Study Alternatives
26. Determine Needs
27. Ease Maintenance
28. Analyze Data
29. Treat Stormwater
30. Accommodate Utilities

These functions were used by the VE team to create/brainstorm new ideas for potential improvement to the project.

3.4.2 Project Policies & Directives: (documented things the project must or must not do)

1. The project shall meet economic, engineering design, environmental and social/cultural criteria requirements
2. Meet the goals of the Long Range Transportation Plans for future developments

3.4.3 General Project Constraints: (unchangeable project restrictions)

1. SunRail at the Orange Boulevard – Monroe Road intersection
2. Omit the Wekiva Parkway/SR 417 Interchange
3. No impacts to the Ford Dealership right of way

3.4.4 General Project Conditions & Considerations:

1. Refer to the PD&E documents and backup documentation prepared by HNTB.

3.4.5 Site Review Comments and other observations:

1. Consider two lefts, two through lanes, and dual rights on State Road 46A eastbound at International Parkway.
2. Consider Alternative 5 at US 17-92 with possible modifications.
3. Can we shorten the dual lefts eastbound on State Road 46 to eastbound I-4
4. Consider easement or buying right of way from the BB&T Bank on Lake Mary Boulevard and put the sidewalk off the curb.

ECONOMIC DATA, COST MODELS AND ESTIMATES 4

4.1 ECONOMIC DATA

The study team developed economic criteria used for evaluation with information gathered from the HNTB PD&E documents. To express costs in a meaningful manner, the cost comparisons associated with alternatives are presented on the basis of total Life Cycle Cost and discounted present worth. Project period interest rates are based on the following parameters:

Year of Analysis:	2014
Economic Planning Life:	20 years starting in 2019
Discount Rate/Interest:	5.00%
Inflation/Escalation Rate:	3.00%

The Preliminary PD&E Cost Estimate was used by the team for the major construction elements and right of way costs were developed by HNTB and the FDOT Right of Way Estimating team. The VE team had costs for the mainline improvements and alternative interchanges at Lake Mary Boulevard and at US 17-92 provided by HNTB. The cost for the roadway and interchange improvements is based on Alternative 1 were a combined $461,389,572. The estimated cost to acquire all right of way for the proposed Alternative 1 concept is $9,700,000.

Table 4.1 – 1
Preliminary Cost Estimate
PD&E Alternate 1

I-4 Segment 3									
(Mainline I-4) STA. 2043+70.33 TO 2604+28.35						(Tie-in) STA. 2218+09.76 TO 2296+19.08	(Tie-in) STA. 2537+17.35 TO 2583+00.00		
Item	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Segment Cost**	**Segment Cost**	**Segment Cost**	**Total Cost**	**FUNCTION**
0110 1 1	Clearing & Grubbing	AC	$ 7,724	1,122	$ 8,664,609	$15,448	$936,836	$9,616,893	Prepare Site
0110 3	Removal of Existing Structure	SF	$ 24	127,084	$ 2,994,099	$1,061,967	$1,061,967	$5,118,033	Remove Obstruction
160 4	Stabilization Type B LBR 40	SY	$ 2.90	1,210,248	$ 3,509,720	$61,158	$237,805	$3,808,683	Provide Foundation
285 706	Base optional (base group 6) ML	SY	$ 13.69	431,162	$ 5,902,606	$99,418	$159,000	$6,161,025	Provide Foundation
285 712	Base optional (base group 12) ML	SY	$ 14.02	779,086	$ 10,922,790	$193,855	$986,829	$12,103,474	Provide Foundation
334 1 12	Superpave asphaltic concrete (Traff B)	TN	$ 87.28	47,428	$ 4,139,499	$69,722	$111,507	$4,320,728	Transfer Load
334 1 14	Superpave asphaltic concrete (Traff D)	TN	$ 87.21	128,549	$ 11,210,780	$198,966	$1,012,847	$12,422,593	Transfer Load
334 1 24	Superpave asphaltic concrete (Traff D-PG 76-22)	TN	$ 89.64	85,699	$ 7,682,103	$136,340	$694,046	$8,512,489	Transfer Load
337 7 22	Asphaltic Conc friction course (FC-5) (PG 76-22)	TN	$ 117.20	32,137	$ 3,766,493	$66,847	$340,287	$4,173,627	Enhance Friction
521 1	Barrier Wall	LF	$ 113	235,332	$ 26,592,516	$102,265	$195,377	$26,890,158	Segregate Traffic
	Thermoplastic, White, Striping	NM	$ 3,178	143	$ 454,439	$12,509	$35,052	$502,000	Denote Guidance
	Vehicle Impact Attenuator	EA	$ 18,327.63	13	$ 238,259	$36,655	$0	$274,914	Shield Obstructions
	Fencing	LF	$ 10.00	124,994	$ 1,249,940	$0	$77,000	$1,326,940	Limit Access
	Embankment	CY	$ 5.94	1,210,248	$ 7,188,874	$125,269	$234,462	$7,548,605	Change Profile
	MSE wall	SF	$ 34.00	477,178	$ 16,224,053	$0	$211,344	$16,435,397	Conserve Space
	Bridges	SF	$ 160.00	514,335	$ 82,293,600	$9,184,000	$8,149,760	$99,627,360	Span Obstacles
	Subtotal Cost	LS			$ 193,034,380	$11,364,419	$14,444,119	$218,842,918	
	Compensable Utility Relocation (5%)	LS			$ 9,651,719	$722,206	$722,206	$11,096,131	Relocate Obstructions
	Mobilization (10%)	LS			$ 19,303,438	$1,444,412	$1,444,412	$22,192,262	Start Construction
	Maintenance of Traffic (MOT) (20%)	LS			$ 38,606,876	$2,888,824	$2,888,824	$44,384,524	Maintain Traffic
	Lighting (5%)	LS			$ 9,651,719	$722,206	$722,206	$11,096,131	Illuminate Project
	Signage (5%)	LS			$ 9,651,719	$722,206	$722,206	$11,096,131	Direct Traffic
	Drainage (20%)	LS			$ 38,606,876	$2,888,824	$2,888,824	$44,384,524	Remove Water
	ITS (5%)	LS			$ 9,651,719	$722,206	$722,206	$11,096,131	Convey Information
	Erosion Control (1%)	LS			$ 1,930,344	$144,441	$144,441	$2,219,226	Protect Environment
	Construction Subtotal	LS			$ 330,088,790	$21,619,743	$24,699,444	$376,407,977	
	Contingency (20%)	LS			$ 66,017,758	$4,323,949	$4,939,889	$75,281,595	Address Unforeseens
	Subtotal							$451,689,572	
	Right of Way	LS						$9,700,000	Provide Space
	Grand Total				**$ 396,106,548**	**$25,943,692**	**$29,639,332**	**$ 461,389,572**	

Reference: Preliminary Cost Estimate, prepared by HNTB, provided March 20, 2014

FUNCTION ANALYSIS AND FAST DIAGRAM 5

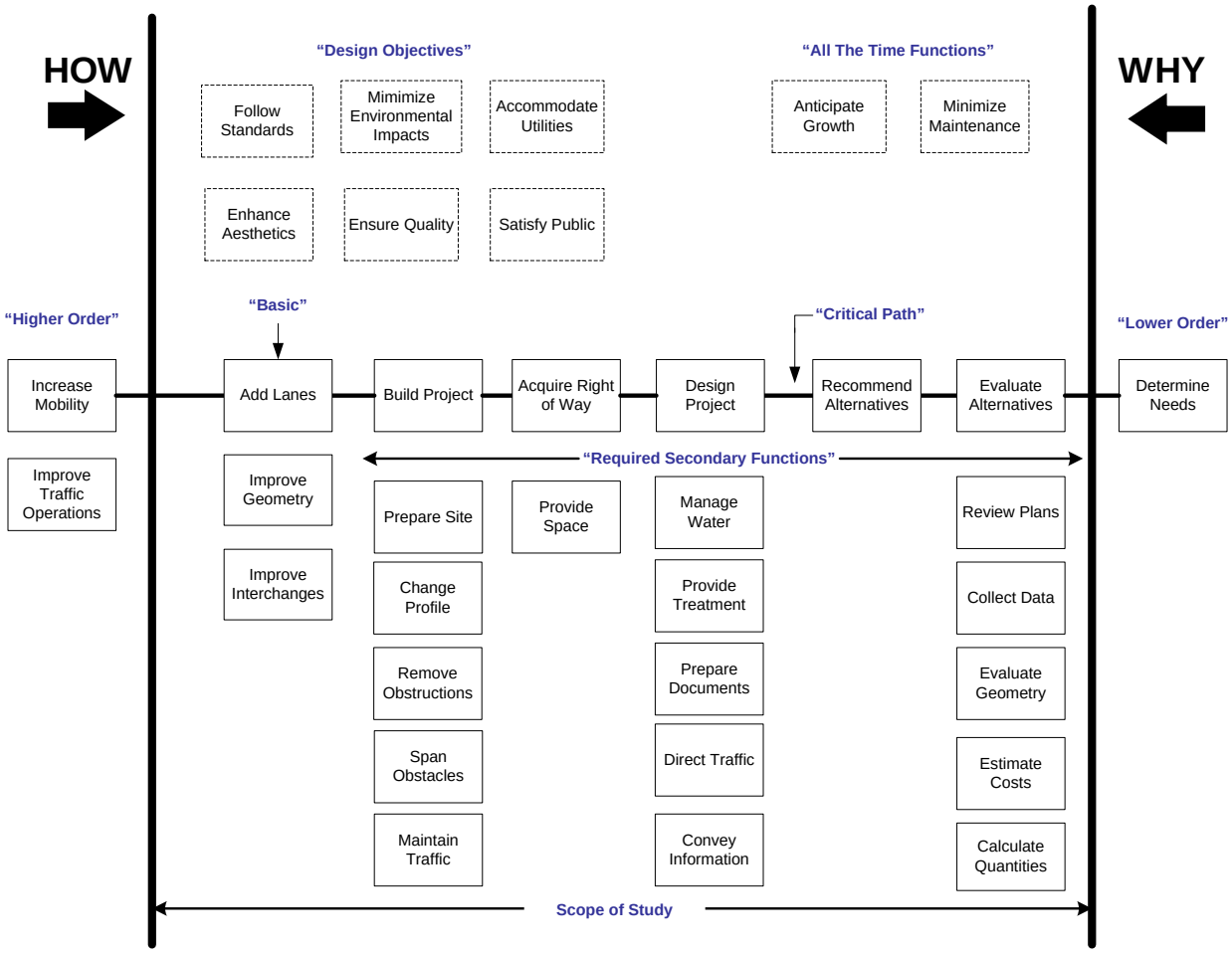
This project's Function Analysis was reviewed and developed by the team to define the requirements for the overall project (and each project element, if required) and to ensure that the VE team had a complete and thorough understanding of the functions (basic and others) needed to satisfy the project requirements. The primary Function Analysis System Technique (FAST) Diagram for the project is included. The development of FAST diagrams help stimulate team members to think in terms of required functions, not just normal solutions, to enhance their creative idea development. The project's primary tasks, the critical path functions, the project's primary basic functions and other required functions that must be satisfied were identified and are indicated in the report.

A Functional Analysis was prepared to determine the basic function of the overall project and each area shown in the cost model. Functional Analysis is a means of evaluating the functions of each element to see if the expenditures for each of those elements actually provide the requirements of the process, or if there are disproportionate amounts of money being proposed to be spent for support functions. These elements add cost to the final product, but have a relatively low worth to the basic function. This creates a high cost-to-worth ratio.

A FAST diagram was developed to identify and display the critical functions path for the overall project. The basic and supporting secondary functions are illustrated on the following FAST Diagram.

Figure 5.1 – FAST Diagram

Interstate 4 from 1 Mile East of State Road 434 to Volusia County Line



EVALUATION 6

During the creative phase numerous ideas, alternative proposals and/or recommendations were generated for each required function using conventional brainstorming techniques and are recorded on the following pages. These ideas were discussed and evaluation criteria were determined. The VE team identified eight weighted evaluation criteria that included Capital Cost, Right of Way Impacts, Level of Service, Maintenance of Traffic Mobility Enhancement, Utility Impacts, Future Maintenance and Constructability. The evaluation criteria were assigned a weighted value from 1 to 8 based on a VE team consensus on the importance of each item. Criteria with the most importance received an 8-weight and the least important received a 1-weight. The ideas were then individually discussed and given a score, on a scale of 1 to 5 with 1 being the least beneficial and 5 most beneficial. The score for each item is multiplied by the weighted criteria value and each multiplication product is added to obtain a total score for the idea.

Table 6.1 – 1 includes a list of ideas that were generated during the creative phase and each idea's score. **Table 6.1 – 2** illustrates the weighted values for the evaluation criteria and **Table 6.1 – 3** shows the evaluation matrix for idea ranking total scores for all ideas carried forward. The ideas that scored equal to or greater than the original design concept total score were sufficiently rated for further development. The ideas in the table with strike-throughs were not developed because they were combined with other ideas, not feasible, or were eliminated from consideration for other reasons.

There were a total of 30 creative ideas and 24 that were evaluated and scored. The VE team discussed each of the evaluated ideas with the PD&E Project Manager during a mid-point review meeting on Wednesday, April 2, 2014. The VE team and the Consultant Project Manager discussed each idea before developing the final group of ideas for final development and analysis.

The write-ups for the developed ideas are in **Section 7**. The tables that follow show the original 29 ideas and a 30th idea that emerged during development, with the ideas that survived the evaluation, analysis and development phases of the study becoming viable recommendations for value improvements. During the evaluation process the VE team redefined some of the creative ideas as questions for the designers or design suggestions. Ideas that became design suggestions or design questions for the mid-point review are designated as "DS" on the evaluation worksheets. The major design suggestions identified by the VE team are listed below:

DS-1 Use the rubble from the ramp demo to augment the County Reef programs
DS-2 Consider light weight panel construction for perimeter walls
DS-3 Combine the sound wall concrete foundation with the ditch bottom
DS-4 Obtain rights to enhance and improve the aesthetics of the perimeter walls
DS-5 Use segmental block retaining walls instead of MSE walls

The VE team presents design suggestions for the design consultant and FDOT's consideration. No specific action is normally required to accept or not accept the suggestions, though it is often helpful, for documentation purposes, to formally list those suggestions that will be acted upon by the FDOT. Readers are encouraged to review the Creative Idea Listing and Evaluation Worksheets that follow, since they may suggest additional ideas that can be applied to the design or construction.

TABLE 6.1 –1
Value Engineering Study Ideas

Idea No.	Ideas	Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Future Maintenance	Constructability
	Original Concept								
	PD&E Documents for I-4 from SR 434 to Volusia County Line	3	3	3	3	3	3	3	3
	Drainage (Remove Water)								
1	Provide an additional floodplain compensation alternative in Basin 300 as FPC 300-A is impacted by a billboard	3	4.5	3	3	3	3	3	3
2	Increase the size of the Pond 303-A1 and incorporate the entire lot that is for sale	3	2.5	3	3	3	3	3	3
3	Make Pond 303-B2 the preferred pond by relocating the billboard within the site	3	4.5	3	3	3	3	2.5	2.75
	Mainline (Access Interstate)								
4	Maintain the design variation in the Ultimate section though the entire project	3.5	3.25	2.75	3	3	3	3	3
5	Consider concrete express lanes	2	3	3	2.75	3	3	5	3
	Right of Way (Provide Space)								
6	Relocate the sidewalk off of back of curb at the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations	3	3	3	3	3.25	3	3	3
	EE Williamson Blvd Bridge (Space Obstacles)								
7	Don't build the 6-ft. sidewalk on the south side of the bridge	3.25	3	3	3	2.75	3	3.25	3.5
8	Add direct connect ramps to the express lanes at EE Williamson	2.5	3	3.5	2.75	2.75	3	3	2.5
	Lake Mary Blvd. Interchange (Connect Roadways)								
9	Separate the eastbound Lake Mary Blvd. to eastbound I-4 before the interchange signal on the west side of I-4	3	3	3.5	3	3	3	3	3
10	Bifurcate Lake Mary Blvd. and fly the westbound I-4 ramp over to eastbound Lake Mary	1.5	3	3.75	2	2.5	3	2.5	2
11	Separate grade at Lake Mary Blvd. and Primera Blvd./Lake Emma Road	1.5	3	4	2.5	3	3	2.75	2
12	Corridor improvements on Lake Mary Blvd. to Rinehart Road	2.5	3	3.75	2.75	3	3	3	3
13	Construct two shorter pedestrian bridges span the ramps on the north side of the road and add sidewalk on the north side of the bridge	2.5	3	3	3	4	3	2.5	2.75
14	Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary	2.5	3	3	3	4	3	2.5	2.75
15	Put the sidewalk at grade on the south side of Lake Mary Blvd. in conjunction with grade separation at Lake Emma Rd.	1.5	3	4	2.5	4	3	2.75	2
16	~~Cross the pedestrians at grade east of I-4 and add a pedestrian bridge on the west side over the ramps with a sidewalk on the north side of the bridge~~								

TABLE 6.1 –1

Value Engineering Study Ideas

Idea No.	Ideas	Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Future Maintenance	Constructability
	Original Concept								
	PD&E Documents for I-4 from SR 434 to Volusia County Line	3	3	3	3	3	3	3	3
	CR 46A Interchange (Connect Roadways)								
17	Eliminate the right turn lane at International Drive because the outside lane becomes a right turn lane at the intersection	3.25	3	3	3	3	4	3	3.5
	SR 46 Interchange (Connect Roadways)								
18	Start the second eastbound left to eastbound I-4 after the westbound I-4 on ramp so the shift is under and before the overpass	3.25	3	2.75	3	3	3.25	3	3.5
	US 17/92 Interchange (Connect Roadways)								
19	~~Alternative 1 add a cloverleaf for northbound Monroe Rd. to flyover Monroe Rd. and the eastbound I-4 off ramp. Merge with the southbound Monroe Rd. and then merge with I-4 eastbound~~								
DS-1	Use the rubble from the ramp demo to augment the County Reef programs								
21	Modify Alt. 1 to taper the US 17-92 southbound to I-4 westbound to eliminate the hard right turn and add a third southbound lane to US 17-92 to accommodate a continuous I-4 westbound off ramp weaving with I-4 eastbound on ramp traffic along with US 17-92 southbound and make the free flow dual rights metered onto southbound Monroe Rd.	2.75	2.75	3.5	3	3	3	3	3
22	Consider a skewed 4-leg Orange Ave. intersection that eliminates the left turn off of Monroe Road as a straight movement through the skewed intersection. Leave the off ramp as-is	3.5	3	3	2.75	3	2.5	3	2.75
23	Modify the US 17-92 intersection and widen the existing I-4 off ramp to accept Monroe Rd. northbound and US 17-92 traffic onto eastbound I-4	2	3	3.75	3	3	3	2.75	2
24	Add a flyover for the northbound US 17-92 left turns to land in the infield between Monroe Rd. and I-4	2	2.75	3.5	2.75	3	2.5	2.75	2.25
25	~~Leave the interchange as-is signalize the free flow right onto Monroe Rd. and modify the westbound on ramp from US 17-92 southbound and optimize the Monroe Rd. signals~~	4.5	2.75	3.25	4	3	3	3	4
	Other								
DS-2	Consider Tridipanel for perimeter walls								
DS-3	Combine the sound wall concrete foundation with the ditch bottom								
DS-4	Obtain rights to enhance and improve the aesthetics of the perimeter walls								
DS-5	Use segmental block retaining walls instead of MSE walls								
30	Modify the US 17/92 Alternate 5 Interchange								

TABLE 6.1 –2
Value Engineering Study Weighted Values

Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Future Maintenance	Constructability
7	1	8	4	2	3	6	5

TABLE 6.1 –3
Value Engineering Study Evaluation Scores

Idea No.	Ideas	Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Future Maintenance	Constructability	TOTAL	FHWA CATEGORIES				
	Original Concept										Safety	Construction	Operations	Environment	Other
	PD&E Documents for I-4 from SR 434 to Volusia County Line	21	3	24	12	6	9	18	9	**102**					
	Drainage (Remove Water)														
1	Provide an additional floodplain compensation alternative in Basin 300 as FPC 300-A is impacted by a billboard	21	4.5	24	12	6	9	18	9	**103.5**					
2	Increase the size of the Pond 303-A1 and incorporate the entire lot that is for sale	21	2.5	24	12	6	9	18	9	**101.5**					
3	Make Pond 303-B2 the preferred pond by relocating the billboard within the site	21	4.5	24	12	6	9	15	8.25	**99.75**					
	Mainline (Access Interstate)														
4	Maintain the design variation in the Ultimate section though the entire project	24.5	3.25	22	12	6	9	18	9	**103.8**					
5	Consider concrete express lanes	14	3	24	11	6	9	30	9	**106**			X		
	Right of Way (Provide Space)														
6	Relocate the sidewalk off of back of curb at the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations	21	3	24	12	6.5	9	18	9	**102.5**	X				
	EE Williamson Blvd Bridge (Space Obstacles)														
7	Don't build the 6-ft. sidewalk on the south side of the bridge	22.75	3	24	12	5.5	9	19.5	10.5	**106.3**		X			
8	Add direct connect ramps to the express lanes at EE Williamson	17.5	3	28	11	5.5	9	18	7.5	**99.5**			X		
	Lake Mary Blvd. Interchange (Connect Roadways)														
9	Separate the eastbound Lake Mary Blvd. to eastbound I-4 before the interchange signal on the west side of I-4	21	3	28	12	6	9	18	9	**106**			X		
10	Bifurcate Lake Mary Blvd. and fly the westbound I-4 ramp over to eastbound Lake Mary	10.5	3	30	8	5	9	15	6	**86.5**					
11	Separate grade at Lake Mary Blvd. and Primera Blvd./Lake Emma Road	10.5	3	32	10	6	9	16.5	6	**93**	X		X		
12	Corridor improvements on Lake Mary Blvd. to Rinehart Road	17.5	3	30	11	6	9	18	9	**103.5**	X		X		
13	Construct two shorter pedestrian bridges span the ramps on the north side of the road and add sidewalk on the north side of the bridge	17.5	3	24	12	8	9	15	8.25	**96.75**					
14	Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary	17.5	3	24	12	8	9	15	8.25	**96.75**	X		X		
15	Put the sidewalk at grade on the south side of Lake Mary Blvd. in conjunction with grade separation at Lake Emma Rd.	10.5	3	32	10	8	9	16.5	6	**95**					

TABLE 6.1 –3
Value Engineering Study Evaluation Scores

Idea No.	Ideas	Capital Costs	R/W Impacts	LOS	Maintenance of Traffic	Pedestrian Considerations	Utility Impacts	Future Maintenance	Constructability	TOTAL	FHWA CATEGORIES				
	Original Concept										Safety	Construction	Operations	Environment	Other
	PD&E Documents for I-4 from SR 434 to Volusia County Line	21	3	24	12	6	9	18	9	**102**					
	CR 46A Interchange (Connect Roadways)														
17	Eliminate the right turn lane at International Drive because the outside lane becomes a right turn lane at the intersection	22.75	3	24	12	6	12	18	10.5	**108.3**		X			
	SR 46 Interchange (Connect Roadways)														
18	Start the second eastbound left to eastbound I-4 after the westbound I-4 on ramp so the shift is under and before the overpass	22.75	3	22	12	6	9.75	18	10.5	**104**		X		X	
	US 17/92 Interchange (Connect Roadways)														
21	Modify Alt. 1 to taper the US 17-92 southbound to I-4 westbound to eliminate the hard right turn and add a third southbound lane to US 17-92 to accommodate a continuous I-4 westbound off ramp weaving with I-4 eastbound on ramp traffic along with US 17-92 southbound and make the free flow dual rights metered onto southbound Monroe Rd.	19.25	2.75	28	12	6	9	18	9	**104**		X	X	X	
22	Consider a skewed 4-leg Orange Ave. intersection that eliminates the left turn off of Monroe Road as a straight movement through the skewed intersection. Leave the off ramp as-is	24.5	3	24	11	6	7.5	18	8.25	**102.3**	X		X		
23	Modify the US 17-92 intersection and widen the existing I-4 off ramp to accept Monroe Rd. northbound and US 17-92 traffic onto eastbound I-4	14	3	30	12	6	9	16.5	6	**96.5**					
24	Add a flyover for the northbound US 17-92 left turns to land in the infield between Monroe Rd. and I-4	14	2.75	28	11	6	7.5	16.5	6.75	**92.5**					
25	~~Leave the interchange as-is signalize the free flow right onto Monroe Rd. and modify the westbound on ramp from US 17-92 southbound and optimize the Monroe Rd. signals~~	31.5	2.75	26	16	6	9	18	12	**121.3**					

RECOMMENDATIONS 7

The results of this VE study are shown as individual recommendations developed for each area of the project. These recommendations include a comparison between the VE team's proposal and the designer's original concept. Each proposal consists of a summary of the original design, a description of the proposed change, and a descriptive evaluation of the advantages and disadvantages of the proposed recommendation. Sketches and calculations are shown, if appropriate. The estimated cost comparisons reflect unit prices and quantities on a comparative basis. Value improvement is the primary basis for comparison of competing ideas. To ensure that costs are comparable within the ideas proposed by the VE team, the FDOT Statewide average costs and HNTB's preliminary cost estimates were used as the pricing basis.

7.1 EVALUATION OF RECOMMENDATIONS

Some of the VE recommendations potential savings are interrelated, if one is accepted another one may or may not need to be added, or acceptance of one may mutually exclude another. The VE team identified potential savings as shown on **Table 1.4 – 1**, **Summary of Highest Rated Recommendations**. The write-ups for the individual developed ideas are included in this section and are shown in numerical order.

The FDOT and the design team should evaluate and determine whether to accept or not accept each recommendation. The recommendations that are accepted should be identified and listed for documentation purposes. For each idea that will not be accepted, the design team normally documents, in writing, the reason or reasons for the non-acceptance. The design suggestions are for consideration by FDOT and the designers. No specific action is normally required to accept or not accept the suggestions, though it is often helpful, for documentation purposes, to formally list those suggestions that will be incorporated by the designers.

7.2 CONSIDERATIONS AND ASSUMPTIONS

In the preparation of this report and the alternatives that follow, the study team made some assumptions with respect to conditions that may occur in the future. In addition, the study team reviewed the listed project documentation, relying solely upon the information provided by the designer and owner, and relying on that information as being true, complete and accurate. This value analysis and report are based on the following considerations, assumptions and conditions:

- The recommendations rendered herein are as of the date of this report. The study team or leaders assume no duty to monitor events after the date, or to advise or incorporate into any of the alternatives, any new, previously unknown technology.

- The study team or leaders assume that there are no material documents affecting the design or construction costs that the team has not seen. The existence of any such documents will necessarily alter the alternatives contained herein.

The study team or leaders do not warrant the feasibility of these recommendations or the advisability of their implementation. It is solely the responsibility of the designer in accordance with the owner, to explore the technical feasibility and make the determination for implementation.

RECOMMENDATION No. 1: Provide an additional floodplain compensation alternative in Basin 300 as FPC 300-A is impacted by a billboard

Proposed Alternative:
The PD&E Documents show floodplain compensation pond, FPC 300-A, located on a parcel on the east side of I-4 (parcel ID: 25-20-29-300-0050-0000). It was recently determined that there is a billboard located within the parcel. The location of the billboard significantly impacts the potential storage within the pond site. Due to the billboard, FPC 300-A has a R/W cost of $1,586,000. The alternative site, FPC 300-B, located on the west side of I-4, has a R/W cost of $441,000. As there has been public concern regarding loss of the tree line between FPC 300-B and I-4, it is recommended to provide an additional alternative site for floodplain compensation in this area.

VE Alternative:
It is recommended to provide an additional site for floodplain compensation (FPC 300-C), located south of FPC 300-A, and within the area adjacent to Grace Lake. As there is no contour information for this area, it is not possible to determine if this is a viable alternative until survey is obtained. The R/W cost of this site was determined to be the same as FPC 300-B ($441,000).

Advantages:

- Provides an additional cost effective alternative for floodplain compensation within Basin 300.
- Possibly avoids the public concerns that are associated with FPC 300-B.

Disadvantages:

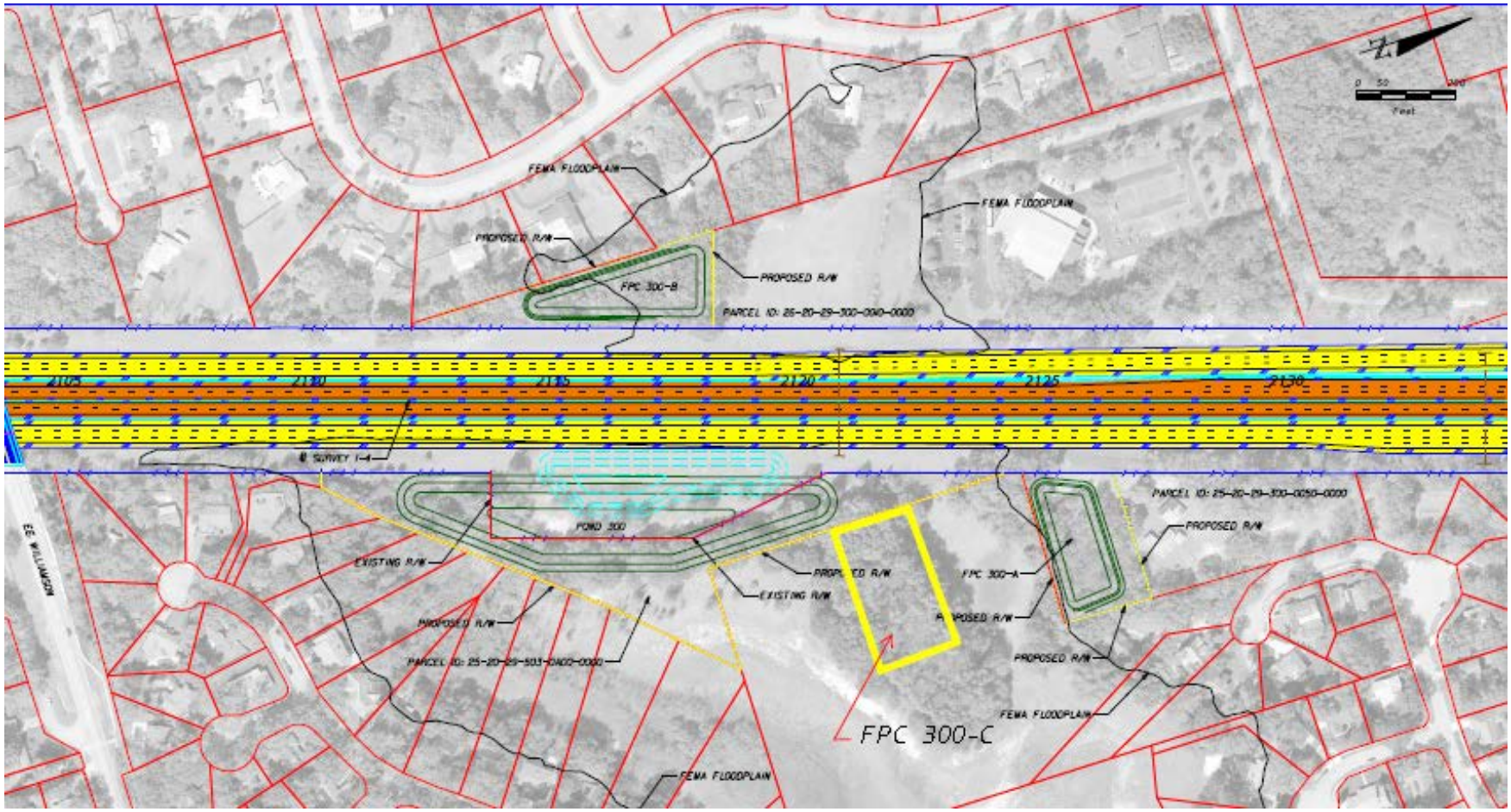
- Unknown if the site is viable at this time as there is no contour information in this area.

FHWA CATEGORIES

___Safety ___Operations ___Environment ___Construction ___Other

Potential Cost Savings: $1,145,000 (Right of Way)

RECOMMENDATION No. 1: Provide an additional floodplain compensation alternative in Basin 300 as FPC 300-A is impacted by a billboard



RECOMMENDATION No. 2: Increase the size of the Pond 303-A1 and incorporate the entire lot that is for sale

Proposed Alternative:
The PD&E Documents show a partial taking from a 4.39 acre site currently listed for sale. The site is primarily vacant, but was previously permitted for flex space development in conjunction with adjoining existing rental improvements. As part of a master planned development, a portion of the 4.39 acres is improved with a retention pond, interior access/circulation road, and limited parking. Some of these completed site improvements appear to serve the proposed flex development, while others would be removed or relocated when the new space is constructed.

VE Alternative:
Make this pond site acquisition a whole taking that is presently listed for sale instead of a partial take. As a partial taking, there is a high expectation for substantial severance damages due to very restricted functional developability of the remaining land since it consists mostly of existing retention pond. Further, since the whole property is "For Sale", acquisition risk is reduced which has the potential to reduce right of way costs below the costs of a partial taking. A whole taking would increase the potential for advance acquisition as well as giving future design flexibility to use the site for a joint use pond or two ponds under FDOT control.

Advantages:

- Increased design flexibility with respect to shape and volume.
- Increased opportunity for advance acquisition with associated cost reduction.
- Reduced acquisition risk with respect to severance damages and project schedule.

Disadvantages:

- Potentially increased right of way cost.
- Added burden of joint use pond permitting and maintenance.

FHWA CATEGORIES

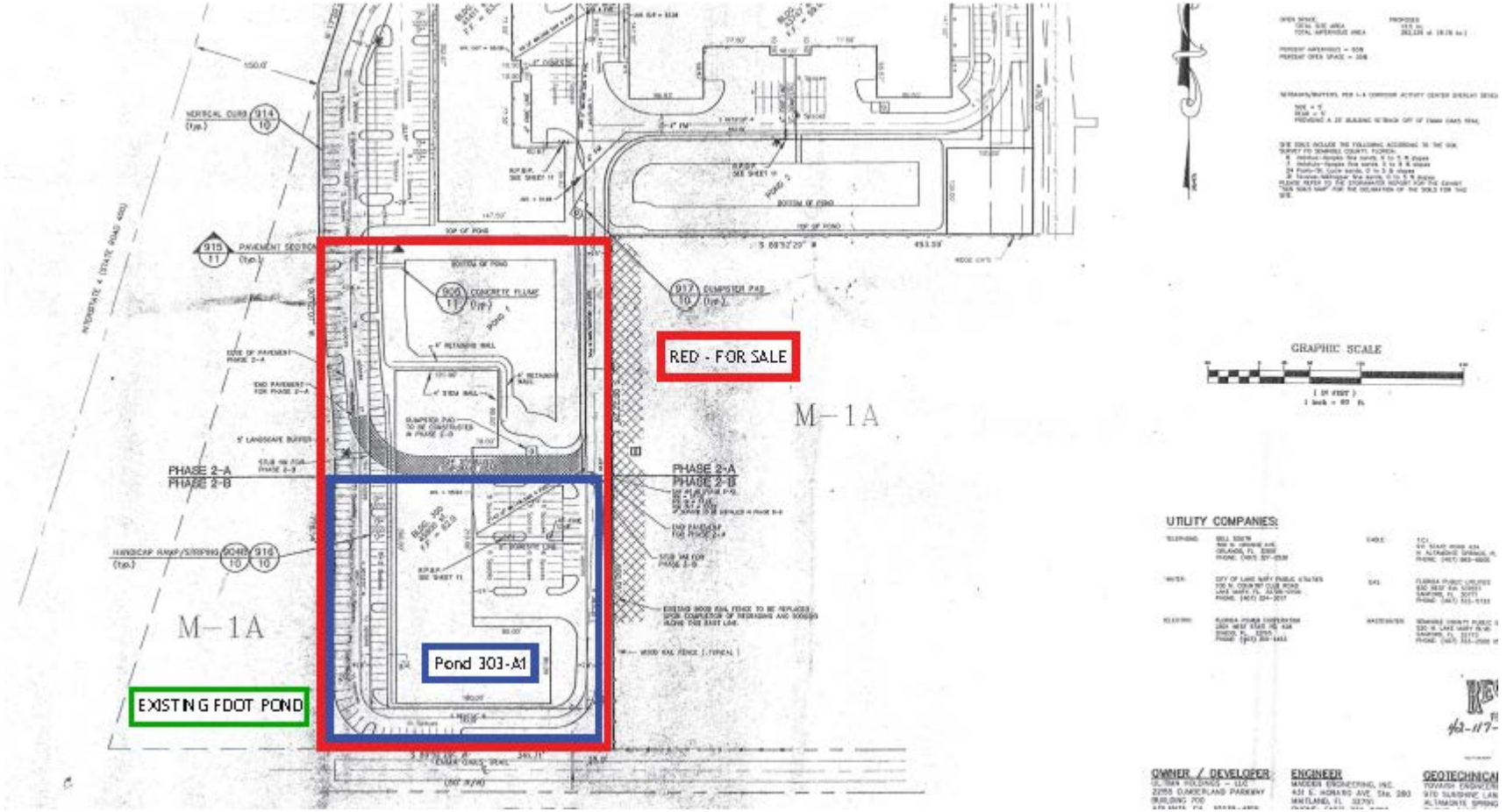
___Safety ___Operations ___Environment ___Construction ___Other

Potential Value Added: ($214,000)

Calculations:

Additional right of way cost = $214,000

RECOMMENDATION No. 2: Increase the size of the Pond 303-A1 and incorporate the entire lot that is for sale



RECOMMENDATION No. 3: Make Pond 303-B2 the preferred pond by relocating the billboard within the site

Proposed Alternative:
The PD&E Documents show Pond 303-B-2 impacting the billboard outdoor advertisement (ODA) sign constructed in 2011.

VE Alternative:
Make Pond 303-B2 the preferred pond by relocating the billboard to the west end or to the east end of the property. The west end would be preferred.

Advantages:

- Less cost

Disadvantages:

- Increased coordination with Seminole County and FDOT Central Office RW-ODA Section.
- Unknown potential screening by a noise barrier.
- View easement may need to be acquired for the relocated sign.
- Two ponds to maintain.

FHWA CATEGORIES

___Safety ___Operations ___Environment ___Construction ___Other

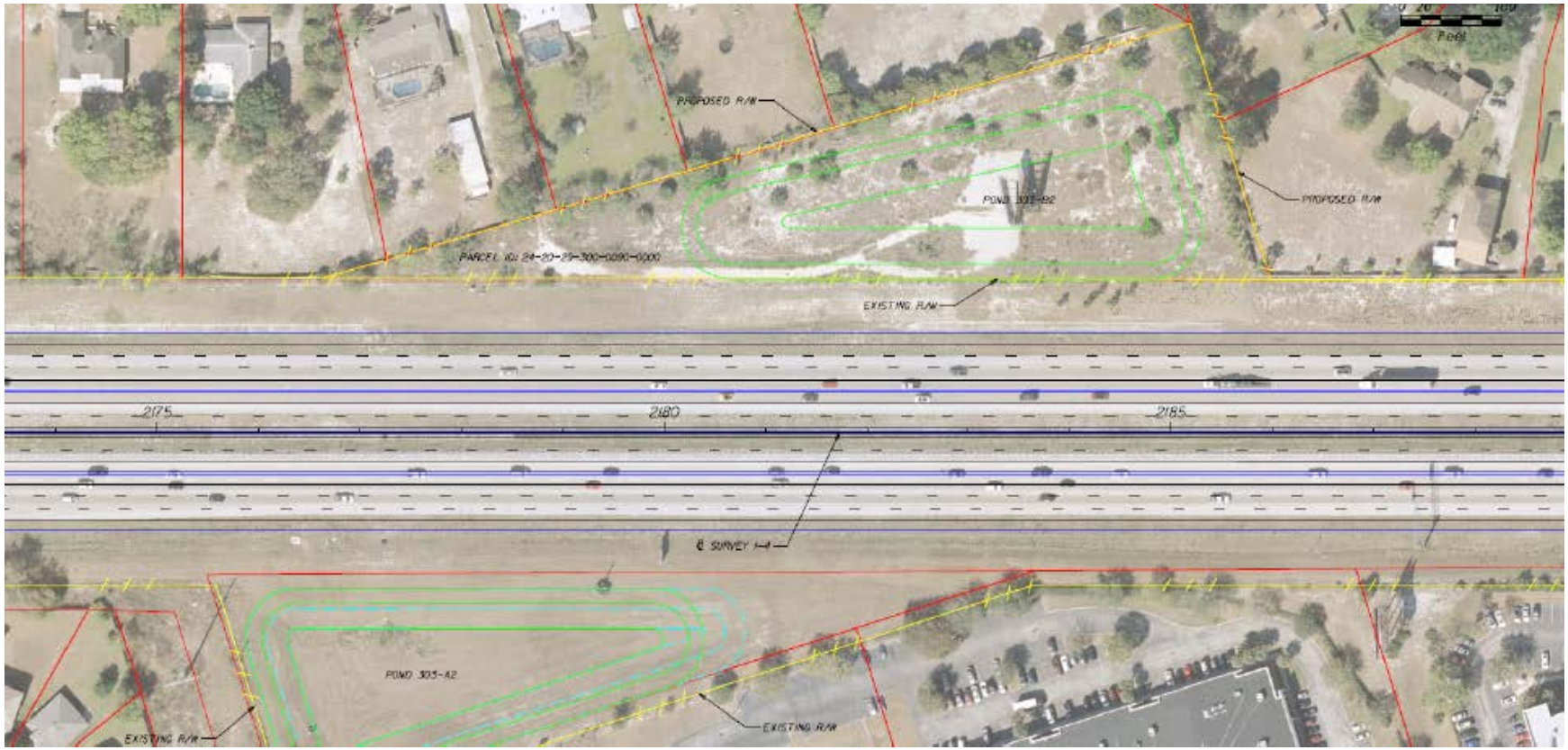
Potential Cost Savings: $1,400,000

Calculations:

Chapter 337 **337.25 Acquisition, lease, and disposal of real and personal property**

(5) The department may convey a leasehold interest for commercial or other purposes, in the name of the state, to any land, building, or other property, real or personal, which was acquired under the provisions of subsection (1).
(a) The department may negotiate such a lease at the prevailing market value with the owner from whom the property was acquired; with the holders of leasehold estates existing at the time of the department's acquisition; or, if public bidding would be inequitable, with the owner holding title to privately owned abutting property, if reasonable notice is provided to all other owners of abutting property. **The department may allow an outdoor advertising sign to remain on the property acquired, or be relocated on department property, and such sign shall not be considered a nonconforming sign pursuant to chapter 479.**

RECOMMENDATION No. 3: Make Pond 303-B2 the preferred pond by relocating the billboard within the site



RECOMMENDATION No. 4: Maintain the design variation in the Ultimate section though the entire corridor

Proposed Alternative:
The PD&E Documents show providing a 6-ft. inside median shoulder width for the Express lanes and providing 12-ft inside and outside shoulder width for general use lanes.

VE Alternative:
The VE team recommends maintaining the design variation in the Ultimate section though the entire project for the express lanes. That typical section provides a 4-ft. inside median shoulder width for the Express lanes and provides a 10-ft. inside and outside shoulder width for general use lanes.

The total reduction is 6 feet in each direction and a total reduction of 12 feet for the typical section.

Advantages:

- Less cost
- Less maintenance
- Less right of way
- Matches the ultimate I-4 consistent driver expectation

Disadvantages:

- Need a variation
- Less room for disabled vehicles

FHWA CATEGORIES

___Safety ___Operations ___Environment ___Construction ___Other

Potential Cost Savings: $9,106,000

RECOMMENDATION No. 4: Maintain the design variation in the Ultimate section though the entire

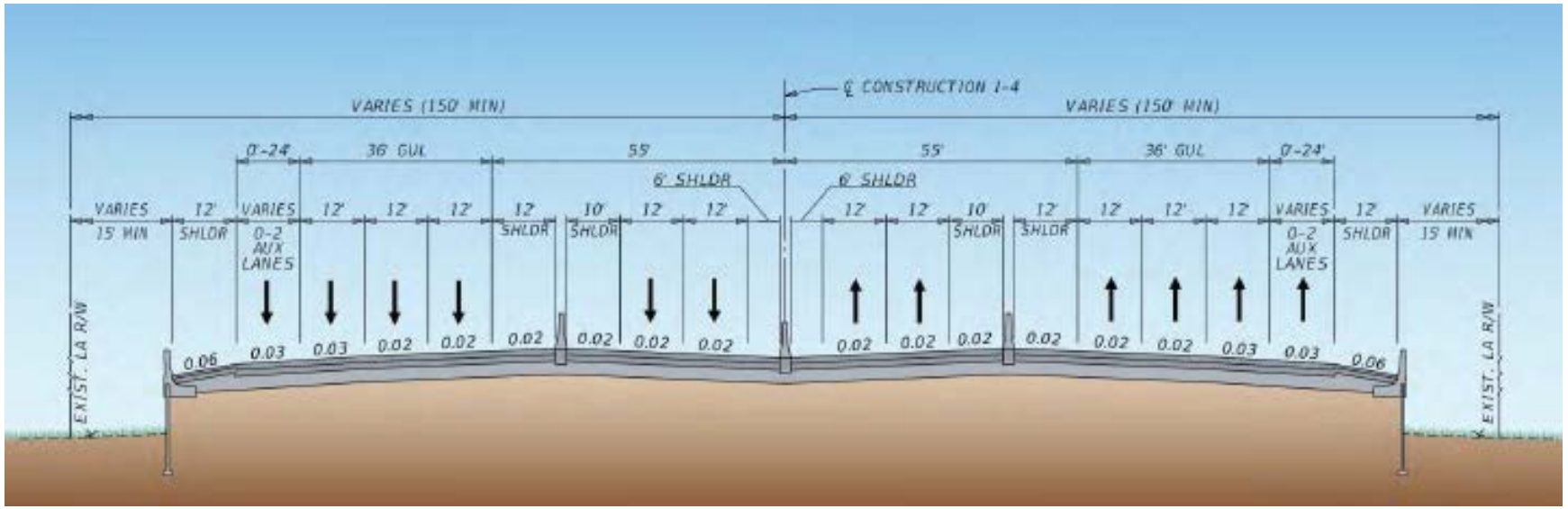
Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Base	-65,066	SY	$14.00	($910,924)
Supepave	-7,157	TNS	$90.00	($644,130)
STAB	-65,066	SY	$2.90	($188,691)
EE Williamson Road over I-4	-409	SF	$160.00	($65,472)
EE Williamson Ped Bridge over I-4	-108	SF	$160.00	($17,280)
Lake Mary Blvd EB over I-4	-1,435	SF	$160.00	($229,632)
Lake Mary Blvd WB over I-4	-1,435	SF	$160.00	($229,632)
CR 46A over I-4	-1,206	SF	$160.00	($192,960)
I-4 EB over SR 46	-2,425	SF	$160.00	($388,032)
I-4 WB over SR 46	-2,425	SF	$160.00	($388,032)
I-4 over Outfall Ditch	-276	SF	$160.00	($44,160)
I-4 WB over Orange Blvd & CSX RR	-3,360	SF	$160.00	($537,600)
I-4 EB over Orange Blvd & CSX RR	-2,946	SF	$160.00	($471,360)
Subtotal				($4,307,905)
Compensable Utility Relocation (5%)	1	LS		($215,395)
Mobilization (10%)	1	LS		($430,791)
Maintenance of Traffic (20%)	1	LS		($861,581)
Lighting (5%)	1	LS		($215,395)
Signage (5%)	1	LS		($215,395)
Drainage (20%)	1	LS		($861,581)
ITS (5%)	1	LS		($215,395)
Erosion Control (1%)	1	LS		($43,079)
Subtotal				($7,366,518)
Contingency (20%)		LS		($1,473,304)
		CONSTRUCTION TOTAL		**($8,839,822)**

Construction Savings: $8,839,822
Right of Way Savings: $266,000
$9,105,822

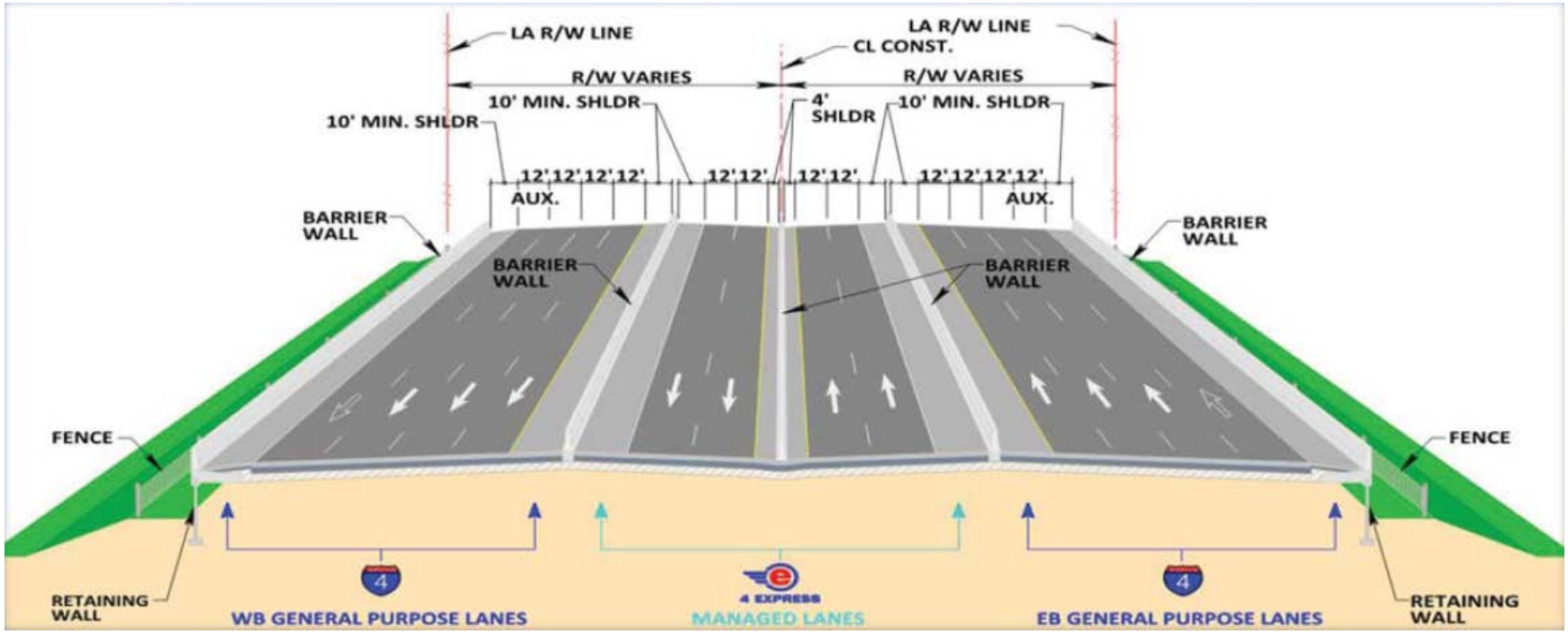
RECOMMENDATION No. 4: Maintain the design variation in the Ultimate section though the entire

PROPOSED TYPICAL SECTION



RECOMMENDATION No. 4: Maintain the design variation in the Ultimate section though the entire

VE TYPICAL SECTION (I-4 ULTIMATE)



RECOMMENDATION No. 5: Consider concrete express lanes

Proposed Alternative:
The PD&E Documents show the Typical Section shows two express lanes in each direction, with 10 ft. outside shoulder against barrier wall, and 6 ft. inside shoulder against barrier wall using asphalt pavement.

VE Alternative:
Construct the entire 9.229 mile project's Express Lanes and inside shoulders in concrete pavement only.

Advantages:

- Less maintenance over time.
- Improved life cycle cost
- Lessens loss of revenue during resurfacing

Disadvantages:

- Increased capital cost to construct

FHWA CATEGORIES

___Safety _X__Operations ___Environment ___Construction ___Other

Life Cycle Cost Savings: $8,130,000

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
JPCP	352,000	SY	$60.00	$21,120,000
OBG 1	352,000	SF	$10.00	$3,520,000
Edgedrain	105,600	LF	$26.75	$2,824,800
FC-5	-14,000	TN	$117.20	($1,640,800)
Superpave	-78,000	SY	$87.21	($6,802,380)
OBG 9	-281,600	SY	$13.75	($3,872,000)
OBG 6	-70,400	SY	$13.69	($963,776)
Subtotal				$14,185,844
Compensable Utility Relocation (5%)	1	LS		$709,292
Mobilization (10%)	1	LS		$1,418,584
Maintenance of Traffic (20%)	1	LS		$2,837,169
Lighting (5%)	1	LS		$709,292
Signage (5%)	1	LS		$709,292
Drainage (20%)	1	LS		$2,837,169
ITS (5%)	1	LS		$709,292
Erosion Control (1%)	1	LS		$141,858
Subtotal				$24,257,793
Contingency (20%)		LS		$4,851,559
			CONSTRUCTION TOTAL	**$29,109,352**

LIFE CYCLE COST

(PRESENT WORTH METHOD)

VE Rec. No.

Project / **Location**			ORIGINAL		VE ALTERNATE	
PROJECT LIFE CYCLE (YEARS)	75					
DISCOUNT RATE (% in decimals)	5%					
Construction Costs			Est.	PW	Est.	PW
A) Asphalt Pavement			$18,854,000	$18,854,000		
B) Concrete					$21,120,000	$21,120,000
C)						
D)						
E)						
F)						
Other Initial Costs						
A)						
B)						
Total Initial Cost Impact (IC)				$18,854,000		$21,120,000
Initial Cost PW Savings						($2,266,000)
Replacement/Salvage Costs	Year	Factor				
A) Resurfacing	12	0.5568	$10,000,000	$5,568,374		
B) Resurfacing	24	0.3101	$10,000,000	$3,100,679		
C) Resurfacing	36	0.1727	$10,000,000	$1,726,574		
D)						
E)						
F)						
G)						
H)						
Total Replacement/Salvage PW Costs				$10,395,627		
Operation/Maintenance Cost	Escl..00	PWA				
A)						
B)						
C)						
D)						
E)						
F)						
G)						
Total Operation/Maintenance (PW) Costs						
Total Present Worth Life Cycle Costs				**$29,249,627**		**$21,120,000**
Life Cycle (PW) Savings						**$8,129,627**

PW - Present Worth PWA - Present Worth of Annuity

RECOMMENDATION No. 6: Relocate the sidewalk off of back of curb at the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations

Proposed Alternative:
The PD&E Documents show leaving Lake Mary Blvd. as is except for replacing the bridge with longer spans across the new typical section.

VE Alternative:
Construct a new sidewalk off of the back of curb in front of the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations.

Advantages:

- Adds missing sidewalk
- Avoids having to relocate the utilities
- Better for the pedestrians

Disadvantages:

- Increases cost
- Requires right of way acquisition
- Dependent on grade separation of Lake Mary Blvd.

FHWA CATEGORIES

_X__Safety ___Operations ___Environment ___Construction ___Other

Potential Value Added: ($238,000)

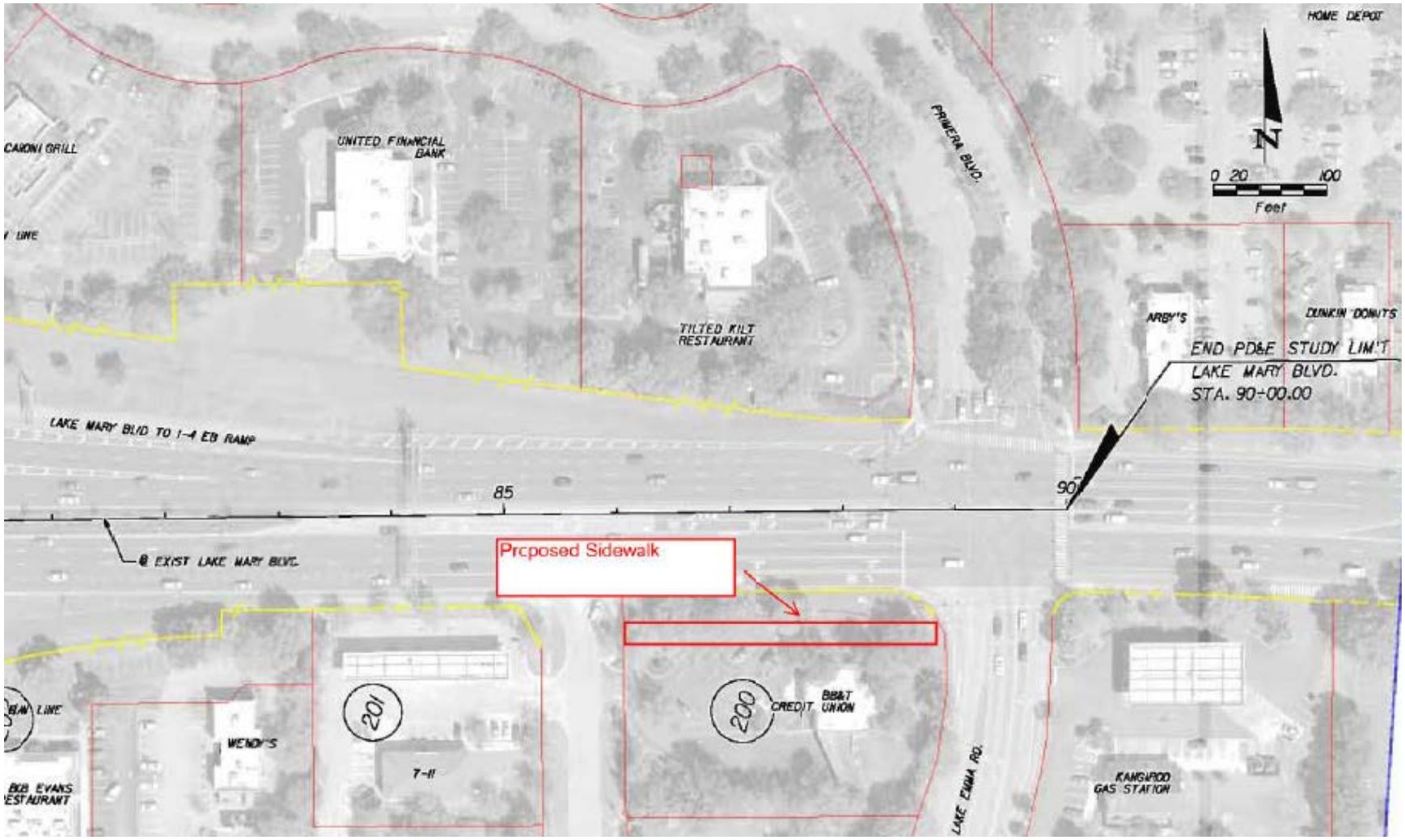
RECOMMENDATION No. 6: Relocate the sidewalk off of back of curb at the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Sidewalk	167	SY	$30.00	$5,010
Subtotal				$5,010
Compensable Utility Relocation (5%)	1	LS		$0
Mobilization (10%)	1	LS		$0
Maintenance of Traffic (10%)	1	LS		$0
Lighting (5%)	1	LS		$0
Signage (5%)	1	LS		$0
Drainage (20%)	1	LS		$0
ITS (5%)	1	LS		$251
Erosion Control (1%)	1	LS		$50
Subtotal				$5,311
Contingency (20%)		LS		$531
		CONSTRUCTION TOTAL		**$5,842**

Construction Cost: **$6,000**
Right of Way Cost: **$232,000**
$238,000

RECOMMENDATION No. 6: Relocate the sidewalk off of back of curb at the BB&T Bank on Lake Mary Blvd. by purchasing an easement or right of way to avoid utility relocations



RECOMMENDATION No. 7: Don't build the 6-ft. sidewalk on the south side of the bridge at EE Williamson Road

Proposed Alternative:
The PD&E Documents show adding a 6-foot sidewalk on the south side of the EE Williamson Road bridge replacement.

VE Alternative:
Replace the EE Williamson Road Bridge without adding the 6-foot sidewalk on the south side, and leave the trail on the north side for pedestrian access. There are pedestrian crosswalks across EE Williamson Road about 600 feet on either side of the bridge.

Advantages:

- Less capital and future maintenance cost.
- Reduced construction time (less bridge and wall to construct).
- Ability to maintain existing slope on the southeast side of the bridge embankment.

Disadvantages:

- Less pedestrian friendly.

FHWA CATEGORIES

___Safety ___Operations ___Environment __X_Construction ___Other

Potential Cost Savings: $851,000

RECOMMENDATION No. 7: Don't build the 6-ft. sidewalk on the south side of the bridge

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Sidewalk Concrete	-90	CY	$30.59	($2,753)
Bridge	-1,620	SF	$160.00	($259,200)
MSE Wall	-4,500	SF	$34.00	($153,000)
Subtotal				($414,953)
Compensable Utility Relocation (5%)	1	LS		($20,748)
Mobilization (10%)	1	LS		($41,495)
Maintenance of Traffic (20%)	1	LS		($82,991)
Lighting (5%)	1	LS		($20,748)
Signage (5%)	1	LS		($20,748)
Drainage (20%)	1	LS		($82,991)
ITS (5%)	1	LS		($20,748)
Erosion Control (1%)	1	LS		($4,150)
Subtotal				($709,570)
Contingency (20%)		LS		($141,914)
	CONSTRUCTION TOTAL			**($851,484)**

RECOMMENDATION No. 7: Don't build the 6-ft. sidewalk on the south side of the bridge

RECOMMENDATION No. 8: Add direct connect ramps to the express lanes at EE Williamson

Proposed Alternative:
The PD&E Documents show entry and exit points for the express lanes approximately 2 miles west of the Lake Mary Boulevard Interchange, 1.2 miles east of the Lake Mary Boulevard Interchange, and at the SR 417/Wekiva Parkway Interchange.

VE Alternative:
The VE Alternative is to consider adding direct access to the express lanes via direct connect on and off ramps at the EE Williamson Road overpass. This addition would introduce an additional entry/exit point to I-4 between SR 434 and Lake Mary Boulevard where there is none today, without adding a full interchange. This area has a large number of residential homes and many of the residents of these communities likely utilize I-4 for their daily commute into Orlando. Projected traffic volumes forecast a large number of vehicles making right turns onto Lake Emma Road from Lake Mary Boulevard and a large number of vehicles making left turns onto Lake Mary Boulevard from Lake Emma Road. Providing direct access to the express lanes at this location has the potential to improve the commute for the residents in the area and improve the operations of the Lake Mary Boulevard and SR 434 interchanges by modifying the traffic demand. This redirected traffic would also improve the operations of the Lake Mary Boulevard and Lake Emma Road/Primea Drive intersection.

Advantages:

- Improved commute times and access to the interstate from the residential areas between SR 434 and Lake Mary Boulevard.
- Potential for improved operations and less delay at the Lake Mary Boulevard and SR 434 interchanges.
- Potential for improved operations and less delay at the intersection of Lake Mary Boulevard and Lake Emma Road/Primera Drive.

Disadvantages:

- Increased construction costs.
- Requires longer/wider overpass bridge.
- Increased traffic demand on EE Williamson Road that may create need for additional improvements on surrounding network.

FHWA CATEGORIES

___Safety __X_Operations ___Environment ___Construction ___Other

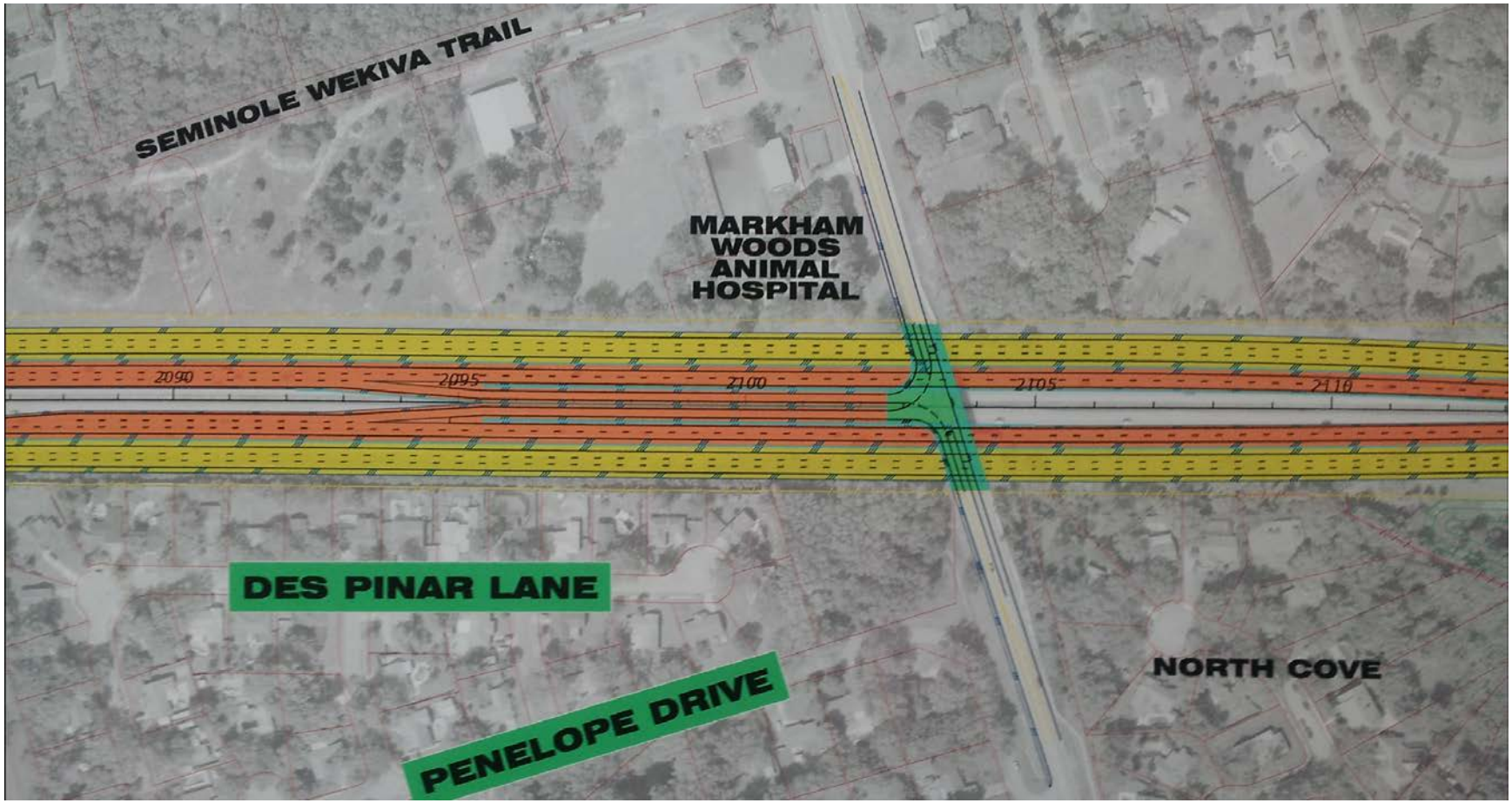
Potential Value Added: ($3,902,000)

RECOMMENDATION No. 8: Add direct connect ramps to the express lanes at EE Williamson

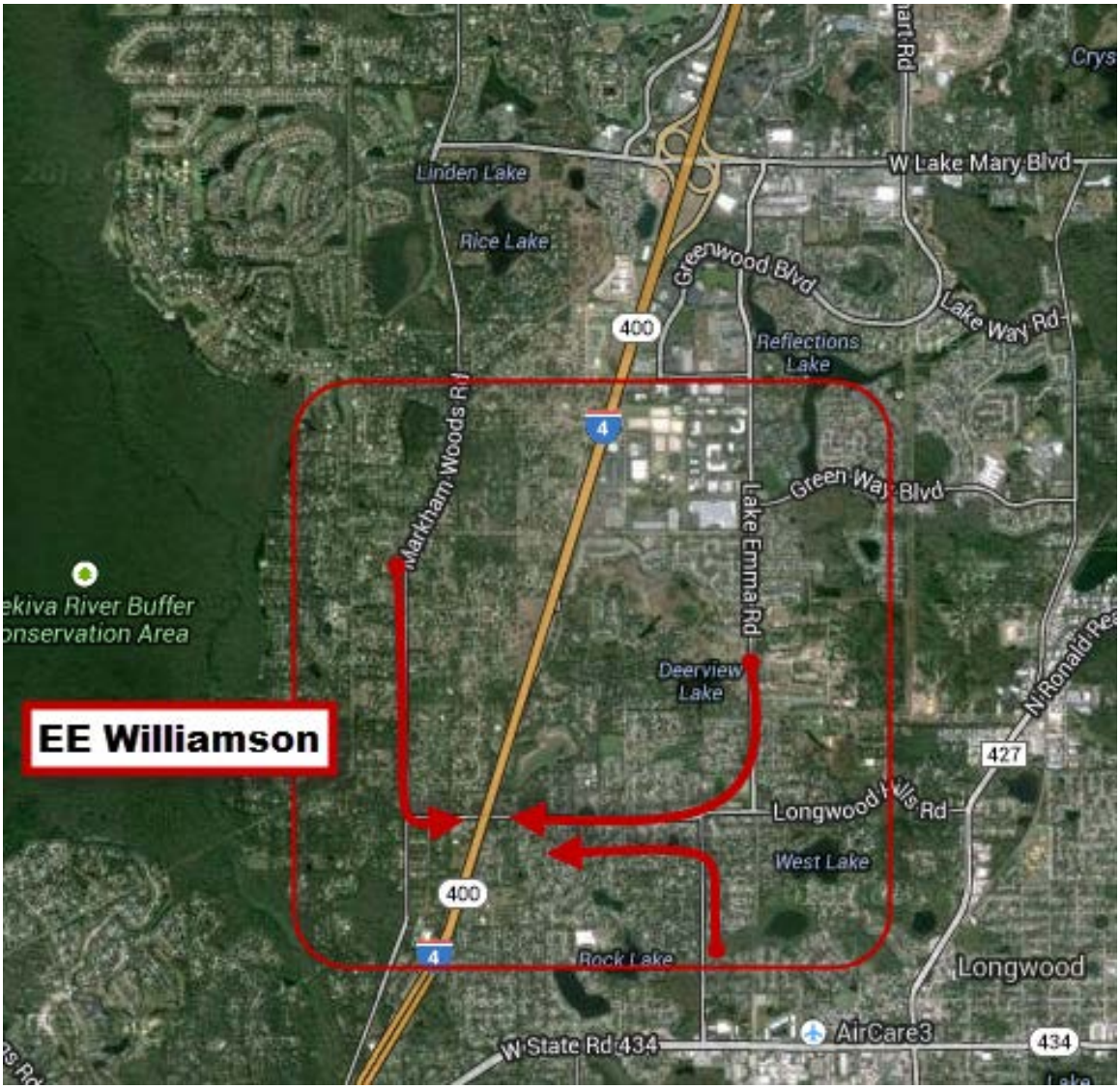
Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Stabilization Type B LBR 40	7,833	SY	$2.90	$22,717
Base optional (base group 6) ML	2,500	SY	$13.69	$34,225
Base optional (base group 12) ML	533	SY	$14.02	$7,477
Superpave asphaltic concrete (Traff B)	87	TN	$87.28	$7,618
Superpave asphaltic concrete (Traff D)	293	TN	$87.21	$25,580
Asphaltic Conc friction course (FC-5) (PG 76-22)	213	TN	$117.20	$25,003
Barrier Wall	800	LF	$113.00	$90,400
Thermoplastic Striping	1	NM	$3,178.00	$2,107
Additional Bridge Structure	9,300	SF	$120.00	$1,116,000
Embankment	29,944	CY	$5.94	$177,870
MSE wall	11,550	SF	$34.00	$392,700
Subtotal				$1,901,696
Compensable Utility Relocation (5%)	1	LS		$95,085
Mobilization (10%)	1	LS		$190,170
Maintenance of Traffic (20%)	1	LS		$380,339
Lighting (5%)	1	LS		$95,085
Signage (5%)	1	LS		$95,085
Drainage (20%)	1	LS		$380,339
ITS (5%)	1	LS		$95,085
Erosion Control (1%)	1	LS		$19,017
Subtotal				$3,251,900
Contingency (20%)		LS		$650,380
			CONSTRUCTION TOTAL	**$3,902,280**

RECOMMENDATION No. 8: Add direct connect ramps to the express lanes at EE Williamson



RECOMMENDATION No. 8: Add direct connect ramps to the express lanes at EE Williamson



RECOMMENDATION No. 9: Modify the eastbound Lake Mary Blvd. to eastbound I-4 ramp to begin before the interchange signal on the west side of I-4

Proposed Alternative:
The PD&E Documents show maintaining the existing interchange configuration for the westbound Lake Mary Boulevard to eastbound I-4 on ramp. As it exists, traffic making this movement travels through the signal for the westbound off ramp before entering the taper for the ramp.

VE Alternative:
The VE alternative for this ramp is to begin the taper for the eastbound on ramp west of the westbound off ramp intersection. This would allow vehicles traveling east on Lake Mary Boulevard to enter the ramp before the traffic signal without stopping. As a result, the signal timings and operations of the I-4 westbound off ramp intersection could be improved.

Advantages:

- Direct access to the on ramp without traffic stopping at the traffic signal
- Less delay as a result of improved signal timings and operations.

Disadvantages:

- Requires wider bridge and increased structure costs.
- Increased costs associated with the longer ramp.

FHWA CATEGORIES

___Safety _X__Operations ___Environment ___Construction ___Other

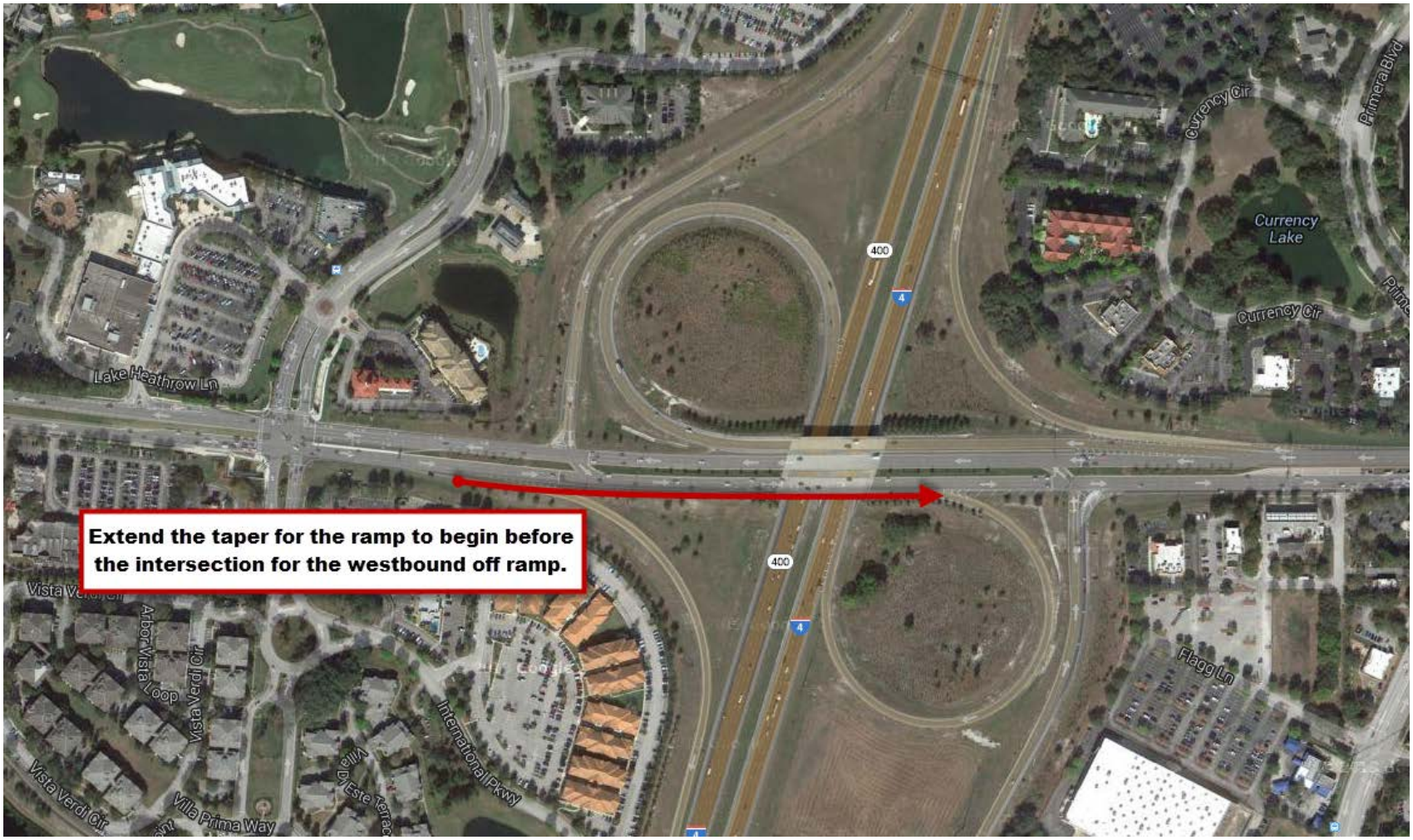
Potential Value Added: ($822,000)

RECOMMENDATION No. 9: Modify the eastbound Lake Mary Blvd. to eastbound I-4 ramp to begin before the interchange signal on the west side of I-4

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Stabilization Type B LBR 40	2,928	SY	$2.90	$8,491
Base optional (base group 6) ML	1,511	SY	$13.69	$20,687
Base optional (base group 12) ML	1,417	SY	$14.02	$19,862
Superpave asphaltic concrete (Traff B)	166	TN	$87.28	$14,488
Superpave asphaltic concrete (Traff D)	312	TN	$87.21	$27,210
Asphaltic Conc friction course (FC-5) (PG 76-22)	78	TN	$117.20	$9,142
Barrier Wall	250	LF	$113.00	$28,250
Thermoplastic Striping	0.19	NM	$3,178.00	$602
Additional Bridge Structure	1,700	SF	$160.00	$272,000
Subtotal				$400,731
Compensable Utility Relocation (5%)	1	LS		$20,037
Mobilization (10%)	1	LS		$40,073
Maintenance of Traffic (20%)	1	LS		$80,146
Lighting (5%)	1	LS		$20,037
Signage (5%)	1	LS		$20,037
Drainage (20%)	1	LS		$80,146
ITS (5%)	1	LS		$20,037
Erosion Control (1%)	1	LS		$4,007
Subtotal				$685,251
Contingency (20%)		LS		$137,050
	CONSTRUCTION TOTAL			**$822,301**

RECOMMENDATION No. 9: Modify the eastbound Lake Mary Blvd. to eastbound I-4 ramp to begin before the interchange signal on the west side of I-4



RECOMMENDATION No. 11: Provide a grade separated intersection at Lake Mary Blvd & Primera Blvd/Lake Emma Rd.

Proposed Alternative:
The PD&E Documents show no changes to the intersection of Lake Mary Blvd. and Primera Blvd./Lake Emma Rd.

VE Alternative:
Construct a grade separated intersection at Lake Mary Blvd. and Primera Blvd./ Lake Emma Rd. This concept would have Lake Mary Blvd. as a flyover with frontage roads on either side to accommodate local traffic.

Advantages:

- Improves LOS of Lake Mary Blvd.
- Improves LOS of Lake Mary Blvd. and I-4 interchange

Disadvantages:

- Increases cost
- More difficult MOT scheme
- Additional future maintenance due to the added bridge structure
- Added constructability issues

FHWA CATEGORIES

_X__Safety _X__Operations ___Environment ___Construction ___Other

Potential Value Added: ($60,192,000)

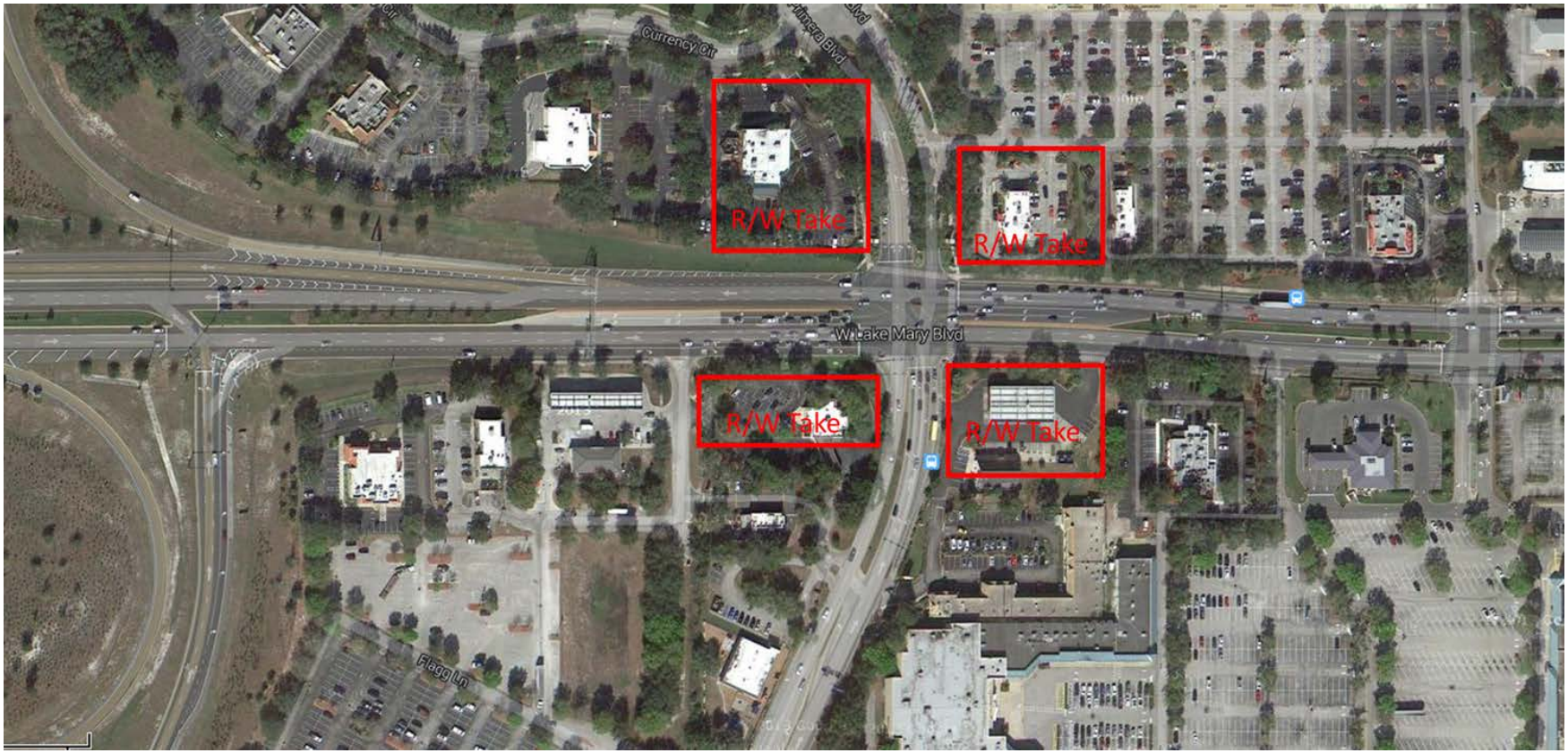
RECOMMENDATION No. 11: Provide a grade separated intersection at Lake Mary Blvd & Primera Blvd/ Lake Emma Rd

Calculations:

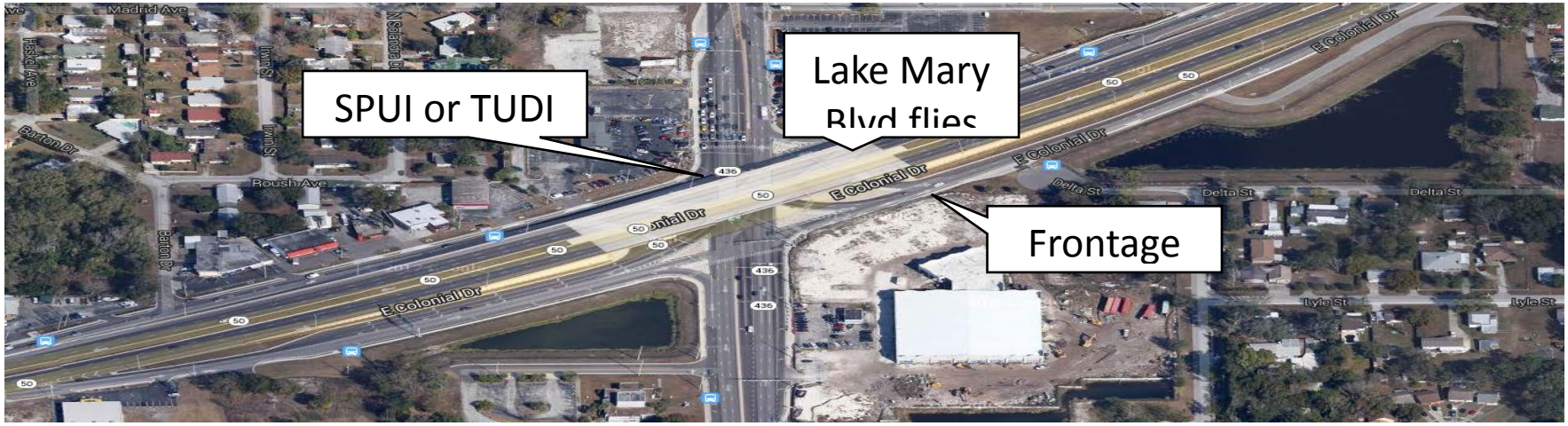
Description	Quantity	Unit	Unit Price	Extended Amount
Flyover	1	LS	($20,000,000.00)	($20,000,000)
Asphalt	1	LS	($1,000,000.00)	($1,000,000)
Subtotal				($21,000,000)
Compensable Utility Relocation (5%)	1	LS		($1,050,000)
Mobilization (10%)	1	LS		($2,100,000)
Maintenance of Traffic (20%)	1	LS		($4,200,000)
Lighting (5%)	1	LS		($1,050,000)
Signage (5%)	1	LS		($1,050,000)
Drainage (20%)	1	LS		($4,200,000)
ITS (5%)	1	LS		($1,050,000)
Erosion Control (1%)	1	LS		($210,000)
Subtotal				($35,910,000)
Contingency (20%)		LS		($7,182,000)
			CONSTRUCTION TOTAL	**($43,092,000)**

Right of Way Cost $17,100,000

RECOMMENDATION No. 11: Provide a grade separated intersection at Lake Mary Blvd & Primera Blvd/ Lake Emma Rd



RECOMMENDATION No. 11: Provide a grade separated intersection at Lake Mary Blvd & Primera Blvd/ Lake Emma Rd



RECOMMENDATION No. 12: Corridor improvements on Lake Mary Blvd. from the I-4 interchange to Rinehart Rd.

Proposed Alternative:
The PD&E Documents show no changes to the Lake Mary Blvd. corridor.

VE Alternative:
At Primera Blvd./Lake Emma Rd. modify the intersection to add a right turn lane for northbound Lake Emma Rd. Additionally convert the existing right turn lane into a through lane and make the three left turn lanes dedicated left turns. On Primera Blvd. convert the through-left to a dedicated left turn lane and add a through lane. Remove all driveways between Primera Blvd. and Rinehart Rd on Lake Mary Blvd. These businesses can be accessed through the existing frontage roads.

Advantages:

- Improves LOS
- Decrease Crashes

Disadvantages:

- Increases cost
- Public acceptance
- Non-direct access to business

FHWA CATEGORIES

_X__Safety _X__Operations ___Environment ___Construction ___Other

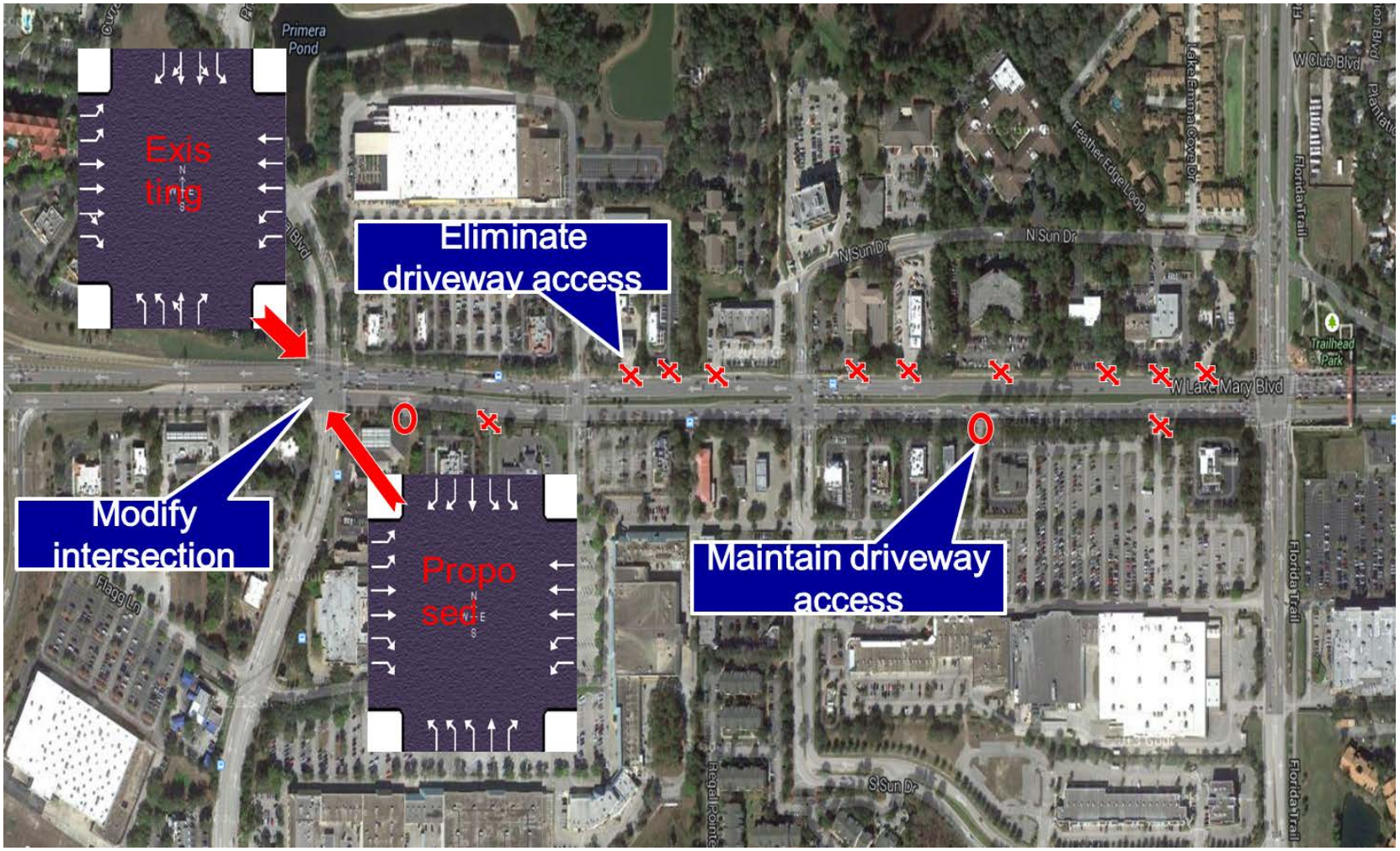
Potential Value Added: ($6,238,000)

RECOMMENDATION No. 12: Corridor improvements on Lake Mary Blvd from the I-4 interchange to Rinehart Rd

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Driveway closure	8	LS	$5,000.00	$40,000
Modifications at Primera/Lake Emma	1	LS	$3,000,000.00	$3,000,000
Subtotal				$3,040,000
Compensable Utility Relocation (5%)	1	LS		$152,000
Mobilization (10%)	1	LS		$304,000
Maintenance of Traffic (20%)	1	LS		$608,000
Lighting (5%)	1	LS		$152,000
Signage (5%)	1	LS		$152,000
Drainage (20%)	1	LS		$608,000
ITS (5%)	1	LS		$152,000
Erosion Control (1%)	1	LS		$30,400
Subtotal				$5,198,400
Contingency (20%)		LS		$1,039,680
		CONSTRUCTION TOTAL		**$6,238,080**

RECOMMENDATION No. 12: Corridor improvements on Lake Mary Blvd from the I-4 interchange to Rinehart Rd



RECOMMENDATION No. 14: Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary Blvd.

Proposed Alternative:
The PD&E Documents show the pedestrian route as being on the westbound side of Lake Mary Boulevard. There is an at-grade one-lane crossing at the eastbound I-4 on ramp. The sidewalk then follows LMB to a point a few hundred feet from the bridge to an at-grade two-lane crossing of westbound Lake Mary Boulevard. There is no signal at this crossing. The pedestrian lane is located in between the double westbound lanes and the rest of the lanes on the Lake Mary Boulevard Bridge. Once off the bridge the sidewalk continues on until it crosses the three lanes of the westbound I-4 off-ramp to Lake Mary Boulevard. There are two left turn lanes and one right turn lane separated by a refuge island.

VE Alternative:
Construct a pedestrian tunnel under the eastbound on-ramp to I-4 to eliminate the two at-grade crossings on the south side of the Lake Mary Boulevard Bridge. Construct a pedestrian tunnel under the westbound off-ramp and from I-4 and the westbound I-4 on-ramp loop on the north side of Lake Mary Boulevard to eliminate the at-grade crossings. Construct a separate pedestrian bridge over the mainline on the north side of Lake Mary Boulevard to match the architectural features of the two existing pedestrian crossings over Lake Mary Boulevard located to the south.

Advantages:

- Increases trail connectivity on both sides of I-4
- Increases safety for the pedestrians on pedestrian bridge due to separation from traffic.
- Provides aesthetic enhancement of the pedestrian bridge that will match the two other pedestrian crossings to the east on Lake Mary Boulevard.
- Maintain the pedestrian's expectation by use of tunnels. There is already a tunnel located at Lake Mary Boulevard and International Parkway.

Disadvantages:

- Increases cost due to separate bridge and addition of tunnels.
- Tunnels are certain candidates for graffiti resulting in constant maintenance issues
- Decreases safety and/or perception of safety for pedestrians in tunnels
- Long tunnel may require ventilation and lighting

FHWA CATEGORIES

_X__Safety _X__Operations ___Environment ___Construction ___Other

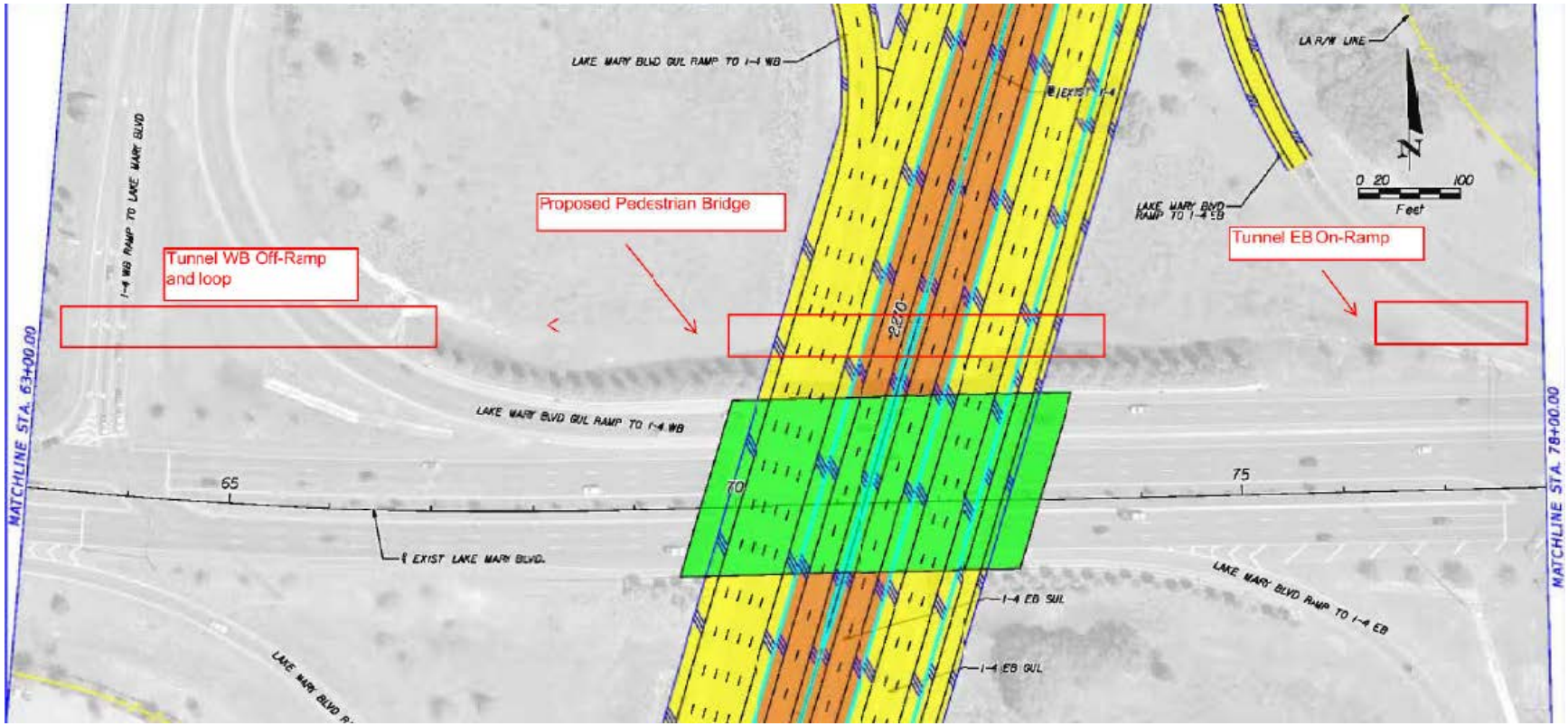
Potential Value Added: ($30,210,247)

RECOMMENDATION No. 14: Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Embankment	-1,000	CY	$15.00	($15,000)
MSE Wall	100	SF	$5.00	$500
Pedestrian Bridge	280	LF	$40,000.00	$11,200,000
Tunnel	140	LF	$25,263.16	$3,536,842
Subtotal				$14,722,342
Compensable Utility Relocation (5%)	1	LS		$736,117
Mobilization (10%)	1	LS		$1,472,234
Maintenance of Traffic (20%)	1	LS		$2,944,468
Lighting (5%)	1	LS		$736,117
Signage (5%)	1	LS		$736,117
Drainage (20%)	1	LS		$2,944,468
ITS (5%)	1	LS		$736,117
Erosion Control (1%)	1	LS		$147,223
Subtotal				$25,175,206
Contingency (20%)		LS		$5,035,041
			CONSTRUCTION TOTAL	**$30,210,247**

RECOMMENDATION No. 14: Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary



RECOMMENDATION No. 14: Construct a pedestrian tunnel under ramps and bridge over the mainline on the north side of Lake Mary

RECOMMENDATION No. 17: Eliminate the right turn lane at International Drive because the outside lane becomes a right turn lane at the intersection

Proposed Alternative:
The PD&E Documents detail the construction of a right turn lane on CR 46A in the westbound direction to the intersection of International Parkway.

VE Alternative:
Eliminate the construction of the additional right turn lane as the lane currently will terminate at the intersection of International Parkway. Propose to use the existing right turn lane, however this may have future consideration when 46A is widened to six lanes beyond the intersection of International Parkway. The challenges that would be encountered during construction the right turn lane would be avoided thus saving additional clearing and grubbing, curb removal and MOT costs.

Advantages:

- Less cost by utilizing a turn lane that currently
- Less disruption to motorists
- No need for the relocation of utilities
- No right of way required

Disadvantages:

- None apparent

FHWA CATEGORIES

___Safety ___Operations ___Environment _X_ Construction ___Other

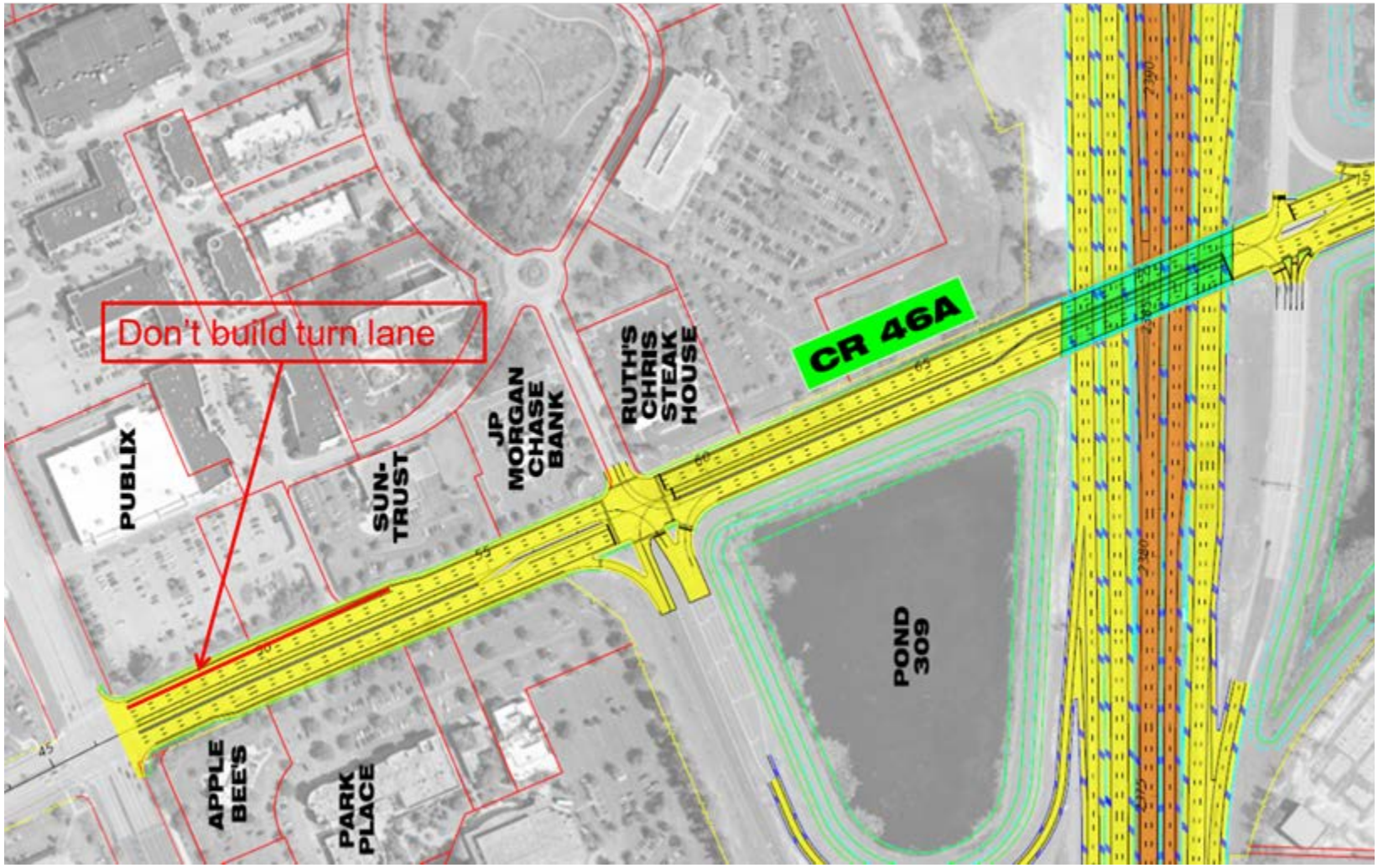
Potential Cost Savings: $62,000

RECOMMENDATION No. 17: Eliminate the right turn lane at International Drive because the outside lane becomes a right turn lane at the intersection

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Type F Curb & Gutter	-700	LF	$17.78	($12,446)
Ashalt Base Group 6	-950	SY	$16.77	($15,932)
Asphalt SP TLD PG 76-22	-13	TN	$89.64	($1,165)
Asphalt Friction Course FC-5 PG 76 22	-4	TN	$117.20	($469)
Thermplastic	-700	FT	$0.11	($77)
Subtotal				($30,089)
Compensable Utility Relocation (5%)	1	LS		($1,504)
Mobilization (10%)	1	LS		($3,009)
Maintenance of Traffic (20%)	1	LS		($6,018)
Lighting (5%)	1	LS		($1,504)
Signage (5%)	1	LS		($1,504)
Drainage (20%)	1	LS		($6,018)
ITS (5%)	1	LS		($1,504)
Erosion Control (1%)	1	LS		($301)
Subtotal				($51,452)
Contingency (20%)		LS		($10,290)
		CONSTRUCTION TOTAL		**($61,742)**

RECOMMENDATION No. 17: Eliminate the right turn lane at International Drive because the outside lane becomes a right turn lane at the intersection



RECOMMENDATION No. 18: Start the second eastbound left to eastbound I-4 after the westbound I-4 on ramp so the shift is under and before the overpass

Proposed Alternative:
The PD&E Documents show that the SR 46 and I-4 eastbound ramp terminal intersection will be changed so that there are two left turn lanes the same length as the existing left turn lane from SR 46 eastbound onto I-4 eastbound and will continue to have three through lanes.

VE Alternative:
Construct a shorter second turn lane that begins after the I-4 westbound on ramp from SR 46 while keeping the three through lanes, thus not impacting the existing sidewalk and retaining wall on the south side of SR 46 adjacent to the I-4 westbound on ramp or the mast arm assembly for the SR 46 and I-4 westbound off ramp.

Advantages:

- Reduced utility impact
- Less capital cost
- Less future maintenance
- Minimizes maintenance of traffic

Disadvantages:

- Decreases left turn lane storage and possibly LOS (pending a traffic study).

FHWA CATEGORIES

___Safety ___Operations _X__Environment _X__Construction ___Other

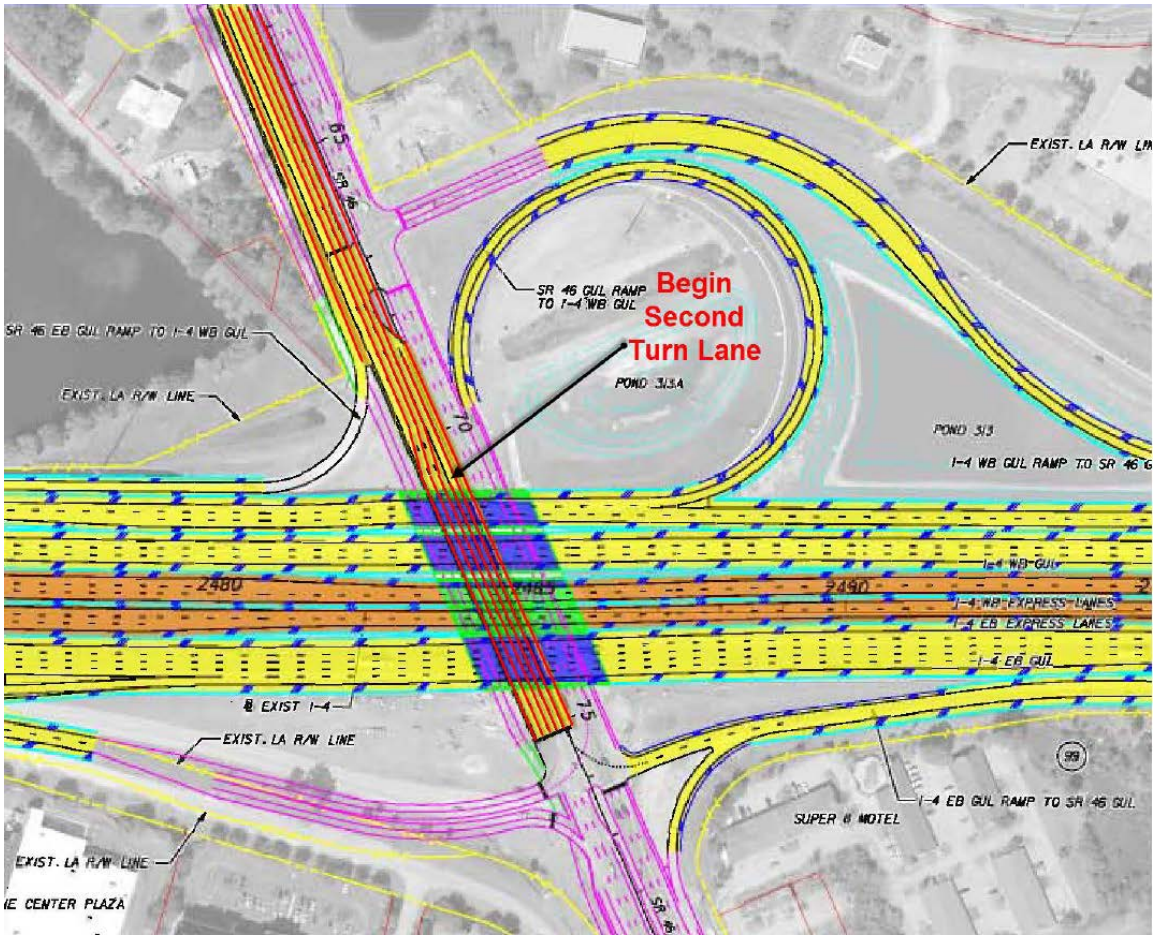
Potential Cost Savings: $164,000

RECOMMENDATION No. 18: Start the second eastbound left to eastbound I-4 after the westbound I-4 on ramp so the shift is under and before the overpass

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Sidewalk Concrete	-25	CY	$30.59	($765)
Retaining Wall	-1,200	SF	$27.27	($32,724)
Mast Arm Assembly	-1	UNIT	$43,000.00	($43,000)
Superpave (Traffic C)	-19	TN	$87.00	($1,653)
Base Optional (Base Group 6)	-112	SY	$13.69	($1,533)
Stabalization Type B LBR 40	-112	SY	$2.90	($325)
Subtotal				($80,000)
Compensable Utility Relocation (5%)	1	LS		($4,000)
Mobilization (10%)	1	LS		($8,000)
Maintenance of Traffic (20%)	1	LS		($16,000)
Lighting (5%)	1	LS		($4,000)
Signage (5%)	1	LS		($4,000)
Drainage (20%)	1	LS		($16,000)
ITS (5%)	1	LS		($4,000)
Erosion Control (1%)	1	LS		($800)
Subtotal				($136,800)
Contingency (20%)		LS		($27,360)
			CONSTRUCTION TOTAL	**($164,160)**

RECOMMENDATION No. 18: Start the second eastbound left to eastbound I-4 after the westbound I-4 on ramp so the shift is under and before the overpass



RECOMMENDATION No. 21: Modify the 17-92 Alternative 1 to better accommodate traffic

Proposed Alternative:
The PD&E Documents Alternative 1 shows the same geometric configuration with the following alterations: the I-4 westbound to US 17/92 loop ramps free flow right is converted to a signal controlled right. The I-4 eastbound to US 17/92 ramp is widened to two lanes. The US 17/92 southbound to Monroe Road southbound free flow right turn is eliminated and brought under signal control.

VE Alternative:
Maintain the same geometric configuration as shown in Alternative 1 with the following alterations: Construct a free flow right from US 17/92 southbound to I-4 westbound on-ramp tying into the existing ramp. Construct a free flow right for the I-4 westbound to US 17/92 loop ramp and maintain the lane under the I-4 overpass. Construct dual rights at US 17/92 southbound to Monroe Rd. southbound along the same alignment as the existing free flow right, but place both rights under signal control. The signal control for the rights will be timed in line with the US 17/92 and Monroe Rd. intersection. The I-4 eastbound to US 17/92 ramp will remain one lane.

Advantages:

- Increases LOS

Disadvantages:

- Right of way Impacts

FHWA CATEGORIES

___Safety _X__Operations _X__Environment _X__Construction ___Other

Potential Cost Savings: $3,117,000

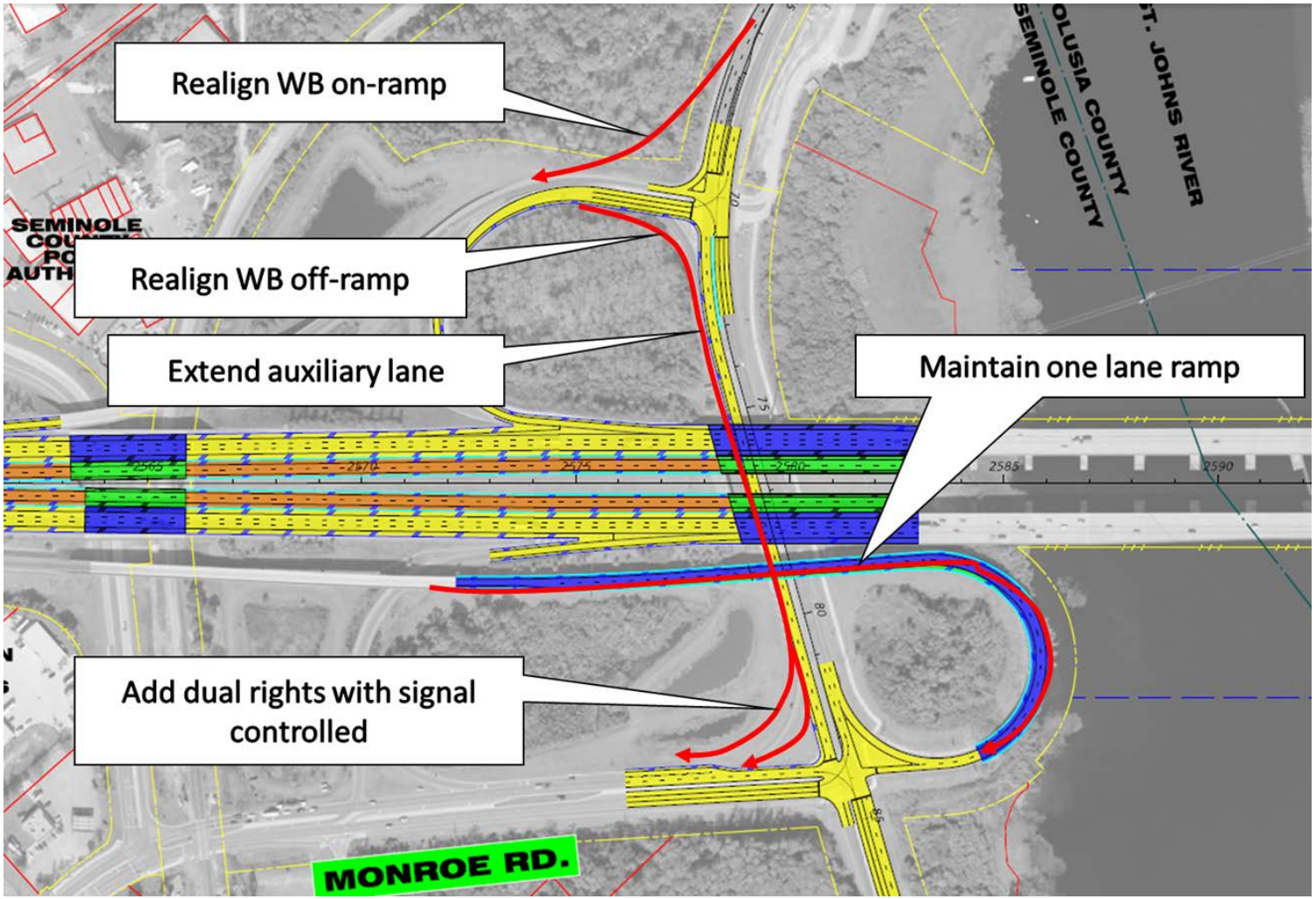
RECOMMENDATION No. 21: Modify the 17-92 Alternative 1 to better accommodate traffic

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Exit ramp widening	-13452	SF	$160.00	($2,152,320)
Subtotal				($2,152,320)
Compensable Utility Relocation (5%)	1	LS		($107,616)
Mobilization (10%)	1	LS		($215,232)
Maintenance of Traffic (20%)	1	LS		($430,464)
Lighting (5%)	1	LS		($107,616)
Signage (5%)	1	LS		($107,616)
Drainage (20%)	1	LS		($430,464)
ITS (5%)	1	LS		($107,616)
Erosion Control (1%)	1	LS		($21,523)
Subtotal				($3,680,467)
Contingency (20%)		LS		($736,093)
	CONSTRUCTION TOTAL			**($4,416,561)**

Right of Way Cost $1,300,000

RECOMMENDATION No. 21: Modify the 17-92 Alternative 1 to better accommodate traffic



RECOMMENDATION No. 22: Consider a skewed 4-leg Orange Ave. intersection that eliminates the left turn off of Monroe Road as a straight movement through the skewed intersection.

Proposed Alternative:
The PD&E Documents shows Alternative 1 has the least changes, it modifies the eastbound I-4 off ramp to a 2-lane off ramp over the St. Johns River. Also the 17-92/I-4 ramp intersection changes to a full signal stop. The SB 17-92 to eastbound I-4 free flow right will be eliminated and all traffic directed to the signal at 17-92 and Monroe Road.

VE Alternative:
Change the Monroe Rd. and Orange Blvd. intersection and create a fourth leg to serve as a northbound Monroe Rd. to I-4 eastbound on ramp. Keep the change in Alternative 1 that modifies the 17-92/I-4 Ramp Intersection, keep the dual lane westbound I-4 off ramp, and keep the changes at 17-92 and Monroe Road. Install advance overhead lane designation signage prior to 17-92/I-4 ramp intersection.

Advantages:

- Eliminates left turn conflicts at median opening on northbound Monroe Road.
- Synchronized signals at 17-92/I-4 ramp intersection, 17-92/Monroe Road and Monroe Road/Orange Boulevard will significantly reduce the weaving conflicts on southbound Monroe Road.
- No right of way acquisition.

Disadvantages:

- Increased cost to construct the new ramp
- Unconventional intersection

FHWA CATEGORIES

_X__Safety _X__Operations ___Environment ___Construction ___Other

Potential Value Added: ($818,000)

RECOMMENDATION No. 22: Consider a skewed 4-leg Orange Ave. intersection that eliminates the left turn off of Monroe Road as a straight movement through the skewed intersection.

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Embankment	10,000	CY	$5.94	$59,400
Stabilization	2,255	SY	$2.90	$6,540
Base Group 9	2,255	SY	$13.75	$31,006
Superpave	300	TN	$90.00	$27,000
Friction Course FC-5	100	TN	$117.00	$11,700
Clear and Grub	1	AC	$7,724.00	$7,724
Guard Rail	300	LF	$16.75	$5,025
Additional RR crossing	1	LS	$250,000.00	$250,000
Subtotal				$398,395
Compensable Utility Relocation (5%)	1	LS		$19,920
Mobilization (10%)	1	LS		$39,839
Maintenance of Traffic (20%)	1	LS		$79,679
Lighting (5%)	1	LS		$19,920
Signage (5%)	1	LS		$19,920
Drainage (20%)	1	LS		$79,679
ITS (5%)	1	LS		$19,920
Erosion Control (1%)	1	LS		$3,984
Subtotal				$681,255
Contingency (20%)		LS		$136,251
		CONSTRUCTION TOTAL		**$817,506**

RECOMMENDATION No. 22: Consider a skewed 4-leg Orange Ave. intersection that eliminates the left turn off of Monroe Road as a straight movement through the skewed intersection.

RECOMMENDATION No. 30: Modify the US 17/92 Alternative 5 interchange

Proposed Alternative:
The PD&E Documents show the US 17/92 alignment shifting south then breaking just east of I-4 and tying into Monroe Rd. The other piece of US 17/92 is brought to the new alignment with a T-intersection. A single point urban interchange (SPUI) is provided for the US 17/92 & I-4 interchange.

VE Alternative:
Construct a tight urban diamond interchange at the US 17/92 & I-4 interchange. Additionally, provide a separate right turn for the eastern most alignment of US 17/92 to go to I-4 EB.

Advantages:

- Less cost
- Better LOS

Disadvantages:

- None apparent

FHWA CATEGORIES

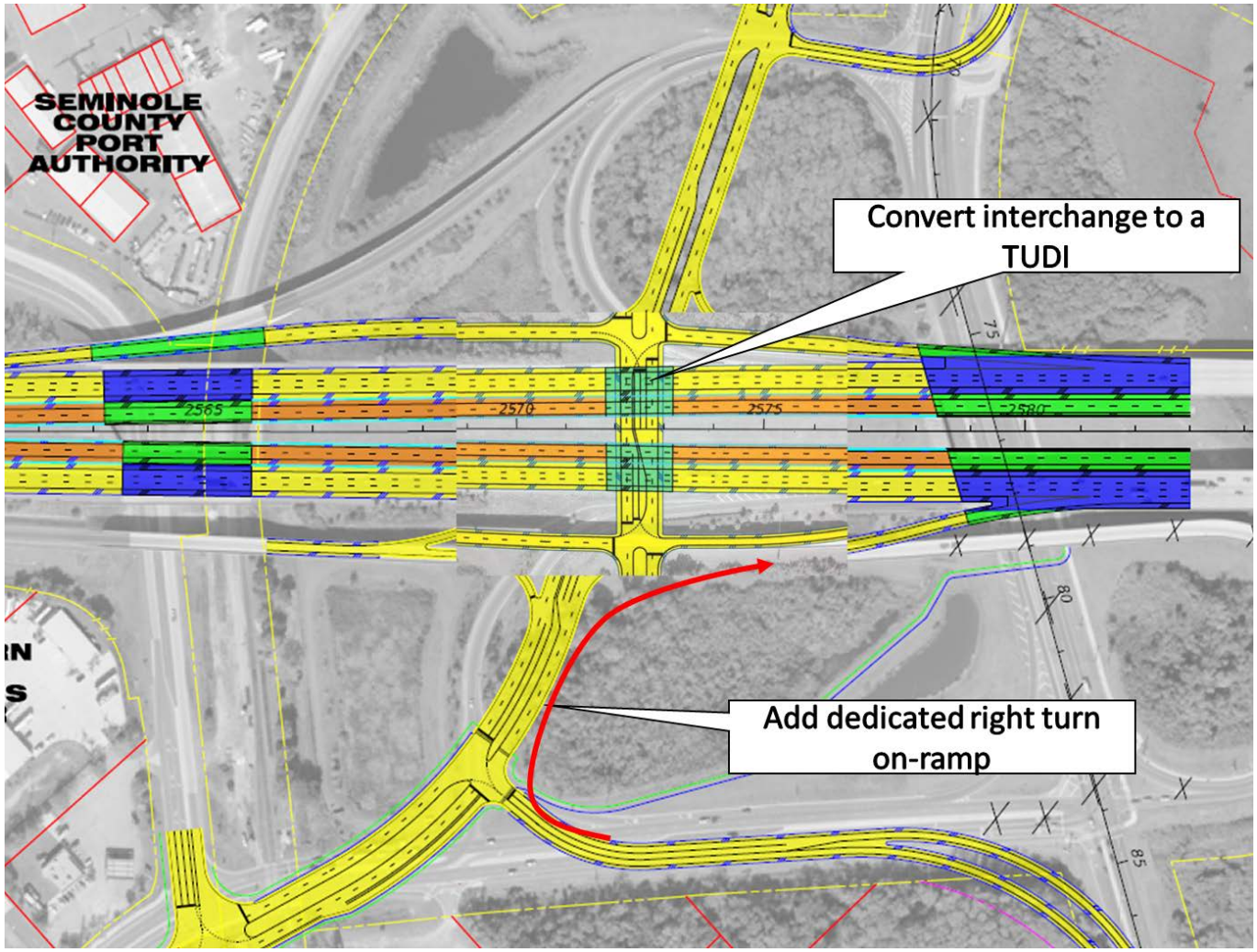
___Safety ___Operations ___Environment ___Construction ___Other

Potential Value Added: ($12,127,000)

Calculations:

Description	Quantity	Unit	Unit Price	Extended Amount
Bridges	1	LS	$6,000,000	$6,000,000
Superpave	-1,000	TN	$90.00	($90,000)
Subtotal				$5,910,000
Compensable Utility Relocation (5%)	1	LS		$295,500
Mobilization (10%)	1	LS		$591,000
Maintenance of Traffic (20%)	1	LS		$1,182,000
Lighting (5%)	1	LS		$295,500
Signage (5%)	1	LS		$295,500
Drainage (20%)	1	LS		$1,182,000
ITS (5%)	1	LS		$295,500
Erosion Control (1%)	1	LS		$59,100
Subtotal				$10,106,100
Contingency (20%)		LS		$2,021,220
			CONSTRUCTION TOTAL	**$12,127,320**

RECOMMENDATION No. 30: Modify the US 17/92 Alternative 5 interchange



APPENDICES

Agenda
Sign In Sheets
Presentation Slides

Agenda
March 31 – April 4, 2014

Day One	Kickoff Intro by VE Team Leader	8:00 am – 8:15 am
	Team Review and Discussions of Documents	8:15 am – 9:30 am
	Designer Orientation	9:30 am – 10:30 am
	Questions for Designers	10:30 am – 11:30 am
	Travel to Site	11:30 am – 12:00 pm
	Lunch	12:00 pm – 1:00 pm
	Site Review	1:00 pm – 3:30 pm
	Return to Lake Mary	3:30 pm – 4:00 pm
	Summarize Site Review & Constraints	4:00 pm – 5:00 pm
Day Two	Cost Model & Function Analysis	8:00 am –9:00 am
	FAST Diagram	9:00 am – 9:30 am
	Intro to Creative Thinking	10:00 am – 10:15 am
	Creative Idea Listing/Function	10:15 am – 12:00 pm
	Lunch	12:00 pm – 1:00 pm
	Creative/Evaluation/Function	1:00 pm – 5:00 pm
Day Three	Evaluation Phase	8:00 am – 12:00 pm
	Lunch	12:00 pm – 1:00 pm
	Mid-point review and determine economic factors	1:00 pm – 2:00 pm
	Begin Development Phase	2:00 pm – 5:00 pm
Day Four	Continue Development	8:00 am – 5:00 pm
Day Five	Finish Development/Prepare Oral Presentation	8:00 am – 10:30 am
	Oral Presentation to FDOT/others	10:30 am – 12:00 pm
	Begin Draft Value Engineering Report	12:00 pm – 5:00 pm

FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING KICKOFF

I-4 from 1 Mile East of SR 434 to East of SR 15/600 (US 17/92)

March 31, 2014

SIGN IN SHEET

Name	Representing	Phone Number	Email Address
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FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING MID-POINT REVIEW

I-4 from 1 Mile East of SR 434 to East of SR 15/600 (US 17/92)

April 2, 2014

SIGN IN SHEET

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FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING STUDY PRESENTATION
I-4 from 1 Mile East of SR 434 to East of SR 15/600 (US 17/92)

April 4, 2014

SIGN IN SHEET

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NEIL KENK	~	5419	NEIL.KENK ~
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FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING STUDY PRESENTATION
I-4 from 1 Mile East of SR 434 to East of SR 15/600 (US 17/92)

April 4, 2014

SIGN IN SHEET

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FLORIDA DEPARTMENT OF TRANSPORTATION

VALUE ENGINEERING STUDY PRESENTATION

I-4 from 1 Mile East of SR 434 to East of SR 15/600 (US 17/92)

April 4, 2014

SIGN IN SHEET

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Adam Brennan	Structures Maint.	386-740-3408	Adam.Brennan@dot.state.fl.us
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George Gilhooly	HNTB	407 805 0355	GGilhooly@hntb.com

SLIDE PRESENTATION