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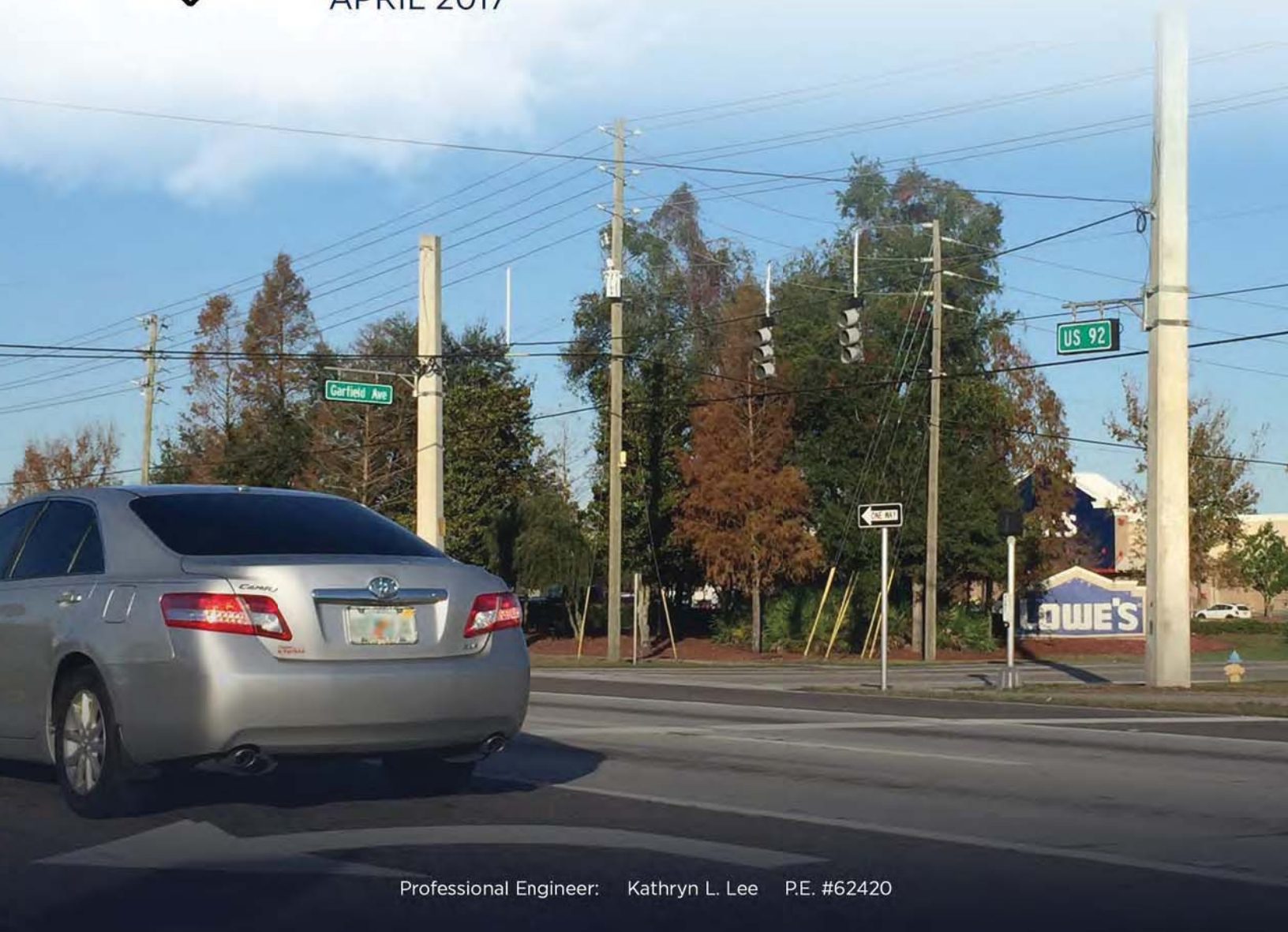
River to Sea Transportation
Planning Organization (R2CTPO)
2570 W International Speedway Blvd.
Suite 100
Daytona Beach, FL 32114

INTERSECTION ANALYSIS

US 92/INTERNATIONAL SPEEDYWAY BLVD. at GARFIELD AVE.

APRIL 2017



Professional Engineer: Kathryn L. Lee P.E. #62420

Final Report

Intersection Analysis for US 92/International Speedway Blvd. at Garfield Ave.

April 2017

Prepared for:

River to Sea Transportation Planning Organization (R2CTPO)
2570 W. International Speedway Blvd., Suite 100
Daytona Beach, FL 32114-8145

Prepared by:
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225 E. Robinson Street,
Orlando, FL – 32801

Professional Engineer: Kathryn L. Lee
P.E. # 62420
April 07, 2017

Intersection Analysis
For
US 92/International Speedway Blvd. at Garfield Ave.

Task 2016-1-1
Work Order #1

VOLUSIA COUNTY

Prepared for:

Prepared by:

Vanasse Hangen Brustlin, Inc.
Orlando, FL

April 2017

EXECUTIVE SUMMARY

This report presents the results of an Intersection Analysis completed for US 92/International Speedway Boulevard at Garfield Avenue, which is located in the City of DeLand in Volusia County, Florida. This report was prompted by an application by Volusia County to construct a right turn lane along eastbound US 92/International Speedway Boulevard and to extend the existing left turn lane along westbound US 92/International Speedway Boulevard at Garfield Avenue.

The existing westbound left turn lane on US 92/International Speedway Boulevard is approximately 400 feet long with a taper of 50 feet. The proposed extension of the left turn will enable vehicles to move out of the through lane and move into the designated turn lane, and improve the overall intersection operations. Constructing an eastbound right turn lane will enable vehicles to move out of the way of through traffic and decelerate in a separate turn lane, thus decreasing delay to through vehicles and reducing the risk of rear end crashes. In addition to this improvement, this study recommends installing a northbound right turn lane and pedestrian safety improvements as mentioned below.

Based upon the crash analyses, qualitative assessment, field observations, intersection analysis, Benefit/Cost (B/C) analysis and engineering judgment, the following modifications are recommended to improve the safety and operation of the intersection:

1: Extend the existing left turn lane along westbound US 92/International Speedway Boulevard at Garfield Avenue. There were no physical constraints observed that would impede the 200' extension of the westbound left turn lane at the intersection of US 92/International Speedway Boulevard and Garfield Avenue. Therefore, the extension of the westbound left turn lane is considered feasible at this location. The left turn lane extension will have a beneficial effect to the operation of the westbound movement as well as to the intersection as a whole. The above modification can be implemented at an approximate cost of $13,871.97.

2: Construct a right turn lane along eastbound US 92/International Speedway Boulevard at Garfield Avenue. The right of way is sufficient to install a separate right turn lane on the

eastbound approach; however, the existing drainage swale would need to be reworked and the cross drain would need to be extended along the southwest quadrant of the intersection. The existing pedestrian signal, pull box and pedestrian landing, equipped with a handrail, would need to be relocated. A separate right turn lane will have a beneficial effect to the operation of the eastbound movement as well as to the intersection as a whole. The above modification can be implemented at an approximate cost of $72,244.04.

3: Construct a right turn lane along northbound Garfield Avenue at US 92/International Speedway Boulevard. Type F curb and gutter would be needed along the east side of Garfield Avenue to fit a separate northbound right turn lane within the limited right-of-way. As the improvements are conceptual, survey was not provided, and the right of way lines shown on the Improvement Diagram are based on lot and parcel lines pulled from the Volusia County Property Appraisers web page. It is not anticipated that the existing traffic signal poles will need to be relocated; however, there are overhead utilities along the east side of Garfield Avenue that would require relocation. The northbound right turn lane will reduce delay and queueing on Garfield Avenue. The above modification can be implemented at an approximate cost of $49,357.65 (not including any additional right-of-way or utility relocation that might be required).

Modifications 1-3 can be implemented at an approximate cost of $135,473.65 and yields a B/C ratio of 5.39, which indicates that the anticipated benefits outweigh the estimated costs for the proposed modifications

4: Extend the existing sidewalks along the east and west sides of Garfield Avenue on the south approach all the way to the intersection of US 92/International Speedway Boulevard and Garfield Avenue. These connections will provide a safe passage for pedestrians by eliminating the need for them to walk on the pavement or in the grass. **Provide crosswalks along the east and south legs of the US 92/International Speedway Boulevard and Garfield Avenue intersection**. The cost for these recommendations (provided as a separate item) is estimated at $15,672.76.

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INTRODUCTION

VHB, Inc. was retained to perform an Intersection Analysis for US 92/International Speedway Boulevard at the intersection of Garfield Avenue, which is located in the City of DeLand in Volusia County, Florida, as illustrated in Figure 1. This report was prompted by an application by Volusia County to construct an eastbound right turn lane and to extend the existing westbound left turn lane at the US 92/International Speedway Boulevard and Garfield Avenue intersection. The purpose of the analysis is to identify cost feasible intersection improvements that may be appropriate to reduce intersection congestion and delay. In addition to these improvements, this study recommends installing a northbound right turn lane (based on information/comments provided by FDOT) and sidewalk improvements to promote pedestrian safety. This final report was revised based on the comments received from Volusia County and Florida Department of Transportation (FDOT) on the draft report. The comments provided by the County and FDOT, along with comment responses, are provided in **Appendix A**. The analysis will particularly consider the benefits and feasibility of adding a dedicated eastbound right turn lane, northbound right turn lane and extending the westbound left turn lane at the intersection of US 92/International Speedway Boulevard and Garfield Avenue.

The analysis methods used in completing this study are consistent with the Manual on Uniform Traffic Control Devices (MUTCD), the Manual on Uniform Traffic Studies (MUTS), the Traffic Engineering Manual (TEM) and engineering judgment. The remainder of this report documents existing conditions, vehicle and pedestrian counts, qualitative assessments, crash analyses, intersection analysis, B/C Analysis and recommendations.

\\vhb\proj\Orlando\62393.01 US 92 at Garfield R2CTPO\graphics\FIGURES\AI

Figure 1

Site Location Map

EXISTING CONDITIONS

Field Inventory

The intersection of US 92/International Speedway Boulevard and Garfield Avenue is located in the City of DeLand in Volusia County, Florida. The Existing Condition Diagram, Figure 2, depicts the existing conditions at the study intersection including the general roadway geometry, pavement markings, land use, and intersection traffic control. In addition, photographs of the existing conditions around the intersection are provided at the end of this section. The conditions stated in this report reflect conditions as observed on the date of the qualitative assessment.

The intersection of US 92/International Speedway Boulevard and Garfield Avenue is a "plus" shaped intersection with US 92/International Speedway Boulevard running east-west and Garfield Avenue running north-south. The intersection is under signal control.

US 92/International Speedway Boulevard is a 4-lane divided roadway and Garfield Avenue is a 2 – lane undivided roadway. At the intersection, there is a separate left turn lane for all approaches, except the northbound which has a shared left through and right turn lane. There is a separate right turn lane in westbound direction only. The posted speed limits are 45 mph along US 92/International Speedway Boulevard and 25 mph and 30 mph along Garfield Avenue north and south of the intersection, respectively.

The traffic signal is a box span strain pole design with concrete poles located in all four quadrants of the intersection. The signal phasing provides protected/permissive left turns from US 92/International Speedway Boulevard and permissive left turns from Garfield Avenue. There are signalized special emphasis pedestrian crosswalks across the north and west legs of the intersection. Sidewalks run along the north side of US 92/International Speedway Boulevard (west of intersection) and the east side of Garfield Avenue (north of intersection), and both east & west sides of Garfield Avenue (south of the intersection). The sidewalks along Garfield Avenue do not extend to the intersection. A shared-use trail runs along the north side of US 92/International Speedway Boulevard between the sidewalk and the roadway. There is no street lighting along US 92/International Speedway Boulevard or along Garfield Avenue.

The land use within the vicinity of the intersection consists of a Lowe's Home Improvement in the northwest quadrant, a DQ Grill & Chill restaurant in the northeast quadrant, a Dunkin Donuts and Comfort inn in the southwest quadrant and an AutoZone in the southeast quadrant. US 92/International Speedway Boulevard is a major arterial connecting the City of DeLand to I-95 and the City of Daytona Beach. Garfield Avenue is largely developed; it provides access to commercial and or residential development.

US 92/International Speedway Boulevard at Garfield Avenue

Exhibit 1: Looking west towards the intersection on WB US 92

Exhibit 2: Looking east away from the intersection on WB US 92

US 92/International Speedway Boulevard at Garfield Avenue

Exhibit 3: Looking east towards the intersection on EB US 92

Exhibit 4: Looking west away from the intersection on EB US 92

US 92/International Speedway Boulevard at Garfield Avenue

Exhibit 5: Looking north towards the intersection on NB Garfield Avenue

Exhibit 6: Looking south away from the intersection on NB Garfield Avenue

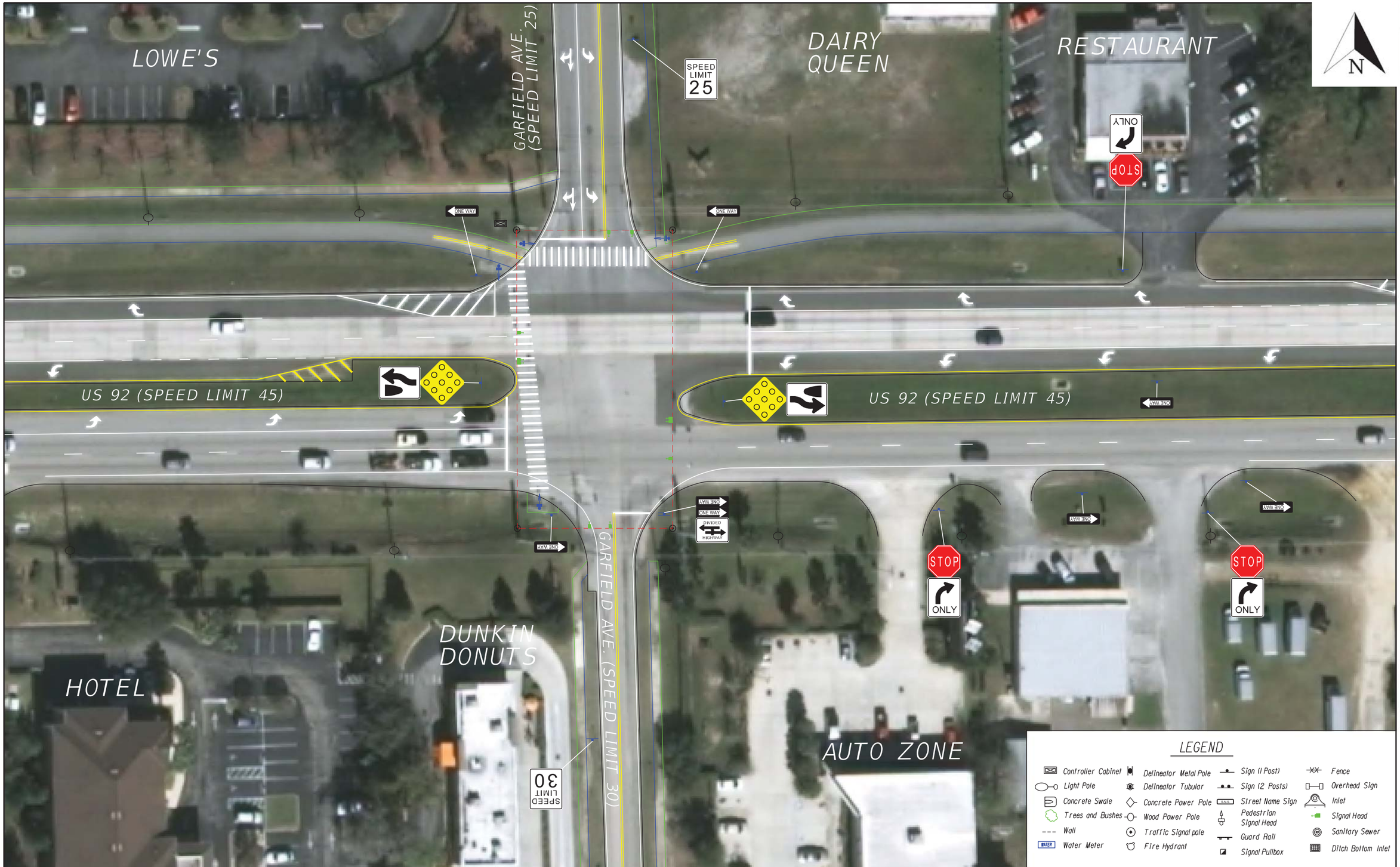
US 92/International Speedway Boulevard at Garfield Avenue

Exhibit 7: Looking south towards the intersection on SB Garfield Avenue

Exhibit 8: Looking north towards the intersection on SB Garfield Avenue

US 92/International Speedway Boulevard at Garfield Avenue

Exhibit 9: Tracking on shoulder - Looking east towards the intersection on EB US 92



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 92	VOLUSIA	

CONDITION DIAGRAM

FIGURE NO.
2

Traffic Volume Data

The 8-hour intersection turning movement counts were collected on December 6, 2016 between 7:00 AM –9:00 AM, 11:00 AM – 1:00 PM and 2:00 PM – 6:00 PM along US 92/International Speedway Boulevard at Lowe's Entrance and Garfield Avenue intersections. From this data, the AM, mid-day and PM peak traffic hours were found to occur from 7:15 AM to 8:15 AM, 11:30 AM to 12:30 PM and 4:45 PM to 5:45 PM, respectively. The overall peak hour for the intersection was found to occur during the PM peak hour.

The turning movement counts on US 92/International Speedway Boulevard reveal that the traffic in eastbound direction peaks during AM conditions and traffic in westbound direction peaks during PM conditions. During Mid-day conditions, the traffic seems to be equally distributed in both the directions. The 8-hour turning movement counts and pedestrian/bicycle counts are provided in greater detail in Appendix B. The following table summarizes the distribution of turning movements through the study intersection:

Table 1: 8 Hour Turning Movement Percentages (All Vehicles)

Movement	Northbound	Southbound	Eastbound	Westbound
Left-turn/U-turn	32.3%	51.1%	3.7%	6.9%
Through	31.4%	21.1%	90.2%	85.3%
Right-turn	36.2%	27.8%	6.1%	7.8%

The existing field collected turning movement counts were balanced (based on the presence of additional access locations between study intersections) and used in the operational analysis.

Crash Data

Crash reports compiled by Florida Signal Four Analytics were provided by River to Sea Transportation Planning Organization (R2CTPO). Based on this data, there were 16 crashes reported within the influence area of the intersection during the latest 36-month period covering January 1, 2013 to December 31, 2015. The crashes consisted of 11 rear end crashes, 1 left turn crash, 2 sideswipe crashes and 2 angle crashes. The crashes caused 7 injuries, and total property damage amounted to approximately $115,700.00. There were no fatalities. Three of the crashes occurred at night and 10 crashes occurred either during the day or at dusk and unknown for the remaining 3. Pavement conditions were dry for 13 of the crashes and unknown for the remaining 3.

Based on this information, it is apparent that rear end crashes account for the majority of the crashes at the intersection, with most of them occurring on US 92/International Speedway Boulevard rather than on the side streets. Rear end crashes are inherent with signalized intersections, and there were no geometric constraints such as vertical or horizontal curves or trees that would promote rear end crashes or obstruct the visibility of the traffic signal.

Of the 11 rear end crashes, 4 crashes occurred on the outside through lane along eastbound US 92/International Speedway Boulevard. Although the crash reports did not specify whether the eastbound vehicles were traveling through or turning right at Garfield Avenue, 3 out of these 4 crashes occurred due to slowing down or stopping for the red light at the traffic signal.

A Crash Summary and Crash Diagram are provided in the following pages.

Table 2: Crash Summary (Jan 2013-Dec 2015)

#	Crash ID	Date	Time	Crash Type	Fatalities	Injuries	Property Damage	Day/Night	Wet/Dry
C1	11682558	1/19/2013	8:10 PM	Rear End	0	0	$4,000	Dark - Lighted	Dry
C2	73480069	7/19/2013	4:05 PM	Angle	0	1	$8,000	Daylight	Dry
C3	73480340	11/9/2013	4:45 PM	Rear End	0	1	$4,100	Dusk	Dry
C4	73480521	3/1/2014	12:23 PM	Rear End	0	0	$4,000	Daylight	Dry
C5	73480608	2/18/2014	6:20 AM	Rear End	0	0	$8,000	Unknown	Unknown
C6	73480886	12/23/2014	1:10 PM	Rear End	0	0	$6,000	Daylight	Dry
C7	73481401	12/3/2013	4:25 PM	Rear End	0	2	$46,100	Daylight	Dry
C8	73481835	11/20/2013	7:17 PM	Sideswipe	0	3	$2,000	Dark - Lighted	Dry
C9	73481845	11/15/2013	7:40 AM	Rear End	0	0	$0	Daylight	Dry
C10	73481904	1/21/2014	4:00 PM	Rear End	0	0	$1	Unknown	Unknown
C11	73483865	1/31/2014	2:25 PM	Rear End	0	0	$0	Unknown	Unknown
C12	73484840	9/15/2014	11:32 AM	Rear End	0	0	$2,000	Daylight	Dry
C13	85807797	7/31/2015	7:24 PM	Sideswipe	0	1	$4,000	Daylight	Dry
C14	85807937	4/1/2015	2:58 PM	Left Turn	0	4	$20,000	Daylight	Dry
C15	86161021	10/23/2015	7:18 PM	Rear End	0	0	$1,500	Dark - Lighted	Dry
C16	86161083	10/30/2015	5:54 PM	Angle	0	3	$6,000	Daylight	Dry

Crash Summary by Crash Types (Jan 2013-Dec 2015)

Crash Type	2013	2014	2015	2013-2015	Percent
Angle	1	0	1	**2**	**12.5%**
Rear End	4	6	1	**11**	**68.7%**
Head On	0	0	0	**0**	**0.0%**
Left Turn	0	0	1	**1**	**6.3%**
Sideswipe	1	0	1	**2**	**12.5%**
Pedestrian	0	0	0	**0**	**0.0%**
Right Turn	0	0	0	**0**	**0.0%**
Bicycle	0	0	0	**0**	**0.0%**
Other	0	0	0	**0**	**0.0%**
Total	***6***	***6***	***4***	***16***	***100.0%***

CRASH SYMBOL LEGEND

Collision w/ Bicycle	Rear End Crash	Sideswipe	Angle Crash
Fatality	Left Turn Crash	Off Road	Right Turn Crash
Fixed Object	Head-On Crash	Overturned Vehicle	

CRASH PERIOD: JANUARY 1, 2013 - DECEMBER 31, 2015

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 92	VOLUSIA	

CRASH DIAGRAM

FIGURE NO. 3

QUALITATIVE ASSESSMENT

A qualitative assessment (QA) was conducted in the field in order to evaluate the existing operating conditions occurring on a typical weekday, and to identify areas where improvements would be potentially beneficial to the overall safety and efficiency of the location. A registered professional engineer performed the QA from 4:30 PM – 5:30 PM during the evening peak hour period.

1. During the QA, the intersection, as a whole, appeared to operate smoothly and with minimal delay. The volume of traffic observed on US 92/International Speedway Boulevard was significantly higher than the volumes observed on Garfield Avenue. The flow of traffic on US 92/International Speedway Boulevard was heavier in the westbound direction than in the eastbound direction. For a couple of cycles between 5:00 PM and 5:20 PM, queues on westbound US 92/International Speedway Boulevard were observed to back up approximately 800 feet, thus blocking the left turning vehicles and causing cycle failures (queues cleared up in the next cycle). During the same period (5:00 – 5:20 PM), the queues on westbound US 92/International Speedway Boulevard frequently backed up approximately 600 feet. During the remainder of the PM peak hour time period, the intersection operated without significant queues or cycle failures. It was observed that the outside through lane on eastbound US 92/International Speedway Boulevard was utilized more than the inside through lane. In a few instances, the queues on eastbound US 92/International Speedway Boulevard were backed up to the Lowe's Entrance; however, all queued vehicles were able to clear the intersection in one cycle.

2. The geometry of the intersection is, in general, straight and flat, so the sight distance to the signal is not impeded and was not observed to present any operational or safety concerns.

3. There are tracking marks on the shoulders of the eastbound approach which bear evidence that vehicles are traveling on the shoulders to get around stopped through traffic to proceed with their right turn.

4. There are crosswalks with pedestrian signals across the north and west legs of the US 92/International Speedway Boulevard and Garfield Avenue intersection. The crosswalks are marked with special emphasis pavement markings, which are appropriate for a crossing at a signalized intersection. The walk times provided appeared adequate for pedestrians to cross at a normal pace and within the allotted time.

5. Crosswalks are not provided on the south and east legs of the intersection. The sidewalks along the east and west side of Garfield Avenue (south leg) are terminated just before the intersection.

FEASIBILITY ANALYSIS

Background

An application was received from Volusia County to perform a feasibility study to construct an eastbound right turn lane and to extend the existing westbound left turn lane along US 92/International Speedway Boulevard at Garfield Avenue. The purpose of the eastbound right turn lane is to enable traffic to move out of the way of through traffic and decelerate in the separate turn lane, thus reducing delay for vehicles turning right onto Garfield Avenue. Adding a new eastbound right turn lane will reduce the likelihood of rear end crashes associated with traffic slowing down to make the turn onto Garfield Avenue. The traffic making the westbound left turn (sometimes) cannot reach the turn lane due to the westbound through queues. Therefore, extending the westbound left turn will enable traffic to move out of the through lane and move into the designated turn lane. A northbound right turn lane is also recommended at the intersection since the northbound right turn traffic consistently drives on the shoulder around northbound through traffic to turn right on red (based on information provided by FDOT).

Methodology

The methodology for determining the feasibility of constructing an eastbound right turn lane, a northbound right turn lane and extending the existing westbound left turn lane along US 92/International Speedway Boulevard at Garfield Avenue includes performing an assessment of the proposed site, a comparison of before and after operating conditions at the intersection utilizing traffic operation analysis software, and preparing a Benefit/Cost (B/C) analysis for any proposed improvements.

Assessment of Proposed Site

US 92/International Speedway Boulevard is a four-lane divided roadway with a wide grass median. At its intersection with Garfield Avenue, US 92/International Speedway Boulevard widens to include separate right and left turn lanes on the westbound approach and a separate left turn lane on the eastbound approach. The drainage system consists of open swales along

the north and south sides of the road, and a cross drain with mitered end sections running under the south leg of Garfield Avenue.

To install a separate right turn lane on the eastbound approach, the swale along the southwest quadrant would need to be re-worked and the cross drain extended to not conflict with the additional lane. The eastbound approach currently drains into the swale along US 17, and the addition of curb and gutter and associated flumes would not change that; although the volume of water will increase with the increased impervious surface area of the new lane. The swales should be analyzed to determine if they can accommodate the additional water. The southwest quadrant of the intersection also contains a pedestrian signal, pull box and a pedestrian landing equipped with a handrail that would need to be relocated to accommodate the additional lane.

In order to construct a northbound right turn lane, curb and gutter will be required to maintain the clear zone along the east side of Garfield Avenue. The northbound approach currently drains north towards the intersection and into the swales along US 17, and the addition of curb and gutter would not change that; although the volume of water will increase with the increased impervious surface area of the new lane. The swales should be analyzed to determine if they can accommodate the additional water. Survey was not provided for the Improvement Diagrams; however, from lot and parcel lines pulled from the Volusia County Property Appraisers web page, it appears that the turn lane could fit within the existing right of way. The overhead utility lines that run along the east side of Garfield Avenue would need to be relocated. It is not anticipated that the existing traffic signal pole in the southeast quadrant will need to be replaced since the curb and gutter will provide the appropriate clear zone.

There were no physical constraints observed that would impede the extension of the westbound left turn lane.

Operational Analysis

An intersection operation analysis was performed for before and after conditions. The before conditions assume that there is no change in intersection geometry and signal timings, whereas, the after conditions assume that the lane configuration on US 92/International Speedway Boulevard will be modified to include a separate eastbound right turn lane, a separate

northbound right turn lane and extension of the westbound left turn lane. The existing operating conditions of US 92/International Speedway Boulevard and Garfield Avenue were determined using Synchro 9/SimTraffic simulation software. The signal timing information was obtained from Volusia County. Table 2 summarizes the intersection delay and levels of service (LOS) for before and after conditions during the three peak periods. As shown in the table, the intersection of US 92/International Speedway Boulevard and Garfield Avenue is overall expected to operate better with the proposed improvements. The SimTraffic simulation results were provided in Appendix C.

Table 3: Before and After Operational Analysis Results

Intersection	AM Peak Hour				Mid-Day				PM Peak Hour			
	Before		After		Before		After		Before		After	
	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS	Delay (Sec.)	LOS
Overall	10.9	B	9.4	A	12.9	B	9.1	A	19.0	B	17.5	B

Note: The results are based on average of 10 random seed SimTraffic Simulation runs

Benefit/Cost Analysis

A benefit cost analysis was performed for the study intersection to estimate the effectiveness of the potential intersection improvements using SimTraffic simulation. The benefits are defined in terms of annualized cost savings associated with reductions in the following three measures of effectiveness (MOEs):

- Total Delay (Vehicle-Hours)
- Stops
- Fuel Consumption (Gallons)

The benefits were calculated for 300 days in a year accounting for reduced benefits anticipated due to lower traffic volumes during the weekend. The value of delay time per hour ($17.67) and fuel cost ($3.27) were obtained from "The Mobility Data for Orlando" published by Texas A&M University. Stops were estimated to cost $0.014 each. Table 4 summarizes the unit value of each MOE in a tabular format along with its source.

Table 4: Unit Value of MOEs		
MOE Values	**Unit Value**	**Source**
Stops ($)	0.014	Transyt 7F
Delay ($)	17.67	2014 Urban Mobility Report published by Texas A&M Transportation Institute (TTI)
Fuel ($/gal.)	3.27	2014 Urban Mobility Report published by TTI
Days per Year	300	Average days with observable peaking characteristics

The estimated cost for the proposed modification is $135,474 (present day value) and it has a corresponding annualized cost amounting to $9,968.39. The cost estimate does not include the potential cost of right of way or the relocation of existing utilities for the northbound right turn lane improvement. The service life for the modification is assumed 20 years and the interest rate used in the calculation of annualized costs is assumed 4%, which is a value frequently used by the Florida Department of Transportation (FDOT) in their benefit cost computations. The Cost Estimate for the proposed lane additions can be found in Appendix D.

Table 5 summarizes the benefit cost analysis for the proposed improvements. The analysis yields a B/C ratio of 5.39. The calculated B/C ratio indicates that the anticipated benefits outweigh the estimated costs for the proposed modifications, with benefits derived through reduced costs associated with lower delay, stops and fuel consumption.

Table 5: Benefit/Cost Analysis Results				
Benefit Period		**Measures of Effectiveness**		
		Total Stops	Total Delay (veh-hrs)	Fuel Consumption (gal)
AM Peak Hour	Existing	678	7.2	13.8
	Proposed	673	6.1	13.3
Mid-Day	Existing	748	7.5	12.7
	Proposed	657	5.3	12.3
PM Peak Hour	Existing	1,236	15.1	18.7
	Proposed	1,195	13.7	18.2
Estimated Daily (AM + Mid + PM)	Existing	2,662	29.8	45.2
	Proposed	2,525	25.1	43.8
Estimated Daily Savings		137	4.7	1.4
Estimated Unit Cost		$0.014	$17.670	$3.270
Daily User Benefit by MOE		$1.92	$83.049	$4.578
Daily User Benefit Total		$179.09		
Annual User Benefit		**$53,727.00**		
Total Annual Cost		**$9,968.39**		
Benefit Cost Ratio		**5.39**		

Notes:

1) The service life of the improvements was kept at 20 years
2) Interest rate of 4% was used to determine the annual cost of improvements
3) Annual user benefit was calculated for 300 days with 2 hours each of AM, Mid-day and PM peak periods

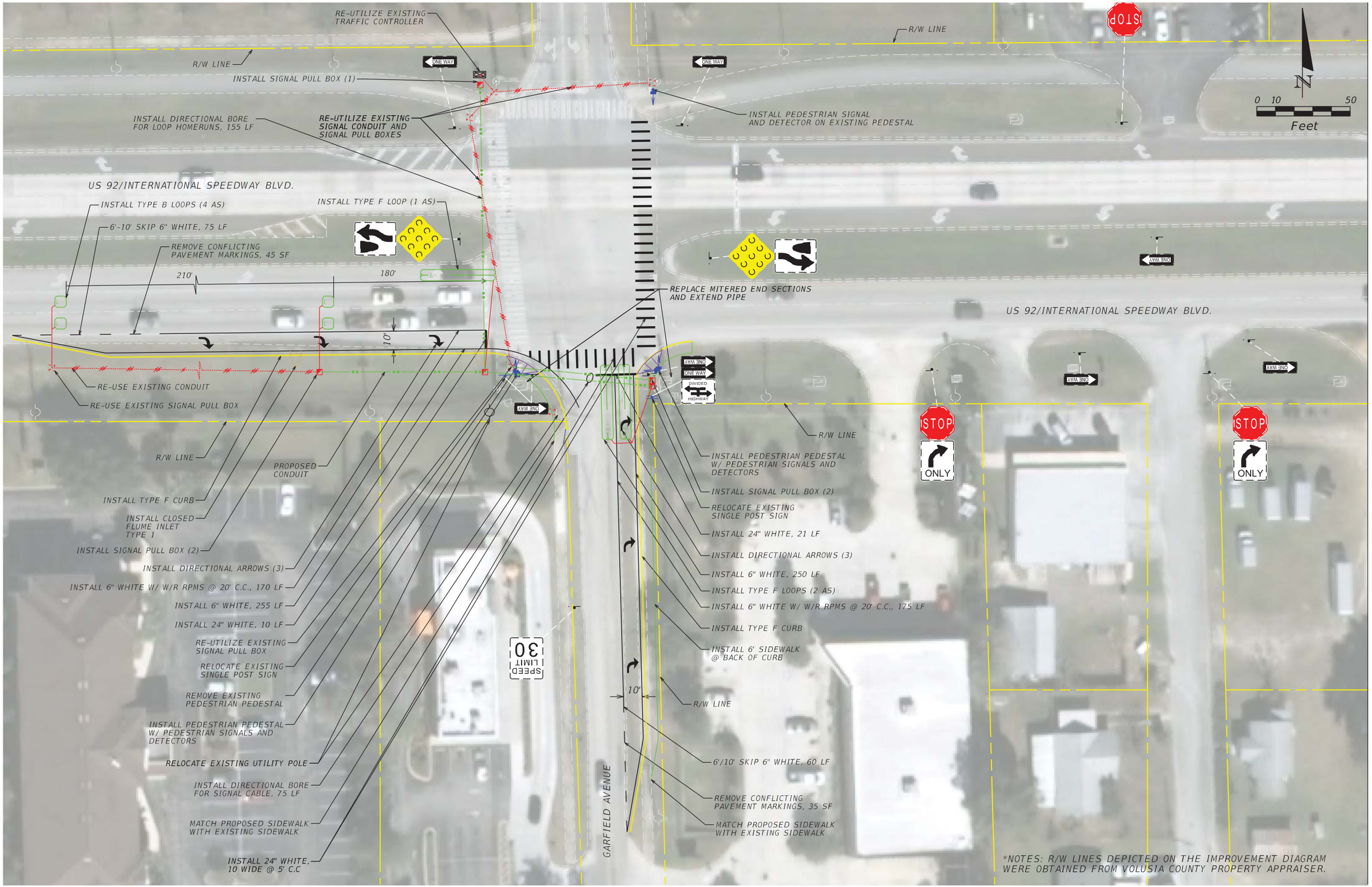
RECOMMENDATIONS

Based upon the crash and speed analyses, qualitative assessment, field observations, intersection analysis, B/C Analysis and engineering judgment, the following modifications are recommended to improve the safety and operation of the intersection:

1: Extend the existing westbound left turn lane, construct an eastbound right turn lane and construct a northbound right turn lane at the intersection of US 92/International Speedway Boulevard and Garfield Avenue. There were no physical constraints found that would impede the extension of the westbound left turn lane at the intersection of US 92/International Speedway Boulevard and Garfield Avenue. The right of way is sufficient to install a separate right turn lane on the eastbound approach; however, the existing drainage swale would need to be reworked and the cross drain would need to be extended along the southwest quadrant of the intersection. The existing pedestrian signal, pull box and pedestrian landing, equipped with a handrail, would need to be relocated. In order to construct a northbound right turn lane, curb and gutter would be required to maintain the clear zone along the east side of Garfield Avenue. Survey was not provided for the Improvement Diagrams; however, from lot and parcel lines pulled from the Volusia County Property Appraisers web page, it appears that the northbound turn lane could fit within the existing right of way; however, the overhead utility lines that run along the east side of Garfield Avenue would need to be relocated. It is not anticipated that the existing traffic signal pole in the southeast quadrant will need to be replaced since the curb and gutter will provide the appropriate clear zone. With both the eastbound and northbound right turn lanes, the swales along US 17 should be analyzed to determine if they can accommodate the additional water. These modifications can be implemented at an approximate cost of $135,473.65 (does not include the potential cost of right of way or relocation of the overhead utilities for the northbound right turn) and yields a B/C ratio of 5.39, which indicates that the anticipated benefits outweigh the estimated costs for the proposed modification.

The proposed improvements are illustrated in the Figure 4 shown on the following page.

2: Extend the existing sidewalks along the east and west sides of Garfield Avenue on the south approach all the way to the intersection of US 92/International Speedway Boulevard and Garfield Avenue. These connections will provide a safe passage for pedestrians by eliminating the need for them to walk on the pavement or in the grass. **Provide crosswalks along the east and south legs of the US 92/International Speedway Boulevard and Garfield Avenue intersection**. The cost for these recommendations (provided as a separate item) is estimated at $15,672.76.



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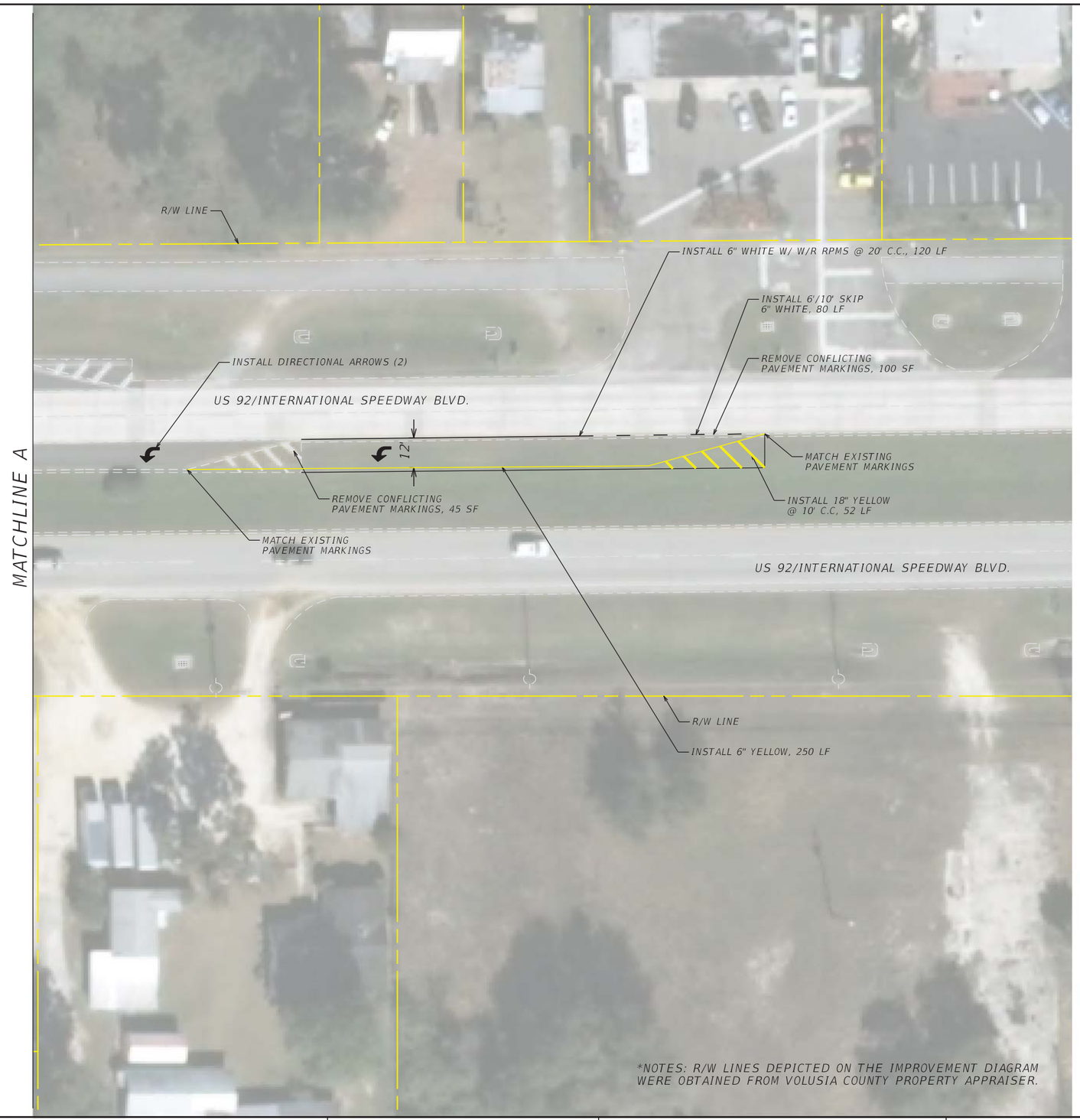
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 92	VOLUSIA	

IMPROVEMENT DIAGRAM

FIGURE NO. 4.1



N

0 10 50

Feet

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

vhb

Vanasse Hangen Brustlin, Inc.
Transportation, Land Development,
Environmental Services
225 E. Robinson St., Suite 300
Landmark Center Two
Orlando, FL 32801 (407)839-4006
Certificate of Authorization # 3932
Kathryn L. Lee, P.E.
PE # 62420

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 92	VOLUSIA	

IMPROVEMENT DIAGRAM

FIGURE NO.

4.2

APPENDICES

APPENDIX A: Responses to Comments

US 92 at Garfield Report – Comments

Comments from Amir Asgarinik(FDOT)

1. Shouldn't we use Optional Base Group 9 instead of 13?

Response: Base Group has been revised from 13 to 9.

2. Does the existing concrete signal assembly need to be upgraded based on the proposed improvements?

Response: It is anticipated that the existing span wire traffic signal can be maintained since no new signal heads will be required, and Type F curb and gutter is being proposed along the east side of the NB right turn lane since there is not enough right of way to maintain an 18' CZ.

3. Need 36" concrete pipes to accommodate the proposed turning movements and sidewalks.

Response: 36" round concrete pipe has been added to the estimate.

4. Most of the proposed sidewalks should be 6" thick due to its proximity to the EOP and traffic movement.

Response: The cost estimate considers that the ramps and sidewalk within the immediate vicinity of the curb radius will be 6" concrete.

5. 20% Contingency may be excessive.

Response: The contingency has been reduced to 15%.

Comments from Keith Riger (City of Deland)

1. I would like to point out that we have a proposed project in the hopper called the DeLand Greenway Trail North Extension, FIN 430217-2-38-01, Federal Aid Number 7777-182-A to build a trail to the SW corner of the intersection. Pertinent plans are attached. Let's coordinate.

Response: Comment Noted**.**

Comments from Jon Cheney (Volusia County)

1. No comments on justification for new turn lanes, but always a support new lanes.
2. Why is this separate from the other turn lane study in the same area? This project should be combined with other turn lane project on US-92 and administered by FDOT since work is on a State Roadway.

Response: Two different reports were created based on the two different feasibility study applications from Volusia county. However, the US 92 & Garfield report was included in the appendix of the US 92 from Woodland Boulevard to Garfield Avenue report**.**

3. Did they look at need for turn lanes on Garfield itself?

Response: As per the information provided by FDOT, additional northbound right turn lane is proposed at Garfield Avenue**.**

4. Not enough information to perform a constructability review, however most construction appears to be in FDOT ROW.

Comments from Christopher Cairns (FDOT)

1. Please clarify the input volumes utilized for the eastbound and westbound approaches in the Synchro analysis for AM, Midday, and PM.

Response: The turning movement counts, provided in Appendix A, were taken and adjusted (balanced) for reasonableness considering the presence or absence of additional access points between study intersections.

2. There is visible wear on the northbound approach leg from right turns. An exclusive right turn lane would appear to reduce peak hour delay and queuing on Garfield Avenue.

Response: Comment noted. Analysis is revised with the exclusive northbound right turn lane improvement.

3. Concur with need for sidewalk to extend to pedestrian signal on SW corner and for pedestrian features and crosswalk for the east and south approaches. Please show these improvements on the improvement diagram. Note that additional work may be required to make well designed sidewalk connectivity on these corners, which may cost more than estimated.

Response: Comment noted. All the proposed improvements are shown in the improvements diagram (figure 4).

4. Concur with need for an eastbound right turn lane as recommended. However, some form of bulb out should be considered to break up the right turn lane. We should avoid creating a new continuous EB auxiliary lane between Amelia and Garfield Avenue (that crosses a median opening).

Response: Comment noted. The proposed eastbound right turn lane will not create a continuous eastbound auxiliary lane between Amelia Avenue and Garfield Avenue

5. There does not appear to be any operational benefit to extending the existing 450′ westbound left turn lane. We are not aware of any wear or queue storage issues to suggest a problem.

Response: Comment noted. During field observations, for a couple of cycles between 5:00 PM and 5:20 PM, queues on westbound US 92/International Speedway Boulevard were observed to back up approximately 800 feet, thus blocking the left turning vehicles and causing cycle failures (queues cleared up in the next cycle). During the same period (5:00 – 5:20 PM), the queues on westbound US 92/International Speedway Boulevard frequently backed up approximately 600 feet.

6. Can the existing signal structure support retroreflective back plates to enhance signal conspicuity and/or 4-section heads for FYA indications?

Response: Comment noted. The report provides conceptual improvements and there is insufficient information regarding the soil conditions, foundation design and capacity of the existing signal system to provide accurate structural analysis for the proposed modifications.

APPENDIX B: Traffic Data

Roadway Count Summary

Vanasse Hangen Brustlin, Inc.

County	Volusia	**City**	DeLand
Intersection	Lowes Driveway	**&**	US 92 - Intn'l Speedway Blvd
Date	December 6, 2016		**All Vehicles**
		VHB Project #:	62430.02

AM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM - 7:15 AM	0	0	0	0	0	6	7	252	0	1	138	1
7:15 AM - 7:30 AM	0	0	1	0	0	6	11	356	0	1	184	4
7:30 AM - 7:45 AM	0	0	0	0	0	6	11	246	0	2	248	3
7:45 AM - 8:00 AM	0	0	0	0	0	5	5	262	0	1	180	4
8:00 AM - 8:15 AM	0	0	1	0	0	11	14	263	0	1	176	5
8:15 AM - 8:30 AM	0	0	1	0	0	16	14	218	0	2	175	7
8:30 AM - 8:45 AM	0	0	0	0	0	13	10	142	0	5	179	6
8:45 AM - 9:00 AM	0	0	1	0	0	18	25	190	0	0	154	4
TOTAL	0	0	4	0	0	81	97	1,929	0	13	1,434	34
Peak Hour												
7:15 AM - 8:15 AM	**0**	**0**	**2**	**0**	**0**	**28**	**41**	**1,127**	**0**	**5**	**788**	**16**

Mid-day

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
11:00 AM - 11:15 AM	0	0	0	0	0	38	24	140	1	0	177	13
11:15 AM - 11:30 AM	0	0	0	0	0	23	15	184	0	0	204	4
11:30 AM - 11:45 AM	0	0	0	0	0	25	26	203	0	0	200	4
11:45 AM - 12:00 PM	0	0	3	0	0	26	24	216	0	3	188	6
12:00 PM - 12:15 PM	0	0	0	0	0	27	14	217	0	1	239	7
12:15 PM - 12:30 PM	0	0	1	0	0	25	25	190	0	0	206	5
12:30 PM - 12:45 PM	0	0	0	0	0	23	15	207	0	0	165	6
12:45 PM - 1:00 PM	0	0	1	0	0	19	16	201	0	0	208	10
TOTAL	0	0	5	0	0	206	159	1,558	1	4	1,587	55
Peak Hour												
11:30 AM - 12:30 PM	**0**	**0**	**4**	**0**	**0**	**103**	**89**	**826**	**0**	**4**	**833**	**22**

PM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2:00 PM - 2:15 PM	0	0	2	0	0	27	23	172	0	1	191	4
2:15 PM - 2:30 PM	0	0	4	0	0	20	20	193	0	1	175	3
2:30 PM - 2:45 PM	0	0	2	0	0	22	30	195	0	0	212	5
2:45 PM - 3:00 PM	0	0	2	0	0	29	15	172	0	2	221	2
3:00 PM - 3:15 PM	0	0	1	0	0	25	13	208	0	1	236	10
3:15 PM - 3:30 PM	0	0	1	0	0	21	20	203	0	0	214	7
3:30 PM - 3:45 PM	0	0	0	0	0	30	20	199	0	0	264	9
3:45 PM - 4:00 PM	0	0	0	0	0	32	18	191	0	3	259	11
4:00 PM - 4:15 PM	0	0	2	0	0	11	11	213	0	0	246	2
4:15 PM - 4:30 PM	0	0	2	0	0	23	17	230	1	2	236	7
4:30 PM - 4:45 PM	0	0	0	0	0	17	20	229	0	1	273	6
4:45 PM - 5:00 PM	0	0	1	0	0	32	25	213	0	1	267	8
5:00 PM - 5:15 PM	0	0	3	0	0	32	9	295	0	1	348	6
5:15 PM - 5:30 PM	0	0	2	0	0	22	13	236	0	1	333	8
5:30 PM - 5:45 PM	0	0	0	0	0	14	10	238	0	0	334	8
5:45 PM - 6:00 PM	0	0	2	0	0	17	10	243	0	0	235	3
TOTAL	0	0	24	0	0	374	274	3,430	1	14	4,044	99
Peak Hour												
4:45 PM - 5:45 PM	**0**	**0**	**6**	**0**	**0**	**100**	**57**	**982**	**0**	**3**	**1,282**	**30**

Roadway Count Summary

Vanasse Hangen Brustlin, Inc.

County	Volusia	**City**	DeLand
Intersection	Lowes Driveway	**&**	US 92 - Intn'l Speedway Blvd
Date	December 6, 2016		**Trucks**
		VHB Project #:	62430.02

AM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	3	0	0	7	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	5	0	0	10	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	9	0	0	5	0
7:45 AM - 8:00 AM	0	0	0	0	0	1	0	13	0	0	4	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	1	10	0	0	10	0
8:15 AM - 8:30 AM	0	0	1	0	0	1	0	12	0	0	7	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	13	0	0	12	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	12	0	0	12	0
TOTAL	0	0	1	0	0	2	1	77	0	0	67	0
Peak Hour												
7:15 AM - 8:15 AM	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**37**	**0**	**0**	**29**	**0**
			0%			4%	2%	3%		0%	4%	0%

Mid-day

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
11:00 AM - 11:15 AM	0	0	0	0	0	0	0	10	0	0	8	1
11:15 AM - 11:30 AM	0	0	0	0	0	0	0	5	0	0	12	0
11:30 AM - 11:45 AM	0	0	0	0	0	0	0	10	0	0	18	0
11:45 AM - 12:00 PM	0	0	0	0	0	0	0	14	0	1	6	1
12:00 PM - 12:15 PM	0	0	0	0	0	0	1	10	0	0	13	0
12:15 PM - 12:30 PM	0	0	0	0	0	1	0	9	0	0	8	0
12:30 PM - 12:45 PM	0	0	0	0	0	0	0	9	0	0	8	0
12:45 PM - 1:00 PM	0	0	0	0	0	0	0	7	0	0	11	0
TOTAL	0	0	0	0	0	1	1	74	0	1	84	2
Peak Hour												
11:30 AM - 12:30 PM	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**43**	**0**	**1**	**45**	**1**
			0%			1%	1%	5%		25%	5%	5%

PM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2:00 PM - 2:15 PM	0	0	0	0	0	0	0	9	0	0	7	0
2:15 PM - 2:30 PM	0	0	0	0	0	1	1	8	0	0	18	0
2:30 PM - 2:45 PM	0	0	0	0	0	0	0	9	0	0	11	0
2:45 PM - 3:00 PM	0	0	0	0	0	0	0	4	0	0	10	0
3:00 PM - 3:15 PM	0	0	1	0	0	1	0	8	0	1	8	0
3:15 PM - 3:30 PM	0	0	0	0	0	0	1	11	0	0	8	0
3:30 PM - 3:45 PM	0	0	0	0	0	0	0	13	0	0	11	0
3:45 PM - 4:00 PM	0	0	0	0	0	0	0	7	0	0	11	0
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	4	0	0	6	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	12	0	0	10	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	1	10	0	0	6	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	3	0	0	3	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	3	0	0	4	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	1	4	0	0	11	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	8	0	0	3	0
5:45 PM - 6:00 PM	0	0	1	0	0	0	0	4	0	0	1	0
TOTAL	0	0	2	0	0	2	4	117	0	1	128	0
Peak Hour												
4:45 PM - 5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**18**	**0**	**0**	**21**	**0**

Roadway Count Summary

Vanasse Hangen Brustlin, Inc.

County	Volusia	**City**	DeLand
Intersection	Lowes Driveway	**&**	US 92 - Intn'l Speedway Blvd
Date	December 6, 2016		**U-Turns & RTOR**
		VHB Project #:	62430.02

AM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM - 7:15 AM	0	0	0	0	0	0	1	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	1	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	1	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	1	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	1	0	0	1	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	1	0	0	1	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	3	0	0	2	0	0
TOTAL	0	0	0	0	0	0	8	0	0	5	0	0
Peak Hour												
8:00 AM - 9:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**4**	**0**	**0**

Mid-day

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
11:00 AM - 11:15 AM	0	0	0	0	0	0	4	0	0	1	0	0
11:15 AM - 11:30 AM	0	0	0	0	0	0	1	0	0	0	0	0
11:30 AM - 11:45 AM	0	0	0	0	0	0	2	0	0	0	0	0
11:45 AM - 12:00 PM	0	0	0	0	0	0	4	0	0	0	0	0
12:00 PM - 12:15 PM	0	0	0	0	0	0	1	0	0	1	0	0
12:15 PM - 12:30 PM	0	0	0	0	0	0	1	0	0	0	0	0
12:30 PM - 12:45 PM	0	0	0	0	0	0	0	0	0	1	0	0
12:45 PM - 1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	13	0	0	3	0	0
Peak Hour												
11:00 AM - 12:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**0**	**1**	**0**	**0**

PM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2:00 PM - 2:15 PM	0	0	0	0	0	0	4	0	0	2	0	0
2:15 PM - 2:30 PM	0	0	0	0	0	0	4	0	0	1	0	0
2:30 PM - 2:45 PM	0	0	0	0	0	0	4	0	0	0	0	0
2:45 PM - 3:00 PM	0	0	0	0	0	0	2	0	0	2	0	0
3:00 PM - 3:15 PM	0	0	0	0	0	0	5	0	0	3	0	0
3:15 PM - 3:30 PM	0	0	0	0	0	0	1	0	0	1	0	0
3:30 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	2	0	0
3:45 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM - 4:15 PM	0	0	0	0	0	0	2	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	3	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	3	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	1	0	0	1	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	2	0	0	1	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	2	0	0	2	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	1	0	0	2	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	2	0	0
TOTAL	0	0	0	0	0	0	34	0	0	19	0	0
Peak Hour												
2:15 PM - 3:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**0**	**6**	**0**	**0**

Pedestrian & Bicycle Summary

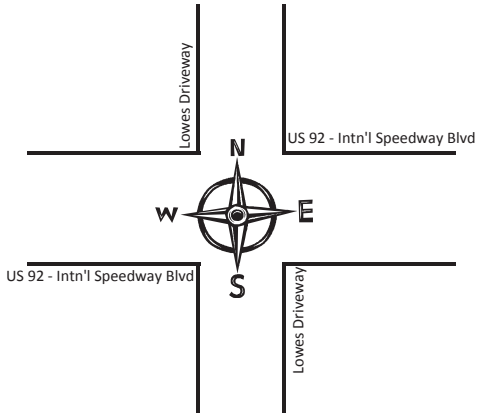
Project #: 62430.02
Date: 12/6/2016

NB/SB: Lowes Driveway
EB/WB: US 92 - Intn'l Speedway Blvd

Hour

		7:00	8:00	11:00	12:00	14:00	15:00	16:00	17:00	
		1	2	3	4	5	6	7	8	
Eastbound ▶	Bike	0	0	0	0	0	0	0	0	0
	Ped	0	0	0	0	0	0	0	0	0
Westbound ◀	Bike	0	0	0	0	0	0	0	0	0
	Ped	0	0	0	0	0	0	0	0	0

Hour	Southbound Ped ▼	Southbound Bike ▼	Northbound Ped ▲	Northbound Bike ▲
7:00	0	0	0	0
8:00	0	0	0	0
11:00	1	0	0	0
12:00	3	0	3	0
14:00	0	1	0	0
15:00	1	0	0	0
16:00	2	0	1	0
17:00	0	2	1	0
	7	3	5	0



Hour	Southbound Ped ▼	Southbound Bike ▼	Northbound Ped ▲	Northbound Bike ▲	
7:00	0	1	0	0	1
8:00	0	0	1	0	2
11:00	0	1	0	0	3
12:00	0	0	0	0	4
14:00	2	1	0	0	5
15:00	0	0	1	0	6
16:00	0	0	0	0	7
17:00	1	1	0	0	8
	3	4	2	0	

		7:00	8:00	11:00	12:00	14:00	15:00	16:00	17:00	
Eastbound ▶	Bike	0	0	0	0	0	0	0	0	0
	Ped	1	0	0	0	0	0	0	0	1
Westbound ◀	Bike	0	0	0	0	0	0	0	0	0
	Ped	0	0	0	0	0	0	0	0	0

Hour

7:00	8:00	11:00	12:00	14:00	15:00	16:00	17:00
1	2	3	4	5	6	7	8

Roadway Count Summary

Vanasse Hangen Brustlin, Inc.

County	Volusia	**City**	DeLand
Intersection	Garfield Ave	**&**	US 92-Intn'l Speedway Blvd
Date	December 6, 2016		**All Vehicles**
		VHB Project #:	62430.02

AM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM - 7:15 AM	10	4	22	9	1	3	6	221	20	18	115	16
7:15 AM - 7:30 AM	11	10	27	10	3	1	5	321	17	22	180	20
7:30 AM - 7:45 AM	8	16	16	12	1	4	11	234	19	13	215	18
7:45 AM - 8:00 AM	10	14	13	12	2	4	4	235	9	25	187	33
8:00 AM - 8:15 AM	8	7	17	11	6	2	5	240	23	20	170	20
8:15 AM - 8:30 AM	16	8	22	17	5	4	3	207	16	23	171	21
8:30 AM - 8:45 AM	15	10	21	17	5	6	3	131	14	8	161	14
8:45 AM - 9:00 AM	7	9	12	12	5	7	3	175	8	15	158	19
TOTAL	85	78	150	100	28	31	40	1,764	126	144	1,357	161
Peak Hour												
7:15 AM - 8:15 AM	**37**	**47**	**73**	**45**	**12**	**11**	**25**	**1,030**	**68**	**80**	**752**	**91**

Mid-day

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
11:00 AM - 11:15 AM	11	11	10	17	7	6	5	116	11	10	165	11
11:15 AM - 11:30 AM	12	10	12	11	4	5	9	173	14	12	199	22
11:30 AM - 11:45 AM	12	9	13	16	10	9	8	183	16	17	183	16
11:45 AM - 12:00 PM	11	10	10	13	11	14	15	174	13	21	168	22
12:00 PM - 12:15 PM	8	5	8	18	6	16	6	194	12	24	222	24
12:15 PM - 12:30 PM	18	7	6	15	6	14	18	168	10	19	181	26
12:30 PM - 12:45 PM	7	5	9	16	5	13	6	181	10	18	150	9
12:45 PM - 1:00 PM	10	8	6	11	6	9	8	168	19	8	203	15
TOTAL	89	65	74	117	55	86	75	1,357	105	129	1,471	145
Peak Hour												
11:30 AM - 12:30 PM	**49**	**31**	**37**	**62**	**33**	**53**	**47**	**719**	**51**	**81**	**754**	**88**

PM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2:00 PM - 2:15 PM	8	9	11	15	6	8	8	139	13	14	169	14
2:15 PM - 2:30 PM	6	11	16	15	9	6	7	170	17	9	173	27
2:30 PM - 2:45 PM	11	13	5	25	7	10	4	189	11	16	191	16
2:45 PM - 3:00 PM	12	14	10	16	8	16	12	151	9	16	197	27
3:00 PM - 3:15 PM	5	12	7	20	7	11	6	172	16	13	218	18
3:15 PM - 3:30 PM	9	8	15	15	12	17	18	192	16	19	192	22
3:30 PM - 3:45 PM	11	11	8	15	6	10	5	173	9	15	258	16
3:45 PM - 4:00 PM	9	12	5	14	5	7	10	178	10	12	244	21
4:00 PM - 4:15 PM	7	11	4	21	13	16	5	197	12	18	234	27
4:15 PM - 4:30 PM	12	8	10	21	7	12	9	210	11	13	223	17
4:30 PM - 4:45 PM	12	8	7	27	1	9	3	204	5	22	256	13
4:45 PM - 5:00 PM	13	14	10	24	9	12	11	184	10	17	241	19
5:00 PM - 5:15 PM	11	14	5	40	21	16	13	257	15	24	335	21
5:15 PM - 5:30 PM	11	9	7	19	12	19	8	233	14	21	300	16
5:30 PM - 5:45 PM	10	9	14	29	13	9	10	233	10	18	325	10
5:45 PM - 6:00 PM	4	10	6	14	7	3	9	208	11	13	217	12
TOTAL	151	173	140	330	143	181	138	3,090	189	260	3,773	296
Peak Hour												
4:45 PM - 5:45 PM	**45**	**46**	**36**	**112**	**55**	**56**	**42**	**907**	**49**	**80**	**1,201**	**66**

Roadway Count Summary

Vanasse Hangen Brustlin, Inc.

County	Volusia	**City**	DeLand
Intersection	Garfield Ave	**&**	US 92-Intn'l Speedway Blvd
Date	December 6, 2016		**Trucks**
		VHB Project #:	62430.02

AM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM - 7:15 AM	0	0	0	2	0	0	0	3	0	1	4	0
7:15 AM - 7:30 AM	0	0	0	1	1	0	1	7	0	1	10	1
7:30 AM - 7:45 AM	0	0	0	4	0	0	0	8	0	1	3	0
7:45 AM - 8:00 AM	0	1	1	0	0	0	0	10	1	0	5	0
8:00 AM - 8:15 AM	0	0	0	0	0	1	0	8	1	0	10	1
8:15 AM - 8:30 AM	0	0	0	0	0	1	1	14	0	0	6	1
8:30 AM - 8:45 AM	0	0	1	4	0	1	1	12	0	0	12	1
8:45 AM - 9:00 AM	0	0	0	1	0	2	0	12	0	0	10	1
TOTAL	0	1	2	12	1	5	3	74	2	3	60	5
Peak Hour												
8:00 AM - 9:00 AM	**0**	**0**	**1**	**5**	**0**	**5**	**2**	**46**	**1**	**0**	**38**	**4**

Mid-day

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
11:00 AM - 11:15 AM	0	0	0	1	0	0	0	8	0	1	8	1
11:15 AM - 11:30 AM	1	0	0	0	0	0	0	7	0	0	12	1
11:30 AM - 11:45 AM	0	0	0	2	0	1	0	10	0	1	16	1
11:45 AM - 12:00 PM	0	0	0	1	0	0	1	13	0	0	8	1
12:00 PM - 12:15 PM	0	0	0	1	0	3	1	8	0	0	12	1
12:15 PM - 12:30 PM	0	0	0	1	0	0	1	9	0	0	8	1
12:30 PM - 12:45 PM	0	1	1	1	0	0	0	6	1	0	8	0
12:45 PM - 1:00 PM	0	0	0	3	0	0	1	7	0	1	13	0
TOTAL	1	1	1	10	0	4	4	68	1	3	85	6
Peak Hour												
11:15 AM - 12:15 PM	**1**	**0**	**0**	**4**	**0**	**4**	**2**	**38**	**0**	**1**	**48**	**4**

PM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2:00 PM - 2:15 PM	0	0	0	1	0	0	1	8	1	1	6	1
2:15 PM - 2:30 PM	0	1	0	2	0	0	0	10	1	0	16	2
2:30 PM - 2:45 PM	0	0	0	1	0	0	0	11	0	0	10	0
2:45 PM - 3:00 PM	0	0	2	0	0	0	0	5	1	0	8	5
3:00 PM - 3:15 PM	1	0	1	1	0	0	1	6	0	0	8	1
3:15 PM - 3:30 PM	0	0	0	1	0	1	0	11	0	0	6	1
3:30 PM - 3:45 PM	0	0	1	2	0	1	0	10	0	0	10	1
3:45 PM - 4:00 PM	0	0	0	0	0	1	0	11	0	0	8	2
4:00 PM - 4:15 PM	0	0	1	0	0	0	0	5	0	1	6	1
4:15 PM - 4:30 PM	1	0	0	0	0	2	2	9	1	0	7	0
4:30 PM - 4:45 PM	0	0	0	1	0	0	0	8	0	0	5	0
4:45 PM - 5:00 PM	0	0	0	0	0	1	0	5	0	0	2	0
5:00 PM - 5:15 PM	0	1	0	0	0	1	0	3	0	0	3	0
5:15 PM - 5:30 PM	0	0	0	0	0	2	1	3	0	0	9	0
5:30 PM - 5:45 PM	0	0	0	2	0	1	0	8	0	0	2	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	5	0	0	1	0
TOTAL	2	2	5	11	0	10	5	118	4	2	107	14
Peak Hour												
2:00 PM - 3:00 PM	**0**	**1**	**2**	**4**	**0**	**0**	**1**	**34**	**3**	**1**	**40**	**8**

Roadway Count Summary

Vanasse Hangen Brustlin, Inc.

County	Volusia	**City**	DeLand
Intersection	Garfield Ave	**&**	US 92-Intn'l Speedway Blvd
Date	December 6, 2016		**U-Turns & RTOR**
		VHB Project #:	62430.02

AM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
7:00 AM - 7:15 AM	0	0	13	0	0	2	3	0	1	2	0	3
7:15 AM - 7:30 AM	0	0	10	0	0	0	1	0	2	3	0	4
7:30 AM - 7:45 AM	0	0	3	0	0	3	8	0	1	1	0	3
7:45 AM - 8:00 AM	0	0	4	0	0	3	1	0	0	4	0	10
8:00 AM - 8:15 AM	0	0	4	0	0	0	2	0	6	2	0	4
8:15 AM - 8:30 AM	0	0	5	0	0	2	1	0	3	2	0	6
8:30 AM - 8:45 AM	0	0	3	0	0	3	0	0	2	1	0	1
8:45 AM - 9:00 AM	0	0	0	0	0	3	1	0	1	3	0	3
TOTAL	0	0	42	0	0	16	17	0	16	18	0	34
Peak Hour												
7:00 AM - 8:00 AM	**0**	**0**	**30**	**0**	**0**	**8**	**13**	**0**	**4**	**10**	**0**	**20**

Mid-day

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
11:00 AM - 11:15 AM	0	0	1	0	0	5	3	0	0	3	0	1
11:15 AM - 11:30 AM	0	0	5	0	0	5	2	0	3	1	0	7
11:30 AM - 11:45 AM	0	0	3	0	0	6	1	0	2	13	0	3
11:45 AM - 12:00 PM	0	0	1	0	0	11	1	0	4	9	0	7
12:00 PM - 12:15 PM	0	0	2	0	0	10	0	0	4	8	0	5
12:15 PM - 12:30 PM	0	0	1	0	0	6	1	0	2	5	0	8
12:30 PM - 12:45 PM	0	0	4	0	0	7	0	0	0	4	0	1
12:45 PM - 1:00 PM	0	0	3	0	0	7	0	0	3	3	0	3
TOTAL	0	0	20	0	0	57	8	0	18	46	0	35
Peak Hour												
11:15 AM - 12:15 PM	**0**	**0**	**11**	**0**	**0**	**32**	**4**	**0**	**13**	**31**	**0**	**22**

PM Peak Hour

Time Period	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
2:00 PM - 2:15 PM	0	0	5	0	0	6	1	0	4	3	0	2
2:15 PM - 2:30 PM	0	0	5	0	0	1	1	0	2	3	0	6
2:30 PM - 2:45 PM	0	0	0	0	0	8	0	0	2	7	0	3
2:45 PM - 3:00 PM	0	0	0	0	0	12	2	0	0	3	0	7
3:00 PM - 3:15 PM	0	0	0	0	0	9	1	0	7	4	0	0
3:15 PM - 3:30 PM	0	0	9	0	0	3	8	0	4	4	0	2
3:30 PM - 3:45 PM	0	0	5	0	0	8	0	0	2	4	0	2
3:45 PM - 4:00 PM	0	0	0	0	0	4	0	0	1	1	0	0
4:00 PM - 4:15 PM	0	0	1	0	0	8	1	0	1	3	0	9
4:15 PM - 4:30 PM	0	0	2	0	0	10	1	0	1	2	0	0
4:30 PM - 4:45 PM	0	0	1	0	0	8	0	0	1	8	0	4
4:45 PM - 5:00 PM	0	0	3	0	0	5	2	0	2	1	0	2
5:00 PM - 5:15 PM	0	0	3	0	0	4	2	0	3	4	0	8
5:15 PM - 5:30 PM	0	0	2	0	0	9	3	0	1	1	0	5
5:30 PM - 5:45 PM	0	0	6	0	0	3	3	0	1	5	0	2
5:45 PM - 6:00 PM	0	0	4	0	0	2	2	0	1	5	0	0
TOTAL	0	0	46	0	0	100	27	0	33	58	0	52
Peak Hour												
2:45 PM - 3:45 PM	**0**	**0**	**14**	**0**	**0**	**32**	**11**	**0**	**13**	**15**	**0**	**11**

Pedestrian & Bicycle Summary

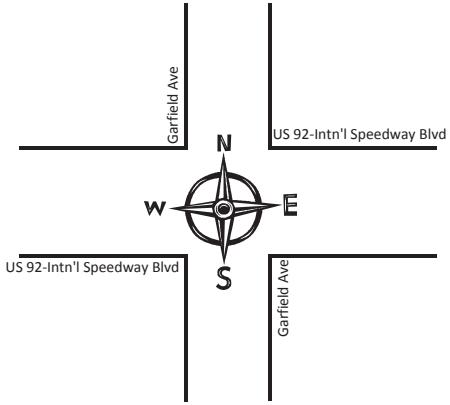
Project #: 62430.02
Date: 12/6/2016

NB/SB: Garfield Ave
EB/WB: US 92-Intn'l Speedway Blvd

Hour

		7:00 (1)	8:00 (2)	11:00 (3)	12:00 (4)	14:00 (5)	15:00 (6)	16:00 (7)	17:00 (8)	
Eastbound ▶	Bike	0	0	0	0	0	0	0	0	**0**
	Ped	1	0	1	0	0	0	3	1	**6**
Westbound ◀	Bike	1	1	0	0	0	0	0	0	**2**
	Ped	0	0	0	0	1	0	0	0	**1**

Hour	Southbound Ped ▼	Southbound Bike	Northbound Ped ▲	Northbound Bike
1 7:00	1	0	0	1
2 8:00	0	0	0	0
3 11:00	1	0	0	0
4 12:00	0	0	0	0
5 14:00	0	0	0	0
6 15:00	1	0	0	0
7 16:00	0	0	0	0
8 17:00	0	1	1	0
	3	**1**	**1**	**1**



Hour	Southbound Ped ▼	Southbound Bike	Northbound Ped ▲	Northbound Bike
1 7:00	0	0	0	0
2 8:00	1	0	0	0
3 11:00	0	0	0	0
4 12:00	0	0	0	0
5 14:00	1	0	0	0
6 15:00	0	0	2	0
7 16:00	3	0	0	0
8 17:00	0	0	1	0
	5	**0**	**3**	**0**

		7:00 (1)	8:00 (2)	11:00 (3)	12:00 (4)	14:00 (5)	15:00 (6)	16:00 (7)	17:00 (8)	
Eastbound ▶	Bike	0	0	0	0	0	2	0	0	**2**
	Ped	0	0	0	0	1	0	0	1	**2**
Westbound ◀	Bike	0	0	0	0	0	0	0	0	**0**
	Ped	0	0	0	0	1	0	0	0	**1**

Hour

22 **6**

APPENDIX C: Traffic Operation Analysis (SimTraffic Results)

COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: US 92 & Garfield Avenue
DeLand

ISOLATED:

DATE: 11/30/2015

SIGNAL #: 395

CO-ORD: X

Design By: M Tobin

System #: 4

Controller Timing Chart

PHASE	1	2	3	4	5	6	7	8	
DIRECTION	EBL	WB	-	NB	WBL	EB	-	SB	
TURN TYPE	PERM/PROT	-	-	-	PERM/PROT	-	-	-	
MIN GREEN	7	17		7	7	17		7	
EXTENSION	3	3		3	3	3		3	
CLEARANCE	5	5		4	5	5		4	
ALL RED	2.5	2		2.5	3	2		3.5	
WALK	-	7		-	-	-		7	
FDW	-	22		-	-	-		38	
MAX 1	25	50		25	25	50		25	
MAX 2	27	75		39	27	75		39	
MAX 3	-	-		-	-	-		-	
ADJUST	-	-		-	-	-		-	
RECALL	-	MIN		-	-	MIN		-	
DETECTOR	NON-LOCK	LOCK		NON-LOCK	NON-LOCK	LOCK		NON-LOCK	
FLASH									
SET	-	-		-	-	-		-	
CLEAR	-	-		-	-	-		-	

BASE DAY		1	2	3	4	5	6	7
MON #1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00			
	PLAN	C1O1S1	C2O1S1	C301S1	Free			
TUES#1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00			
	PLAN	C1O1S1	C2O1S1	C301S1	Free			
WED #1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00			
	PLAN	C1O1S1	C2O1S1	C301S1	Free			
THU #1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00			
	PLAN	C1O1S1	C2O1S1	C301S1	Free			
FRI #1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00			
	PLAN	C1O1S1	C2O1S1	C301S1	Free			
SAT #2	TIME	08:00-18:00	18:00-00:00					
	PLAN	C2O1S1	Free					
SUN #3	TIME	09:30-17:00	17:00-00:00					
	PLAN	C1O1S1	Free					

Crosswalk Length
P2
75 Feet
P4
-
P6
-
P8
130 Feet
SIGNAL OWNER
FDOT
LED YES

CONTROLLER TYPE		CONDITION OF OVERHEAD	Fair	PROM NUMBER	
Econolite ASC/3		OVERHEAD STREET NAMES	NO		
PHASES:	8Φ	ILLUMINATED STREET NAMES	YES		
CABINET TYPE	V	PRE-EMPTION	YES	IP ADDRESS	
CABINET DATE	03/2005	PRE-EMPTION TYPE	INFRARED	10.77.4.62	

REMARKS:

Max 2 for Coordination
Opticom not in Use

1	2	4
5	6	8

VOLUSIA COUNTY TRAFFIC ENGINEERING
SYSTEM INVENTORY

Switch IP.# 10.77.4.30
Controller IP.# 10.77.4.62
Camera IP # -

DATE: 5/16/2016 DESIGNED BY: M Tobin

LOCATION: US 92 & Garfield Avenue
CITY: DeLand SIGNAL ID NO: 395 SYSTEM ID: 4

CONTROLLER TIME CHART

MVMNT	MIN	EXT	CLR	A.R.	WALK	FDW	MAX1	MAX2	MAX3	ADJST	REC	DET	FL	SET	CLR
1	7	3	5	2.5	-	-	25	27	-	-	-	NL	-	-	-
2	17	3	5	2	7	22	50	75	-	-	MIN	L	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	7	3	4	2.5	-	-	25	39	-	-	-	NL	-	-	-
5	7	3	5	3	-	-	25	27	-	-	-	NL	-	-	-
6	17	3	5	2	-	-	50	75	-	-	MIN	L	-	-	-
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	7	3	4	3.5	7	38	25	39	-	-	-	NL	-	-	-

TP# 1

CO-ORDINATION

PLAN	C1/S1	C2/S1	C3/S1	C4/S1	C5/S1	C6/S1		
CYCLE	120	135	135					
OFF 1	26	123	4					
OFF 2								
OFF 3								
OFF 4								
OFF 5								
PERM	10%	10%	10%	10%	10%	10%	10%	10%

PHASE SPLITS (seconds)

CY/SP	C1/S1	C2/S1	C3/S1	C4/S1	C5/S1	C6/S1		
PH 1	20	20	25	-	-	-		
PH 2	65	70	73	-	-	-		
PH 3	-	-	-	-	-	-		
PH 4	35	35	37	-	-	-		
PH 5	20	20	25	-	-	-		
PH 6	65	70	73	-	-	-		
PH 7	-	-	-	-	-	-		
PH 8	35	35	37	-	-	-		

1	2	4
5	6	8

BASE DAY		1	2	3	4	5	6	7	8	9	10	11
MON #1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00							
	PLAN	C1O1S1	C2O1S1	C301S1	Free							
TUES#1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00							
	PLAN	C1O1S1	C2O1S1	C301S1	Free							
WED #1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00							
	PLAN	C1O1S1	C2O1S1	C301S1	Free							
THU #1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00							
	PLAN	C1O1S1	C2O1S1	C301S1	Free							
FRI #1	TIME	05:30-10:00	10:00-14:30	14:30-19:00	19:00-00:00							
	PLAN	C1O1S1	C2O1S1	C301S1	Free							
SAT #2	TIME	08:00-18:00	18:00-00:00									
	PLAN	C2O1S1	Free									
SUN #3	TIME	09:30-17:00	17:00-00:00									
	PLAN	C1O1S1	Free									

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	7:20	7:20	7:20	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	3702	3698	3828	3642	3678	3828	3760
Vehs Exited	3697	3720	3842	3655	3670	3827	3764
Starting Vehs	130	138	142	138	124	136	126
Ending Vehs	135	116	128	125	132	137	122
Denied Entry Before	0	1	1	1	0	0	1
Denied Entry After	0	0	2	0	1	2	2
Travel Distance (mi)	2829	2824	2914	2791	2811	2915	2865
Travel Time (hr)	133.9	134.0	141.3	135.2	133.3	137.9	137.9
Total Delay (hr)	57.2	57.6	61.9	59.6	56.9	59.0	60.2
Total Stops	4277	4158	4541	4327	4183	4359	4373
Fuel Used (gal)	109.5	108.8	114.4	109.1	108.9	112.7	111.4

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	7:20	7:20	7:20	7:20
End Time	8:30	8:30	8:30	8:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	3816	3716	3789	3744
Vehs Exited	3843	3762	3806	3759
Starting Vehs	145	173	146	134
Ending Vehs	118	127	129	124
Denied Entry Before	1	0	1	0
Denied Entry After	1	2	0	0
Travel Distance (mi)	2926	2860	2921	2866
Travel Time (hr)	140.5	135.9	139.6	136.9
Total Delay (hr)	61.1	58.2	60.4	59.2
Total Stops	4536	4368	4349	4347
Fuel Used (gal)	113.8	111.2	113.9	111.4

Interval #0 Information Seeding

Start Time	7:20
End Time	7:30
Total Time (min)	10

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	3702	3698	3828	3642	3678	3828	3760
Vehs Exited	3697	3720	3842	3655	3670	3827	3764
Starting Vehs	130	138	142	138	124	136	126
Ending Vehs	135	116	128	125	132	137	122
Denied Entry Before	0	1	1	1	0	0	1
Denied Entry After	0	0	2	0	1	2	2
Travel Distance (mi)	2829	2824	2914	2791	2811	2915	2865
Travel Time (hr)	133.9	134.0	141.3	135.2	133.3	137.9	137.9
Total Delay (hr)	57.2	57.6	61.9	59.6	56.9	59.0	60.2
Total Stops	4277	4158	4541	4327	4183	4359	4373
Fuel Used (gal)	109.5	108.8	114.4	109.1	108.9	112.7	111.4

Interval #1 Information Recording

Start Time	7:30
End Time	8:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	3816	3716	3789	3744
Vehs Exited	3843	3762	3806	3759
Starting Vehs	145	173	146	134
Ending Vehs	118	127	129	124
Denied Entry Before	1	0	1	0
Denied Entry After	1	2	0	0
Travel Distance (mi)	2926	2860	2921	2866
Travel Time (hr)	140.5	135.9	139.6	136.9
Total Delay (hr)	61.1	58.2	60.4	59.2
Total Stops	4536	4368	4349	4347
Fuel Used (gal)	113.8	111.2	113.9	111.4

5: Garfield Ave & Intnl Spdway Bv/US 92 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.0	0.2	0.0	0.1	0.3
Denied Del/Veh (s)	0.0	0.7	0.2	2.7	0.4
Total Delay (hr)	2.7	1.9	1.8	0.8	7.2
Total Del/Veh (s)	8.1	7.3	38.1	42.3	10.9
Stop Delay (hr)	1.0	1.1	1.6	0.8	4.4
Stop Del/Veh (s)	2.9	4.1	34.7	40.7	6.7
Total Stops	233	243	141	61	678
Stop/Veh	0.20	0.26	0.84	0.87	0.29
Travel Dist (mi)	146.1	260.0	31.2	11.0	448.3
Travel Time (hr)	6.1	8.1	2.9	1.3	18.4
Avg Speed (mph)	24	33	11	9	25
Fuel Used (gal)	4.5	7.5	1.3	0.5	13.8
Fuel Eff. (mpg)	32.6	34.5	23.6	21.7	32.4
HC Emissions (g)	67	133	10	13	223
CO Emissions (g)	2074	4195	313	218	6800
NOx Emissions (g)	231	483	29	28	772
Vehicles Entered	1183	933	163	68	2347
Vehicles Exited	1184	934	164	68	2350
Hourly Exit Rate	1184	934	164	68	2350
Input Volume	1186	932	157	68	2343
% of Volume	100	100	104	100	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0
Density (ft/veh)	310	741	349	1307	575
Occupancy (veh)	6	8	3	1	18

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	11:20	11:20	11:20	11:20	11:20	11:20	11:20
End Time	12:30	12:30	12:30	12:30	12:30	12:30	12:30
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4418	4490	4383	4405	4347	4380	4552
Vehs Exited	4436	4513	4442	4397	4373	4374	4547
Starting Vehs	161	164	179	157	176	150	150
Ending Vehs	143	141	120	165	150	156	155
Denied Entry Before	2	0	2	0	1	0	0
Denied Entry After	0	2	0	1	1	1	2
Travel Distance (mi)	3056	3095	2994	3032	2986	3018	3107
Travel Time (hr)	159.4	164.9	157.2	158.1	155.2	156.5	162.3
Total Delay (hr)	73.1	77.4	72.3	72.5	70.7	71.3	74.2
Total Stops	5310	5479	5152	5250	5128	5115	5462
Fuel Used (gal)	122.7	124.7	120.0	121.9	119.6	120.1	125.3

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	11:20	11:20	11:20	11:20
End Time	12:30	12:30	12:30	12:30
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4513	4297	4482	4425
Vehs Exited	4501	4301	4480	4438
Starting Vehs	165	163	158	158
Ending Vehs	177	159	160	147
Denied Entry Before	1	0	0	0
Denied Entry After	1	3	1	0
Travel Distance (mi)	3094	2920	3093	3039
Travel Time (hr)	165.6	155.5	165.6	160.0
Total Delay (hr)	77.8	72.5	78.1	74.0
Total Stops	5500	5205	5607	5324
Fuel Used (gal)	125.6	118.1	125.7	122.4

Interval #0 Information Seeding

Start Time	11:20
End Time	11:30
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	11:30
End Time	12:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	4418	4490	4383	4405	4347	4380	4552
Vehs Exited	4436	4513	4442	4397	4373	4374	4547
Starting Vehs	161	164	179	157	176	150	150
Ending Vehs	143	141	120	165	150	156	155
Denied Entry Before	2	0	2	0	1	0	0
Denied Entry After	0	2	0	1	1	1	2
Travel Distance (mi)	3056	3095	2994	3032	2986	3018	3107
Travel Time (hr)	159.4	164.9	157.2	158.1	155.2	156.5	162.3
Total Delay (hr)	73.1	77.4	72.3	72.5	70.7	71.3	74.2
Total Stops	5310	5479	5152	5250	5128	5115	5462
Fuel Used (gal)	122.7	124.7	120.0	121.9	119.6	120.1	125.3

Interval #1 Information Recording

Start Time	11:30
End Time	12:30
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	4513	4297	4482	4425
Vehs Exited	4501	4301	4480	4438
Starting Vehs	165	163	158	158
Ending Vehs	177	159	160	147
Denied Entry Before	1	0	0	0
Denied Entry After	1	3	1	0
Travel Distance (mi)	3094	2920	3093	3039
Travel Time (hr)	165.6	155.5	165.6	160.0
Total Delay (hr)	77.8	72.5	78.1	74.0
Total Stops	5500	5205	5607	5324
Fuel Used (gal)	125.6	118.1	125.7	122.4

5: Garfield Ave & Intnl Spdway Bv/US 92 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.0	0.2	0.0	0.1	0.3
Denied Del/Veh (s)	0.0	0.7	0.2	1.8	0.5
Total Delay (hr)	2.5	2.0	1.4	1.6	7.5
Total Del/Veh (s)	10.4	7.5	43.3	38.9	12.9
Stop Delay (hr)	1.3	1.1	1.3	1.5	5.1
Stop Del/Veh (s)	5.2	4.1	40.0	37.1	8.9
Total Stops	272	251	97	128	748
Stop/Veh	0.31	0.26	0.84	0.89	0.36
Travel Dist (mi)	105.7	261.9	21.9	22.8	412.2
Travel Time (hr)	5.0	8.2	2.2	2.6	18.0
Avg Speed (mph)	21	33	10	9	23
Fuel Used (gal)	3.1	7.6	1.0	1.1	12.7
Fuel Eff. (mpg)	34.4	34.6	22.3	21.7	32.5
HC Emissions (g)	71	186	4	15	276
CO Emissions (g)	1742	5066	179	307	7294
NOx Emissions (g)	210	613	14	38	875
Vehicles Entered	861	941	114	142	2058
Vehicles Exited	861	938	115	143	2057
Hourly Exit Rate	861	938	115	143	2057
Input Volume	859	926	117	148	2050
% of Volume	100	101	98	97	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0
Density (ft/veh)	375	729	464	666	588
Occupancy (veh)	5	8	2	3	18

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	4:30	4:30	4:30	4:30	4:30	4:30	4:30
End Time	5:40	5:40	5:40	5:40	5:40	5:40	5:40
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	5244	5420	5355	5224	5328	5289	5367
Vehs Exited	5233	5415	5355	5196	5330	5295	5349
Starting Vehs	218	205	239	199	220	233	199
Ending Vehs	229	210	239	227	218	227	217
Denied Entry Before	1	3	2	2	1	1	0
Denied Entry After	1	0	1	1	2	1	0
Travel Distance (mi)	3831	3985	3904	3852	3873	3848	3949
Travel Time (hr)	219.0	231.2	227.4	220.5	224.4	220.3	226.5
Total Delay (hr)	111.6	119.9	118.1	113.2	115.8	112.4	116.3
Total Stops	7243	7612	7496	7251	7417	7191	7483
Fuel Used (gal)	156.8	163.1	159.8	157.5	159.3	157.2	162.0

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	4:30	4:30	4:30	4:30
End Time	5:40	5:40	5:40	5:40
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	5270	5299	5378	5319
Vehs Exited	5271	5297	5412	5315
Starting Vehs	223	214	257	217
Ending Vehs	222	216	223	220
Denied Entry Before	2	1	0	0
Denied Entry After	1	2	0	0
Travel Distance (mi)	3835	3882	3966	3892
Travel Time (hr)	218.2	220.8	230.1	223.8
Total Delay (hr)	110.7	112.2	119.4	115.0
Total Stops	7125	7270	7548	7362
Fuel Used (gal)	155.6	158.5	162.5	159.2

Interval #0 Information Seeding

Start Time	4:30
End Time	4:40
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	4:40
End Time	5:40
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	5244	5420	5355	5224	5328	5289	5367
Vehs Exited	5233	5415	5355	5196	5330	5295	5349
Starting Vehs	218	205	239	199	220	233	199
Ending Vehs	229	210	239	227	218	227	217
Denied Entry Before	1	3	2	2	1	1	0
Denied Entry After	1	0	1	1	2	1	0
Travel Distance (mi)	3831	3985	3904	3852	3873	3848	3949
Travel Time (hr)	219.0	231.2	227.4	220.5	224.4	220.3	226.5
Total Delay (hr)	111.6	119.9	118.1	113.2	115.8	112.4	116.3
Total Stops	7243	7612	7496	7251	7417	7191	7483
Fuel Used (gal)	156.8	163.1	159.8	157.5	159.3	157.2	162.0

Interval #1 Information Recording

Start Time	4:40
End Time	5:40
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	5270	5299	5378	5319
Vehs Exited	5271	5297	5412	5315
Starting Vehs	223	214	257	217
Ending Vehs	222	216	223	220
Denied Entry Before	2	1	0	0
Denied Entry After	1	2	0	0
Travel Distance (mi)	3835	3882	3966	3892
Travel Time (hr)	218.2	220.8	230.1	223.8
Total Delay (hr)	110.7	112.2	119.4	115.0
Total Stops	7125	7270	7548	7362
Fuel Used (gal)	155.6	158.5	162.5	159.2

5: Garfield Ave & Intnl Spdway Bv/US 92 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.0	0.3	0.0	0.1	0.4
Denied Del/Veh (s)	0.0	0.7	0.2	2.1	0.5
Total Delay (hr)	5.2	5.1	1.8	3.0	15.1
Total Del/Veh (s)	17.5	12.9	49.4	45.4	19.0
Stop Delay (hr)	2.8	2.7	1.7	2.8	10.1
Stop Del/Veh (s)	9.6	6.7	46.0	43.1	12.6
Total Stops	463	461	113	199	1236
Stop/Veh	0.43	0.32	0.84	0.84	0.43
Travel Dist (mi)	131.2	392.9	25.1	37.0	586.2
Travel Time (hr)	8.3	14.4	2.7	4.7	30.0
Avg Speed (mph)	16	28	9	8	20
Fuel Used (gal)	4.2	11.5	1.2	1.8	18.7
Fuel Eff. (mpg)	31.1	34.2	21.4	20.1	31.3
HC Emissions (g)	38	106	7	14	166
CO Emissions (g)	1248	4740	248	370	6606
NOx Emissions (g)	137	453	22	42	654
Vehicles Entered	1067	1412	131	231	2841
Vehicles Exited	1057	1406	133	234	2830
Hourly Exit Rate	1057	1406	133	234	2830
Input Volume	1065	1407	127	223	2822
% of Volume	99	100	105	105	100
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0
Density (ft/veh)	228	417	370	370	352
Occupancy (veh)	8	14	3	5	30

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	3796	3758	3698	3714	3696	3662	3710
Vehs Exited	3788	3729	3713	3731	3712	3652	3718
Starting Vehs	126	112	132	138	130	112	115
Ending Vehs	134	141	117	121	114	122	107
Denied Entry Before	1	2	2	0	0	2	0
Denied Entry After	1	2	2	3	2	1	2
Travel Distance (mi)	2862	2863	2843	2862	2815	2824	2831
Travel Time (hr)	128.2	127.7	127.9	127.3	125.2	124.4	127.1
Total Delay (hr)	50.3	50.1	50.9	49.9	48.9	48.5	50.3
Total Stops	3917	3853	3908	3880	3777	3726	3834
Fuel Used (gal)	108.4	107.6	107.3	107.8	105.5	106.3	106.8

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	3748	3738	3753	3724
Vehs Exited	3737	3757	3743	3727
Starting Vehs	118	143	114	121
Ending Vehs	129	124	124	118
Denied Entry Before	1	0	2	0
Denied Entry After	2	0	2	0
Travel Distance (mi)	2842	2893	2880	2852
Travel Time (hr)	125.9	129.8	127.3	127.1
Total Delay (hr)	49.0	51.6	49.3	49.9
Total Stops	3845	3968	3827	3851
Fuel Used (gal)	107.1	108.9	107.6	107.3

Interval #0 Information Seeding

Start Time	6:57
End Time	7:07
Total Time (min)	10

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:07
End Time	8:07
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	3796	3758	3698	3714	3696	3662	3710
Vehs Exited	3788	3729	3713	3731	3712	3652	3718
Starting Vehs	126	112	132	138	130	112	115
Ending Vehs	134	141	117	121	114	122	107
Denied Entry Before	1	2	2	0	0	2	0
Denied Entry After	1	2	2	3	2	1	2
Travel Distance (mi)	2862	2863	2843	2862	2815	2824	2831
Travel Time (hr)	128.2	127.7	127.9	127.3	125.2	124.4	127.1
Total Delay (hr)	50.3	50.1	50.9	49.9	48.9	48.5	50.3
Total Stops	3917	3853	3908	3880	3777	3726	3834
Fuel Used (gal)	108.4	107.6	107.3	107.8	105.5	106.3	106.8

Interval #1 Information Recording

Start Time	7:07
End Time	8:07
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	3748	3738	3753	3724
Vehs Exited	3737	3757	3743	3727
Starting Vehs	118	143	114	121
Ending Vehs	129	124	124	118
Denied Entry Before	1	0	2	0
Denied Entry After	2	0	2	0
Travel Distance (mi)	2842	2893	2880	2852
Travel Time (hr)	125.9	129.8	127.3	127.1
Total Delay (hr)	49.0	51.6	49.3	49.9
Total Stops	3845	3968	3827	3851
Fuel Used (gal)	107.1	108.9	107.6	107.3

5: Garfield Ave & Intnl Spdway Bv/US 92 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.0	0.2	0.1	0.1	0.3
Denied Del/Veh (s)	0.0	0.7	2.0	2.7	0.5
Total Delay (hr)	2.2	1.6	1.5	0.9	6.1
Total Del/Veh (s)	6.6	6.3	33.5	45.6	9.4
Stop Delay (hr)	1.2	0.9	1.3	0.8	4.3
Stop Del/Veh (s)	3.7	3.5	30.5	44.1	6.6
Total Stops	249	228	136	60	673
Stop/Veh	0.21	0.25	0.86	0.88	0.29
Travel Dist (mi)	146.7	254.7	30.1	10.7	442.2
Travel Time (hr)	5.6	7.7	2.6	1.4	17.3
Avg Speed (mph)	26	34	12	8	26
Fuel Used (gal)	4.2	7.4	1.2	0.5	13.3
Fuel Eff. (mpg)	34.7	34.6	24.2	21.0	33.1
HC Emissions (g)	63	137	8	10	218
CO Emissions (g)	1828	4190	285	178	6482
NOx Emissions (g)	235	492	26	23	776
Vehicles Entered	1188	916	158	67	2329
Vehicles Exited	1190	916	158	67	2331
Hourly Exit Rate	1190	916	158	67	2331
Input Volume	1186	932	157	68	2343
% of Volume	100	98	101	99	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0
Density (ft/veh)	443	777	788	1275	707
Occupancy (veh)	6	8	3	1	17

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	11:57	11:57	11:57	11:57	11:57	11:57	11:57
End Time	1:07	1:07	1:07	1:07	1:07	1:07	1:07
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4254	4410	4486	4409	4334	4376	4491
Vehs Exited	4312	4425	4487	4441	4341	4380	4468
Starting Vehs	174	151	140	163	163	152	142
Ending Vehs	116	136	139	131	156	148	165
Denied Entry Before	0	1	2	2	0	2	1
Denied Entry After	1	3	0	2	3	0	2
Travel Distance (mi)	2895	3023	3073	3039	2997	2977	3058
Travel Time (hr)	145.9	154.9	155.8	152.8	150.0	150.6	154.3
Total Delay (hr)	63.8	69.1	69.0	66.9	65.4	66.3	67.9
Total Stops	4743	5017	5032	4928	4936	4812	5013
Fuel Used (gal)	114.6	120.2	121.9	120.2	117.5	117.0	120.3

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	11:57	11:57	11:57	11:57
End Time	1:07	1:07	1:07	1:07
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4393	4444	4454	4405
Vehs Exited	4420	4466	4479	4423
Starting Vehs	168	168	168	159
Ending Vehs	141	146	143	139
Denied Entry Before	0	3	1	0
Denied Entry After	3	2	1	1
Travel Distance (mi)	3012	3044	3084	3020
Travel Time (hr)	153.2	154.2	154.8	152.7
Total Delay (hr)	67.5	68.0	67.7	67.2
Total Stops	4986	5004	4948	4942
Fuel Used (gal)	120.2	119.9	120.9	119.3

Interval #0 Information Seeding

Start Time	11:57
End Time	12:07
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	12:07
End Time	1:07
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	4254	4410	4486	4409	4334	4376	4491
Vehs Exited	4312	4425	4487	4441	4341	4380	4468
Starting Vehs	174	151	140	163	163	152	142
Ending Vehs	116	136	139	131	156	148	165
Denied Entry Before	0	1	2	2	0	2	1
Denied Entry After	1	3	0	2	3	0	2
Travel Distance (mi)	2895	3023	3073	3039	2997	2977	3058
Travel Time (hr)	145.9	154.9	155.8	152.8	150.0	150.6	154.3
Total Delay (hr)	63.8	69.1	69.0	66.9	65.4	66.3	67.9
Total Stops	4743	5017	5032	4928	4936	4812	5013
Fuel Used (gal)	114.6	120.2	121.9	120.2	117.5	117.0	120.3

Interval #1 Information Recording

Start Time	12:07
End Time	1:07
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	4393	4444	4454	4405
Vehs Exited	4420	4466	4479	4423
Starting Vehs	168	168	168	159
Ending Vehs	141	146	143	139
Denied Entry Before	0	3	1	0
Denied Entry After	3	2	1	1
Travel Distance (mi)	3012	3044	3084	3020
Travel Time (hr)	153.2	154.2	154.8	152.7
Total Delay (hr)	67.5	68.0	67.7	67.2
Total Stops	4986	5004	4948	4942
Fuel Used (gal)	120.2	119.9	120.9	119.3

5: Garfield Ave & Intnl Spdway Bv/US 92 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.0	0.2	0.0	0.1	0.3
Denied Del/Veh (s)	0.0	0.8	1.4	1.9	0.6
Total Delay (hr)	1.1	2.0	0.9	1.2	5.3
Total Del/Veh (s)	4.7	7.6	27.5	28.9	9.1
Stop Delay (hr)	0.6	1.1	0.8	1.1	3.6
Stop Del/Veh (s)	2.3	4.2	24.8	27.2	6.3
Total Stops	153	279	99	126	657
Stop/Veh	0.18	0.30	0.80	0.83	0.32
Travel Dist (mi)	105.6	259.4	22.8	23.9	411.7
Travel Time (hr)	3.6	8.2	1.8	2.3	16.0
Avg Speed (mph)	29	32	13	11	26
Fuel Used (gal)	2.9	7.5	0.9	1.0	12.3
Fuel Eff. (mpg)	36.0	34.5	25.6	24.1	33.4
HC Emissions (g)	76	181	4	14	275
CO Emissions (g)	1888	5050	171	287	7397
NOx Emissions (g)	242	598	14	37	890
Vehicles Entered	863	934	121	149	2067
Vehicles Exited	861	932	122	151	2066
Hourly Exit Rate	861	932	122	151	2066
Input Volume	859	926	117	148	2050
% of Volume	100	101	104	102	101
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0
Density (ft/veh)	684	728	1143	751	768
Occupancy (veh)	4	8	2	2	16

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	4:57	4:57	4:57	4:57	4:57	4:57	4:57
End Time	6:07	6:07	6:07	6:07	6:07	6:07	6:07
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	5238	5341	5210	5062	5341	5312	5377
Vehs Exited	5263	5371	5234	5107	5363	5330	5375
Starting Vehs	214	252	220	211	221	196	216
Ending Vehs	189	222	196	166	199	178	218
Denied Entry Before	2	0	0	2	2	1	3
Denied Entry After	2	1	2	0	1	2	1
Travel Distance (mi)	3821	3908	3797	3741	3888	3863	3904
Travel Time (hr)	202.2	210.9	203.2	191.5	207.3	208.7	209.2
Total Delay (hr)	95.3	101.6	96.8	87.3	98.6	100.3	99.8
Total Stops	6413	6588	6458	5972	6568	6542	6598
Fuel Used (gal)	151.5	155.5	150.8	146.9	153.8	153.3	155.1

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	4:57	4:57	4:57	4:57
End Time	6:07	6:07	6:07	6:07
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	5309	5297	5321	5277
Vehs Exited	5336	5327	5305	5301
Starting Vehs	237	225	192	215
Ending Vehs	210	195	208	195
Denied Entry Before	1	2	0	0
Denied Entry After	1	3	2	0
Travel Distance (mi)	3888	3884	3891	3859
Travel Time (hr)	207.7	206.5	207.8	205.5
Total Delay (hr)	98.8	98.0	99.1	97.6
Total Stops	6612	6495	6556	6482
Fuel Used (gal)	154.8	154.2	155.0	153.1

Interval #0 Information Seeding

Start Time	4:57
End Time	5:07
Total Time (min)	10

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	5:07
End Time	6:07
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	5238	5341	5210	5062	5341	5312	5377
Vehs Exited	5263	5371	5234	5107	5363	5330	5375
Starting Vehs	214	252	220	211	221	196	216
Ending Vehs	189	222	196	166	199	178	218
Denied Entry Before	2	0	0	2	2	1	3
Denied Entry After	2	1	2	0	1	2	1
Travel Distance (mi)	3821	3908	3797	3741	3888	3863	3904
Travel Time (hr)	202.2	210.9	203.2	191.5	207.3	208.7	209.2
Total Delay (hr)	95.3	101.6	96.8	87.3	98.6	100.3	99.8
Total Stops	6413	6588	6458	5972	6568	6542	6598
Fuel Used (gal)	151.5	155.5	150.8	146.9	153.8	153.3	155.1

Interval #1 Information Recording

Start Time	5:07
End Time	6:07
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	5309	5297	5321	5277
Vehs Exited	5336	5327	5305	5301
Starting Vehs	237	225	192	215
Ending Vehs	210	195	208	195
Denied Entry Before	1	2	0	0
Denied Entry After	1	3	2	0
Travel Distance (mi)	3888	3884	3891	3859
Travel Time (hr)	207.7	206.5	207.8	205.5
Total Delay (hr)	98.8	98.0	99.1	97.6
Total Stops	6612	6495	6556	6482
Fuel Used (gal)	154.8	154.2	155.0	153.1

5: Garfield Ave & Intnl Spdway Bv/US 92 Performance by approach

Approach	EB	WB	NB	SB	All
Denied Delay (hr)	0.0	0.3	0.0	0.1	0.4
Denied Del/Veh (s)	0.0	0.7	1.4	2.2	0.6
Total Delay (hr)	4.3	4.9	1.5	3.1	13.7
Total Del/Veh (s)	14.6	12.5	41.4	48.3	17.5
Stop Delay (hr)	2.7	2.6	1.4	2.9	9.6
Stop Del/Veh (s)	9.3	6.6	38.3	46.0	12.3
Total Stops	433	458	105	199	1195
Stop/Veh	0.41	0.32	0.82	0.87	0.42
Travel Dist (mi)	130.0	389.7	23.9	35.6	579.1
Travel Time (hr)	7.3	14.1	2.4	4.7	28.5
Avg Speed (mph)	18	28	10	8	21
Fuel Used (gal)	4.1	11.3	1.1	1.8	18.2
Fuel Eff. (mpg)	32.1	34.5	22.4	19.5	31.8
HC Emissions (g)	43	100	6	17	166
CO Emissions (g)	1308	4522	232	400	6462
NOx Emissions (g)	163	437	20	46	666
Vehicles Entered	1052	1403	124	222	2801
Vehicles Exited	1056	1399	126	224	2805
Hourly Exit Rate	1056	1399	126	224	2805
Input Volume	1065	1407	127	223	2822
% of Volume	99	99	99	100	99
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0
Density (ft/veh)	338	422	864	367	428
Occupancy (veh)	7	14	2	5	28

APPENDIX D: Cost Estimates

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 5

FINANCIAL PROJECT ID:	
FILE VERSION:	
PAGE NUMBER:	

Garfield Avenue Cost Estimate

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0110 1 1	CLEARING & GRUBBING	AC	0.290	$ 10,324.67	$ 2,994.15
0120 1	REGULAR EXCAVATION	CY	475.000	$ 7.58	$ 3,600.50
0120 6	EMBANKMENT	CY		$ 13.41	$ -
0160 4	TYPE B STABILIZATION	SY	1,424.000	$ 2.15	$ 3,061.60
0285709	OPTIONAL BASE,BASE GROUP 09	SY	1,096.000	$ 16.38	$ 17,952.48
0334 1 53	SUPERPAVE ASPH CONC, TRAF C, PG76-22 (1", 110 lb/yd2)	TN	59.000	$ 95.94	$ 5,660.46
0337 7 73	ASPH CONC FC,TRAF C,FC-9.5,PG 76-22, ARB (1", 110 lb/yd2))	TN	59.000	$ 121.82	$ 7,187.38
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	EA	2.000	$ 1,869.73	$ 3,739.46
0425 1910	INLETS, CLOSED FLUME	EA	2.000	$ 3,819.86	$ 7,639.72
0430982138	MITERED END SECT, OPTIONAL RD, 36" CD	EA	2.000	$ 3,698.65	$ 7,397.30
0430175136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	LF	30.000	$ 107.83	$ 3,234.90
0520 1 10	CONCRETE CURB & GUTTER, TYPE F	LF	660.000	$ 17.50	$ 11,550.00
0522 1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY	146.700	$ 34.09	$ 5,001.00
0522 2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY	11.200	$ 52.00	$ 582.40
0527 2	DETECTABLE WARNINGS	SF	20.000	$ 40.00	$ 800.00
0570 1 2	PERFORMANCE TURF, SOD	SY	89.000	$ 4.00	$ 356.00
0630 2 11	CONDUIT, F& I, OPEN TRENCH	LF	545.000	$ 6.24	$ 3,400.80
0630 2 12	CONDUIT, F& I, DIRECTIONAL BORE	LF	240.000	$ 18.00	$ 4,320.00
0632 7 1	SIGNAL CABLE- NEW OR RECO, FUR & INSTALL	PI	2.000	$ 4,968.18	$ 9,936.36
0635 2 11	PULL & SPLICE BOX, F&I, 13" x 24"	EA	6.000	$ 637.13	$ 3,822.78
0646 1 11	ALUMINUM SIGNALS POLE, PEDESTAL	EA	2.000	$ 1,154.08	$ 2,308.16
0646 1 60	ALUMINUM SIGNALS POLE, REMOVE	EA	1.000	$ 165.65	$ 165.65
0650 1 14	TRAFFIC SIGNAL,F&I ALUMINUM, 3 S 1 W	AS		$ 896.44	$ -
0653 1 11	PEDESTRIAN SIGNAL, F&I LED COUNT, 1 WAY	AS	1.000	$ 648.24	$ 648.24
0653 1 12	PEDESTRIAN SIGNAL, F&I LED COUNT, 2 WAYS	AS	2.000	$ 1,086.35	$ 2,172.70
0653 1 40	PEDESTRIAN SIGNAL, RELOCATE	AS		$ 337.70	$ -
0660 2102	LOOP ASSEMBLY, F&I, TYPE B	AS	4.000	$ 686.28	$ 2,745.12
0660 2106	LOOP ASSEMBLY, F&I, TYPE F	AS	3.000	$ 781.92	$ 2,345.76
0665 1 11	PEDESTRIAN DETECTOR, F&I, STANDARD	EA	5.000	$ 300.00	$ 1,500.00
0670 5400	TRAF CNTL ASSEM, MODIFY	AS	2.000	$ 1,392.23	$ 2,784.46
0700 1 11	SINGLE POST SIGN, F&I GM, <12 SF	AS		$ 306.40	$ -
0700 1 50	SINGLE POST SIGN, RELOCATE	AS	2.000	$ 161.58	$ 323.16
0700 2 15	MULTI- POST SIGN, F&I GM, 51-100 SF	AS		$ 6,030.44	$ -
0706 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	24.000	$ 3.34	$ 80.16
0711 11123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	LF		$ 2.06	$ -
0711 11124	THERMOPLASTIC, STD, WHITE, SOLID, 18"	LF	52.000	$ 2.90	$ 150.80
0711 11125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	LF	351.000	$ 4.50	$ 1,579.50
0711 11141	THERMOPLASTIC, STD, WHITE, DOT GUIDE, 6"	GM		$ 1,791.54	$ -
0711 11160	THERMOPLASTIC, STD, WHITE, MESSAGE	EA		$ 225.00	$ -
0711 11170	THERMOPLASTIC, STD, WHITE, ARROW	EA	8.000	$ 70.00	$ 560.00
0711 16131	THERMOPLASTIC, STD-OTH, WHITE, SKIP, 6"	GM	0.040	$ 1,444.48	$ 57.78
0711 16101	THERMOPLASTIC, STD-OTH, WHITE, SOLID, 6"	GM	0.169	$ 3,909.24	$ 660.66
0711 16201	THERMOPLASTIC, STD-OTH,YELLOW, SOLID, 6"	GM	0.047	$ 5,095.44	$ 239.49
0711 17	THERMOPLASTIC, REMOVE	SF	180.000	$ 1.99	$ 358.20
				TOTAL OF IMPROVEMENTS:	**$ 120,917.13**
				DESIGN (0%):	
				MOBILIZATION (5%):	**$ 6,045.86**
				MAINTENANCE OF TRAFFIC (5%):	**$ 6,045.86**
				CONTINGENCY (15%):	**$ 18,137.57**
				COMPONENT TOTAL	**$ 151,146.42**

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 5

FINANCIAL PROJECT ID:	
FILE VERSION:	
PAGE NUMBER:	

WB Left Turn at Garfield Avenue (L=200')

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0110 1 1	CLEARING & GRUBBING	AC	0.070	$ 10,324.67	$ 722.73
0120 1	REGULAR EXCAVATION	CY	119.000	$ 7.58	$ 902.02
0120 6	EMBANKMENT	CY		$ 13.41	$ -
0160 4	TYPE B STABILIZATION	SY	356.000	$ 2.15	$ 765.40
0285709	OPTIONAL BASE,BASE GROUP 09	SY	274.000	$ 16.38	$ 4,488.12
0334 1 53	SUPERPAVE ASPH CONC, TRAF C, PG76-22 (1", 110 lb/yd2)	TN	15.000	$ 95.94	$ 1,439.10
0337 7 73	ASPH CONC FC,TRAF C,FC-9.5,PG 76-22, ARB (1", 110 lb/yd2))	TN	15.000	$ 121.82	$ 1,827.30
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	EA		$ 1,869.73	$ -
0425 1910	INLETS, CLOSED FLUME	EA		$ 3,819.86	$ -
0430982138	MITERED END SECT, OPTIONAL RD, 36" CD	EA		$ 3,698.65	$ -
0430175136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	LF		$ 107.83	$ -
0520 1 10	CONCRETE CURB & GUTTER, TYPE F	LF		$ 17.50	$ -
0522 1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY		$ 34.09	$ -
0522 2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY		$ 52.00	$ -
0527 2	DETECTABLE WARNINGS	SF		$ 40.00	$ -
0570 1 2	PERFORMANCE TURF, SOD	SY	23.000	$ 4.00	$ 92.00
0630 2 11	CONDUIT, F& I, OPEN TRENCH	LF		$ 6.24	$ -
0630 2 12	CONDUIT, F& I, DIRECTIONAL BORE	LF		$ 18.00	$ -
0632 7 1	SIGNAL CABLE- NEW OR RECO, FUR & INSTALL	PI		$ 4,968.18	$ -
0635 2 11	PULL & SPLICE BOX, F&I, 13" x 24"	EA		$ 637.13	$ -
0646 1 11	ALUMINUM SIGNALS POLE, PEDESTAL	EA		$ 1,154.08	$ -
0646 1 60	ALUMINUM SIGNALS POLE, REMOVE	EA		$ 165.65	$ -
0650 1 14	TRAFFIC SIGNAL,F&I ALUMINUM, 3 S 1 W	AS		$ 896.44	$ -
0653 1 11	PEDESTRIAN SIGNAL, F&I LED COUNT, 1 WAY	AS		$ 648.24	$ -
0653 1 12	PEDESTRIAN SIGNAL, F&I LED COUNT, 2 WAYS	AS		$ 1,086.35	$ -
0653 1 40	PEDESTRIAN SIGNAL, RELOCATE	AS		$ 337.70	$ -
0660 2102	LOOP ASSEMBLY, F&I, TYPE B	AS		$ 686.28	$ -
0660 2106	LOOP ASSEMBLY, F&I, TYPE F	AS		$ 781.92	$ -
0665 1 11	PEDESTRIAN DETECTOR, F&I, STANDARD	EA		$ 300.00	$ -
0670 5400	TRAF CNTL ASSEM, MODIFY	AS		$ 1,392.23	$ -
0700 1 11	SINGLE POST SIGN, F&I GM, <12 SF	AS		$ 306.40	$ -
0700 1 50	SINGLE POST SIGN, RELOCATE	AS		$ 161.58	$ -
0700 2 15	MULTI- POST SIGN, F&I GM, 51-100 SF	AS		$ 6,030.44	$ -
0706 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	6.000	$ 3.34	$ 20.04
0711 11123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	LF		$ 2.06	$ -
0711 11124	THERMOPLASTIC, STD, WHITE, SOLID, 18"	LF	52.000	$ 2.90	$ 150.80
0711 11125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	LF		$ 4.50	$ -
0711 11141	THERMOPLASTIC, STD, WHITE, DOT GUIDE, 6"	GM		$ 1,791.54	$ -
0711 11160	THERMOPLASTIC, STD, WHITE, MESSAGE	EA		$ 225.00	$ -
0711 11170	THERMOPLASTIC, STD, WHITE, ARROW	EA	2.000	$ 70.00	$ 140.00
0711 16131	THERMOPLASTIC, STD-OTH, WHITE, SKIP, 6"	GM	0.015	$ 1,444.48	$ 21.67
0711 16101	THERMOPLASTIC, STD-OTH, WHITE, SOLID, 6"	GM	0.023	$ 3,909.24	$ 89.91
0711 16201	THERMOPLASTIC, STD-OTH,YELLOW, SOLID, 6"	GM	0.047	$ 5,095.44	$ 239.49
0711 17	THERMOPLASTIC, REMOVE	SF	100.000	$ 1.99	$ 199.00
				TOTAL OF IMPROVEMENTS:	**$ 11,097.57**
				DESIGN (0%):	
				MOBILIZATION (5%):	**$ 554.88**
				MAINTENANCE OF TRAFFIC (5%):	**$ 554.88**
				CONTINGENCY (15%):	**$ 1,664.64**
				COMPONENT TOTAL	**$ 13,871.97**

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 5

FINANCIAL PROJECT ID:	
FILE VERSION:	
PAGE NUMBER:	

EB Right Turn at Garfield Avenue (L=250')

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0110 1 1	CLEARING & GRUBBING	AC	0.110	$ 10,324.67	$ 1,135.71
0120 1	REGULAR EXCAVATION	CY	178.000	$ 7.58	$ 1,349.24
0120 6	EMBANKMENT	CY		$ 13.41	$ -
0160 4	TYPE B STABILIZATION	SY	534.000	$ 2.15	$ 1,148.10
0285709	OPTIONAL BASE,BASE GROUP 09	SY	411.000	$ 16.38	$ 6,732.18
0334 1 53	SUPERPAVE ASPH CONC, TRAF C, PG76-22 (1", 110 lb/yd2)	TN	22.000	$ 95.94	$ 2,110.68
0337 7 73	ASPH CONC FC,TRAF C,FC-9.5,PG 76-22, ARB (1", 110 lb/yd2))	TN	22.000	$ 121.82	$ 2,680.04
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	EA	1.000	$ 1,869.73	$ 1,869.73
0425 1910	INLETS, CLOSED FLUME	EA	2.000	$ 3,819.86	$ 7,639.72
0430982138	MITERED END SECT, OPTIONAL RD, 36" CD	EA	1.000	$ 3,698.65	$ 3,698.65
0430175136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	LF	15.000	$ 107.83	$ 1,617.45
0520 1 10	CONCRETE CURB & GUTTER, TYPE F	LF	330.000	$ 17.50	$ 5,775.00
0522 1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY	16.700	$ 34.09	$ 569.30
0522 2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY	5.600	$ 52.00	$ 291.20
0527 2	DETECTABLE WARNINGS	SF	10.000	$ 40.00	$ 400.00
0570 1 2	PERFORMANCE TURF, SOD	SY	33.000	$ 4.00	$ 132.00
0630 2 11	CONDUIT, F& I, OPEN TRENCH	LF	445.000	$ 6.24	$ 2,776.80
0630 2 12	CONDUIT, F& I, DIRECTIONAL BORE	LF	165.000	$ 18.00	$ 2,970.00
0632 7 1	SIGNAL CABLE- NEW OR RECO, FUR & INSTALL	PI	1.000	$ 4,968.18	$ 4,968.18
0635 2 11	PULL & SPLICE BOX, F&I, 13" x 24"	EA	4.000	$ 637.13	$ 2,548.52
0646 1 11	ALUMINUM SIGNALS POLE, PEDESTAL	EA	1.000	$ 1,154.08	$ 1,154.08
0646 1 60	ALUMINUM SIGNALS POLE, REMOVE	EA	1.000	$ 165.65	$ 165.65
0650 1 14	TRAFFIC SIGNAL,F&I ALUMINUM, 3 S 1 W	AS		$ 896.44	$ -
0653 1 11	PEDESTRIAN SIGNAL, F&I LED COUNT, 1 WAY	AS		$ 648.24	$ -
0653 1 12	PEDESTRIAN SIGNAL, F&I LED COUNT, 2 WAYS	AS	1.000	$ 1,086.35	$ 1,086.35
0653 1 40	PEDESTRIAN SIGNAL, RELOCATE	AS		$ 337.70	$ -
0660 2102	LOOP ASSEMBLY, F&I, TYPE B	AS	4.000	$ 686.28	$ 2,745.12
0660 2106	LOOP ASSEMBLY, F&I, TYPE F	AS	1.000	$ 781.92	$ 781.92
0665 1 11	PEDESTRIAN DETECTOR, F&I, STANDARD	EA	2.000	$ 300.00	$ 600.00
0670 5400	TRAF CNTL ASSEM, MODIFY	AS		$ 1,392.23	$ -
0700 1 11	SINGLE POST SIGN, F&I GM, <12 SF	AS		$ 306.40	$ -
0700 1 50	SINGLE POST SIGN, RELOCATE	AS	1.000	$ 161.58	$ 161.58
0700 2 15	MULTI- POST SIGN, F&I GM, 51-100 SF	AS		$ 6,030.44	$ -
0706 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	9.000	$ 3.34	$ 30.06
0711 11123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	LF		$ 2.06	$ -
0711 11124	THERMOPLASTIC, STD, WHITE, SOLID, 18"	LF		$ 2.90	$ -
0711 11125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	LF	10.000	$ 4.50	$ 45.00
0711 11141	THERMOPLASTIC, STD, WHITE, DOT GUIDE, 6"	GM		$ 1,791.54	$ -
0711 11160	THERMOPLASTIC, STD, WHITE, MESSAGE	EA		$ 225.00	$ -
0711 11170	THERMOPLASTIC, STD, WHITE, ARROW	EA	3.000	$ 70.00	$ 210.00
0711 16131	THERMOPLASTIC, STD-OTH, WHITE, SKIP, 6"	GM	0.014	$ 1,444.48	$ 20.22
0711 16101	THERMOPLASTIC, STD-OTH, WHITE, SOLID, 6"	GM	0.075	$ 3,909.24	$ 293.19
0711 16201	THERMOPLASTIC, STD-OTH,YELLOW, SOLID, 6"	GM		$ 5,095.44	$ -
0711 17	THERMOPLASTIC, REMOVE	SF	45.000	$ 1.99	$ 89.55
				TOTAL OF IMPROVEMENTS:	**$ 57,795.23**
				DESIGN (0%):	
				MOBILIZATION (5%):	**$ 2,889.76**
				MAINTENANCE OF TRAFFIC (5%):	**$ 2,889.76**
				CONTINGENCY (15%):	**$ 8,669.28**
				COMPONENT TOTAL	**$ 72,244.04**

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 5

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NB Right Turn at Garfield Avenue (L=250')

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0110 1 1	CLEARING & GRUBBING	AC	0.110	$ 10,324.67	$ 1,135.71
0120 1	REGULAR EXCAVATION	CY	178.000	$ 7.58	$ 1,349.24
0120 6	EMBANKMENT	CY		$ 13.41	$ -
0160 4	TYPE B STABILIZATION	SY	534.000	$ 2.15	$ 1,148.10
0285709	OPTIONAL BASE,BASE GROUP 09	SY	411.000	$ 16.38	$ 6,732.18
0334 1 53	SUPERPAVE ASPH CONC, TRAF C, PG76-22 (1", 110 lb/yd2)	TN	22.000	$ 95.94	$ 2,110.68
0337 7 73	ASPH CONC FC,TRAF C,FC-9.5,PG 76-22, ARB (1", 110 lb/yd2))	TN	22.000	$ 121.82	$ 2,680.04
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	EA	1.000	$ 1,869.73	$ 1,869.73
0425 1910	INLETS, CLOSED FLUME	EA		$ 3,819.86	$ -
0430982138	MITERED END SECT, OPTIONAL RD, 36" CD	EA	1.000	$ 3,698.65	$ 3,698.65
0430175136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	LF	15.000	$ 107.83	$ 1,617.45
0520 1 10	CONCRETE CURB & GUTTER, TYPE F	LF	330.000	$ 17.50	$ 5,775.00
0522 1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY	130.000	$ 34.09	$ 4,431.70
0522 2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY	5.600	$ 52.00	$ 291.20
0527 2	DETECTABLE WARNINGS	SF	10.000	$ 40.00	$ 400.00
0570 1 2	PERFORMANCE TURF, SOD	SY	33.000	$ 4.00	$ 132.00
0630 2 11	CONDUIT, F& I, OPEN TRENCH	LF	50.000	$ 6.24	$ 312.00
0630 2 12	CONDUIT, F& I, DIRECTIONAL BORE	LF	75.000	$ 18.00	$ 1,350.00
0632 7 1	SIGNAL CABLE- NEW OR RECO, FUR & INSTALL	PI		$ 4,968.18	$ -
0635 2 11	PULL & SPLICE BOX, F&I, 13" x 24"	EA	1.000	$ 637.13	$ 637.13
0646 1 11	ALUMINUM SIGNALS POLE, PEDESTAL	EA		$ 1,154.08	$ -
0646 1 60	ALUMINUM SIGNALS POLE, REMOVE	EA		$ 165.65	$ -
0650 1 14	TRAFFIC SIGNAL,F&I ALUMINUM, 3 S 1 W	AS		$ 896.44	$ -
0653 1 11	PEDESTRIAN SIGNAL, F&I LED COUNT, 1 WAY	AS		$ 648.24	$ -
0653 1 12	PEDESTRIAN SIGNAL, F&I LED COUNT, 2 WAYS	AS		$ 1,086.35	$ -
0653 1 40	PEDESTRIAN SIGNAL, RELOCATE	AS		$ 337.70	$ -
0660 2102	LOOP ASSEMBLY, F&I, TYPE B	AS		$ 686.28	$ -
0660 2106	LOOP ASSEMBLY, F&I, TYPE F	AS	2.000	$ 781.92	$ 1,563.84
0665 1 11	PEDESTRIAN DETECTOR, F&I, STANDARD	EA		$ 300.00	$ -
0670 5400	TRAF CNTL ASSEM, MODIFY	AS	1.000	$ 1,392.23	$ 1,392.23
0700 1 11	SINGLE POST SIGN, F&I GM, <12 SF	AS		$ 306.40	$ -
0700 1 50	SINGLE POST SIGN, RELOCATE	AS	1.000	$ 161.58	$ 161.58
0700 2 15	MULTI- POST SIGN, F&I GM, 51-100 SF	AS		$ 6,030.44	$ -
0706 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	9.000	$ 3.34	$ 30.06
0711 11123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	LF		$ 2.06	$ -
0711 11124	THERMOPLASTIC, STD, WHITE, SOLID, 18"	LF		$ 2.90	$ -
0711 11125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	LF	21.000	$ 4.50	$ 94.50
0711 11141	THERMOPLASTIC, STD, WHITE, DOT GUIDE, 6"	GM		$ 1,791.54	$ -
0711 11160	THERMOPLASTIC, STD, WHITE, MESSAGE	EA		$ 225.00	$ -
0711 11170	THERMOPLASTIC, STD, WHITE, ARROW	EA	3.000	$ 70.00	$ 210.00
0711 16131	THERMOPLASTIC, STD-OTH, WHITE, SKIP, 6"	GM	0.011	$ 1,444.48	$ 15.89
0711 16101	THERMOPLASTIC, STD-OTH, WHITE, SOLID, 6"	GM	0.071	$ 3,909.24	$ 277.56
0711 16201	THERMOPLASTIC, STD-OTH,YELLOW, SOLID, 6"	GM		$ 5,095.44	$ -
0711 17	THERMOPLASTIC, REMOVE	SF	35.000	$ 1.99	$ 69.65
				TOTAL OF IMPROVEMENTS:	**$ 39,486.12**
				DESIGN (0%):	
				MOBILIZATION (5%):	**$ 1,974.31**
				MAINTENANCE OF TRAFFIC (5%):	**$ 1,974.31**
				CONTINGENCY (15%):	**$ 5,922.92**
				COMPONENT TOTAL	**$ 49,357.65**

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 5

FINANCIAL PROJECT ID:	
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Garfield Avenue Cost Estimate (Sidewalks & Crosswalks)

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0110 1 1	CLEARING & GRUBBING	AC		$ 10,324.67	$ -
0120 1	REGULAR EXCAVATION	CY		$ 7.58	$ -
0120 6	EMBANKMENT	CY		$ 13.41	$ -
0160 4	TYPE B STABILIZATION	SY		$ 2.15	$ -
0285709	OPTIONAL BASE,BASE GROUP 09	SY		$ 16.38	$ -
0334 1 53	SUPERPAVE ASPH CONC, TRAF C, PG76-22 (1", 110 lb/yd2)	TN		$ 95.94	$ -
0337 7 73	ASPH CONC FC,TRAF C,FC-9.5,PG 76-22, ARB (1", 110 lb/yd2))	TN		$ 121.82	$ -
0425 11	MODIFY EXISTING DRAINAGE STRUCTURE	EA		$ 1,869.73	$ -
0425 1910	INLETS, CLOSED FLUME	EA		$ 3,819.86	$ -
0430982138	MITERED END SECT, OPTIONAL RD, 36" CD	EA		$ 3,698.65	$ -
0430175136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	LF		$ 107.83	$ -
0520 1 10	CONCRETE CURB & GUTTER, TYPE F	LF		$ 17.50	$ -
0522 1	CONCRETE SIDEWALK AND DRIVEWAYS, 4"	SY		$ 34.09	$ -
0522 2	CONCRETE SIDEWALK AND DRIVEWAYS, 6"	SY		$ 52.00	$ -
0527 2	DETECTABLE WARNINGS	SF		$ 40.00	$ -
0570 1 2	PERFORMANCE TURF, SOD	SY		$ 4.00	$ -
0630 2 11	CONDUIT, F& I, OPEN TRENCH	LF	50.000	$ 6.24	$ 312.00
0630 2 12	CONDUIT, F& I, DIRECTIONAL BORE	LF		$ 18.00	$ -
0632 7 1	SIGNAL CABLE- NEW OR RECO, FUR & INSTALL	PI	1.000	$ 4,968.18	$ 4,968.18
0635 2 11	PULL & SPLICE BOX, F&I, 13" x 24"	EA	1.000	$ 637.13	$ 637.13
0646 1 11	ALUMINUM SIGNALS POLE, PEDESTAL	EA	1.000	$ 1,154.08	$ 1,154.08
0646 1 60	ALUMINUM SIGNALS POLE, REMOVE	EA		$ 165.65	$ -
0650 1 14	TRAFFIC SIGNAL,F&I ALUMINUM, 3 S 1 W	AS		$ 896.44	$ -
0653 1 11	PEDESTRIAN SIGNAL, F&I LED COUNT, 1 WAY	AS	1.000	$ 648.24	$ 648.24
0653 1 12	PEDESTRIAN SIGNAL, F&I LED COUNT, 2 WAYS	AS	1.000	$ 1,086.35	$ 1,086.35
0653 1 40	PEDESTRIAN SIGNAL, RELOCATE	AS		$ 337.70	$ -
0660 2102	LOOP ASSEMBLY, F&I, TYPE B	AS		$ 686.28	$ -
0660 2106	LOOP ASSEMBLY, F&I, TYPE F	AS		$ 781.92	$ -
0665 1 11	PEDESTRIAN DETECTOR, F&I, STANDARD	EA	3.000	$ 300.00	$ 900.00
0670 5400	TRAF CNTL ASSEM, MODIFY	AS	1.000	$ 1,392.23	$ 1,392.23
0700 1 11	SINGLE POST SIGN, F&I GM, <12 SF	AS		$ 306.40	$ -
0700 1 50	SINGLE POST SIGN, RELOCATE	AS		$ 161.58	$ -
0700 2 15	MULTI- POST SIGN, F&I GM, 51-100 SF	AS		$ 6,030.44	$ -
0706 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA		$ 3.34	$ -
0711 11123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	LF		$ 2.06	$ -
0711 11124	THERMOPLASTIC, STD, WHITE, SOLID, 18"	LF		$ 2.90	$ -
0711 11125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	LF	320.000	$ 4.50	$ 1,440.00
0711 11141	THERMOPLASTIC, STD, WHITE, DOT GUIDE, 6"	GM		$ 1,791.54	$ -
0711 11160	THERMOPLASTIC, STD, WHITE, MESSAGE	EA		$ 225.00	$ -
0711 11170	THERMOPLASTIC, STD, WHITE, ARROW	EA		$ 70.00	$ -
0711 16131	THERMOPLASTIC, STD-OTH, WHITE, SKIP, 6"	GM		$ 1,444.48	$ -
0711 16101	THERMOPLASTIC, STD-OTH, WHITE, SOLID, 6"	GM		$ 3,909.24	$ -
0711 16201	THERMOPLASTIC, STD-OTH,YELLOW, SOLID, 6"	GM		$ 5,095.44	$ -
0711 17	THERMOPLASTIC, REMOVE	SF		$ 1.99	$ -
				TOTAL OF IMPROVEMENTS:	**$ 12,538.21**
				DESIGN (0%):	
				MOBILIZATION (5%):	**$ 626.91**
				MAINTENANCE OF TRAFFIC (5%):	**$ 626.91**
				CONTINGENCY (15%):	**$ 1,880.73**
				COMPONENT TOTAL	**$ 15,672.76**