Village of Estero Area-Wide TRAFFIC STUDY

Prepared for:



Prepared by: Kimley »Horn





August 14, 2017

Village of Estero Area-Wide TRAFFIC STUDY



TABLE OF CONTENTS

Page

INTRODUCTION	1
EXECUTIVE SUMMARY	5
ROADWAY ANALYSIS	8
SUMMARY OF ROADWAY ANALYSIS	9
ROADWAY STUDY AREA	10
CORRIDOR GROWTH RATES	12
DAILY TRAFFIC VOLUMES	20
INTERSECTION ANALYSIS	21
SUMMARY OF INTERSECTION ANALYSIS	22
INTERSECTIONS STUDY AREA	23
EXISTING CONDITIONS	27
SCHEDULED IMPROVEMENTS	28
Future Widening of Corkscrew Road	28
FDOT Interim Improvements at Corkscrew Road & I-75 Ramps	29
Corkscrew Road & Corkscrew Woodlands Boulevard	30
Corkscrew Road & Bella Terra Boulevard	31
Estero Parkway	31
FUTURE CONDITIONS	32
SAFE LY ANALYSIS	/5
SUMMARY OF SAFETY ANALYSIS	/6
Overview of Area-Wide Crashes	11
Corkscrew Road from US 41 to Bella Terra Boulevard Corridor	/8
Intersection of US 41 & Broadway Avenue	81
Intersection of Infee Oaks Parkway & Coconul Road	82
Intersection of Coconul Road & Via Coconul Point	83 02
Intersection of Three Oaks Darkway & Estern Darkway	03
Intersection of US /1 & Estoro Darkway	04
Intersection of US 41 & Eductain Lakes	00
Intersection of US 41 & Polican Sound Drivo	00 97
Intersection of US 41 & Williams Poad	07 87
Intersection of Three Oaks Parkway & Williams Road	07 80
	07
Neighborhood Access Points	91
Heavy Vehicles along Corkscrew Road	71
Corkscrew Road Signal Timing	94
Multi-Modal Observations	95
CONCLUSION	



Village of Estero Area-Wide TRAFFIC STUDY



Page

LIST OF FIGURES

LIST OF TABLES

Page Table 9: Corkscrew Road & Grande Oaks Way Intersection Analysis 39 TABLE 14: CORKSCREW ROAD & I-75 NORTHBOUND RAMPS INTERSECTION ANALYSIS 46





Village of Estero Area-Wide **TRAFFIC STUDY**



LIST OF APPENDICES

- APPENDIX A: Transportation Methodology
- APPENDIX B: Village of Estero Roadways
- APPENDIX C: Existing Traffic Count Data
- APPENDIX D: Interactive Growth Model & FSUTMS Growth Factors
- APPENDIX E: FDOT Memorandum
- APPENDIX F: Existing and Future Traffic Volume Worksheets
- APPENDIX G: Intersection Analyses







INTRODUCTION

The Village of Estero, Florida's Newest City, was established on December 31, 2014. The Village has continued to develop since 2014 and is increasing in residential and commercial development. As part of the increasing development, the Village of Estero has seen an increase in traffic within the Village limits. Kimley-Horn and Associates, Inc. was retained by the Village of Estero to conduct an Area-Wide Traffic Study to identify existing and areas of concern and recommend solutions needed for both operational and level of service issues.

This report documents existing conditions and the anticipated future conditions of certain intersections and roadways within The Village of Estero. The existing conditions analysis includes observations of traffic conditions during peak times, existing operating characteristics, and existing volumes. The analysis of future (2027) conditions includes identification of future travel demand, evaluation of future operating conditions, and future potential operational improvements.

Within The Village of Estero, roadways are maintained privately or publicly by either The Village, Lee County, or the Florida Department of Transportation (FDOT). FDOT maintains I-75 and US 41 (South Tamiami Trail) and Lee County maintains Ben Hill Griffin Parkway, Corkscrew Road, Estero Parkway Extension, Imperial Parkway, and Three Oaks Parkway. The Village has recently taken over the management of several roadways from Lee County. FDOT, Lee County, and The Village of Estero major roadways and key intersections were included in the report.



Village of Estero Area-Wide



A map of The Village of Estero boundary limits is illustrated in Figure 1. The major transportation facilities within The Village of Estero and the surrounding area is provided in Figure 2. Prior to undertaking this analysis, a formal study methodology was submitted and approved on January 26, 2017 by The Village of Estero staff.

FFIC STUDY

The methodology is summarized in a letter contained in Appendix A of this report. In general, the following procedural steps were undertaken:

- The study area network was defined based upon discussions with The Village of Estero staff;
- Traffic counts for the study area were collected and adjusted to reflect peak-season volumes;
- Work Programs of Lee County, the Florida Department of Transportation (FDOT), and information provided by The Village of Estero were reviewed to identify scheduled road and intersection improvements in the area;
- Future traffic volumes (2027) were developed based upon corridor growth rates. The Interactive Growth Model provided by Metro Forecasting Models, LLC and data provided by Lee County Department of Transportation (DOT) was used to determine the future corridor growth rates;
- Intersection and roadway analyses were completed to determine vehicular delays and levels of service using the methodologies defined in the *2010 Highway Capacity Manual.*





Figure 1: The Village of Estero





Figure 2: The Village of Estero Transportation Facilities





EXECUTIVE SUMMARY

This Area-Wide Traffic Study includes an analysis of the existing and projected future roadway and intersection conditions. The results of the analysis are outlined in more detail in the report.

The roadway analysis indicates that Corkscrew Road from Three Oaks Parkway to Bella Terra Boulevard is anticipated to operate over capacity in future conditions during the p.m. peakhour. Corkscrew Road from Ben Hill Griffin Parkway to Bella Terra Boulevard is currently a twolane roadway and is anticipated to be over capacity within the ten-year horizon period (2027) analyzed. Based upon discussions with Lee County DOT, the roadway widening is not a scheduled improvement as it is not currently funded as part of the County's five-year capital improvement program. However, concurrently with this analysis, Lee County has contracted with AIM Engineering & Surveying, Inc., to conduct an environmental and traffic study along Corkscrew Road. The study is intended to determine improvements needed to address the increased density along Corkscrew Road, east of I-75, and to identify costs and recommended transportation proportionate fair-share within the Corkscrew Road study area. It is anticipated potential widening of Corkscrew Road and funding will be analyzed as part of the County's study.

The intersection analysis for this study indicates several intersections within The Village of Estero are currently operating with approaches at an unacceptable level of service during the a.m. peak-hour and/or p.m. peak-hour including the following:

- Corkscrew Road & Bella Terra Boulevard
- Corkscrew Road & Cypress Shadows Boulevard
- Corkscrew Road & Ben Hill Griffin Parkway
- Corkscrew Road & I-75 Northbound Ramps
- Corkscrew Road & I-75 Southbound Ramps







- Corkscrew Road & Three Oaks Parkway
- Corkscrew Road & US 41
- US 41 & Estero Parkway
- US 41 & Broadway
- US 41 & Pelican Sound Drive
- US 41 & Williams Road
- US 41 & Fountain Lakes Boulevard

Programmed improvements that are anticipated within the ten-year analysis period of this study, from the FDOT, Lee County DOT, Village of Estero, and various development were included in the analysis.

In addition to the existing intersection deficiencies, the future (2027) analysis indicates the following intersection is anticipated to operate unacceptably during the p.m. peak-hour period.

- Corkscrew Road & Bella Terra Boulevard
- Coconut Road & Three Oaks Parkway

The following potential improvements were recommended to correct existing and future deficiencies (when warranted), for study area intersections in order to improve operations:

- Create median storage for the northbound left-turn at the intersection of Corkscrew Road & Cypress Shadows Boulevard
- Extend the southbound left-turn lane at Corkscrew Road & Ben Hill Griffin Parkway and re-time the intersection
- Provide interim safety improvements at the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard





 Re-time intersection, extend the eastbound left-turn lane at Corkscrew Road & Three Oaks Parkway, and add an additional northbound right-turn lane (for dual northbound right-turn lanes), depending on available right-of way

Area-Wide TRAFFIC STUDY

Village of Estero

- Re-time the intersection of US 41 & Corkscrew Road and add an additional westbound right-turn lane (for dual westbound right-turn lanes), depending on available right-of way
- Re-time the intersection of US 41 & Estero Parkway and explore the possibility of an additional westbound right-turn (for dual westbound right-turns)
- Add a right-turn lane at the intersection of US 41 & Williams Road and extend the eastbound left-turn lane (along with the closure of the driveway on the west leg of Williams Road)
- Signalize the intersection of US 41 & Fountain Lakes Boulevard (when warranted)
- Re-time the intersection of Three Oaks Parkway & Coconut Road including changing the signal cycle length

The safety analysis that was conducted as part of the area-wide traffic study indicated that the study intersection signals appear to be in good shape as far as backplates, borders, and signal heads. It is recommended to confirm with Lee County DOT that the signal clearance interval times (yellow and all-red times) are adequate. It is also recommended to consider pavement friction improvements if skid numbers or visual inspection show poor pavement at the intersections of Ben Hill Griffin Parkway & Estero Parkway and Three Oaks Parkway & Williams Road. It is also recommended to consider lighting improvements at the intersection of Ben Hill Griffin Parkway and Three Oaks Parkway.





ROADWAY ANALYSIS





SUMMARY OF ROADWAY ANALYSIS

The roadway analysis indicates that Corkscrew Road from Three Oaks Parkway to Ben Hill Griffin Parkway is anticipated to operate over capacity in future conditions during the p.m. peak-hour. The segments of Corkscrew Road from Ben Hill Griffin Parkway to Bella Terra Boulevard and east of Bella Terra Boulevard to Alico Road (outside The Village of Estero limits) are currently two-lanes and are anticipated to be over capacity within the ten-year horizon period (2027) analyzed.

Based upon discussions with Lee County DOT, the roadway widening is not a scheduled improvement as it is not currently funded as part of the County's five-year capital improvement program. The Metropolitan Planning Organization (MPO) Long Range Transportation Plan includes the four-lane improvement to Corkscrew Road in the Cost Feasible Plan with a projected year of expenditure between 2021 and 2025 for Preliminary Engineering and Right-of-Way Acquisition and from 2026 to 2030 for construction.

Concurrently with this analysis, Lee County has contracted with AIM Engineering & Surveying, Inc., to conduct an environmental and traffic study along Corkscrew Road. The study is intended to determine improvements needed to address the increased density along Corkscrew Road, east of I-75, and to identify costs and recommended transportation proportionate fairshare within the Corkscrew Road study area. It is anticipated potential widening of Corkscrew Road and funding will be analyzed as part of the County's study.





ROADWAY STUDY AREA

Within The Village of Estero, roadways are maintained privately or publicly by either The Village, Lee County, or the Florida Department of Transportation (FDOT). FDOT maintains I-75 and US 41 (South Tamiami Trail) and Lee County maintains Ben Hill Griffin Parkway, Corkscrew Road, Estero Parkway Extension, Imperial Parkway, and Three Oaks Parkway. The Village has recently taken over the management of several roadways from Lee County. Village maintained roads are included in Appendix B.

The extent of the roadway network to be studied was based upon discussions and subsequent agreements with The Village of Estero staff. These discussions resulted in the determination of the following roadway segments to be studied within the study area:

- Corkscrew Road: from US 41 to Bella Terra Boulevard
- Corkscrew Road: from Bella Terra Boulevard to Alico Road
- Williams Road: from Via Coconut Point to Three Oaks Parkway
- Via Coconut Point: from Corkscrew Road to Williams Road
- Via Coconut Point: from Williams Road to Coconut Road
- River Ranch Road: from Corkscrew Road to Williams Road
- Trailside Drive: from US 41 to Poinciana Avenue
- Poinciana Avenue: from Trailside Drive to Broadway West

Traffic counts (to identify 24-hour roadway volumes) were collected along the roadway segments at the locations identified in Figure 3. The data collected is included in Appendix C.





Figure 3: Roadway Count Locations





CORRIDOR GROWTH RATES

As agreed to in the transportation study methodology, 2027 (a ten-year horizon) was determined to be the future analysis year for the study area and, thus, 2027 conditions would be evaluated as the "future" year scenario.

Traffic volumes associated with approved developments in the area were considered in the development of background traffic estimates through the use of the Interactive Growth Model from Metro Forecasting, LLC. Based upon information provided by Metro Forecasting, traffic associated with several approved developments in the area was incorporated into the analysis to determine corridor growth rates. Data provided by Lee County was also incorporated into the model outside of The Village of Estero to evaluate future growth in the surrounding area and the impacts to the transportation roadways and intersections within The Village.

The annual exponential growth rates are summarized in the following table. The exponential growth rates were applied to the peak season existing volumes and grown ten years (to the future analysis year of 2027). Based upon discussions with The Village of Estero, a minimum of 1% growth rate was used. Corkscrew Road from Three Oaks Parkway to Bella Terra Boulevard is anticipated to operate over the available peak-hour peak direction capacity in future conditions during the p.m. peak-hour. Growth rates were applied to both a.m. peak-hour and p.m. peak-hour conditions. Additional information is provided in Appendix D.





Table 1: Growth Rate Determinations for Study Area							
Roadway	From	То	Annual Exponential Growth Rate				
US 41	Estero Parkway	Corkscrew Road	1.0%				
	Corkscrew Road	Williams Road	1.0%				
	Williams Road	Coconut Road	1.0%				
Via Coconut Point	conut Point Corkscrew Road Coconut Road						
Williams Road	Williams Road US 41 T		1.0%				
Estero Parkway	Estero Parkway Ben Hill Griffin Parkway		1.0%				
Three Oaks Parkway	Estero Parkway	Coconut Road	1.5%				
Ben Griffin Parkway	Ben Griffin Parkway Estero Parkway		1.0%				
River Ranch Road Corkscrew Road Willi		Williams Road	1.0%				
Corkscrew Road	Bella Terra Boulevard	Stoneybrook Golf Drive	2.0%				
	Stoneybrook Golf Drive	Ben Hill Griffin Parkway	2.0%				
	Ben Hill Griffin Parkway	I-75	2.0%				
	I-75	Three Oaks Parkway	2.0%				
	Three Oaks Parkway	Via Coconut Point	2.0%				
	Via Coconut Point	US 41	2.0%				





ROADWAY CAPACITY ANALYSIS

A capacity analysis of several key roadway segments was performed, including both Corkscrew Road and other roadways within The Village of Estero. The following roadway segments were included in this analysis:

- Corkscrew Road: from US 41 to Bella Terra Boulevard
- Corkscrew Road: from Bella Terra Boulevard to Alico Road
- Williams Road: from Via Coconut Point to Three Oaks Parkway
- Via Coconut Point: from Corkscrew Road to Williams Road
- Via Coconut Point: from Williams Road to Coconut Road
- River Ranch Road: from Corkscrew Road to Williams Road
- Trailside Drive: from US 41 to Poinciana Avenue
- Poinciana Avenue: from Trailside Drive to Broadway West

For the purpose of this analysis, a ten-year horizon was used for future conditions, and roadway volumes are included for both existing (2017) conditions and projected future (2027) conditions. The analysis was performed for both the a.m. peak-hour (7:00 a.m. to 9:00 a.m.) and p.m. peak-hour (4:00 p.m. to 6:00 p.m.) periods. The purpose of this analysis was to determine if the study area roadway segments are either currently or projected to operate over capacity.

Acceptable operations for a roadway are defined as the roadway having traffic volumes that are lower than the service volumes for that facility. The service volumes are based upon the roadway geometry and define the amount of available capacity and were determined by Lee County DOT standards. The existing and future roadway volumes were compared to the available capacity along each roadway segment to determine the percent of capacity the roadway operates at. Roadway segments operating above 100% capacity are considered to be



Village of Estero



failing (operating at Level of Service F) and thus, considered to operate unacceptably. The results of the study area roadway analysis are summarized in the following tables.

The analysis indicates that the following study roadway segments currently operate and will continue to operate at an acceptable level of service in both directions during the a.m. peak-hour and p.m. peak-hour in the future 2027 scenario:

- Williams Road: from Via Coconut Point to Three Oaks Parkway
- Via Coconut Point: from Corkscrew Road to Williams Road
- Via Coconut Point: from Williams Road to Coconut Road
- River Ranch Road: from Corkscrew Road to Williams Road
- Trailside Drive: from US 41 to Poinciana Avenue

Area-Wide TRAFFIC STUDY

• Poinciana Avenue: from Trailside Drive to Broadway West

Corkscrew Road from Three Oaks Parkway to Ben Hill Griffin Parkway is a four-lane divided roadway and is anticipated to exceed the available capacity in the p.m. peak-hour in future 2027 conditions. The existing roadway segment of Corkscrew from Three Oaks Parkway to I-75 ramps currently operates at a failing level of service during the p.m. peak-hour. Improvements are programmed along Corkscrew Road with the interim FDOT improvements to the I-75 ramps. This will include additional laneage along Corkscrew Road between the intersections of Corkscrew Road & I-75 Northbound Ramp and Corkscrew Road & I-75 Southbound Ramp. The graphic showing the improvements is included in Appendix E. It is recommended to monitor the results of these interim improvements after construction and to discuss further with FDOT any additional planned improvements along Corkscrew Road.

Corkscrew Road east of Ben Hill Griffin Parkway is currently a two-lane undivided roadway and is anticipated to exceed the capacity in the future 2027 conditions. Additionally, a high number





of heavy vehicles were observed during the a.m. peak-hour period (7:00 a.m. to 9:00 a.m.) and should be considered in the need for widening the sections of Corkscrew Road, east of Ben Hill Griffin Parkway, that are currently two-lanes.

The addition of several developments (including Wildblue, Corkscrew Shores, Corkscrew Farms, Pepperland Ranch, and Verdana), while not all approved at this time, were assumed for planning purposes in the analysis of the roadway segment of Corkscrew Road, east of I-75. The addition of the pending or approved residential units and commercial development indicates Corkscrew Road is anticipated to operate over the existing capacity in the future (2027) conditions. These trips were accounted for based upon a trip generation estimate using The Institute of Transportation Engineers' *Trip Generation Manual* (9th Edition) in this roadway analysis along Corkscrew Road. The additional projected future trips from these developments resulted in the failing level of service of the Corkscrew Road east of Bella Terra Boulevard. It is recommended to coordinate closely with Lee County regarding the analysis of Corkscrew Road as these developments are outside The Village of Estero limits. The approval process for each development is anticipate to require a more detailed transportation study. As directed by Village staff, the developments were all assumed in the analysis to evaluate the potential impact.

Corkscrew Road plans for future widening, to four lanes, are available on the Lee County DOT website and included in Appendix E. However, based upon discussions with Lee County DOT, the roadway widening is not a programmed improvement as it is not currently funded as part of the five-year Capital Improvement Program (CIP 2018 to 2022). The Metropolitan Planning Organization (MPO) Long Range Transportation Plan includes the four-lane improvement to Corkscrew Road in the Cost Feasible Plan with a projected year of expenditure between 2021 and 2025 for Preliminary Engineering and Right-of-Way Acquisition and from 2026 to 2030 for construction.



Village of Estero Area-Wide TRAFFIC STUDY



Lee County has contracted with AIM Engineering & Surveying, Inc., to conduct an environmental and traffic study along Corkscrew Road. The study is intended to determine specific improvements needed to address the increased density along Corkscrew Road, east of I-75, and to identify costs and recommended transportation proportionate fair-share within the study area. It is anticipated potential widening of Corkscrew Road and funding will be analyzed as part of that study. It is recommended to begin coordination with Lee County DOT and FDOT regarding this analysis, the traffic study along Corkscrew Road, and programmed improvements.







Table 2: Existing and Future A.M. Peak-Hour Roadway Conditions									
Roadway	Location of Data Collection	Laneage	LOS Standard Service Volume	2017 Existing Volumes		Existing %	2027 Future Volumes		Future % of
			Peak-Hour Peak Direction	NB/EB	SB/WB	or capacity.	NB/EB	SB/WB	capacity
Corkscrew Road	US 41 to Three Oaks Parkway	4	1,900	667	1,303	69%	814	1,589	84%
Corkscrew Road	Three Oaks Parkway to I-75	4	1,900	949	1,541	81%	1,157	1,879	99%
Corkscrew Road	I-75 to Ben Hill Griffin Parkway	4	1,900	987	1,550	82%	1,326	2,243	118%
Corkscrew Road	Ben Hill Griffin Parkway to West of Bella Terra	2	1,130	350	979	86%	689	2,072	183%
Corkscrew Road	East of Bella Terra Boulevard to Alico Road	2	1,130	323	226	29%	775	1,684	149%
Williams Road	Between Via Coconut Point and Three Oaks Parkway	2	860	442	293	51%	539	357	63%
Via Coconut Point	South of Corkscrew Road	4	1,790	488	337	27%	595	411	33%
Via Coconut Point	North of Coconut Road	4	1,790	529	442	30%	645	539	36%
River Ranch Road	South of Corkscrew Road	2	860	211	99	24%	257	121	30%
Trailside Drive	Between US 41 and Poinciana Avenue	2	740	4	6	1%	5	7	1%
Poinciana Avenue	Between Trailside Drive and Broadway West	2	740	15	74	10%	18	90	12%







Table 3: Existing and Future P.M. Peak-Hour Roadway Conditions									
Roadway	Location of Data Collection	Laneage	LOS Standard Service Volume	2017 Existing Volume		Existing % of	2027 Future Volume		Future Roadway % of
			Peak-Hour Peak Direction	NB/EB	SB/WB	Capacity	NB/EB	SB/WB	Capacity
Corkscrew Road	US 41 to Three Oaks Parkway	4	1,900	1,052	987	55%	1,282	1,203	67%
Corkscrew Road	Three Oaks Parkway to I-75	4	1,900	1,932	1,328	102%	2,356	1,619	124%
Corkscrew Road	I-75 to Ben Hill Griffin Parkway	4	1,900	1,629	1,189	82%	2,183	1,845	115%
Corkscrew Road	Ben Hill Griffin Parkway to West of Bella Terra	2	1,130	821	650	86%	2,017	1,345	178%
Corkscrew Road	East of Bella Terra Boulevard to Alico Road	2	1,130	326	228	29%	1,196	695	106%
Williams Road	Between Via Coconut Point and Three Oaks Parkway	2	860	446	296	52%	544	361	63%
Via Coconut Point	South of Corkscrew Road	4	1,790	493	340	28%	601	414	33%
Via Coconut Point	North of Coconut Road	4	1,790	534	446	30%	651	544	36%
River Ranch Road	South of Corkscrew Road	2	860	213	100	25%	260	122	30%
Trailside Drive	Between US 41 and Poinciana Avenue	2	740	4	6	1%	5	7	1%
Poinciana Avenue	Between Trailside Drive and Broadway West	2	740	15	75	10%	18	91	12%





EXISTING DAILY TRAFFIC VOLUMES

As specified in the methodology, traffic counts, identifying the daily roadway volumes, were collected on Tuesday, February 14, 2017 along the previously identified seven study roadways to report the existing traffic volumes. A summary of the existing daily volumes, by direction, is included in the table below. As indicated in the table, over 7,000 vehicles enter and exit The Village of Estero limits daily along Corkscrew Road and over 10,000 vehicles enter and exit The Village from the south along Via Coconut Point daily.

Table 4: Daily Volumes								
Roadway	Location of Data Collection	Eastbound/ Northbound Daily Volume	Westbound/ Southbound Daily Volume	Two-Way Daily Volumes				
Corkscrew Road	East of Bella Terra Boulevard	3,622	3,715	7,337				
Williams Road	Between Via Coconut Point & Three Oaks Parkway	4,588	3,698	8,286				
Via Coconut Point	South of Dint Corkscrew 3,381 Road		4,089	7,470				
Via Coconut Point	North of Coconut Road	5,128	5,357	10,485				
River Ranch Road	River Ranch Road Corkscrew Road		1,603	3,222				
Trailside Drive	Between US 41 /e & Poinciana 28 Avenue		106	134				
Poinciana Avenue	Between Trailside Drive & Broadway West	159	737	896				





INTERSECTION ANALYSIS



Village of Estero Area-Wide TRAFFIC STUDY



SUMMARY OF INTERSECTION ANALYSIS

The intersection analysis for this study indicates that the following intersections within The Village of Estero are currently operating with approaches that have an unacceptable level of service during the a.m. peak-hour and/or p.m. peak-hour:

- Corkscrew Road & Bella Terra Boulevard
- Corkscrew Road & Cypress Shadows Boulevard
- Corkscrew Road & Ben Hill Griffin Parkway
- Corkscrew Road & I-75 Northbound Ramps
- Corkscrew Road & I-75 Southbound Ramps
- Corkscrew Road & Three Oaks Parkway
- Corkscrew Road & US 41
- US 41 & Estero Parkway
- US 41 & Broadway
- US 41 & Pelican Sound Drive
- US 41 & Williams Road
- US 41 & Fountain Lakes Boulevard
- Coconut Road & Three Oaks Parkway

In addition to the existing intersection deficiencies, the future (2027) analysis indicates the following intersection is anticipated to operate unacceptably during the peak-hour period.

- Corkscrew Road & Bella Terra Boulevard
- Coconut Road & Three Oaks Parkway





INTERSECTIONS STUDY AREA

The following study intersections, identified by The Village, were analyzed during the a.m. peak-

hour (7 a.m. to 9 a.m.):

- Corkscrew Road & Bella Terra Boulevard
- Corkscrew Road & Cypress Shadows Boulevard
- Corkscrew Road & Wildcat Run Drive
- Corkscrew Road & Palermo Lake Court
- Corkscrew Road & Grande Oaks Way
- Corkscrew Road & Stoneybrook Golf Drive
- Corkscrew Road & I-75 Northbound Ramps
- Corkscrew Road & I-75 Southbound Ramps
- Corkscrew Road & Corkscrew Woodlands Boulevard
- Corkscrew Road & River Ranch Road/Country Creek Drive
- US 41 & Pelican Sound Drive
- US 41 & Fountain Lakes Boulevard

The study intersections for the a.m. peak-hour (7 a.m. to 9 a.m.) are illustrated in Figure 4.





Figure 4: A.M. Peak-Hour Intersections





The study intersections that were identified by The Village to be analyzed during the p.m. peakhour (4 p.m. to 6 p.m.) are illustrated in Figure 5 and are comprised of the following:

- Corkscrew Road & Bella Terra Boulevard
- Corkscrew Road & Cypress Shadows Boulevard
- Corkscrew Road & Wildcat Run Drive
- Corkscrew Road & Palermo Lake Court
- Corkscrew Road & Grande Oaks Way
- Corkscrew Road & Stoneybrook Golf Drive
- Corkscrew Road & Grande Oaks Shoppes Boulevard
- Corkscrew Road & Ben Hill Griffin Parkway
- Corkscrew Road & Miromar Outlets Boulevard
- Corkscrew Road & I-75 Northbound Ramps
- Corkscrew Road & I-75 Southbound Ramps
- Corkscrew Road & Corkscrew Woodlands Boulevard
- Corkscrew Road & Three Oaks Parkway
- Corkscrew Road & River Ranch Road & Country Creek Drive
- Corkscrew Road & Via Coconut Point/Sandy Lane
- Corkscrew Road & US 41
- US 41 & Estero Parkway
- US 41 & Broadway
- US 41 & Pelican Sound Drive
- US 41 & Williams Road
- US 41 & Fountain Lakes Boulevard
- Coconut Road & Via Coconut Point
- Coconut Road & Three Oaks Parkway
- Williams Road & Three Oaks Parkway
- Estero Parkway & Three Oaks Parkway
- Estero Parkway & Ben Hill Griffin Parkway





Figure 5: P.M. Peak-Hour Intersections





EXISTING CONDITIONS

Traffic counts were conducted on Tuesday, February 14, 2017 at the previously identified study intersections during the a.m. peak period (7:00 a.m. to 9:00 a.m.) and p.m. peak period (4:00 p.m. to 6:00 p.m.) The vehicle counts at the study intersections were adjusted to reflect peak-season conditions. Existing lane geometry and traffic controls were used in the analysis of the intersections.

Adopted Level of Service

The analysis of transportation facility operations, both roads and intersections, is based upon the concept of level of service (LOS). The level of service of a facility is a qualitative measure used to describe operational conditions. The level of service ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of service for this evaluation were determined using methods defined in the *Highway Capacity Manual (HCM)*.

The adopted level of service for the roads in the study area was taken from the 2016 Lee County Concurrency Report. The adopted LOS represents the level of service considered to be acceptable by the applicable maintaining agency.

Percentage of Capacity

Intersection operations were also evaluated with regards to the percentage of capacity. The percent of capacity (derived from the volume-to-capacity ratio in Synchro) was used to compare the traffic volumes using the intersection with the amount of capacity the intersection is designed for. An intersection was deemed to operate acceptably if each approach (i.e. northbound approach, southbound approach etc.) operated below capacity (less than 100% capacity). This performance standard was compared to the existing and future operating conditions shown in later sections of this report.





SCHEDULED IMPROVEMENTS

A review of the Work Programs for Lee County and FDOT District 1 was completed for the future ten-year period (2027). As part of the analysis, the following documents were also reviewed:

- Coconut Road Traffic Study: From Estero Bay to Three Oaks Parkway (June 2016)
- The Lee Plan 2014 Codification (October 2014)
- The Lee County Concurrency Report (2016)
- Board of County Commissioners Draft Capital Improvements Program FY17-18 (May 2017)
- Board of Lee County Commissioners Draft Capital Plan (May 2017)
- Lee County Metropolitan Planning Organization (MPO) Transportation Improvement Program Fiscal Year 2016/2017 Through Fiscal Year 2020/2021 (Adopted June 2016)
- Lee County Metropolitan Planning Organization (MPO) Transportation Improvement Program Fiscal Year 2017/2018 Through Fiscal Year 2021/2022 (Draft June 2017)
- MPO 2040 Transportation Plan (Adopted December 2015)
- North Point Development of Regional Impact (DRI) Resolution Number Z-04-038
- Traffic Impact Statement for Estero Grande Infrastructure Development Order
- Estero Grande Turn Lane Improvements Plans
- I-75/Corkscrew Road Interchange Technical Memorandum (March 31, 2017)
- Corkscrew Road (CR 850) and Bella Terra Boulevard Intersection Signalization Plans

Future Widening of Corkscrew Road

Plans for future widening, to four lanes along Corkscrew Road, east of Ben Hill Griffin Parkway, are available on the Lee County DOT website. However, based upon discussions with Lee County DOT, the roadway widening is not a programmed improvement as it is not funded as part of the County's capital improvement program. The widening to four lanes of Corkscrew Road from Ben Hill Griffin Parkway to Alico Road is identified in the *2040 Needs Plan* in the Lee



Village of Estero



County MPO Transportation Plan. It is also identified as a Tier 2 project in the Lee County BOCC draft presentation for the Capital Improvements Program.

Concurrent with this analysis, Lee County has contracted with AIM Engineering & Surveying, Inc., to conduct an environmental and traffic study along Corkscrew Road. The study is intended to determine improvements needed to address the increased density along Corkscrew Road, east of I-75, and to identify costs and recommended transportation proportionate fairshare within the Corkscrew Road study area.

FDOT Interim Improvements at Corkscrew Road & I-75 Ramps

Area-Wide

AFFIC STUDY

FDOT has a programmed improvement to I-75 (FDOT Project Number 4062254) from the segment south of Corkscrew Road to south of Daniels Parkway. Interim improvements are also scheduled for the intersections of Corkscrew Road & I-75 Ramps based upon information received from FDOT. Intersection queuing issues, significantly for the eastbound left-turn at Corkscrew Road & I-75 NB Ramp, were observed to impact upstream intersections based upon the FDOT technical memorandum. The I-75/Corkscrew Road Interchange technical memorandum dated March 31, 2017 describes the proposed improvements:

"The proposed interim interchange improvements consist of dual left turn lanes along Corkscrew Road for the eastbound and westbound left turn movements accessing the I-75 on-ramps, the construction of one additional queue storage (pocket) lane in both directions approaching the interchange, and the extension of the ramp acceleration/deceleration lanes along I-75 to improve merge/diverge operations."

The signalized ramp terminal intersections had an estimated year of failure of 2032 and the interim improvements are anticipated to provide sufficient queue storage and an acceptable operation beyond the design year (2019). The interim improvements are scheduled for construction in 2019 and were therefore included in this analysis. The technical memorandum details the widening of Corkscrew Road, east of Ben Hill Griffin Parkway, to four lanes to provide a consistent analysis with the MPO's Long Range Transportation Plan. Additional







information, including a graphic of the proposed interim improvements, is included in Appendix E. The FDOT technical memorandum evaluation maintained the cycle length and phase sequences and therefore, these conditions were included in this analysis.

Additionally, the FDOT analysis included a northbound to eastbound right turn overlap phase at the intersection of Corkscrew Road & Three Oaks Parkway during the p.m. peak-hour. Therefore, to provide a consistent future conditions analysis, this improvement was also assumed in this analysis.

Corkscrew Road & Corkscrew Woodlands Boulevard

Currently the high volume of traffic using the I-75 ramp intersections blocks the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard. Additional vehicle storage along Corkscrew Road from the interim improvements to the I-75 ramp intersections (anticipated to be constructed in 2019) is anticipated to improve the current operations at the intersection.

The FDOT technical memorandum noted that based upon the projected volumes the median closure at Corkscrew Road & Corkscrew Woodlands Boulevard is not anticipated to be necessary before the year 2029 due to the queues at the I-75 ramp intersections. However, the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard provides a safety concern due to the difficulty in merging onto Corkscrew Road. The FDOT technical memorandum notes future 2029 conditions, without any changes to the intersection of Corkscrew Woodlands Boulevard & Corkscrew Road, are anticipated to result in a failing northbound approach and average delays exceeding 100 seconds per vehicle.

Based upon discussions with Village of Estero staff, per a zoning proposal, it is planned to create a frontage road connecting Corkscrew Woodlands Boulevard with a development to the west. This frontage road has been discussed to access Corkscrew Road via a signalized intersection. At the time of implementation of the frontage road, it is recommended to consider the closure



Village of Estero Area-Wide TRAFFIC STUDY



of the existing intersection of Corkscrew Road & Corkscrew Woodlands Boulevard. The future volumes at the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard would be diverted to the future signalized intersection at the frontage road along Corkscrew Road. This improvement would also improve future conditions; the FDOT memorandum noted that the closure of the full median opening could provide the opportunity to extend the storage space for the I-75 ramps along Corkscrew Road in the future.

Corkscrew Road & Bella Terra Boulevard

Based upon information provided by Lee County DOT and Village of Estero staff, Corkscrew Road & Bella Terra Boulevard is programmed to be signalized in 2017 and therefore, was assumed as a signalized intersection in the future conditions analysis. Signal timing plans were provided by Lee County.

Estero Parkway

At the time of this analysis, public information is being requested for Estero Parkway improvements as the first significant capital improvement project to be undertaken by The Village of Estero. The proposed changes to Estero Parkway, including potential bicycle lanes, are not anticipated to impact the amount of available vehicular capacity for the roadways or intersections. Therefore, no roadway or intersection improvements were assumed along Estero Parkway in the future conditions analysis.



Village of Estero Area-Wide TRAFFIC STUDY



FUTURE CONDITIONS

The results of this analysis indicate that in 2027 there are study area intersections anticipated to operate with movements with a percent capacity (v/c ratio) greater than 100% and/or failing level of service (F) during the future peak-hour conditions. The following intersections are anticipated to operate unacceptably during the a.m. peak-hour or p.m. peak-hour:

- Corkscrew Road & Bella Terra Boulevard
- Corkscrew Road & Cypress Shadows Boulevard
- Corkscrew Road & Ben Hill Griffin Parkway
- Corkscrew Road & I-75 Northbound Ramps
- Corkscrew Road & I-75 Southbound Ramps
- Corkscrew Road & Three Oaks Parkway
- Corkscrew Road & US 41
- US 41 & Estero Parkway
- US 41 & Broadway
- US 41 & Pelican Sound Drive
- US 41 & Williams Road
- US 41 & Fountain Lakes Boulevard
- Coconut Road & Three Oaks Parkway

Therefore, signalization, geometric improvements, and access management improvements were recommended and then assumed in the future scenario which allow the transportation network to operate at an acceptable level of service or v/c ratio to identify potential improvements for the Village of Estero to consider. These improvements and the future v/c ratios (expressed as percentage of capacity) for the study area intersections are summarized in detail later in this report. Additional documentation is provided in Appendix F and Appendix G.




Programmed improvements are anticipated within ten years and the following were included in the analysis:

- Signalization of Corkscrew Road & Bella Terra Boulevard
- Interim FDOT improvements to Corkscrew Road & I-75 Ramps
- Signalization of Corkscrew Road & Corkscrew Woodlands Boulevard
- Signalization of US 41 & Pelican Sound Drive (anticipated as part of the North Point DRI)
- Addition of an east leg including westbound through lane, southbound right-turn lane, eastbound left-turn lane, eastbound through lane, and eastbound right-turn lane as part of the Estero Grande project at the intersection of US 41 & Estero Parkway
- Additional southbound left-turn lane (to provide dual southbound left-turn lanes) and additional westbound left-turn lane (to provide dual westbound left-turn lanes) at the intersection of US 41 & Williams Road as part of the North Point DRI





Corkscrew Road & Bella Terra Boulevard

	Table 5: Corkscrew Road & Bella Terra Boulevard Intersection Analysis										
	Percent of Capacity										
	Level of Service										
	Future Control Delay (seconds) for Unsignalized Intersections or										
		Future Appr	oach Delay (se	econas/venicie)	for signalized i	ntersectic	ons	E 11 111 /			
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints			
Existing	Unsignalized			02%							
A.M.				7570 F							
Peak-				13.6							
Hour				43.0							
Future	Signalized	40%	79%	87%							
A.M.		-4070 B	R 7770	B		R	Signalization				
Peak-		11 3	17.2	18.8		16.5	Signalization				
Hour		11.5	17.2	10.0		10.5					
Existing	Unsignalized			13%							
P.M.											
Peak-				14.5							
Hour				14.5							
Future	Signalized	72%	22%	76%							
P.M.		Λ	Δ	70% B		B	Signalization				
Peak-		81	6.6	15 /		9.6	Signalization				
Hour		0.4	0.0	13.4		7.0					

Criteria Not Met:

The intersection of Corkscrew Road & Bella Terra Boulevard is anticipated to operate with a northbound approach at level of service E during the future conditions during the a.m. peak-hour.

Potential Improvement:

The intersection is already programmed to be signalized. This improvement is anticipated to reduce the delay for the northbound approach and was assumed in the analysis of future conditions. Signalization plans were provided by Lee County DOT. With the signalization, all intersection movements are anticipated to operate acceptably.





Corkscrew Road & Cypress Shadows Boulevard

Table 6: Corkscrew Road & Cypress Shadows Boulevard Intersection Analysis Percent of Capacity Level of Service Future Control Delay (seconds) for Unsignalized Intersections or											
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints			
Existing A.M. Peak-Hour	Unsignalized			83% F 164.3							
Future A.M. Peak-Hour	Unsignalized			124% F 218.5							
Future A.M. Peak-Hour with Improvement	Unsignalized			58% D 34.0			Create median storage for the NBL movement	Coordinate with Lee County DOT; Availability of ROW			
Existing P.M. Peak-Hour	Unsignalized			33% D 29.7							
Future P.M. Peak-Hour	Unsignalized			59% F 57.4							
Future P.M. Peak-Hour with Improvement	Unsignalized			25% C 19.2			Create median storage for the NBL movement	Coordinate with Lee County DOT; Availability of ROW			

Criteria Not Met:

The intersection of Corkscrew Road & Cypress Shadows Boulevard currently operates and is anticipated to continue to operate with an unacceptable northbound approach, LOS F, during the future conditions during the a.m. peak-hour and p.m. peak-hour. The northbound approach, vehicles exiting from Cypress Shadows Boulevard, currently experience high delays and are anticipated to continue to experience high delays in 2027.





Potential Improvement:

It is recommended to provide geometric improvements to the intersection to provide additional space in the median area to allow for the northbound left-turn vehicles to have a refuge location during the a.m. peak-hour.

The intersection is located approximately 2,000 feet to the west of the intersection of Corkscrew Road & Bella Terra Boulevard. The future signalization of the intersection of Corkscrew Road & Bella Terra Boulevard is anticipated to provide gaps for the adjacent intersection of Corkscrew Road & Cypress Shadows Boulevard. It is recommended to monitor the intersection of Corkscrew Road & Cypress Shadows Boulevard after the signalization to see if operations are improved.

Feasibility of Potential Improvement:

Coordination with Lee County DOT will be required as Corkscrew Road is a County maintained arterial. The feasibility of acquiring right of way will need to be determined. It is recommended to explore median improvements to this intersection concurrently with any future widening plans of Corkscrew Road.





Corkscrew Road & Wildcat Run Drive

	Table 7: Corkscrew Road & Wildcat Run Drive Intersection Analysis										
Percent of Capacity											
Level of Service											
	Future Control Delay (seconds) for Unsignalized Intersections or										
	Future <i>i</i>	Approach Delay (seconds/vehicle)	for Signalized Inters	sections						
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall					
Existing A.M.	Unsignalized			21%							
Peak-Hour	-			С							
				19.4							
Future A.M.	Unsignalized			33%							
Peak-Hour				D							
				26.9							
Existing P.M.	Unsignalized			20%							
Peak-Hour	-			С							
				19.1							
Future P.M.	Unsignalized			29%							
Peak-Hour	-			С							
				21.0							

The intersection of Corkscrew Road & Wildcat Run Drive currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Corkscrew Road & Palermo Lake Court

	Table 8:	Corkscrew Road	& Palermo Lake	Court Intersection	Analysis						
Percent of Capacity											
	Level of Service										
	Futur	e Control Delay	(seconds) for Unsi	gnalized Intersection	ons or						
	Future <i>i</i>	Approach Delay ((seconds/vehicle)	for Signalized Inter	sections						
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall					
Existing A.M.	Unsignalized				3%						
Peak-Hour					С						
					19.0						
Future A.M.	Unsignalized				5%						
Peak-Hour	-				С						
					24.7						
Existing P.M.	Unsignalized				3%						
Peak-Hour	-				В						
					13.5						
Future P.M.	Unsignalized				4%						
Peak-Hour	-				С						
					16.2						

The intersection of Corkscrew Road & Palermo Lake Court currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Corkscrew Road & Grande Oaks Way

	Table 9: Corkscrew Road & Grande Oaks Way Intersection Analysis									
Percent of Capacity										
			Level of Service							
	Futur	e Control Delay	(seconds) for Unsi	gnalized Intersection	ons or					
	Future <i>i</i>	Approach Delay ((seconds/vehicle)	for Signalized Inters	sections					
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall				
Existing A.M.	Unsignalized				15%					
Peak-Hour					С					
					20.6					
Future A.M.	Unsignalized				24%					
Peak-Hour	-				D					
					29.1					
Existing P.M.	Unsignalized				3%					
Peak-Hour	-				В					
					13.4					
Future P.M.	Unsignalized				19%					
Peak-Hour	-				С					
					15.7					

The intersection of Corkscrew Road & Grande Oaks Way currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Corkscrew Road & Stoneybrook Golf Drive

	Table 10: Corkscrew Road & Stoneybrook Golf Drive Intersection Analysis											
Percent of Capacity												
Future LOS												
Future Control Delay (seconds) for Unsignalized Intersections or												
	Future Approach Delay (seconds/vehicle) for Signalized Intersections											
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall						
Existing A.M.	Signalized	37%	77%	78%								
Peak-Hour		В	В	D		В						
	10.1 10.8 46.5 15.4											
Future A.M.	Signalized	42%	87%	82%								
Peak-Hour		В	В	D		С						
		11.4	17.6	54.5		20.7						
Existing P.M.	Signalized	68%	44%	31%								
Peak-Hour	-	А	А	С		А						
		8.2	3.0	34.8		7.3						
Future P.M.	Signalized	80%	52%	40%								
Peak-Hour	-	В	А	D		А						
		11.3	3.5	41.7		9.5						

Pinewoods Elementary School is located along Stoneybrook Golf Drive, and access to the school is provided indirectly via Corkscrew Road. During the a.m. peak-hours, a significant northbound queue (comprised of traffic leaving the school, Stoneybrook Golf Course, and the gated neighborhood) was observed from the intersection of Corkscrew Road & Stoneybrook Golf Drive to the entrance to Pinewoods Elementary School. It was observed that the traffic signal at the intersection of Corkscrew Road & Stoneybrook Golf Drive allowed most of the northbound queue to clear within one cycle. The higher delay times experienced by the vehicles exiting the northbound approach could be mitigated with signal re-timing. This could allow more green time to be allocated to Stoneybrook Golf Drive during school peak periods and should be based upon the schedule for Pinewoods Elementary School. This would require coordination with Lee County DOT.



Village of Estero Area-Wide TRAFFIC STUDY





Northbound Queue at the Intersection of Corkscrew Road & Stoneybrook Golf Drive





Corkscrew Road & Grande Oaks Shoppes Boulevard

	Table 11: Corkscrew Road & Grande Oaks Shoppes Boulevard Intersection Analysis									
	Percent of Capacity									
			Level of Service							
	Futur	e Control Delay ((seconds) for Unsi	gnalized Intersection	ons or					
	Future <i>i</i>	Approach Delay (seconds/vehicle)	for Signalized Inters	sections					
Scenario	Scenario Control Eastbound Westbound Northbound Southbound Overall									
Existing P.M.	Unsignalized				15%					
Peak-Hour					С					
					20.6					
Future P.M.	Unsignalized				49%					
Peak-Hour C										
					19.6					

The intersection of Corkscrew Road & Grande Oaks Shoppes Boulevard currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Corkscrew Road & Ben Hill Griffin Parkway

Table 12: Corkscrew Road & Ben Hill Griffin Parkway Intersection Analysis Percent of Capacity											
Level of Service											
Future Control Delay (seconds) for Unsignalized Intersections or											
	_	Future Appr	oach Delay (se	conds/vehicle)	for Signalized I	ntersectio	ns				
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints			
Existing P.M.	Signalized	58%	52%	77%	88%						
Peak-Hour		С	D	E	D	D					
		26.3	46.5	68.3	49.5	41.4					
Future P.M.	Signalized	74%	62%	80%	104%						
Peak-Hour	-	С	D	E	E	D					
		30.8	47.6	70.3	61.9	47.0					
Future P.M. Peak-Hour with	Signalized	68% C 32.7	79% D 51.6	77% E 66.9	98% D 54.4	D 46.6	Re-time intersection, Extend SBL	Coordination with Lee County DOT			

Criteria Not Met:

The intersection of Corkscrew Road & Ben Hill Griffin Parkway is anticipated to operate with an unacceptable southbound left-turn movement (percent of capacity is greater than 100%) during the future conditions during the p.m. peak-hour.

Potential Improvement:

It is recommended to extend the southbound left-turn lane. The 95th percentile queue length in Synchro is anticipated to be 570 feet which extends beyond the existing 350-foot southbound left-turn lane. Re-timing (optimization of the signal timing splits) of the intersection is also recommended to allow the percent of capacity for the northbound and southbound approach to operate acceptably (below 100%).

Additionally, the northbound right-turn vehicles may be unable to make a right-turn on red as the current intersection has a shared right/through lane. A northbound right-turn lane was analyzed to determine the improvement to the operations at the intersection. The northbound right-turn lane would reduce the overall intersection delay by 2.3 seconds and reduce the delay





for the northbound approach by 1 second. It is recommended to explore the amount of available right of way on the south leg of the intersection to determine if this improvement is feasible.

Feasibility of Potential Improvement:

Right-of-way may need to be required to extend the southbound left-turn but it is anticipated there is available space in the existing median for this improvement. Coordination will be required with Lee County DOT as Ben Hill Griffin Parkway is a Lee County DOT maintained roadway.





Corkscrew Road & Miromar Outlets Boulevard

	Table 13: Corkscrew Road & Miromar Outlets Boulevard Intersection Analysis										
Percent of Capacity											
	Level of Service										
	Future Control Delay (seconds) for Unsignalized Intersections or										
	Future <i>i</i>	Approach Delay ((seconds/vehicle)	for Signalized Inters	sections						
Scenario	Control Eastbound Westbound Northbound Southbound Overall										
Existing P.M.	Signalized	39%	38%		70%						
Peak-Hour	-	А	А		С	А					
		4.9	8.2		29.9	9.4					
Future P.M.	Signalized	43%	44%		76%						
Peak-Hour	eak-Hour C A										
		5.0	7.8		31.2	9.5					

The intersection of Corkscrew Road & Miromar Outlets Boulevard currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Corkscrew Road & I-75 Northbound Ramps

	Table 14: Corkscrew Road & I-75 Northbound Ramps Intersection Analysis											
	Percent of Capacity											
Future Control Delay (seconds) for Unsignalized Intersections or												
	[Future Ap	proach Deiay (Seconds/venici	e) for signalized	a intersect	IUIIS Dotoptial	Foodbility/				
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Improvement	Constraints				
Existing	Signalized	84%	11%	113%								
A.M.		B		F		р						
Peak-		15 7	177	102.4		39.4						
Hour		10.7		102.1		07.1						
Future	Signalized	73%	47%	79%								
A.M.		B	C	D		С	FDOT Interim					
Peak-		17.0	21.1	42.4		27.0	Improvements					
Hour												
Existing	Signalized	101%	67%	77%								
P.M.		B	D	F		С						
Peak-		16.4	41 4	62 0		32.0						
Hour		10.1		02.0		02.0						
Future	Signalized	86%	48%	79%								
P.M.		B		F		C	FDOT Interim					
Peak-		12.9	27 /	60.8		25.4	Improvements					
Hour		12.7	27.4	00.0		23.4						

Intersection queuing issues, especially for the eastbound left-turn, were observed to impact upstream intersections along Corkscrew Road. During the p.m. peak-hour, the queue for the I-75 ramps along Corkscrew Road was observed to extend past Corkscrew Woodlands Boulevard. The queue impacted the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard. Several vehicles were also observed trying to make a westbound U-turn at the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard in order to join the queue for the I-75 ramps.

The I-75/Corkscrew Road Interchange technical memorandum describes the proposed improvements including dual eastbound left-turn lanes onto the I-75 ramps. The intersection was analyzed in future conditions with the optimization of the signal timing and the proposed FDOT geometric improvements as they are scheduled for design in 2017 and construction in 2019.









Eastbound Queue observed at the I-75 Ramps & Corkscrew Road during the P.M. Peak-Hour





Corkscrew Road & I-75 Southbound Ramps

	Table 15: Corkscrew Road & I-75 Southbound Ramps Intersection Analysis											
Percent of Capacity												
	Level of Service											
	Future Control Delay (seconds) for Unsignalized Intersections or											
		Future Ap	proach Delay (seconds/vehicle	e) for Signalized	d Intersect	ions					
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints				
Existing	Signalized	37%	51%		166%							
A.M.		5770	Δ		F	F						
Peak-		20.5	6.4		201.8	10/11						
Hour		50.5	0.4		501.0	104.1						
Future	Signalized	55%	61%		07%							
A.M.		55% D	04 /o A		0770 D	C	FDOT Interim					
Peak-		12 1	A 0 1		D 27 1	24 5	Improvements					
Hour		43.1	ð. I		37.1	24.5	-					
Existing	Signalized	0,00/	6 1 0/		1010/							
P.M.	-	00%	04 %		101% F	D						
Peak-			A		Г 07 1	U 27.0						
Hour		39.9	3.7		87.1	37.8						
Future	Signalized	0/0/	400/		700/							
P.M.	-	80%	48%		/9%	D	FDOT Interim					
Peak-					F	D	Improvements					
Hour		35.3	32.0		87.0	44.8	-					

The I-75/Corkscrew Road Interchange technical memorandum describes the proposed improvements including dual westbound left-turn lanes onto the I-75 ramps. The intersection was analyzed in future conditions with the optimization of the signal timing and the proposed FDOT geometric improvements as they are scheduled for design in 2017 and construction in 2019.





Corkscrew Road & Corkscrew Woodlands Boulevard

	Table 16: Corkscrew Road & Corkscrew Woodlands Boulevard Intersection Analysis Percent of Capacity Level of Service Future Control Delay (seconds) for Unsignalized Intersections or Future Approach Delay (seconds/vehicle) for Signalized Intersections										
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints			
Existing A.M. Peak- Hour	Unsignalized			46% D 29							
Future A.M. Peak- Hour	Signalized	49% A 3.7	77% A 7.0	55% C 27.1		A 6.7	Close intersection; access via a signalized frontage road				
Existing P.M. Peak- Hour	Unsignalized			32% C 22.8							
Future P.M. Peak- Hour	Signalized at Frontage Road	76% A 0.2	64% A 4.0	61% C 34.2		A 3.3	Close intersection; access via a signalized frontage road				

The intersection of Corkscrew Road & Corkscrew Woodlands Boulevard currently allows for a northbound left-turn movement and provides a storage area delineated by the barriers shown in the image on the next page. The sight line when merging onto Corkscrew Road is difficult as drivers must look over their shoulders in order to merge onto Corkscrew Road. It is recommended to make interim safety improvements to this intersection with a focus on the egress and ingress movements on Corkscrew Road.

Based upon discussions with The Village of Estero staff, per a zoning proposal for Puente Way, it is planned to create a frontage road connecting Corkscrew Woodlands Boulevard with a development to the west. This frontage road has been discussed to access Corkscrew Road via



Village of Estero Area-Wide TRAFFIC STUDY



a signalized intersection at the intersection of Corkscrew Road & Puente Way. At the time of implementation of the frontage road, it is recommended to consider the closure of the existing intersection of Corkscrew Road & Corkscrew Woodlands Boulevard. The future volumes at the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard would be diverted to the future signalized intersection at the frontage road along Corkscrew Road.



Merging Westbound onto Corkscrew Road



Intersection of Corkscrew Road & Corkscrew Woodlands Boulevard





Kimley »Horn



Potential Improvement:

The intersection of Corkscrew Road & Corkscrew Woodlands Boulevard does not meet signal spacing requirements. Per discussions with The Village of Estero staff, the addition of a frontage road is included in a zoning proposal for Puente Way and could provide a connection from the development to Corkscrew Road. Therefore, the future traffic volumes at the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard were assumed to be relocated at a signalized intersection (assuming the closure of the intersection and diversion of the traffic to the signalization of a frontage road) in future 2027 conditions.





Corkscrew Road & Three Oaks Parkway

	Table 17: Corkscrew Road & Three Oaks Parkway Intersection Analysis										
Percent of Capacity											
Level of Service											
Future Control Delay (seconds) for Unsignalized Intersections or											
		Future Appro	ach Delay (sec	onds/vehicle) f	or Signalized In	tersectior	IS				
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints			
Existing P.M.	Signalized	73%	79%	119%	72%						
Peak-Hour	-	D	D	F	D	E					
		37.7	36.1	154.4	53.0	68.9					
Future P.M.	Signalized	77%	85%	170%	82%						
Peak-Hour	0	D	В	F	D	F					
		45.0	18.6	258.9	54.3	93.3					
Future P.M.	Signalized						Add NBR (to	Right-of-			
Peak-Hour	-						provide dual	way			
with		92%	85%	94%	75%		lanes),	acquisition			
Improvement		E	С	D	D	D	Re-time	and			
		56.7	24.2	50.5	45.1	43.8	intersection,	potential			
							Extend EBL	geometric			
							turn lane	constraints			

Criteria Not Met:

The intersection of Corkscrew Road & Three Oaks Parkway is anticipated to operate with a failing northbound approach (LOS F and percent of capacity exceeds 100%) during the future conditions during the p.m. peak-hour.

The dual eastbound left-turn lanes at the intersection are each approximately 600 feet. During the p.m. peak-hour, the eastbound left-turn lane was blocked by the eastbound through queue. Vehicles were observed to drive on the grass along the side of the road, prior to the beginning of the turn lane, in order to enter the turn lane.



Village of Estero Area-Wide TRAFFIC STUDY





Eastbound Left-Turn Lane at the Intersection of Corkscrew Road & Three Oaks Parkway

Potential Improvement:

Since the intersection operates with a protected eastbound left-turn lane, it is recommended to extend the eastbound left-turn lane to allow for more vehicles to enter the lane on a paved roadway segment. It is also recommended to explore the option of adding a second northbound right-turn lane. The 95th percentile queue length in Synchro indicates the queue is anticipated to extend beyond the existing 475-foot northbound right-turn lane.

Feasibility of Potential Improvement:

The addition of a second northbound right-turn lane may require additional right-of-way and may require the relocation of existing utilities. There is an existing sidewalk along the east side of Three Oaks Parkway and an existing pedestrian crossing button pedestal. There also appears to be a drainage ditch on the east side of Three Oaks Parkway. These constraints will need to be further evaluated. Coordination will be required with Lee County DOT.





Corkscrew Road & River Ranch Road

Table 18: Corkscrew Road & River Ranch Road/Country Creek Drive Intersection Analysis											
	Percent of Capacity										
Level of Service											
Future Control Delay (seconds) for Unsignalized Intersections or											
Future Approach Delay (seconds/vehicle) for Signalized Intersections											
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall					
Existing A.M.	Signalized	25%	50%	21%	11%						
Peak-Hour		А	А	D	D	А					
		5.3	6.8	51.4	50.7	8.1					
Future A.M.	Signalized	29%	58%	26%	19%						
Peak-Hour	-	А	А	D	D	А					
		5.8	7.4	52.2	51.4	9.0					
Existing P.M.	Signalized	46%	38%	31%	17%						
Peak-Hour	-	А	А	E	E	А					
		5.8	5.0	67.0	66.9	8.2					
Future P.M.	Signalized	57%	47%	38%	20%						
Peak-Hour	-	А	А	E	E	В					
		7.7	6.4	66.1	65.8	10.1					

The intersection of Corkscrew Road & River Ranch Road/Country Creek Drive currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Corkscrew Road & Via Coconut Point

	Table 19: Corkscrew Road & Coconut Point/Sandy Lane Intersection Analysis										
Percent of Capacity											
Level of Service											
Future Control Delay (seconds) for Unsignalized Intersections or											
	Future <i>i</i>	Approach Delay ((seconds/vehicle) t	for Signalized Inters	sections						
Scenario	Control	Eastbound	Eastbound Westbound Northbound Southbound Overall								
Existing P.M.	Signalized	52%	72%	75%	23%						
Peak-Hour		В	В	С	С	В					
		12.9	16.5	32.5	31.7	17.6					
Future P.M.	Signalized	67%	77%	84%	26%						
Peak-Hour		В	В	D	С	С					
		17.6	19.4	38.7	32.7	21.8					

The intersection of Corkscrew Road & Via Coconut Point currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Corkscrew Road & US 41

	Table 20: Corkscrew Road & US 41 Intersection Analysis										
	Percent of Capacity										
Level of Service											
	Future Control Delay (seconds) for Unsignalized Intersections or										
		Future Appr	oach Delay (se	conds/vehicle)	for Signalized I	ntersectio	ns				
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints			
Existing P.M.	Signalized	60%	83%	87%	75%						
Peak-Hour	-	F	F	С	С	D					
		83.8	81.1	34.9	28.4	39.7					
Future P.M.	Signalized	65%	97%	114%	80%						
Peak-Hour	0	F	F	F	С	E					
		83.0	98.4	99.9	33.7	78.3					
Future P.M. Peak-Hour with Improvement	Signalized	65% F 87.4	97% F 97.1	110% F 82.1	98% D 39.2	E 70.5	Re-time intersection	Coordination with Lee County DOT			
Future P.M. Peak-Hour with Improvement	Signalized	65% F 87.4	91% F 81.1	110% E 78.8	98% D 39.2	E 66.7	Re-time intersection, WBR (to provide dual lanes)	Right-of-way acquisition and potential geometric constraints			

Criteria Not Met:

The intersection of Corkscrew Road & US 41 currently operates with failing levels of service for the eastbound and westbound approach. The intersection is anticipated to operate with failing eastbound, westbound, and northbound approaches (LOS F) during the future conditions during the p.m. peak-hour. Due to the heavy northbound through volumes along US 41, the northbound through movement along Corkscrew Road & US 41 is anticipated to operate with movements that are above 100% capacity during the future conditions.

Potential Improvement:

The addition of another westbound right-turn lane (dual westbound right-turns) is anticipated to result in the intersection operating at an acceptable percent of capacity for the eastbound, westbound, and southbound approaches. Failing levels of service are still anticipated for the







minor street approaches (eastbound and westbound approaches) due to the signal prioritization of the US 41.

Feasibility of Potential Improvement:

The failing movements are due to the prioritizing of the signal timing to US 41 and heavy traffic volumes along US 41. If the signal timing cannot be further adjusted to provide timing for Corkscrew Road, another potential improvement could be an additional westbound right-turn lane to provide additional capacity. It is recommended to explore the feasibility of adding an additional westbound right-turn lane to improve the operations of the intersection including the right-of-way required if signal timing improvements are not feasible. Coordination with FDOT is required.





US 41 & Estero Parkway

Table 21: US 41 & Estero Parkway Intersection Analysis										
Percent of Capacity										
Level of Service										
Future Control Delay (seconds) for Unsignalized Intersections or										
		Future Approa	ach Delay (seco	onds/vehicle) fo	or Signalized In	tersections	S			
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints		
Existing P.M.	Signalized		92%	95%	93%					
Peak-Hour			F	D	С	D				
			81.2	44.7	28.5	42.2				
Future P.M.	Signalized									
Peak-Hour			93%	113%	94%					
(without			F	F	С	E				
Estero Grande			81.7	98.5	30.4	71.3				
improvements)										
Future P.M.	Signalized	123%	184%	110%	116%		SBR, WBT,			
Peak-Hour		F	F	F	F	F	EBL, EBT, EBR	Estero		
(with		183.0	280.6	86.6	60.4	102.6	Extend SBL	Grande		
Estero Grande)		100.0	200.0		00.1	102.0	turn lane			
Future P.M.	Signalized						Adjust signal	Right-of-		
Peak-Hour		98%	111%	115%	116%		timing;	way		
with		F	F	F	F	F	Additional	acquisition;		
Improvement		117.2	127.6	105 7	62.5	93.3	WBR	potential		
		117.2	127.0	100.7	02.0	70.0	(to provide	geometric		
							dual WBR)	constraints		

Criteria Not Met:

Currently the intersection of US 41 & Estero Parkway operates with a failing westbound approach. During the future conditions for the p.m. peak-hour, the intersection is anticipated to operate with failing northbound and westbound approaches. Failing levels of service for the minor street (westbound approach) are anticipated due to the signal prioritization of US 41 and heavy traffic volumes along US 41.

Modifications to the intersection are planned as part of the Estero Grande development. The intersection is then anticipated to add a westbound through lane. The western approach will then have dual westbound left-turn lanes, a westbound through lane, and a westbound right-turn lane. An eastbound approach will also be added to the intersection that includes an



Village of Estero Area-Wide TRAFFIC STUDY



eastbound left-turn lane, an eastbound through lane, and an eastbound right-turn lane. As per the Traffic Impact Statement for Estero Grande Infrastructure Development Order (August 24, 2016), a southbound right-turn lane on US 41 is warranted and will be constructed to provide a total length of 480 feet. Additionally, the existing northbound left-turn lane should be extended to provide a total length of 575 feet per the Traffic Impact Statement for Estero Grande.

Potential Improvement:

It is recommended to explore the option of adding an additional westbound right-turn lane (to have dual westbound right-turn lanes) along with the Estero Grande planned improvements. While an additional westbound right turn would reduce delays at the intersection, the intersection is still anticipated to operate with LOS F for the eastbound, westbound, and northbound approaches.

Feasibility of Potential Improvement:

Coordination with FDOT will be required. It is recommended to explore the feasibility of adding an additional westbound right-turn lane to improve the operations of the intersection including the availability of right-of-way.





US 41 & Broadway

Table 22: US 41 & Broadway Intersection Analysis											
Percent of Capacity											
Level of Service											
Future Control Delay (seconds) for Unsignalized Intersections or											
	Future <i>i</i>	Approach Delay (seconds/vehicle)	for Signalized Inters	sections						
Scenario	Control	Eastbound	Eastbound Westbound Northbound Southbound Overa								
Existing P.M.	Signalized	82%	81%	84%	74%						
Peak-Hour		F	F	С	С	С					
		89.2	96.8	24.7	20.9	27.8					
Future P.M.	Signalized	83%	85%	93%	74%						
Peak-Hour		F	F	С	С	С					
		91.4	103.2	30.5	24.7	33.0					

Criteria Not Met:

Due to the heavy volumes along US 41, the intersection of US 41 & Broadway currently operates and is anticipated to continue to operate at failing levels of service for the minor street (eastbound and westbound) approaches during the p.m. peak-hour. The eastbound and westbound left-turn movements are anticipated to operate with failing levels of service. The failing levels of service are due to the signal prioritization of US 41 as opposed to insufficient capacity on the side streets. All intersection movements are anticipated to operate with a percent of capacity below 100% in the future conditions.

Potential Improvement:

Due to the low volumes on the side streets, no geometric improvements are recommended at this intersection. The failing levels of service are due to the heavy volumes along US 41 and signal prioritization of US 41.





US 41 & Pelican Sound Drive

Table 23: US 41 & Pelican Sound Drive Intersection Analysis Percent of Capacity Level of Service Future Control Delay (seconds) for Unsignalized Intersections or Future Approach Delay (seconds/vehicle) for Signalized Intersections									
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints	
Existing A.M. Peak- Hour	Unsignalized	140% F 334.1							
Future A.M. Peak- Hour	Unsignalized	220% F ¹ 1232.7							
Future A.M. Peak- Hour	Signalized	64% E 71.8		70% A 2.6	71% A 5.7		Signalization if warranted		
Existing P.M. Peak- Hour	Unsignalized	27% C 21.6							
Future P.M. Peak- Hour	Unsignalized	56% E 43.8							
Future P.M. Peak- Hour	Signalized	46% F 81.2		88% B 16.1	50% A 6.3		Signalization if warranted		

Note:

1. Volume exceeds capacity in computation

Criteria Not Met:

Due to the heavy volumes along US 41, the eastbound approach of the intersection of US 41 & Pelican Sound Drive currently operates and is anticipated to continue to operate at failing levels of service (LOS F). The percent capacity is also anticipated to be greater than 100% for the eastbound approach during the a.m. peak-hour.



Village of Estero Area-Wide TRAFFIC STUDY



Potential Improvement:

The failing eastbound approach at the intersection of US 41 & Pelican Sound Drive is the result of the heavy side-street delay caused by the through volumes along US 41 as opposed to insufficient capacity along the side-streets. It is common for side-streets along major arterials to operate at v/c ratios greater than 1.0 during peak-hour conditions.

As part of the North Point DRI, the following improvements were included in the transportation analysis and a proportionate share was paid as part of the Development Order. As these improvements are not currently programmed, they were not considered in the future conditions analysis.

- Signalization;
- Add southbound left-turn lane;
- Add northbound right-turn lane;
- Add westbound left-turn lane;
- Add westbound through lane; and
- Add westbound right-turn lane.

Signalization, if warranted, could decrease the delay for the minor side street of Pelican Sound Drive. However, signalization of the intersections will impact the through traffic along US 41 and result in higher delays for the major arterial. It is important to follow spacing requirements in the determination of signal locations. The signal spacings for FDOT from *The Median Handbook (September 2014)* is illustrated on the following page. US 41 from Estero Parkway to Coconut Road is designated by FDOT as Class 5 and has a speed limit of 50 miles per hour.



Village of Estero



Class	Medians	Median O	penings	Signal	Connection	
		Full	Directional		More than 45 mph Posted Speed	45 mph and less Posted Speed
2	Restrictive w/Service Roads	2,640	1,320	2,640	1,320	660
3	Restrictive	2,640	1,320	2,640	660	440
4	Non-Restrictive			2,640	660	440
5	Restrictive	2,640 at greater than 45 mph Posted Speed 1,320 At 45 mph or less Posted Speed	660	2,640 at greater than 45 mph Posted Speed 1,320 At 45 mph or less Posted Speed	440	245
6	Non-Restrictive			1,320	440	245
7	Both Median Types	660	330	1,320	125	125

Exhibit 11 Ccess Management Standards From Rule 14-9

The intersection of US 41 & Pelican Sound Drive is located approximately 1,800 feet south of a signalized intersection (US 41 & Via Coconut Point) and 2,000 feet north of another signalized intersection (US 41 & Williams Road). The criteria based upon FDOT Exhibit 11 for Class 5 roadway is 2,640 feet.

As the signalization of US 41 & Pelican Sound Drive is included in the North Point Development of Regional Impact (DRI), it was included in a future improvement scenario. If warranted with future volumes and approved by FDOT, it is recommended to signalize the intersection of US 41 & Pelican Sound Drive.

Feasibility of Potential Improvement:

Coordination will be required with FDOT as US 41 is a state maintained roadway. Modifications to the existing full access median along US 41 will be required to make this improvement. The eastbound approach is still anticipated to operate with a failing level of service in the p.m. peak-hour with a signal, as timing prioritization will be given to US 41. However, the signalized intersection is anticipated to reduce the delays for the eastbound approach.





US 41 & Williams Road

Table 24: US 41 & Williams Road Intersection Analysis										
Level of Service										
Future Control Delay (seconds) for Unsignalized Intersections or										
Future Approach Delay (seconds/vehicle) for Signalized Intersections										
Scopario Control Easthound Westbound Northbound Southbound Overall Potential								Feasibility/		
Sechario	oontroi	Lustbound	Westbound	Northbound	Southbound	Overall	Improvement	Constraints		
Existing P.M.	Signalized	78%	93%	91%	60%	-				
Peak-Hour		E	F 100.0	C	C	D				
	Cianolizod	68. I	100.9	34.7	23.8	36.3				
Future P.IVI.	Signalized	88% E	107% E		67% C	р				
reak-noui		77 5	129.0	514	26.4	18.3				
Future P M	Signalized	11.5	127.0	51.4	20.4	40.5		Right-of-		
Peak-Hour	orginalized							way		
with		77%	85%	97%	64%			acquisition		
Improvement		E	F	D	С	D	Add WBR	and		
		71.1	83.1	40.4	23.2	38.6		potential		
								geometric		
								constraints		
Future P.M.	Signalized							Right-of-		
Peak-Hour		10/0/	1500/	0.004	0.001		Dual WBL	way		
with North		106%	153%	93%	80%	5	Dual SBL	acquisition		
POINT DRI							Extend EBL	and		
Improvements		117.8	201.1	32.2	23.7	40.2				
								constraints		
Future P M	Signalized							Right-of-		
Peak-Hour	orginalizou							way		
with North		95%	98%	93%	80%		Dual WBL	acquisition		
Point		F	F	С	С	D	Dual SBL,	and		
Improvements		96.3	113.9	40.4	32.2	38.6	WBR	potential		
and WBR								geometric		
								constraints		

Criteria Not Met:

The intersection of Williams Road & US 41 currently operates and is anticipated to operate with a failing westbound approach (LOS F) during the future conditions during the p.m. peak-hour. The westbound through movement is anticipated to operate with a percent of capacity greater than 100%. The intersection has a shared westbound through/right-turn lane and an exclusive



Village of Estero Area-Wide TRAFFIC STUDY



westbound left-turn lane. The shared westbound through/right-turn lane may prohibit vehicles from making a right-turn on red.

Potential Improvement:

As part of the North Point DRI, the following future improvements to the intersection were included in the analysis:

- Add 2nd southbound left-turn lane; and
- Add 2nd westbound left-turn lane.

It is recommended to add an exclusive westbound right-turn lane (in addition to the improvements programmed with the North Point DRI).

Additionally, it is recommended to coordinate with FDOT to close the westbound left-turn of the driveway opening on Williams Road (approximately 200 feet to the west of the signalized intersection of US 41 & Williams Road) indicated in the aerial below.









This driveway opening is considered to be in the functional area of the intersection. The driveway opening impacts the eastbound left-turn lane of US 41 & Williams Road which is anticipated to require approximately 450 feet (per the 95th percentile queue in Synchro). Therefore, the closure of this driveway opening would allow for an extension of the eastbound left turn lane at US 41 & Williams Road.

Feasibility of Potential Improvement:

Currently, there is an existing offset sidewalk along Williams Road and an existing signal pole which would restrict any additional roadway laneage on the eastern leg. These constraints would need to be addressed.

It is recommended to explore the right-of-way feasibility to close the driveway on the west leg of the intersection and to extend the eastbound left-turn lane.





US 41 & Fountain Lakes Boulevard

Table 25: US 41 & Fountain Lakes Boulevard Intersection Analysis Percent of Capacity Future LOS Future Control Delay (seconds) for Unsignalized Intersections or Future Approach Delay (seconds/vehicle) for Signalized Intersections									
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints	
Existing A.M. Peak- Hour	Unsignalized	720% F ¹ 3034.1	10% E 42.7						
Future A.M. Peak- Hour	Unsignalized	1113% F ¹ 4812.2	13% F 53.0						
Future A.M. Peak- Hour	Signalized	51% E 61.5	10% E 57.0	31% A 2.4	67% A 4.4	A 5.1	Signalization if warranted		
Existing P.M. Peak- Hour	Unsignalized	29% E 48.5	181% F 718.8						
Future P.M. Peak- Hour	Unsignalized	52% F ¹ 77.1	326% F 1036.2						
Future P.M. Peak- Hour	Signalized	61% F 87.1	23% F 81.5	94% C 23.4	60% B 12.1	C 20.1	Signalization if warranted		

Note:

2. Volume exceeds capacity in computation

Criteria Not Met:

The eastbound approach of the intersection of US 41 & Fountain Lakes Boulevard currently operates and is anticipated to operate over capacity in the future 2027 conditions. Both the eastbound and westbound approaches are anticipated to operate with failing level of service (LOS F) at the intersection of US 41 & Fountain Lakes Boulevard during the a.m. and p.m. peak-hour period in the future.





Potential Improvement:

Along this roadway segment FDOT signal spacing requires 2,640 feet. The intersection of US 41 & Fountain Lakes Boulevard is located approximately 2,300 feet north of the nearest signal at the intersection of US 41 & Coconut Road and 3,250 feet south of the intersection of US 41 & Williams Road. The intersection does not meet signal spacing standards. However, the intersection of US 41 & Fountain Lakes Boulevard currently operates with a flashing signal due to the emergency services located on the eastern side of the intersection. Therefore, it is recommended to coordinate with FDOT and consider the signalization of the intersection of US 41 & Fountain Lakes Boulevard.

Feasibility of Potential Improvement:

A signal warrant analysis is required to determine if a traffic signal is warranted at this intersection. Coordination will be required with FDOT as US 41 is a state maintained roadway.




Coconut Road & Via Coconut

	Table 2	26: Coconut Road	d & Via Coconut P	oint Intersection A	nalysis						
			Percent of Capaci	ty							
Level of Service											
Future Control Delay (seconds) for Unsignalized Intersections or											
	Future Approach Delay (seconds/vehicle) for Signalized Intersections										
Scenario	Control	Eastbound	stbound Westbound Northbound Southbound Overall								
Existing A.M.	Signalized	49%	43%	17%	76%						
Peak-Hour	-	В	В	С	С	С					
		17.0	18.0	29.7	31.0	20.8					
Existing P.M.	Signalized	55%	45%	20%	79%						
Peak-Hour	-	В	В	С	С	С					
		17.3	18.5	31.8	33.6	21.8					

The intersection of Coconut Road & Via Coconut currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.

As per the *Coconut Road Traffic Study* (June 2016) completed by Trebilcock, Coconut Road is anticipated to operate at the adopted level of service standard west of US 41. No improvements were recommended to Coconut Road, west of US 41, for the future (2026) conditions. The report analyzed future roadway conditions in 2026. The report notes the Coconut Road segment west of US 41 is anticipated to operate over capacity in future conditions and the addition of roundabouts along this segment could provide benefits to the entire corridor.





Coconut Road & Three Oaks Parkway

	Table 27: Coconut Road & Three Oaks Parkway Intersection Analysis										
	Percent of Capacity										
Level of Service											
Future Control Delay (seconds) for Unsignalized Intersections or											
		Future Appr	oach Delay (se	conds/vehicle)	for Signalized I	ntersectio	ns				
Scenario	Control	Fastbound	Westbound	Northbound	Southbound	Overall	Potential	Feasibility/			
coondino	001101	2401000				0.00.000	Improvement	Constraints			
Existing P.M.	Signalized	83%	35%	98%	44%						
Peak-Hour		D	D	D	С	D					
		43.0	43.7	40.5	22.4	36.4					
Future P.M.	Signalized	86%	42%	116%	54%						
Peak-Hour	0	D	D	F	С	E					
		46.2	45.8	92.7	26.0	67.0					
Future P.M.	Signalized	04.0/	4.40/	0.20/	E10/		Re-time	Coordination			
Peak-Hour	-	00%	44 %	03%	51%	0	intersection,	with Lee			
with		U AZ (U 40 F				Adjust signal	County DOT			
Improvement		47.6	48.5	25.9	25.1	29.8	cycle length	,			

Criteria Not Met:

The intersection of Corkscrew Road & Three Oaks Parkway is anticipated to operate with a failing northbound approach (LOS F) and percent of capacity for the northbound through movement exceed 100% during the p.m. peak-hour.

Potential Improvement:

It is recommended to optimize the intersection splits and optimize the signal cycle length for the signal timing at the intersection of Coconut Road & Three Oaks Parkway. With the adjustments in the signal timing splits and 140 second cycle length, the intersection is anticipated to operate at an acceptable LOS D in 2027 with all movements operating below 100% capacity.

The *Coconut Road Traffic Study* (June 2016) includes the projected 2021 level of service as C for Coconut Road from Via Coconut Point to Three Oaks Parkway. Therefore, no roadway improvements are recommended at this intersection.





Feasibility of Potential Improvement:

Coordination with Lee County DOT will be required for the signal timing and cycle length adjustment. This is anticipated to be feasible and the signal timing should be adjusted then monitored.





Williams Road & Three Oaks Parkway

Table 28: Williams Road & Three Oaks Parkway Intersection Analysis Percent of Capacity Level of Service Future Control Delay (seconds) for Unsignalized Intersections or Future Approach Delay (seconds/vehicle) for Signalized Intersections											
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints			
Existing P.M.	Signalized	91%		63%	42%						
Peak-Hour	-	E		В	В	В					
		57.1		11.4	15.3	18.3					
Future P.M.	Signalized	97%		75%	51%						
Peak-Hour	-	E B B C									
		71.5		14.9	18.3	23.1					

The intersection of Williams Road & Three Oaks Parkway currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Estero Parkway & Three Oaks Parkway

	Table 29: Estero Parkway & Three Oaks Parkway Intersection Analysis Percent of Capacity Level of Service										
Future Control Delay (seconds) for Unsignalized Intersections or											
		Future Appr	oach Delay (se	conds/vehicle)	for Signalized I	ntersectio	ns				
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints			
Existing P.M.	Signalized	72%	80%	73%	77%						
Peak-Hour	0	D	D	С	С	D					
		43.1	40.6	30.3	30.8	35.4					
Future P.M.	Signalized	77%	84%	77%	81%						
Peak-Hour	-	D	D	D	С	D					
		48.3	45.8	35.3	33.7	40.1					

The intersection of Estero Parkway & Three Oaks Parkway currently operates and is anticipated to continue to operate acceptably in future 2027 conditions.





Estero Parkway & Ben Hill Griffin Parkway

Table 30: Estero Parkway & Ben Hill Griffin Parkway Intersection Analysis Percent of Capacity Level of Service Future Control Delay (seconds) for Unsignalized Intersections or Future Approach Delay (seconds/vehicle) for Signalized Intersections										
Scenario	Control	Eastbound	Westbound	Northbound	Southbound	Overall	Potential Improvement	Feasibility/ Constraints		
Existing P.M.	Signalized	86%		72%	53%					
Peak-Hour	0	D		С	В	С				
		45.9		22.4	19.8	27.4				
Future P.M.	Signalized	90%		74%	65%					
Peak-Hour	-	D		С	С	С				
		49.2		23.5	23.3	30.1				

The intersection of Estero Parkway & Ben Hill Griffin Parkway currently operates and is anticipated to operate acceptably in future 2027 conditions.





SAFETY ANALYSIS





SUMMARY OF SAFETY ANALYSIS

Along the Corkscrew Road corridor and other identified intersections, Kimley-Horn reviewed the most recent five (5) years of crash data from Signal Four Analytics, an online system developed by the GeoPlan Center at the University of Florida.

The corridor crash trends are generally indicative of typical arterial congestion. Rear-end and sideswipe crashes are common for signalized intersections, especially during the peak travel demand periods. The results of the analysis did not indicate any needed potential access management or signal phasing changes; as the only trends that were identified were minimal and occurred at signalized intersections with existing protected-only left-turn phasing (green arrow).

It is recommended to consider pavement friction improvements if skid numbers or visual inspection show poor pavement at the intersections of Ben Hill Griffin Parkway & Estero Parkway and Three Oaks Parkway & Williams Road. It is recommended to consider lighting improvements at the intersection of Ben Hill Griffin Parkway & Estero Parkway and Three Oaks Parkway.



Overview of Area-Wide Crashes

Village of Estero

Crash report data were obtained for a five-year period from January 1, 2011 to December 31, 2015. The crash data were obtained from the Signal Four Analytics crash database, which compiles statewide crash data from the Florida Highway Patrol (FHP) consisting of both long form and short form reports. As directed by Village staff, the study area included the corridor of Corkscrew Road from US 41 to Bella Terra Boulevard as well as the following intersections:

- Coconut Road at Three Oaks Parkway
- Coconut Road at Via Coconut Point
- Estero Parkway at Ben Hill Griffin Parkway

Area-Wide

- Estero Parkway at Three Oaks Parkway
- Williams Road at Three Oaks Parkway
- Estero Parkway at US 41
- Broadway at US 41
- Pelican Sound Drive at US 41
- Williams Road at US 41
- Fountain Lakes Boulevard at US 41

The crash data indicated the predominant spot locations where crashes occurred during the five-year period. The following observations were made:

- Three Oaks Parkway (56 crashes or 11.2 per year)
 - o Rear-end crash trend in all directions
 - o Angle/left-turn crash trend in all directions
- I-75 (55 crashes or 11.0 per year)
 - o Westbound rear-end crash trend
- US 41 (38 crashes or 7.6 per year)
 - o Northbound/southbound rear-end crash trend
- Miromar Outlets Blvd (26 crashes or 5.2 per year)





• Eastbound left-turn crash trend with vehicles at fault in the westbound direction

The crash data was tabulated to identify trends in crash frequency, crash type, and other relevant contributing circumstances such as lighting conditions, pavement conditions, and time of day. Tables were created for intersections identifying the crash types when the total number exceeds 40 crashes or 8 per year (typically defined for a "high-crash intersection").

A total of 1,194 crashes, resulting in 435 injuries and 9 fatalities, were reported over the fiveyear period. Table 31 briefly summarizes the crash characteristics within the study area by year.

Table 31: Summary of Crashes (Area-Wide Study Area)											
Year	Total Number of Crashes	Number of Injury Crashes	Number of Fatal Crashes	Number of Crashes at Night	Number of Crashes in Wet Conditions	Number of Angle/Left- Turn Crashes					
2011	124	38	5	25	18	25					
2012	180	52	1	31	21	21					
2013	254	66	1	59	37	38					
2014	270	61	0	56	42	30					
2015	366	65	0	57	66	35					
Total	1,194	282	7	228	184	149					
Average	238.8	56.4	1.4	45.6	36.8	29.8					
Per	rcent	23.6%	0.6%	19.1%	15.4%	12.5%					

The data within the study area was broken down and further analyzed for location to identify specific crash patterns and locations that may indicate a safety problem within each specific area.

Corkscrew Road from US 41 to Bella Terra Boulevard Corridor

A total of 844 crashes were reported for the five-period. The crashes included 187 injury crashes, resulting in 284 injuries and 7 fatalities. The seven fatalities resulted from five fatal crashes including two rollover crashes, one head-on crash, one sideswipe crash, and one



Village of Estero Area-Wide TRAFFIC STUDY



unknown-type crash. The total number of crashes per year increased annually over the fiveyear period: 88 crashes were reported in 2011, 122 crashes in 2012, 182 crashes in 2013, 197 crashes in 2014, and 255 crashes in 2015. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

- Nearly 17 percent of the crashes occurred at night, during dark conditions.
- Approximately 14 percent of the crashes occurred on wet pavement.
- The peak in crash frequency occurred from 4:00 PM to 5:00 PM with 85 crashes.
- The overwhelming majority of crashes were rear-end crashes (49 percent). The second most common crash type was a sideswipe crash (9 percent).
- There were a total of 71 left-turn crashes (8 percent) and 32 angle crashes (4 percent).
- Three bicycle crashes and two pedestrian crashes occurred.



Village of Estero Area-Wide TRAFFIC STUDY

Table 32 depicts the number of crashes that occurred in the study area by crash type and the year the crash occurred.

Table 32: Summary of Crashes by Harmful Event (Corkscrew Road from US 41 to Bella Terra Boulevard)										
Crash Type	2011	2012	2013	2014	2015	Total	Percent			
Rear-End	39	53	78	104	139	413	48.9%			
Sideswipe	12	8	8	20	26	74	8.8%			
Left-Turn	13	6	16	17	19	71	8.4%			
Head-On	1	20	27	8	1	57	6.8%			
Single Vehicle	4	5	17	10	16	52	6.2%			
Other/Unknown	7	7	6	10	17	47	5.6%			
Ran off the Road	3	8	8	6	9	34	4.0%			
Angle	6	5	8	8	5	32	3.8%			
Right-Turn	0	3	5	2	6	16	1.9%			
Rollover	3	3	4	1	4	15	1.8%			
Parked Vehicle	0	0	2	7	5	14	1.7%			
Backed-Into	0	1	1	3	6	11	1.3%			
Animal	0	1	1	1	0	3	0.4%			
Bicycle	0	1	1	0	1	3	0.4%			
Pedestrian	0	1	0	0	1	2	0.2%			
Total	88	122	182	197	255	844	100.0%			

Specific attention was paid to the presence of left-turn and angle crashes to determine if any potential access management or signal phasing changes are warranted; however, the only trends that were identified were minimal and occurred at signalized intersections with existing protected-only left-turn phasing (green arrow):

- Three Oaks Parkway (16 angle/left-turn crashes or 3.2 per year)
- Miromar Outlets Boulevard (11 angle/left-turn crashes or 2.2 per year)
- Ben Hill Griffin Parkway (11 angle/left-turn crashes or 2.2 per year)

The corridor crash trends are generally indicative of typical arterial congestion. Rear-end and sideswipe crashes are common for signalized intersections, especially during the peak travel



Village of Estero Area-Wide TRAFFIC STUDY



demand periods. The signals appear to be in good shape as far as backplates, borders, and signal heads assigned to each lane rather than lane lines. It is recommended to confirm with Lee County DOT that the signal timing clearance intervals, the yellow and all red time, meet current standards (from the Institute of Transportation Engineers). Adequate clearance intervals may reduce crashes caused by red-light running or early braking.

Intersection of US 41 & Broadway Avenue

A total of 44 crashes were reported for the five-period. The crashes included 15 injury crashes, resulting in 20 injuries, and no fatal crashes. The number of crashes per year fluctuated over the five-year period: 10 crashes were reported in 2011, 6 crashes in 2012, 11 crashes in 2013, 8 crashes in 2014, and 9 crashes in 2015. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

- Nearly 27 percent of the crashes occurred during dark conditions. It is recommended to consider lighting improvements at the intersection. Based upon information received by The Village, FDOT is currently installing light poles along US 41, and this is anticipated to improve the situation.
- Seven crashes (16 percent) occurred on wet pavement.
- The peak in crash frequency occurred from 4:00 PM to 5:00 PM with five crashes.
- The majority of crashes were rear-end crashes (49 percent).





Table 33 depicts the number of crashes that occurred at the intersection of US 41 & Broadway by crash type and the year the crash occurred.

IC STUDY

Table 33: Summary of Crashes by Harmful Event (US 41 & Broadway Avenue)										
Crash Type	2011	2012	2013	2014	2015	Total	Percent			
Rear-End	6	4	7	5	6	28	48.9%			
Head-On	1	1	2	0	0	4	9.1%			
Single Vehicle	0	0	1	2	0	3	6.8%			
Sideswipe	1	0	0	0	1	2	4.5%			
Angle	1	0	0	0	1	2	4.5%			
Other/Unknown	1	1	0	0	0	2	4.5%			
Ran off the Road	0	0	0	0	1	1	2.3%			
Parked Vehicle	0	0	1	0	0	1	2.3%			
Animal	0	0	0	1	0	1	2.3%			
Total	10	6	11	8	9	44	100.0%			

Intersection of Three Oaks Parkway & Coconut Road

A total of 23 crashes were reported for the five-year period. The crashes included seven injury crashes, resulting in nine injuries, and no fatal crashes. The number of crashes per year fluctuated over the five-year period: 2 crashes were reported in 2011, 3 crashes in 2012, 4 crashes in 2013, 3 crashes in 2014, and 11 crashes in 2015. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

- Nearly 13 percent of the crashes occurred during dark conditions.
- Two crashes (9 percent) occurred on wet pavement.
- The peak in crash frequency occurred from 4:00 PM to 5:00 PM with three crashes.
- The peak day of the week for crashes was Tuesday (30 percent). Overall, 83 percent of the crashes occurred on a weekday and the remaining 17 percent occurred on a weekend.





• The most predominant crash types were left-turn crashes (6 crashes), single vehicle crashes (5 crashes), rear-end crashes (4 crashes), and sideswipe crashes (3 crashes).

Intersection of Coconut Road & Via Coconut Point

Village of Estero

A total of 10 crashes were reported for the five-year period. The crashes included one injury crash, resulting in two injuries, and no fatal crashes. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

• Three of the crashes occurred during dark conditions.

Area-Wide TRAFFIC STUDY

- Only one crash occurred on wet pavement.
- The peak in crash frequency occurred from 4:00 PM to 5:00 PM with three crashes.
- The peak day of the week for crashes was Monday (40 percent). Overall, 90 percent of the crashes occurred on a weekday and the remaining 10 percent occurred on a weekend.
- The crashes included two rear-end crashes and single occurrences of angle, head-on, sideswipe, left-turn, backed into, hit tree, single vehicle, and "other" crashes.

Intersection of Ben Hill Griffin Parkway & Estero Parkway

A total of 30 crashes were reported for the five-year period. The crashes included two injury crashes, resulting in two injuries, and no fatal crashes. The number of crashes per year increased over the five-year period: 2 crashes were reported in 2011, 2 crashes in 2012, 6 crashes in 2013, 7 crashes in 2014, and 13 crashes in 2015. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

• Nearly 30 percent of the crashes occurred during dark conditions. It is recommended to consider lighting improvements at the intersection.





- 11 crashes (37 percent) occurred on wet pavement. It is recommended to consider pavement friction improvements if skid numbers or visual inspection show poor pavement.
- The peak in crash frequency occurred during the evening peak hour from 5:00 PM to 6:00 PM with four crashes.
- The peak day of the week for crashes was Friday (33 percent). Overall, 77 percent of the crashes occurred on a weekday and the remaining 23 percent occurred on a weekend.
- The most predominant crash type was a rear-end crash (12 crashes).

Intersection of Three Oaks Parkway & Estero Parkway

A total of 42 crashes were reported for the five-year period. The crashes included 15 injury crashes, resulting in 21 injuries, and 1 fatal crash, resulting in 1 fatality. The fatal crash was a single vehicle crash at 10:24 AM in 2011 on dry pavement. The number of crashes per year fluctuated over the five-year period: 5 crashes were reported in 2011, 8 crashes in 2012, 8 crashes in 2013, 11 crashes in 2014, and 10 crashes in 2015. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

- Nearly 29 percent of the crashes occurred during dark conditions. It is recommended to consider lighting improvements at this intersection.
- Five crashes (12 percent) occurred on wet pavement.
- The peak in crash frequency occurred from 2:00 PM to 3:00 PM with six crashes.
- The peak day of the week for crashes were Monday and Friday (21 percent each).
 Overall, 69 percent of the crashes occurred on a weekday and the remaining 31 percent occurred on a weekend.
- The predominant crash type was a rear-end crash (57 percent).



Table 34 depicts the number of crashes that occurred at the intersection of Three Oaks Parkway & Estero Parkway by crash type and the year the crash occurred.

Table 34: Summary of Crashes by Harmful Event (Three Oaks Parkway & Estero Parkway)										
Crash Type	2011	2012	2013	2014	2015	Total	Percent			
Rear-End	2	7	3	6	6	24	57.1%			
Left-Turn	1	0	3	1	1	6	14.3%			
Single Vehicle	1	1	0	1	1	4	9.5%			
Angle	0	0	1	0	1	2	4.8%			
Sideswipe	0	0	0	2	0	2	4.8%			
Hit Utility Pole	0	0	0	0	1	1	2.4%			
Backed Into	0	0	0	1	0	1	2.4%			
Rollover	1	0	0	0	0	1	2.4%			
Head-On	0	0	1	0	0	1	2.4%			
Total	5	8	8	11	10	42	100.0%			

Intersection of US 41 & Estero Parkway

A total of 84 crashes were reported for the five-year period. The crashes included 17 injury crashes, resulting in 28 injuries, and no fatal crashes. The number of crashes per year increased over the five-year period: 4 crashes were reported in 2011, 15 crashes in 2012, 20 crashes in 2013, 19 crashes in 2014, and 26 crashes in 2015. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

- Nearly 27 percent of the crashes occurred during dark conditions. It is recommended to consider lighting improvements at the intersection. Based upon information received by The Village, FDOT is currently installing light poles along US 41, which is anticipated to improve the situation.
- Eight crashes (10 percent) occurred on wet pavement.
- The peak in crash frequency occurred from 4:00 PM to 5:00 PM with eight crashes.





- The peak day of the week for crashes was Wednesday and Thursday (17 percent each).
 Overall, 77 percent of the crashes occurred on a weekday and the remaining 23 percent occurred on a weekend.
- The predominant crash type was a rear-end crash (61 percent).

Table 35 depicts the number of crashes that occurred at the intersection of US 41 & Estero Parkway by crash type and the year the crash occurred.

Table 35: Summary of Crashes by Harmful Event (US 41 & Estero Parkway)										
Crash Type	2011	2012	2013	2014	2015	Total	Percent			
Rear-End	3	9	8	12	19	51	60.7%			
Head-On	0	3	6	3	0	12	14.3%			
Sideswipe	0	1	2	1	3	7	8.3%			
Left-Turn	0	0	3	0	1	4	4.8%			
Parked Vehicle	0	0	0	2	1	3	3.6%			
Right-Turn	1	1	0	0	0	2	2.4%			
Single Vehicle	0	0	1	1	0	2	2.4%			
Other/Unknown	0	0	0	0	1	1	1.2%			
Backed Into	0	0	0	0	1	1	1.2%			
Angle	0	1	0	0	0	1	1.2%			
Total	4	15	20	19	26	84	100.0%			

Intersection of US 41 & Fountain Lakes

A total of 25 crashes were reported for the five-year period. The crashes included six injury crashes, resulting in seven injuries, and one fatal crash, resulting in one fatality. The fatal crash was a single vehicle crash at 7:31 PM in 2012 on dry pavement under dark conditions not involving alcohol. The number of crashes per year fluctuated over the five-year period: three crashes were reported in 2011, six crashes in 2012, three crashes in 2013, four crashes in 2014, and nine crashes in 2015. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

- Nearly 24 percent of the crashes occurred during dark conditions.
- Four crashes (16 percent) occurred on wet pavement.







- The peak in crash frequency occurred from 7:00 PM to 8:00 PM with five crashes.
- The peak day of the week for crashes was Friday (24 percent). Overall, 84 percent of the crashes occurred on a weekday and the remaining 16 percent occurred on a weekend.
- The most predominant crash types were rear-end crashes (28 percent) and sideswipe crashes (20 percent).

Intersection of US 41 & Pelican Sound Drive

A total of 14 crashes were reported for the five-year period. The crashes included five injury crashes, resulting in seven injuries, and no fatal crashes. The number of crashes per year remained low over the five-year period: four crashes were reported in 2011, two crashes in 2012, two crashes in 2013, three crashes in 2014, and three crashes in 2015. The crash data were evaluated to determine significant trends in the circumstances surrounding each crash. The following observations were made:

- Four of the crashes occurred during dark conditions.
- Four crashes occurred on wet pavement.
- The peak in crash frequency occurred from 5:00 PM to 6:00 PM with three crashes.
- The peak day of the week for crashes was Tuesday (29 percent). Overall, 79 percent of the crashes occurred on a weekday and the remaining 21 percent occurred on a weekend.
- The crashes included four rear-end crashes, three angle crashes, two left-turn crashes, and other single occurrences.

Intersection of US 41 & Williams Road

A total of 61 crashes were reported for the five-year period. The crashes included 24 injury crashes, resulting in 44 injuries, and no fatal crashes. The number of crashes per year increased over the five-year period: 6 crashes were reported in 2011, 12 crashes in 2012, 12 crashes in 2013, 13 crashes in 2014, and 18 crashes in 2015. The crash data were evaluated to determine





significant trends in the circumstances surrounding each crash. The following observations were made:

- Nearly 15 percent of the crashes occurred during dark conditions.
- 13 crashes (21 percent) occurred on wet pavement.
- The peak in crash frequency occurred from 3:00 PM to 4:00 PM with 11 crashes.
- The peak day of the week for crashes was Monday (26 percent). Overall, 77 percent of the crashes occurred on a weekday and the remaining 23 percent occurred on a weekend.
- The predominant crash type was a rear-end crash (41 percent).



Table 36 depicts the number of crashes that occurred at the intersection of US 41 & Williams Road by crash type and the year the crash occurred.

Table 36: Summary of Crashes by Harmful Event (US 41 & Williams Road)										
Crash Type	2011	2012	2013	2014	2015	Total	Percent			
Rear-End	2	2	7	3	11	25	40.9%			
Angle	0	2	2	1	1	6	9.8%			
Left-Turn	1	2	1	1	1	6	9.8%			
Head-On	0	3	0	1	1	5	8.2%			
Single Vehicle	0	0	1	2	1	4	6.6%			
Sideswipe	1	0	0	2	1	4	6.6%			
Ran off the Road	1	0	0	2	1	4	6.6%			
Other/Unknown	0	2	1	0	0	3	4.9%			
Right-Turn	1	0	0	1	0	2	3.3%			
Pedestrian	0	0	0	0	1	1	1.6%			
Rollover	0	1	0	0	0	1	1.6%			
Total	6	12	12	13	18	61	100.0%			

Intersection of Three Oaks Parkway & Williams Road

A total of 17 crashes were reported for the five-year period. The crashes included 3 injury crashes, resulting in 11 injuries, and no fatal crashes. The number of crashes per year increased over the five-year period: no crashes were reported in 2011, two crashes in 2012, four crashes in 2013, two crashes in 2014, and nine crashes in 2015. The crash data were evaluated to determine any significant trends in the circumstances surrounding each crash. The following observations were made:

- Nearly 18 percent of the crashes occurred during dark conditions.
- 13 crashes (76 percent) occurred on wet pavement. It is recommended to consider pavement friction improvements if skid numbers or visual inspection show poor pavement.
- The peak in crash frequency occurred from 4:00 PM to 5:00 PM with three crashes.





1 mm 12 2

The predominant crash type was a rear-end crash (53 percent) followed by a single • vehicle crash (35 percent).

Village of Estero





TRANSPORTATION OBSERVATIONS

Traffic observations were performed within the study area during the a.m. peak-hour period (7:00 a.m. to 9:00 a.m.) and p.m. peak-hour period (4:00 p.m. to 6:00 p.m.) on January 10, 2017. Site observations were used to verify field conditions and identify operational issues.

Neighborhood Access Points

Due to the higher traffic volumes along US 41 and Corkscrew Road, the neighborhood access points that operate at stop-controlled intersections must wait for adequate gaps. While the queues were not observed to be significant at the minor street access points at the time of the site observations, increases to traffic volumes along both US 41 and Corkscrew Road are anticipated to increase these delays.



Northbound Traffic at Intersection Of Corkscrew Road & Bella Terra Boulevard





Westbound Traffic on Corkscrew Road

It is not recommended to signalize all neighborhood access points along US 41 or Corkscrew Road, as the signalization will cause delays to the US 41 and Corkscrew Road corridors. FDOT currently has standards for the required spacing between signals and median openings along US 41. Adequate spacing for potential signalization should also be considered along Corkscrew Road.

The planned improvement of a traffic signal at the intersection of Corkscrew Road & Bella Terra Boulevard is anticipated to provide gaps to traffic west of the intersection. This is anticipated to reduce delays at the adjacent neighborhood access point of Corkscrew Road & Cypress Shadows Boulevard.





Heavy Vehicles along Corkscrew Road

A high volume of truck traffic was observed during the a.m. peak-hour period along Corkscrew Road travelling eastbound. Based upon discussions with The Village of Estero staff, a portion of these heavy vehicles are related to mining operations in areas east of The Village. The heavy vehicles traveling along Corkscrew Road were traveling in the opposite direction of the a.m. peak-hour traffic. At the intersection of Corkscrew Road & Bella Terra Boulevard the heavy vehicles were 24% of all eastbound traffic during the a.m. peak-hour (7:00 a.m. to 8:00 a.m.). Observations were only performed during the a.m. peak-hour and p.m. peak-hour. The heavy vehicles were not observed in as high volumes traveling westbound during the p.m. peak-hour.

A high volume of loaded heavy vehicles may result in faster degradation of the roadway and may require more frequent roadway maintenance. Additionally, a high volume of truck traffic also can impact the speeds along the two-lane roadway of Corkscrew Road. Safety concerns should also be considered with a higher volume of heavy vehicles near residential areas.



Heavy Vehicle Traffic Eastbound on Corkscrew Road





Kimley »Horn

Village of Estero Area-Wide TRAFFIC STUDY



Corkscrew Road Signal Timing

The current signal timing along Corkscrew Road allowed for a progression of vehicles from the intersection of US 41 & Corkscrew Road to the intersection of Corkscrew Road & Stoneybrook Golf Drive. The offsets and signal timing allowed for vehicles, particularly during the p.m. peakhour in the eastbound direction, to travel throughout the corridor with minimal delays at the signalized intersections. Therefore, it is recommended to continue to monitor the intersections along Corkscrew Road and maintain the timing to allow for this progression.



Signal at the Intersection of Corkscrew Road & Stoneybrook Golf Drive







Multi-Modal Observations

The Lee County Metropolitan Planning Organization (MPO) is creating a Bicycle and Pedestrian Master Plan for The Village of Estero and will evaluate in more detail the multi-modal conditions. Although not part of the study, as part of the site observations, a variety of modes were observed and pictures were taken from the site observations within the following categories:

Bicycling

Cyclists were observed along Corkscrew Road and Three Oaks Parkway. Within the study area, Corkscrew Road, from Corkscrew Woodlands Boulevard to Bella Terra Boulevard, contains a striped bicycle lane. Future roadway improvements from the intersection of US 41 & Corkscrew Road to Corkscrew Road & Corkscrew Woodlands Boulevard are recommended to consider the addition of bicycle lanes. The MPO is currently in the process of developing a Bicycle and Pedestrian Master Plan.

Three Oaks Parkway, within the study area, also contains a striped bicycle lane and cyclists were observed to use the bicycle facilities and sidewalk during the site observations.



Cyclist on the Sidewalk Approaching the Intersection of Corkscrew Road & Three Oaks Parkway











Cyclists on Corkscrew Road West of Bella Terra Boulevard



Cyclists in The Village of Estero





Pedestrian

Pedestrian access, including the location and condition of sidewalks and crosswalks, should also be evaluated within the study area. The Village of Estero is recommended to evaluate the distances between crosswalks within the study area.



Pedestrian along Corkscrew Road



Pedestrian along River Ranch Road









Pedestrian along Corkscrew Road



Pedestrian along River Ranch Road



School Access (Pedestrian Crosswalk)

Village of Estero

Area-Wide TRAFFIC STUDY

It is recommended to provide crosswalks and sidewalks along River Ranch Road, adjacent to the Estero High School. For example, the picture below shows a student who was observed crossing the roadway (without a crosswalk during the p.m. peak-hour). It is recommended to discuss with the school district, the need for crosswalks and sidewalks adjacent to the school.



Student Crossing River Ranch Road





CONCLUSION

This report documents the existing conditions (2017), and anticipated future conditions (2027) of intersections and study area roadways with The Village of Estero. The analysis of future conditions includes identification of future travel demand, evaluation of future operating conditions, and future potential operational improvements.

A roadway analysis was included in the analysis for the study roadway segments identified by The Village. To determine future (2027) roadway volumes, corridor growth rates were applied with the highest amount of growth anticipated along Corkscrew Road. Corkscrew Road from Three Oaks Parkway to Bella Terra Boulevard is anticipated to operate over the available peakhour peak direction capacity in future conditions during the p.m. peak-hour.

The intersection analysis indicates thirteen of the study intersections within The Village of Estero are currently operating with approaches at an unacceptable standard during the a.m. peak-hour and p.m. peak-hour.

Programmed improvements are anticipated within ten years and the following were included in the analysis:

- Signalization of Corkscrew Road & Bella Terra Boulevard
- Interim FDOT improvements to Corkscrew Road & I-75 Ramps
- Signalization of Corkscrew Road & Puente Way including a frontage road to Corkscrew Woodlands Boulevard
- Signalization of US 41 & Pelican Sound Drive (anticipated as part of the North Point DRI)
- Addition of an east leg including westbound through lane, southbound right-turn lane, eastbound left-turn lane, eastbound through lane, and eastbound right-turn lane as part of the Estero Grande project at the intersection of US 41 & Estero Parkway





TA WAY NO P

Area-Wide

FIC STUDY

Village of Estero

Additional failing movements or approaches are anticipated with the increase in future traffic. The following potential improvements were recommended, when warranted, for study area intersections in order to improve operations:

- Create median storage for the northbound approach at the intersection of Corkscrew Road & Cypress Shadows Boulevard
- Extend the southbound left-turn lane at Corkscrew Road & Ben Hill Griffin Parkway and re-time the intersection
- Provide interim safety improvements at the intersection of Corkscrew Road & Corkscrew Woodlands Boulevard
- Re-time intersection, extend the eastbound left-turn lane at Corkscrew Road & Three Oaks Parkway, and add an additional northbound right-turn lane (for dual northbound right-turn lanes), depending on available right-of way
- Re-time the intersection of US 41 & Corkscrew Road and add an additional westbound right-turn lane (for dual westbound right-turn lanes), depending on available right-of way
- Re-time the intersection of US 41 & Estero Parkway and explore the possibility of an additional westbound right-turn (for dual westbound right-turns)
- Add a right-turn lane at the intersection of US 41 & Williams Road and extend the eastbound left-turn lane (along with the closure of the driveway on the west leg of Williams Road)
- Signalize the intersection of US 41 & Fountain Lakes Boulevard (when warranted)
- Re-time the intersection of Three Oaks Parkway & Coconut Road including changing the signal cycle length







The safety analysis indicated the corridor crash trends are generally indicative of typical arterial congestion. Rear-end and sideswipe crashes are common for signalized intersections, especially during the peak travel demand periods. The signals appear to be in good shape as far as backplates, borders, and signal heads. It is recommended to confirm that the clearance intervals meet current Institute of Transportation Engineers standards to reduce crashes caused by red-light running or early braking.

