Section 3K:

East University Drive/ Shug Jordan Parkway Corridor

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INTRODUCTION

This section documents the results of traffic operations evaluations for the Shug Jordan Parkway/East University Drive roadway corridor. Shug Jordan/EUD is located outside the downtown business district of Auburn and forms a ring roadway around the city. Motorists utilizing Shug Jordan/EUD can access points north, south, east, and west. The Shug Jordan/EUD roadway corridor is approximately 12.8 miles in length approximately twenty-one (21) study intersections, including:

- Shug Jordan/EUD at N. College Street
- EUD at Shelton Mill Road
- EUD at N. Dean Road
- EUD at Stoker Street
- EUD at Gatewood Drive
- EUD at Mall Parkway
- EUD at Opelika Road
- EUD at Saugahatchee Road
- EUD at Annalue Drive
- EUD at E. Glenn Avenue
- EUD at Moores Mill Road
- EUD at S. Dean Road
- EUD at Wrights Mill Road
- EUD at S. Donahue Drive
- Shug Jordan/EUD at S. College Street
- Shug Jordan at Alabama Street/W. Samford Avenue
- Shug Jordan at Martin Luther King Drive Ramps
- Shug Jordan at Richland Road/Judd Avenue
- Shug Jordan at Ware Drive

Study intersections along the East University Drive/Shug Jordan Parkway roadway corridor are illustrated in **Figure 1**. To accomplish the traffic operations evaluations for the East University Drive/Shug Jordan Parkway Corridor, the following tasks were undertaken:

- existing peak hour turning movement counts were conducted for the study intersections;
- drive times were collected for the morning and afternoon commuter peak periods;
- capacity analyses were conducted for the study intersections;
- arterial capacity analyses were conducted for East University Drive/Shug Jordan Parkway;
- current traffic operational deficiencies were identified;
- projections for ten (10) year growth in traffic through the corridor were developed; and
- geometric and traffic control improvements were developed for the study intersections to address traffic operational and safety deficiencies for existing and projected ten (10) year conditions.

Sources of information used in this section include: The City of Auburn, Alabama; the Institute of Transportation Engineers; American Association of State Highway and Transportation Officials; the Manual on Uniform Traffic Control Devices; the Transportation Research Board; and the files and field reconnaissance efforts of Skipper Consulting, Inc.

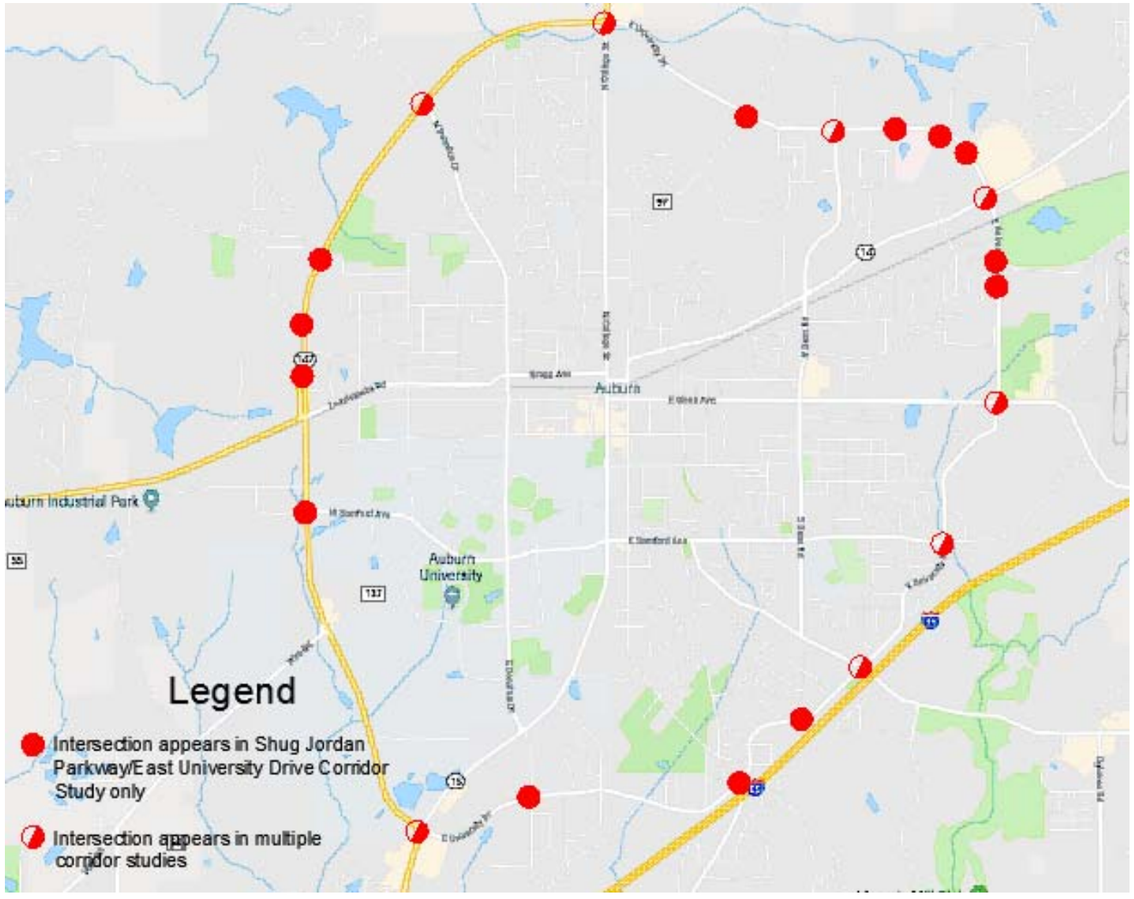


Figure 1- Study Intersection Locations

BACKGROUND INFORMATION

Study Area Roadways

The study area for this roadway corridor traffic operations evaluation is Shug Jordan Parkway and East University Drive. Both roadways have terminus at North College Street and South College Street. The entire length of Shug Jordan Parkway and East University Drive between those two points was evaluated. East University Drive is classified as a minor arterial roadway while Shug Jordan Parkway is classified as a principal arterial roadway. Note that East University Drive is a City of Auburn roadway while Shug Jordan Parkway is designated as Alabama Highway 147 and maintained by ALDOT.

The following is a listing of the cross sections present along the study roadway corridor:

East University Drive *(approximately 7.7 miles total length)*

- From North College Street to East Glenn Avenue, East University Drive is a four-lane City of Auburn roadway.
- From East Glenn Avenue to just east of South College Street, East University Drive is a three-lane City of Auburn roadway.

Shug Jordan Parkway *(approximately 5.06 miles total length)*

- Shug Jordan Parkway from South College Street to North College Street is mostly a four-lane undivided roadway. The roadway cross section is expanded to 5+ lanes in various intersection locations, but quickly reduces back to a four-lane section.

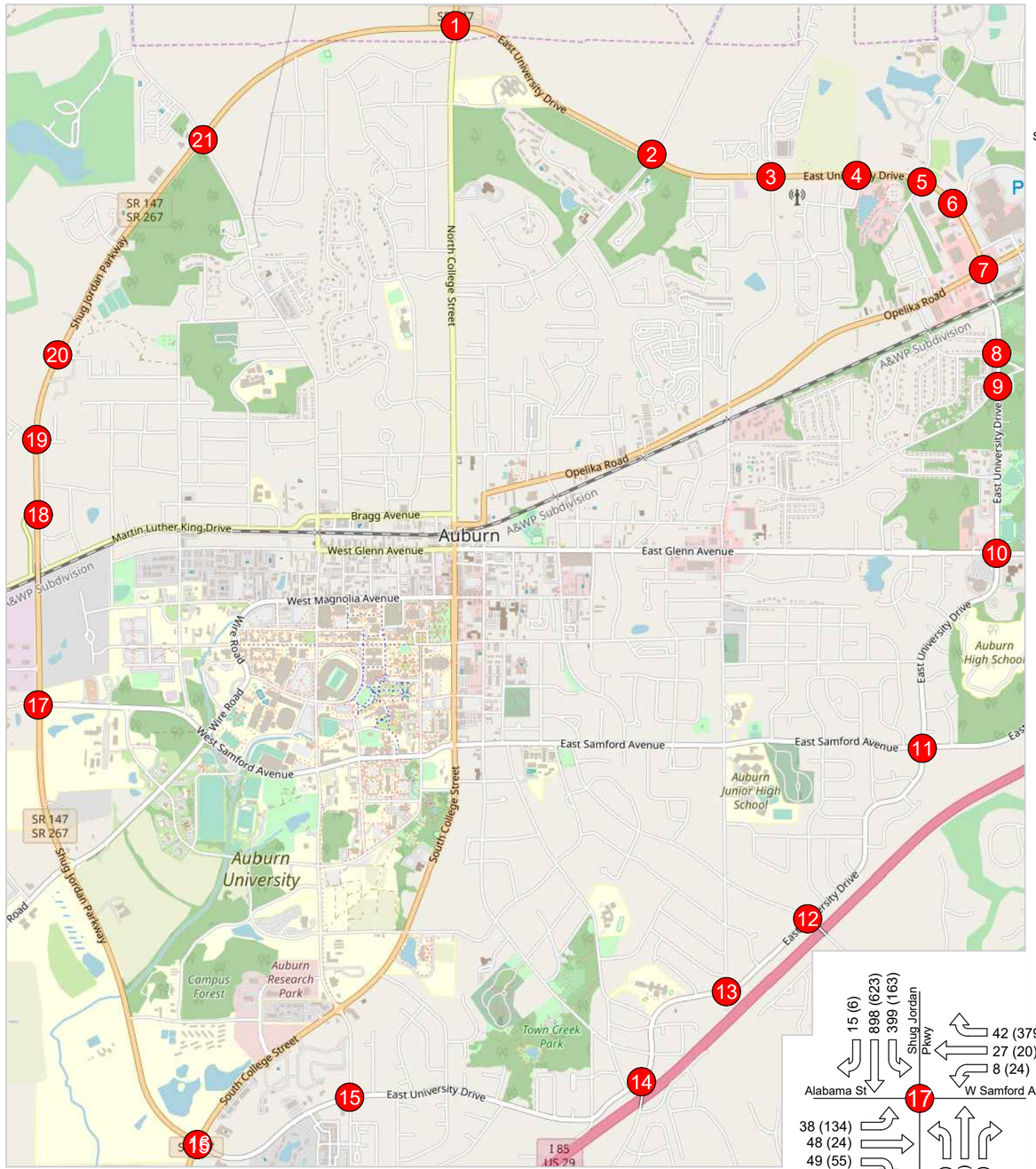
Characteristics of East University Drive/Shug Jordan Parkway roadway segments are summarized in **Table 1**.

Peak Hour Traffic Counts

Intersection turning movement traffic counts were conducted along the study area roadway during peak commuter traffic periods. The morning peak traffic counts were conducted between 7:00-9:00 AM, and the afternoon peak traffic counts were conducted between 4:00-6:00 PM. Peak hour traffic counts were conducted for a typical weekday while all area schools were in normal operation. The peak hour traffic volumes are included in this report document as **Figure 2**.

Table 1 - Existing Roadway Characteristics - East University Drive & Shug Jordan Parkway

Roadway	# of Lanes	Travel Direction	Travel Speeds (MPH)	Classification
East University Drive (North College Street to Shelton Mill Road)	4	East/West	45	Minor Arterial
East University Drive (Shelton Mill Road to North Dean Road)	4	East/West	45	Minor Arterial
East University Drive (North Dean Road to Stoker Street)	4	East/West	45	Minor Arterial
East University Drive (Stoker Street to Gatewood Drive)	4	East/West	45	Minor Arterial
East University Drive (Gatewood Drive to Mall Parkway)	4	North/South	45	Minor Arterial
East University Drive (Mall Parkway to Opelika Road)	4	North/South	45	Minor Arterial
East University Drive (Opelika Road to Saugahatchee Road)	4	North/South	45	Minor Arterial
East University Drive (Saugahatchee Road to Annalue Drive)	4	North/South	45	Minor Arterial
East University Drive (Annalue Drive to East Glenn Avenue)	4	North/South	45	Minor Arterial
East University Drive (East Glenn Drive to East Samford Avenue)	3	North/South	35	Minor Arterial
East University Drive (East Samford Avenue to Moores Mill Road)	3	North/South	30	Minor Arterial
East University Drive (Moores Mill Road to South Dean Road)	3	North/South	30	Minor Arterial
East University Drive (South Dean Road to Wright Mill Road)	3	North/South	30	Minor Arterial
East University Drive (Wright Mill Road to South Donahue Drive)	3	East/West	30	Minor Arterial
East University Drive (South Donahue Drive to South College Street)	3/4	East/West	30	Minor Arterial
Shug Jordan Parkway (South College Street to West Samford Avenue)	4	North/South	55	Principal Arterial
Shug Jordan Parkway (West Samford Avenue to Martin Luther King Drive Ramp)	4	North/South	55	Principal Arterial
Shug Jordan Parkway (Martin Luther King Drive Ramp to Judd Avenue)	4	North/South	55	Principal Arterial
Shug Jordan Parkway (Judd Avenue to Ware Drive)	4	North/South	55	Principal Arterial
Shug Jordan Parkway (Ware Drive to North Donahue Drive)	4	North/South	55	Principal Arterial
Shug Jordan Parkway (North Donahue Drive to North College Street)	4	North/South	55	Principal Arterial



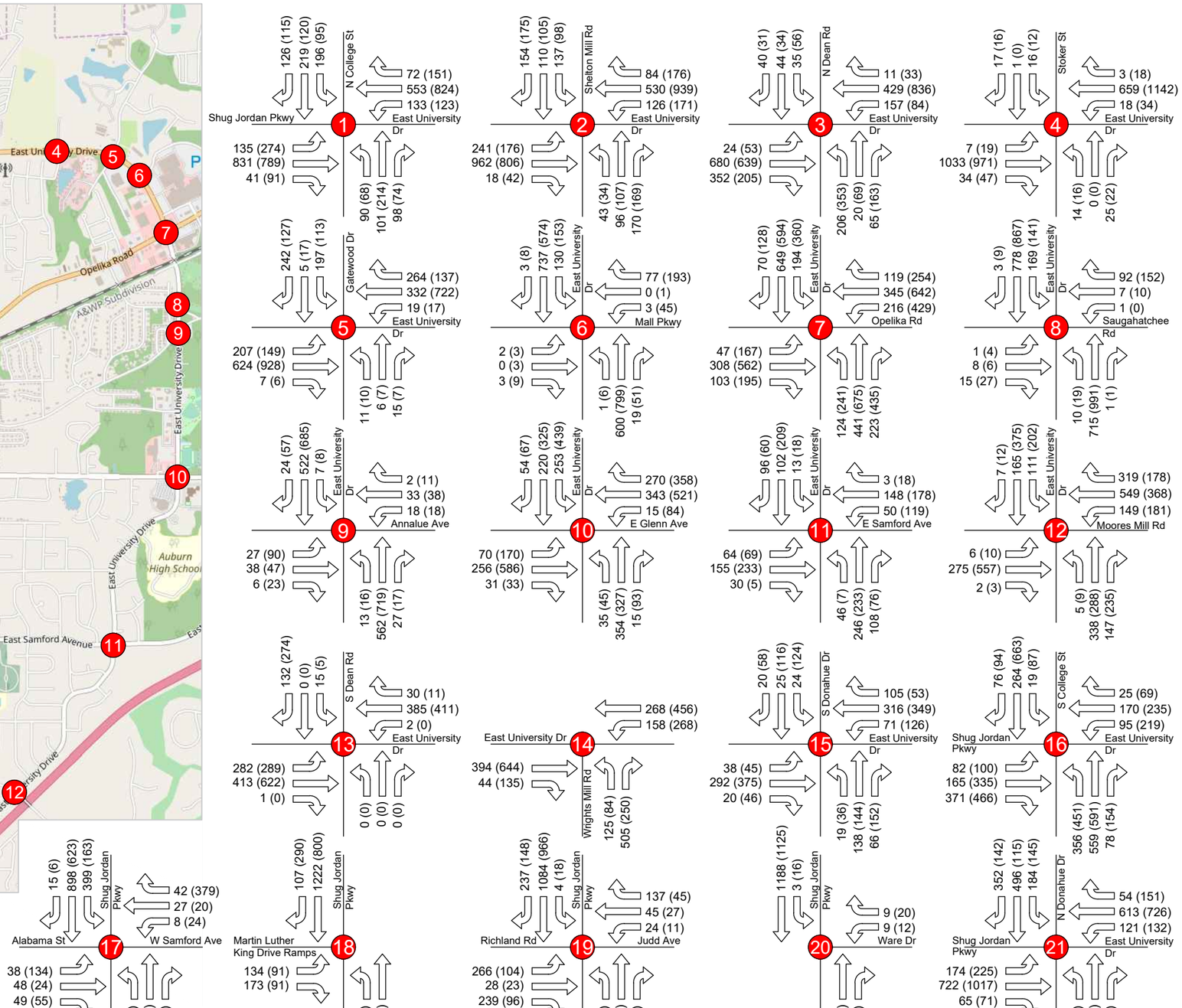


Figure 2 - Existing Traffic Volumes
East University Drive/Shug Jordan Parkway Corridor
Auburn, Alabama

SKIPPER CONSULTING INC

LEGEND

AM(PM) Peak Hour Volumes

X Study Intersection

Scale: Not to Scale
Date: FEB. 2019

EXISTING TRAFFIC CONDITIONS ANALYSES

Existing Intersection Capacity Analysis

Intersection capacity analyses were conducted for peak hour traffic conditions at the study intersections using methods outlined in the *Highway Capacity Manual, 2010*. According to the *Highway Capacity Manual*, capacity is expressed as levels of service ranging from "A" (best) through "F" (worst). In general, a level of service "C" is considered desirable while a level of service "D" is considered acceptable during peak hour operations. Results of these capacity analyses for existing conditions are summarized in **Table 2**.

Table 2 - Existing Intersection Capacity Analysis

Existing Traffic Conditions Capacity Analysis				
Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
Shug Jordan Parkway/ East University Drive at North College Street (traffic signal)	NB North College Street	Left	C	C
		Through/Right	D	D
	SB North College Street	Left	C	C
		Through	D	D
		Right	A	A
	EB Shug Jordan Parkway	Left	B	B
		Through/Right	B	B
	WB East University Drive	Left	B	B
		Through/Right	B	C
	Overall Intersection LOS		C	C
East University Drive at Shelton Mill Road (traffic signal)	NB Shelton Mill Road	Left	D	D
		Through	D	D
		Right	A	A
	SB Shelton Mill Road	Left	C	C
		Through	D	D
		Right	A	A
	EB East University Drive	Left	B	B
		Through	B	B
		Right	A	A
	WB East University Drive	Left	B	B
		Through	B	B
		Right	A	A
	Overall LOS		C	C

Table 2 (Continued) - Existing Intersection Capacity Analysis

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at North Dean Road (traffic signal)	NB North Dean Road	Left	C	C
		Through	C	C
		Right	C	A
	SB North Dean Road	Left	C	C
		Through/Right	C	C
	EB East University Drive	Left	B	B
		Through	B	C
		Right	A	A
	WB East University Drive	Left	B	B
		Through	B	C
		Right	A	A
	Overall LOS		B	C
East University Drive at Stoker Street (unsignalized)	NB Stoker Street	Left/Through/Right	E	F
	SB Stoker Street	Left/Through	F	F
		Right	B	B
	EB East University Drive	Left/Through	A	B
		Right	A	A
	WB East University Drive	Left/Through	B	B
		Through/Right	A	A
East University Drive at Gatewood Drive (traffic signal)	NB Gatewood Drive	Left	C	C
		Through/Right	C	C
	SB Gatewood Drive	Left	C	C
		Through/Right	C	C
	EB East University Drive	Left	B	B
		Through/Right	B	B
	WB East University Drive	Left	B	B
		Through	C	B
		Right	A	A
	Overall LOS		C	B
East University Drive at Mall Parkway (traffic signal)	NB East University Drive	Left	A	A
		Through/Right	B	B
	SB East University Drive	Left	A	A
		Through/Right	A	B
	EB Mall Parkway	Left	C	C
		Through/Right	C	B
	WB Mall Parkway	Left	C	C
		Through/Right	C	C
	Overall LOS		B	B

Table 2 (Continued) - Existing Intersection Capacity Analysis

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at Opelika Road (traffic signal)	NB East University Drive	Left	D	E
		Through	C	D
		Right	B	C
	SB East University Drive	Left	D	E
		Through	C	E
		Right	B	C
	EB Opelika Road	Left	D	E
		Through	D	E
		Right	B	B
	WB Opelika Road	Left	D	E
		Through	C	D
		Right	A	B
	Overall LOS		C	D
East University Drive at Saugahatchee Road (unsignalized)	NB East University Drive	Left/Through	B	A
		Through/Right	A	A
	SB East University Drive	Left/Through	B	A
		Through/Right	A	A
	EB Saugahatchee Road	Left/Through/Right	F	F
	WB Saugahatchee Road	Left/Through/Right	F	E
East University Drive at Annalue Drive (traffic signal)	NB East University Drive	Left/Through	A	A
		Through/Right	A	A
	SB East University Drive	Left/Through	A	A
		Through/Right	A	A
	EB Annalue Drive	Left/Through/Right	B	B
	WB Annalue Drive	Left/Through/Right	B	B
	Overall LOS		A	A
East University Drive at East Glenn Avenue (traffic signal)	NB East University Drive	Left	B	C
		Through	C	D
		Right	A	A
	SB East University Drive	Left	D	D
		Through	C	C
		Right	A	A
	EB East Glenn Avenue	Left	C	C
		Through/Right	C	C
	WB East Glenn Avenue	Left	C	C
		Through	C	D
		Right	A	A
	Overall LOS		C	D

Table 2 (Continued) - Existing Intersection Capacity Analysis

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at East Samford Avenue (traffic signal)	NB East University Drive	Left	A	B
		Through	B	B
		Right	A	A
	SB East University Drive	Left	A	B
		Through/Right	B	B
	EB Samford Avenue	Left	C	B
		Through/Right	B	B
	WB Samford Avenue	Left	C	C
		Through/Right	B	B
	Overall LOS		B	B
East University Drive at Moores Mill Road (traffic signal)	NB East University Drive	Left	E	E
		Through	D	D
		Right	C	D
	SB East University Drive	Left	D	E
		Through/Right	C	D
	EB Moores Mill Road	Left	C	B
		Through/Right	D	D
	WB Moores Mill Road	Left	C	D
		Through	C	B
		Right	C	C
	Overall LOS		C	D
East University Drive at South Dean Road (unsignalized)	NB South Dean Road	Left/Through/Right	A	A
	SB South Dean Road	Left	E	F
		Through/Right	B	C
	EB East University Drive	Left	A	A
		Through/Right	A	A
	WB East University Drive	Left	A	A
		Through/Right	A	A
East University Drive at Wrights Mill Road (traffic signal)	NB Wrights Mill Road	Left/Right	C	C
	EB East University Drive	Through/Right	C	E
	WB East University Drive	Left	B	C
		Through	A	A
	Overall LOS		B	D
East University Drive at South Donahue Drive (traffic signal)	NB South Donahue Drive	Left	B	B
		Through/Right	C	D
	SB South Donahue Drive	Left	B	B
		Through/Right	B	C
	EB East University Drive	Left	B	B
		Through/Right	C	D
	WB East University Drive	Left	B	B
		Through/Right	C	C
	Overall LOS		C	C

Table 2 (Continued) - Existing Intersection Capacity Analysis

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive/ Shug Jordan Parkway at South College Street (traffic signal)	NB South College Street	Left	D	F
		Through	C	C
		Right	A	A
	SB South College Street	Left	D	C
		Through	C	D
		Right	A	A
	EB Shug Jordan Parkway	Left	C	C
		Through	C	C
		Right	A	A
	WB East University Drive	Left	C	C
		Through/Right	C	C
	Overall LOS		C	D
Shug Jordan Parkway at West Samford Avenue/ Alabama Street (traffic signal)	NB Shug Jordan Parkway	Left	B	B
		Through/Right	C	C
	SB Shug Jordan Parkway	Left	C	B
		Through	C	B
		Right	A	A
	EB Alabama Street	Left	C	C
		Through	C	C
		Right	A	A
	WB West Samford Avenue	Left	C	C
		Through	D	D
		Right	A	A
	Overall LOS		C	C
Shug Jordan Parkway at Martin Luther King Drive Ramps (unsignalized)	NB Shug Jordan Parkway	Left	B	B
		Through	A	A
	SB Shug Jordan Parkway	Through	A	A
		Right	A	A
	EB Martin Luther King Drive Ramps	Left/Right	F	F
Shug Jordan Parkway at Richland Road/ Judd Avenue (traffic signal)	NB Shug Jordan Parkway	Left	C	B
		Through/Right	B	C
	SB Shug Jordan Parkway	Left	B	B
		Through	F	B
		Right	A	A
	EB Richland Road	Left	F	C
		Through/Right	C	C
	WB Judd Avenue	Left/Through/Right	C	C
	Overall LOS		D	B
Shug Jordan Parkway at Ware Drive (unsignalized)	NB Shug Jordan Parkway	Through/Right	A	A
	SB Shug Jordan Parkway	Left/Through	A	A
	WB Ware Drive	Left/Right	E	F

Table 2 (Continued) - Existing Intersection Capacity Analysis

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
Shug Jordan Parkway at North Donahue Drive (traffic signal)	NB North Donahue Drive	Left	D	D
		Through/Right	D	E
	SB North Donahue Drive	Left	D	D
		Through	F	D
		Right	E	D
	EB Shug Jordan Parkway	Left	D	C
		Through/Right	D	C
	WB Shug Jordan Parkway	Left	C	C
		Through/Right	D	C
	Overall LOS		E	D

Existing Arterial Segment Capacity Analysis

Arterial segment capacity analyses for peak hour conditions along the East University Drive/Shug Jordan Parkway Corridor were conducted for the morning and afternoon peak hour periods using methods outlined in the *Highway Capacity Manual, 2010*. Levels of service for the arterial analyses conducted for College Street are summarized in **Table 3**.

Table 3 - Existing Peak Hour Arterial Segment Capacity Analysis

East University Drive/Shug Jordan Parkway Arterial Analysis (Northbound)				
From	To	Segment Length (miles)	Arterial LOS by Segment	
			AM Peak	PM Peak
North Donahue Drive	Richland Road/Judd Avenue	1.29	E	C
Richland Road/Judd Avenue	West Samford Avenue	0.96	B	B
West Samford Avenue	South College Street	1.77	A	C
South College Street	South Donahue Drive	0.62	C	C
South Donahue Drive	Wrights Mill Road	1.13	C	D
Wrights Mill Road	Moores Mill Road	0.93	C	C
Moores Mill Road	East Samford Avenue	0.77	C	B
East Samford Avenue	East Glenn Avenue	0.82	C	C
East Glenn Avenue	Annalue Drive	0.61	A	B
Annalue Drive	Opelika Road	0.43	D	D
Opelika Road	Mall Parkway	0.27	C	C
Mall Parkway	Gatewood Drive	0.14	F	E
Gatewood Drive	North Dean Road	0.55	B	C
North Dean Road	Shelton Mill Road	0.44	C	C
Shelton Mill Road	North College Street	0.90	B	C

Table 3 (Continued) - Existing Peak Hour Arterial Segment Capacity Analysis

Table 3 Continued - East University Drive/Shug Jordan Parkway Arterial Analysis (Southbound)				
From	To	Segment Length (miles)	Arterial LOS by Segment	
			AM Peak	PM Peak
North College Street	North Donahue Street	1.07	C	B
North College Street	North Donahue Street	1.07	C	B
North College Street	Shelton Mill Road	0.90	A	B
Shelton Mill Road	North Dean Road	0.44	C	C
North Dean Road	Gatewood Drive	0.55	A	B
Gatewood Drive	Mall Parkway	0.14	C	C
Mall Parkway	Opelika Road	0.27	D	E
Opelika Road	Annalue Drive	0.43	A	B
Annalue Drive	East Glenn Avenue	0.61	B	B
East Glenn Avenue	East Samford Avenue	0.82	B	B
East Samford Avenue	Moores Mill Road	0.77	B	C
Moores Mill Road	Wrights Mill Road	0.93	B	B
Wrights Mill Road	South Donahue Drive	1.13	B	B
South Donahue Drive	South College Street	0.62	C	C
South College Street	West Samford Avenue	1.77	A	B
West Samford Avenue	Richland Road/Judd Avenue	0.69	A	B
Richland Road/Judd Avenue	North Donahue Drive	1.29	B	A

Existing Daily Roadway Segment Capacity Analysis

Roadway segment capacity analyses for daily traffic conditions along the East University Drive and Shug Jordan Parkway Corridor were performed using the daily capacity and level of service chart obtained from the Alabama Department of Transportation. This chart is included in **Table 4**. Levels of service for the daily roadway segment capacity analyses conducted for Magnolia Avenue are summarized in **Table 5**.

Table 4 - Daily Capacity and Level of Service Chart

Functional Classification	Number of Lanes	Maximum Daily Flow Rate Related to Level of Service					
		A	B	C	D	E	F
Freeway	4	23,800	34,000	42,160	51,000	68,000	>68,000
	6	35,700	51,000	63,240	76,500	102,000	>102,000
	8	47,600	68,000	84,320	102,000	136,000	>136,000
	10	59,500	85,000	105,400	127,500	170,000	>170,000
Expressway	4	17,500	25,000	31,000	37,500	50,000	>50,000
	6	26,250	37,500	46,500	56,250	75,000	>75,000
	8	35,000	50,000	62,000	75,000	100,000	>100,000
Arterial (Divided)	2	7,700	11,000	13,640	16,500	22,000	>22,000
	4	11,865	16,950	21,018	25,425	33,900	>33,900
	6	17,500	25,000	31,000	37,500	50,000	>50,000
	8	25,760	36,800	45,632	55,200	73,600	>73,600
Arterial (Undivided)	2	6,230	8,900	11,036	13,350	17,800	>17,800
	4	10,850	15,500	19,220	23,250	31,000	>31,000
	6	16,030	22,900	28,396	34,350	45,800	>45,800
	8	22,085	31,550	39,122	47,325	63,100	>63,100
Collector (Divided)	2	7,280	10,400	12,896	15,600	20,800	>20,800
	4	9,975	14,250	17,670	21,375	28,500	>28,500
	6	14,700	21,000	26,040	31,500	42,000	>42,000
Collector (Undivided)	2	5,810	8,300	10,292	12,450	16,600	>16,600
	4	9,170	13,100	16,244	19,650	26,200	>26,200
	6	13,545	19,350	23,994	29,025	38,700	>38,700

Table 5 - Existing Daily Roadway Segment Levels of Service

Existing Daily Roadway Segment Levels of Service – East University Drive/Shug Jordan Parkway					
From	To	Segment Length (miles)	Cross Section	Daily Volume	Roadway LOS by Segment
East University Drive					
North Dean Road	Gatewood Drive	0.55	4 Lane Undivided	22,610	D
Gatewood Drive	Opelika Road	0.41	4 Lane Divided	20,187	C
Wrights Mill Road	Moores Mill Road	0.70	2 Lane Divided	9,082	B
Shug Jordan Parkway					
North College Street	North Donahue Drive	1.06	4 Lane Undivided	22,839	C
North Donahue Drive	Richland Road	1.28	4 Lane Undivided	25,195	E
Wire Road	South College Street	1.14	4 Lane Undivided	22,045	D

Intersection Crash Evaluation

Skipper Consulting, Inc. performed a citywide crash study for intersections and roadway segments maintained by the City of Auburn. The results of this crash study have been documented in a separate bound report. The citywide crash study included the study intersections along East University Drive/Shug Jordan Parkway. Screening procedures and crash analyses were conducted to determine any locations that are worthy of safety-based roadway improvements. The crash analysis indicated the following:

- Low Priority Intersections - this indicates the crash experience should be considered when completing other roadway improvements at this location. However, the crash experience does not warrant an immediate safety improvement project.
    - East University Drive at Wrights Mill Road
- Moderate Priority Intersections - this indicates the crash experience should be monitored in the near future and could be worthy of a safety-based roadway improvement if crash experience trends upward. This does not warrant a safety-based improvement at this time, but a safety-based improvement should be incorporated in any roadway improvement at this location.
    - Shug Jordan Parkway at Samford Avenue (W)
    - Shug Jordan Parkway at MLK Ramps
    - East University Drive at Stoker Street
    - East University Drive at Dean Road (N)
    - East University Drive at East Glenn Avenue
- High Priority Intersections – this indicates that improvements are recommended for each location identified based upon the detailed crash evaluation.
    - East University Drive/Shug Jordan Parkway at South College Street
    - East University Drive/Shug Jordan Parkway at North College Street
    - East University Drive at Opelika Road
    - Shug Jordan Parkway at North Donahue Drive
    - Shug Jordan Parkway at Ware Drive

The Citywide Crash Study made recommendations for safety-based improvements to study intersections. The following is a listing of the high priority study intersections and the recommended improvements:

<u>East University Drive/Shug Jordan Parkway at South College Street</u>

- Implement Protected/Permissive Flashing Yellow Arrow (FYA) left turn phasing.
- Adjust the traffic signal timings to update clearance times to current ITE guidelines and adjust green time to comply with capacity needs as identified in the corridor traffic operations study.

<u>East University Drive/Shug Jordan Parkway at North College Street</u>

- Adjust the traffic signal timings to update clearance times to current ITE guidelines and adjust green time to comply with capacity needs as identified in the corridor traffic operations study.

<u>East University Drive at Opelika Road</u>

- Adjust the traffic signal timings to update clearance times to current ITE guidelines and adjust green time to comply with capacity needs as identified in the corridor traffic operations study.

<u>Shug Jordan Parkway at North Donahue Drive</u>

- Adjust the traffic signal timings to update clearance times to current ITE guidelines and adjust green time to comply with capacity needs as identified in the corridor traffic operations study.
- Construct right turn lanes

<u>Shug Jordan Parkway at Ware Drive</u>

- Construct a southbound left turn lane along Shug Jordan Parkway to address rear-end crashes associated with vehicles turning left onto Ware Drive.

Existing Left-Turn Lane Warrant Evaluations

An evaluation was conducted to determine the need for left turn lanes at study intersections. To complete this analysis, existing peak hour traffic volumes were compared with the left-turn lane warrant criteria outlined in the National Cooperative Highway Research Program (NCHRP) Report 457 *Evaluating Intersection Improvements: An Engineering Study Guide*, published by the Transportation Research Board. Evaluations were conducted for all study intersection approaches where left turn lanes do not currently exist. The results of the left-turn lane warrant evaluations indicate the following left-turn lanes are warranted for existing conditions:

Table 6 – Existing Left Turn Lane Warrant Evaluation

Left Turn Lane Warrant Review – Existing Traffic Conditions		
Intersection	**Approach**	**Turn Lane Warrant Status**
East University Drive at Stoker Street	Eastbound	Left Turn Lane Warranted
	Westbound	Left Turn Lane Warranted
East University Drive at Saugahatchee Road	Northbound	Left Turn Lane Warranted
	Southbound	Left Turn Lane Warranted
East University Drive at Annalue Avenue	Northbound	Left Turn Lane Warranted
	Southbound	Left Turn Lane Not Warranted
East University Drive at Ware Drive	Northbound	Left Turn Lane Warranted

Existing Right-Turn Lane Warrant Evaluations

An evaluation was conducted to determine the need for right turn lanes at study intersections. To complete this analysis, existing peak hour traffic volumes were compared with the right-turn lane warrant criteria outlined in the National Cooperative Highway Research Program (NCHRP) Report 457 *Evaluating Intersection Improvements: An Engineering Study Guide*, published by the Transportation Research Board. Evaluations were conducted for all study intersection approaches where right turn lanes do not currently exist. The results of the right-turn lane warrant evaluations indicate the following right-turn lanes are warranted for existing conditions:

Table 7 – Existing Right Turn Lane Warrant Evaluation

Right Turn Lane Warrant Review – Existing Traffic Conditions		
Intersection	**Approach**	**Turn Lane Warrant Status**
East University Drive/ Shug Jordan Parkway at North College Street	Eastbound	Right Turn Lane Warranted
	Westbound	Right Turn Lane Warranted
	Northbound	Right Turn Lane Warranted
East University Drive at Stoker Street	Westbound	Right Turn Lane Not Warranted
East University Drive at Gatewood Drive	Eastbound	Right Turn Lane Not Warranted
East University Drive at Mall Parkway	Northbound	Right Turn Lane Warranted
	Southbound	Right Turn Lane Not Warranted
East University Drive at Saugahatchee Road	Northbound	Right Turn Lane Not Warranted
	Southbound	Right Turn Lane Not Warranted
East University Drive at Annalue Avenue	Northbound	Right Turn Lane Not Warranted
	Southbound	Right Turn Lane Warranted
East University Drive at East Glenn Avenue	Eastbound	Right Turn Lane Not Warranted
East University Drive at East Samford Avenue	Southbound	Right Turn Lane Not Warranted
East University Drive at Moores Mill Road	Southbound	Right Turn Lane Not Warranted
East University Drive at South Dean Road	Eastbound	Right Turn Lane Not Warranted
	Westbound	Right Turn Lane Not Warranted
East University Drive at Wrights Mill Road	Eastbound	Right Turn Lane Warranted
East University Drive at South Donahue Drive	Eastbound	Right Turn Lane Not Warranted
	Westbound	Right Turn Lane Not Warranted
East University Drive/ Shug Jordan Parkway at South College Street	Westbound	Right Turn Lane Not Warranted
Shug Jordan Parkway at West Samford Avenue	Northbound	Right Turn Lane Warranted
Shug Jordan Parkway at Judd Avenue	Northbound	Right Turn Lane Warranted **Not Recommended**
East University Drive at North Donahue Drive	Eastbound	Right Turn Lane Not Warranted
	Westbound	Right Turn Lane Not Warranted
	Northbound	Right Turn Lane Not Warranted
	Southbound	Right Turn Lane Not Warranted

Peak Period Observations

Observations of traffic operations were conducted within the East University Drive/Shug Jordan Parkway Corridor during the morning and afternoon peak periods. The following items were noted in these observations:

- During the morning peak period (approximately 6:50AM) The northbound left turn movement at the intersection of Shug Jordan and Sanford Avenue experiences an extended queue.
- During the morning peak period the southbound queue at Wire Road was observed to not clear.
- During the morning peak period (approximately 7:54AM) southbound Shug Jordan experiences an extended queue past the Starr Insurance driveway. Main street queues are not clearing.

RECOMMENDED IMPROVEMENT PROJECTS – EXISTING TRAFFIC CONDITIONS

The following is a listing of recommended projects to address the noted deficiencies for existing traffic conditions. Specific details of the recommended projects are included (when necessary) as Figures 3-7.

East University Drive at North College Street

A project to address the listed deficiencies at this location is included in the College Street Corridor Report completed by Skipper Consulting Inc. The recommended improvements are as follows:

- Construct an eastbound right turn lane along Shug Jordan Parkway;
- Construct a westbound right turn lane along East University Drive; and,
- Install flashing yellow arrow protective/permissive left turn phasing in the traffic signal for all approaches.

East University Drive at Stoker Street

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Construct eastbound and westbound left turn lanes; and,
- Modify the intersection to prevent left turns from the side streets.

A diagram listing the recommended improvement is included as **Figure 3**.

East University Drive at Mall Parkway

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Construct a northbound right turn lane; and,
- Implement a coordinated traffic signal system to include this intersection as well as the intersection of East University Drive and Gatewood Drive.

A diagram listing the recommended improvement is included as **Figure 4**.

East University Drive at Opelika Road

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Re-stripe the northbound approach to provide dual left turn lanes;
- Modify the driveway at the Flints Crossing Shopping Plaza; and,
- Modify the driveway at the CVS to prohibit left turns outbound.

A diagram listing the recommended improvement is included as **Figure 5**.

East University Drive at Saugahatchee Road

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Modify the eastbound approach to allow right turn outbound access only; and,
- Close the east leg of the intersection and convert to a pedestrian/bicycle facility;
- Construct a median along East University Drive to allow left turns inbound to the side street and prevent left turns outbound from the side street.

A diagram listing the recommended improvement is included as **Figure 6**.

East University Drive at Annalue Avenue

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Construct a northbound left turn lane along East University Drive; and,
- Construct a southbound right turn lane along East University Drive.
- A diagram listing the recommended improvement is included as **Figure 7**.

East University Drive at North Dean Road

A project to address the listed deficiencies at this location is included in the Dean Road Corridor Report completed by Skipper Consulting Inc. The recommended improvements are as follows:

- Reconfigure the northbound approach to provide a left turn lane, a shared left/thru lane, and a right turn lane; and,
- Modify the traffic signal operation from standard operation to split phase operation.

East University Drive at Wrights Mill Road

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Modify existing traffic signal timings to address capacity related issues.

East University Drive at South College Street

A project to address the listed deficiencies at this location is included in the College Street Corridor Report completed by Skipper Consulting Inc. The recommended improvements are as follows:

- Install flashing yellow arrow protective/permissive left turn phasing in the traffic signal for eastbound and westbound approaches;
- Review and adjust traffic signal clearance timings; and,
- Include this intersection in the coordinated traffic signal system along College Street.

Shug Jordan Parkway at West Samford Avenue

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Construct a northbound right turn lane along Shug Jordan Parkway.

A diagram listing the recommended improvement is included as **Figure 8**.

Shug Jordan Parkway at Martin Luther King Drive Ramp

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Re-stripe/reconfigure Shug Jordan Parkway to an "Alabama T" intersection configuration; and,
- Construct a traffic signal.

A diagram listing the recommended improvement is included as **Figure 9**.

Shug Jordan Parkway at Richland Road/Judd Avenue

The City of Auburn has a project underway to address the deficiencies as noted in this report. The following items are within that scope of work:

- Construct dual left turn lanes eastbound & westbound;
- Construct an eastbound right turn lane; and,
- Install flashing yellow arrow protected/permissive left turn phasing along the Shug Jordan Parkway approaches.

Shug Jordan Parkway at North Donahue Drive

A project to address the listed deficiencies at this location is included in the Donahue Drive Corridor Report completed by Skipper Consulting Inc. The recommended improvements are as follows:

- Construct right turn lanes along the eastbound and westbound approaches;
- Widen the southbound approach to provide a left turn lane, two thru lanes, and a right turn lane; and,
- Widen the northbound approach to provide an additional receiving lane from the southbound approach.

Existing Intersection Capacity Analysis with Improvements

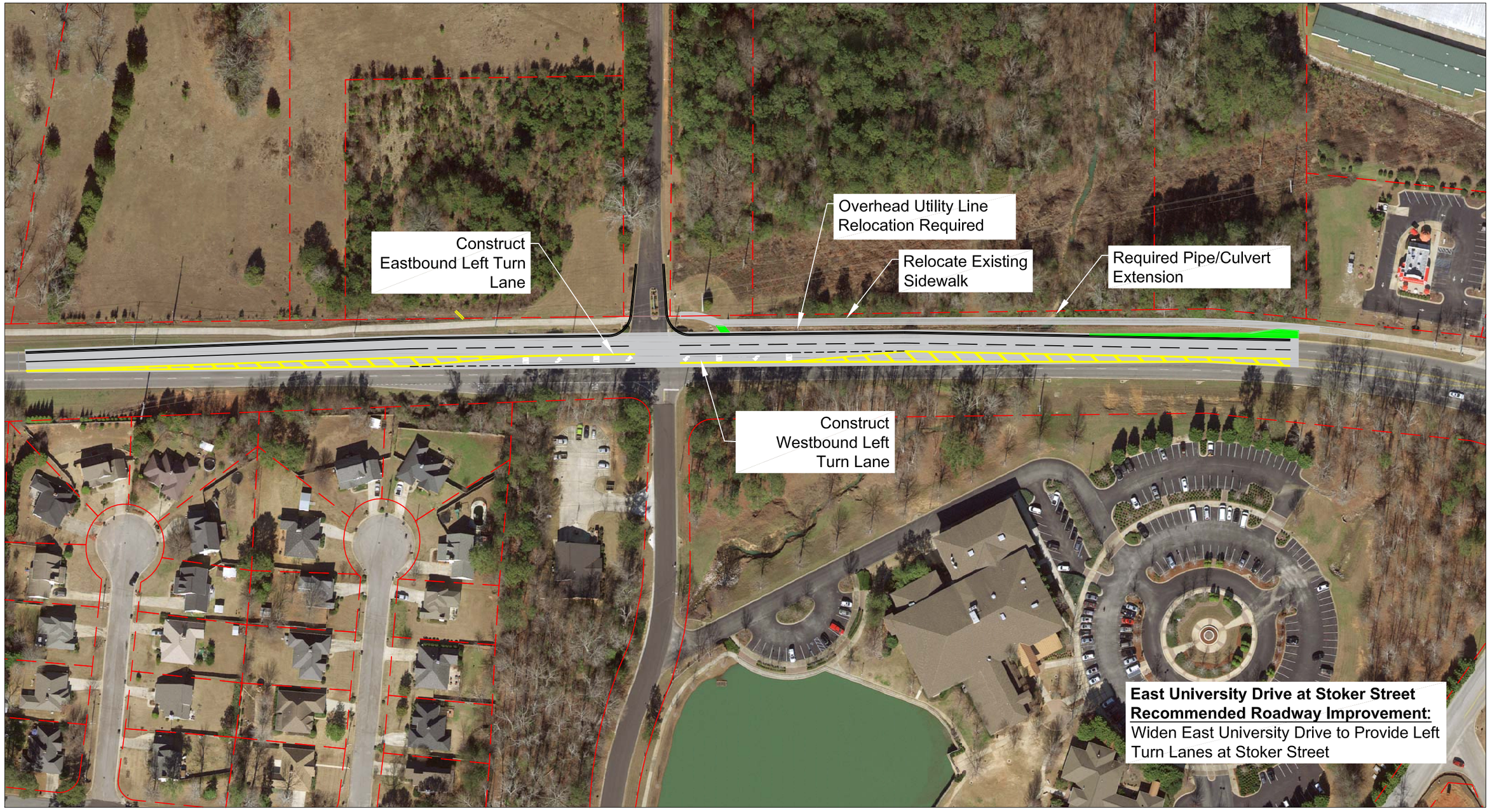
To test the effectiveness of the recommended roadway improvements, a capacity analysis was conducted for the recommended roadway improvements. It should be noted that:

- only intersection capacity analyses were conducted, since there were no roadway cross section recommendations made for East University Drive or Shug Jordan Parkway.
- only the intersections with recommended roadway improvements were analyzed.
- This analysis scenario assumes the recommended roadway improvements to be in place with existing traffic volumes.

As outlined previously, intersection capacity analyses were conducted using methods outlined in the *Highway Capacity Manual, 2010*. **Table 8** lists the results of the capacity analyses.

Table 8 - Intersection Capacity Analysis - Existing Traffic Conditions with Roadway Improvements

Intersection Capacity Analysis – Existing Traffic Conditions with Roadway Improvements				
Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
Shug Jordan Parkway/ East University Drive at North College Street (traffic signal)	NB North College Street	Left	C	C
		Through/Right	D	D
	SB North College Street	Left	C	C
		Through	D	D
		Right	A	A
	EB Shug Jordan Parkway	Left	B	B
		Through	B	B
		Right	A	A
	WB East University Drive	Left	B	B
		Through	B	B
		Right	A	A
	Overall Intersection LOS		**C**	**C**

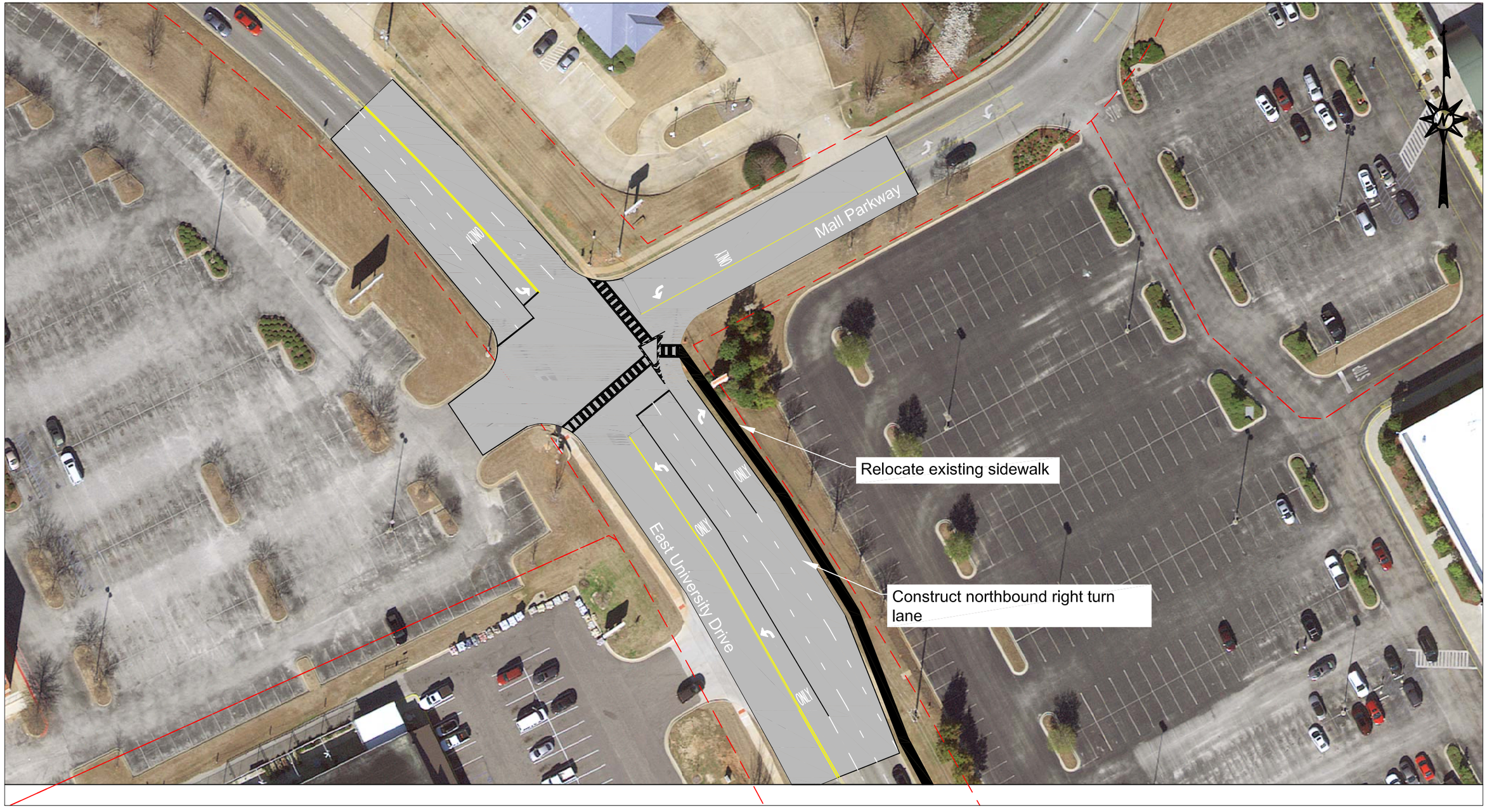


SKIPPER
CONSULTING INC

Figure 3 - Recommended Roadway Improvements
East University Drive at Stoker Street - Existing Conditions
Auburn, Alabama

LEGEND

Scale: Not to Scale
Date: January 2019



SKIPPER CONSULTING INC

Figure 4 - Recommended Roadway Improvements
East University Drive at Mall Parkway - Existing Conditions
Auburn, Alabama

LEGEND

Scale: Not to Scale
Date: April 2019

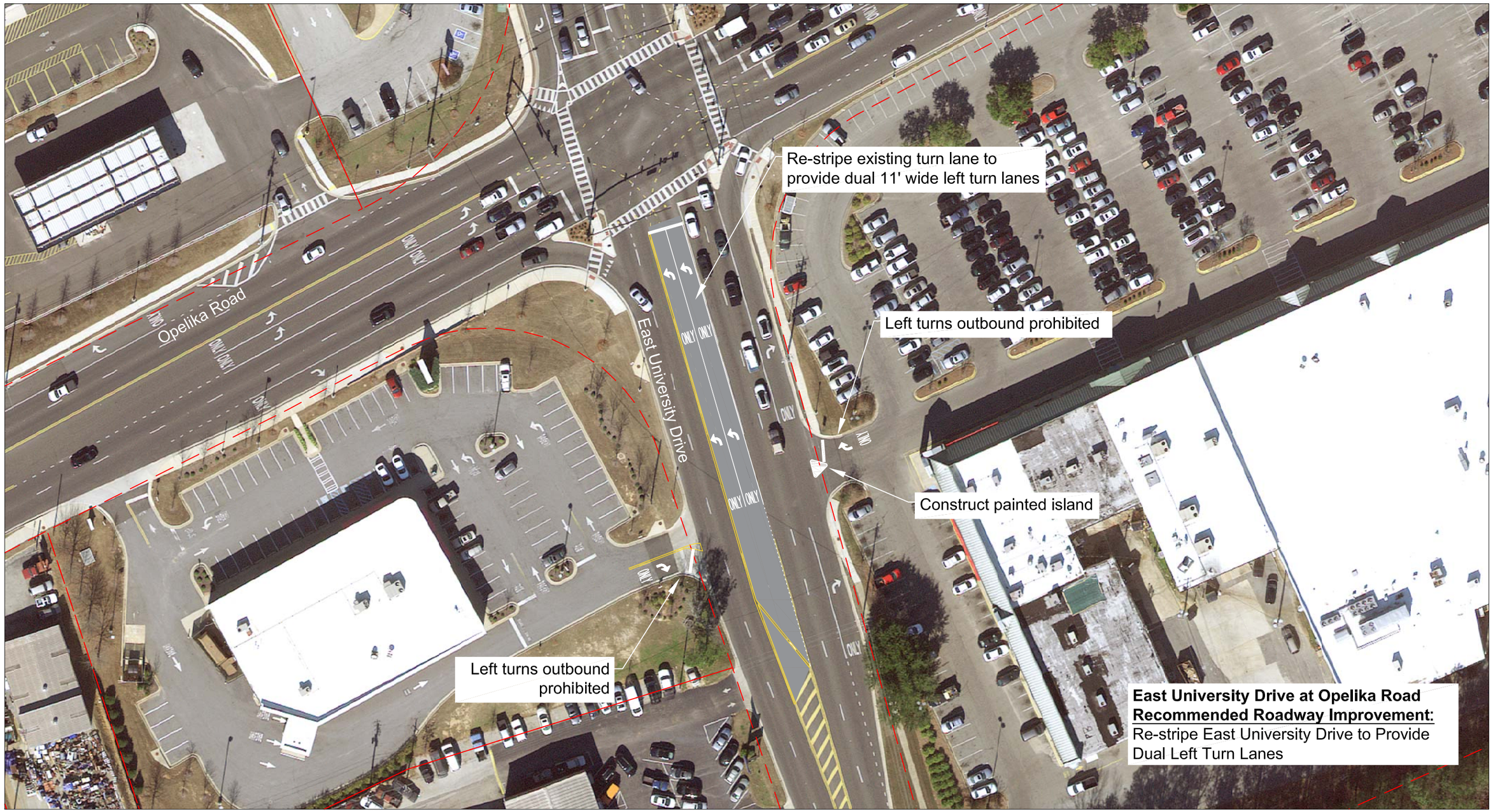


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Figure 5 - Recommended Roadway Improvements -Existing Conditions
East University Drive at Opelika Road
Auburn, Alabama

LEGEND

Scale: Not to Scale
Date: January 2019

SKIPPER CONSULTING INC

Figure 6 - Recommended Roadway Improvements
East University Drive at Saugahatchee Road - Existing Conditions
Auburn, Alabama

LEGEND

Scale: Not to Scale
Date: January 2019

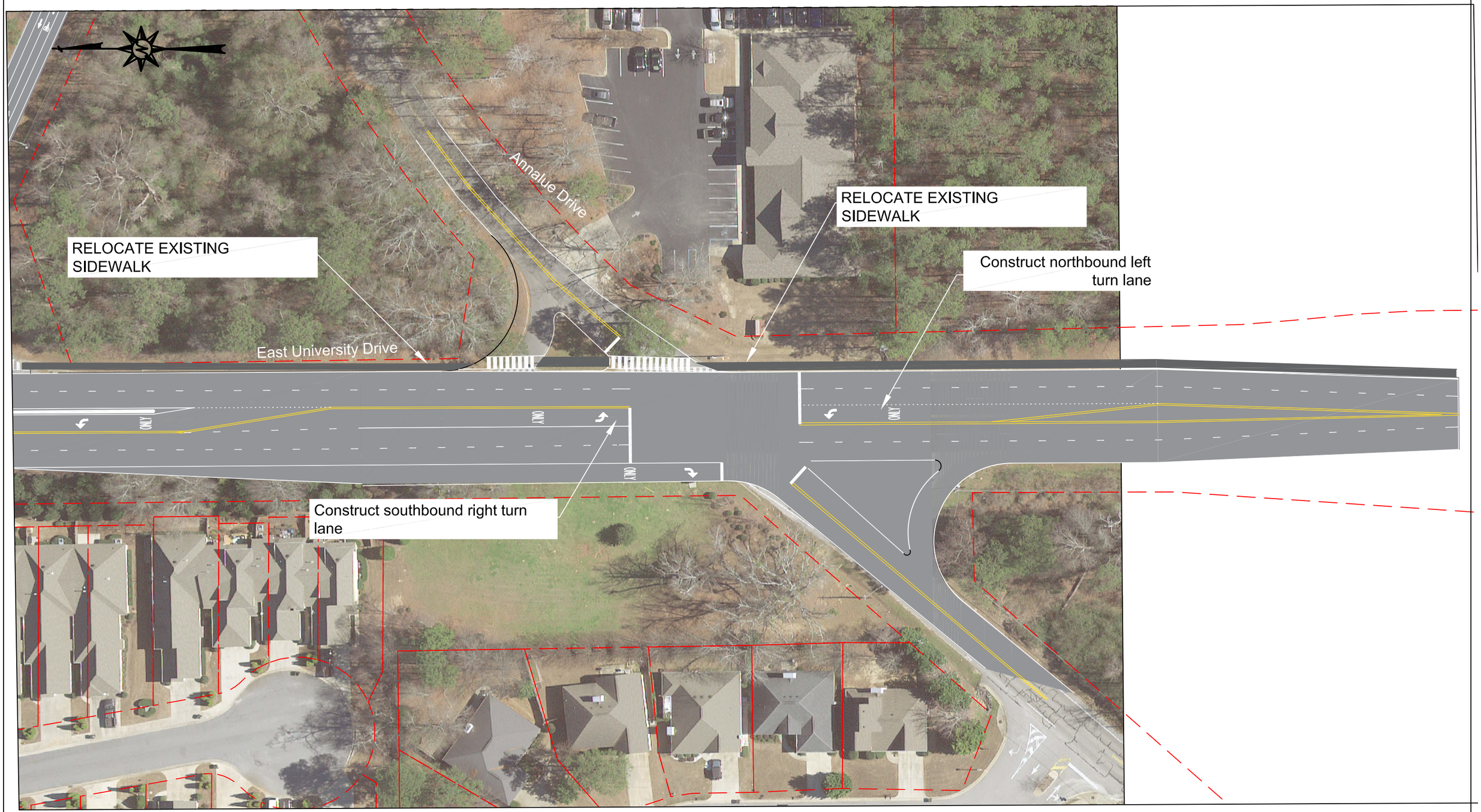

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Figure 7 - Recommended Roadway Improvements
East University Drive at Annalue Drive - Existing Conditions
Auburn, Alabama

LEGEND

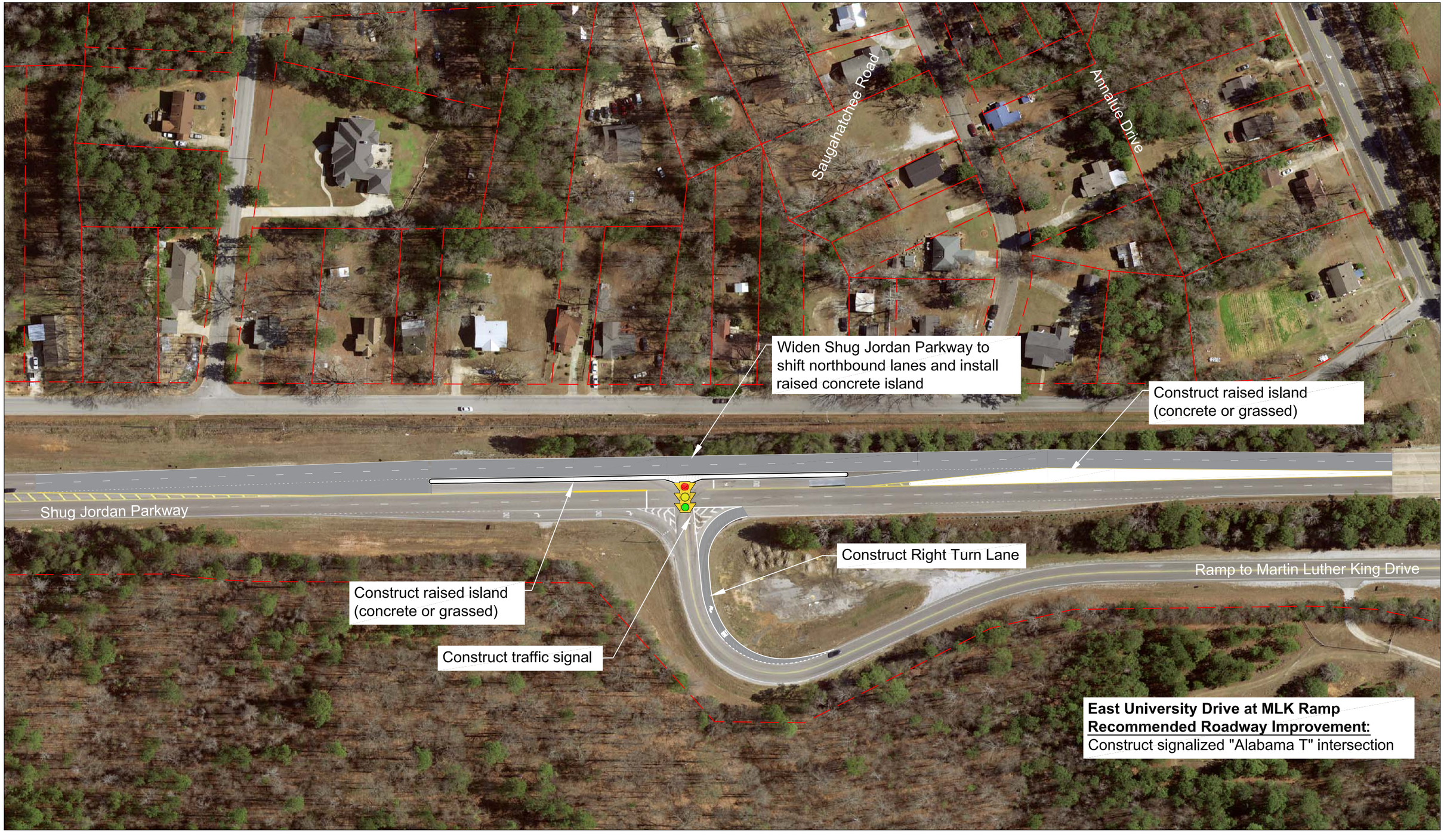
Scale: Not to Scale
Date: April 2019

SKIPPER CONSULTING INC

Figure 8 - Recommended Roadway Improvements -Existing Conditions
Shug Jordan Parkway at West Samford Avenue
Auburn, Alabama

LEGEND

Scale: Not to Scale
Date: April 2019



SKIPPER CONSULTING INC

Figure 9 - Recommended Roadway Improvements -Existing Conditions
Shug Jordan Parkway at Martin Luther King Drive Ramp
Auburn, Alabama

LEGEND

Scale: Not to Scale
Date: January 2019

Table 8 (continued) Intersection Capacity Analysis - Existing Traffic Conditions with Roadway Improvements

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at Stoker Street (unsignalized)	NB Stoker Street	Right	B	B
	SB Stoker Street	Right	B	B
	EB East University Drive	Left	A	B
		Through	A	A
		Right	A	A
	WB East University Drive	Left	B	B
		Through/Right	A	A
East University Drive at Opelika Road (traffic signal)	NB East University Drive	Left	D	E
		Through	C	D
		Right	A	A
	SB East University Drive	Left	D	E
		Through	D	C
		Right	A	A
	EB Opelika Road	Left	D	E
		Through	C	D
		Right	A	A
	WB Opelika Road	Left	D	E
		Through	B	C
		Right	A	A
	Overall LOS		**D**	**D**
East University Drive at Saugahatchee Road (unsignalized)	NB East University Drive	Left	B	B
		Through/Right	A	A
	SB East University Drive	Left	B	B
		Through/Right	A	A
	EB Saugahatchee Road	Right	B	B
	WB Saugahatchee Road	Right	B	C
East University Drive at Annalue Drive (traffic signal)	NB East University Drive	Left	A	A
		Through/Right	A	A
	SB East University Drive	Left/Through	A	A
		Through/Right	A	A
	EB Annalue Drive	Left/Through/Right	B	B
	WB Annalue Drive	Left/Through/Right	B	B
	Overall LOS		**A**	**A**

Table 8 (continued) Intersection Capacity Analysis - Existing Traffic Conditions with Roadway Improvements

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at Moores Mill Road (traffic signal)	NB East University Dr	Left	E	E
		Through	D	D
		Right	C	D
	SB East University Dr	Left	C	D
		Through/Right	C	D
	EB Moores Mill Rd	Left	C	C
		Through/Right	D	D
	WB Moores Mill Rd	Left	C	D
		Through	C	C
		Right	D	C
	Overall LOS		**C**	**D**
East University Drive at Wrights Mill Road (traffic signal)	NB Wrights Mill Road	Left/Right	C	C
	EB East University Drive	Through	B	B
		Right	B	A
	WB East University Drive	Left	A	B
		Through	A	A
	Overall LOS		**B**	**B**
East University Drive/ Shug Jordan Parkway at South College Drive (traffic signal)	NB South College Street	Left	D	D
		Through	A	A
		Right	A	A
	SB South College Street	Left	E	E
		Through	C	D
		Right	A	A
	EB Shug Jordan Parkway	Left	D	D
		Through	D	E
		Right	A	A
	WB East University Drive	Left	D	E
		Through/Right	D	D
	Overall LOS		**C**	**D**
Shug Jordan Parkway at West Samford Avenue/ Alabama Street (traffic signal)	NB Shug Jordan Parkway	Left	B	B
		Through	B	C
		Right	A	A
	SB Shug Jordan Parkway	Left	B	B
		Through	B	B
		Right	A	A
	EB Alabama Street	Left	C	C
		Through	C	C
		Right	A	A
	WB West Samford Avenue	Left	C	C
		Through	C	D
		Right	A	A
	Overall LOS		**B**	**B**

Table 8 (continued) Intersection Capacity Analysis - Existing Traffic Conditions with Roadway Improvements

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
Shug Jordan Parkway at Martin Luther King Drive Ramps (unsignalized)	NB Shug Jordan Parkway	Left	C	C
		Through	A	A
	SB Shug Jordan Parkway	Through	B	B
		Right	A	A
	EB Martin Luther King Drive Ramps	Left	C	C
		Right	C	C
	Overall LOS		**B**	**A**
Shug Jordan Parkway at Richland Road/ Judd Avenue (traffic signal)	NB Shug Jordan Parkway	Left	C	B
		Through/Right	B	B
	SB Shug Jordan Parkway	Left	B	B
		Through	D	B
		Right	A	A
	EB Richland Road	Left	D	D
		Through	C	D
		Right	A	A
	WB Judd Avenue	Left	D	D
		Through/Right	E	E
	Overall LOS		**D**	**B**
Shug Jordan Parkway at Ware Drive (unsignalized)	NB Shug Jordan Parkway	Through	A	A
		Right	A	A
	SB Shug Jordan Parkway	Left	B	B
		Through	A	A
	WB Ware Drive	Left/Right	E	E
Shug Jordan Parkway at North Donahue Drive (traffic signal)	NB North Donahue Drive	Left	D	D
		Through	D	D
		Right	A	A
	SB North Donahue Drive	Left	C	D
		Through	D	D
		Right	A	A
	EB Shug Jordan Parkway	Left	C	B
		Through	C	C
		Right	A	A
	WB Shug Jordan Parkway	Left	C	B
		Through	C	C
		Right	A	A
	Overall LOS		**C**	**C**

As illustrated in **Table 8**, some intersections would experience poor levels of service with the recommended roadway improvements in place. The following is a listing of those locations with further commentary.

East University Drive at Opelika Road – The improvements listed at this intersection would provide the extent of reasonable roadway improvements that could be done to address exiting traffic deficiencies. To achieve further improvements in level of service, extensive roadway improvements would be required. This topic is addressed later in this report document.

Shug Jordan Parkway at Richland Road/Judd Avenue – The Judd Avenue approach of this intersection experiences the lower traffic volumes at the intersection. The poor levels of service indicate that traffic approaching from this direction will experience delay when waiting for a green. To improve the level of service along this approach would mean taking signal time away from the other intersection approaches with higher traffic volumes. This would reduce the delay for some while increasing delay for many.

Shug Jordan Parkway at Ware Drive - The poor levels of service indicate that traffic approaching from this direction will experience delay when waiting for a gap to enter Shug Jordan Parkway. Adjacent traffic signals create adequate gaps along Shug Jordan Parkway for traffic to enter at un-signalized intersections. Therefore, this level of delay would be expected for an un-signalized intersection.

FUTURE TRAFFIC CONDITIONS

Projected Traffic Growth

Growth rates were calculated for the study roadways based on historical traffic volumes and growth trends. The historical growth rate calculated for the intersections along the East University Drive/Shug Jordan Parkway Corridor as follows:

- 3.4% growth per year for North College Street intersection
- 1.4% growth per year for Shelton Mill Road intersection
- 1.4% growth per year for North Dean Road intersection
- 1.4% growth per year for Stoker Street intersection
- 2.6% growth per year for Gatewood Drive intersection
- 2.6% growth per year for Mall Parkway intersection
- 2.6% growth per year for Opelika Road intersection
- 2.6% growth per year for Saugahatchee Road intersection
- 2.6% growth per year for Annalue Drive intersection
- 2.6% growth per year for East Glenn Avenue intersection
- 2.6% growth per year for East Samford Avenue intersection
- 0.9% growth per year for Moores Mill Road intersection
- 0.9% growth per year for South Dean Road intersection
- 0.9% growth per year for Wrights Mill Road intersection
- 0.9% growth per year for South Donahue Drive intersection
- 0.9% growth per year for South College Street intersection
- 2.7% growth per year for West Samford Avenue intersection
- 2.7% growth per year for Martin Luther King Drive Ramp intersection
- 3.4% growth per year for Judd Avenue intersection
- 3.4% growth per year for Ware Drive intersection
- 3.4% growth per year for North Donahue Drive intersection

The annual growth rate was applied for a ten (10) year period, resulting in increased future traffic volumes for the year of 2028. Future traffic volumes are included as **Figure 10**.

FUTURE TRAFFIC CONDITIONS ANALYSES

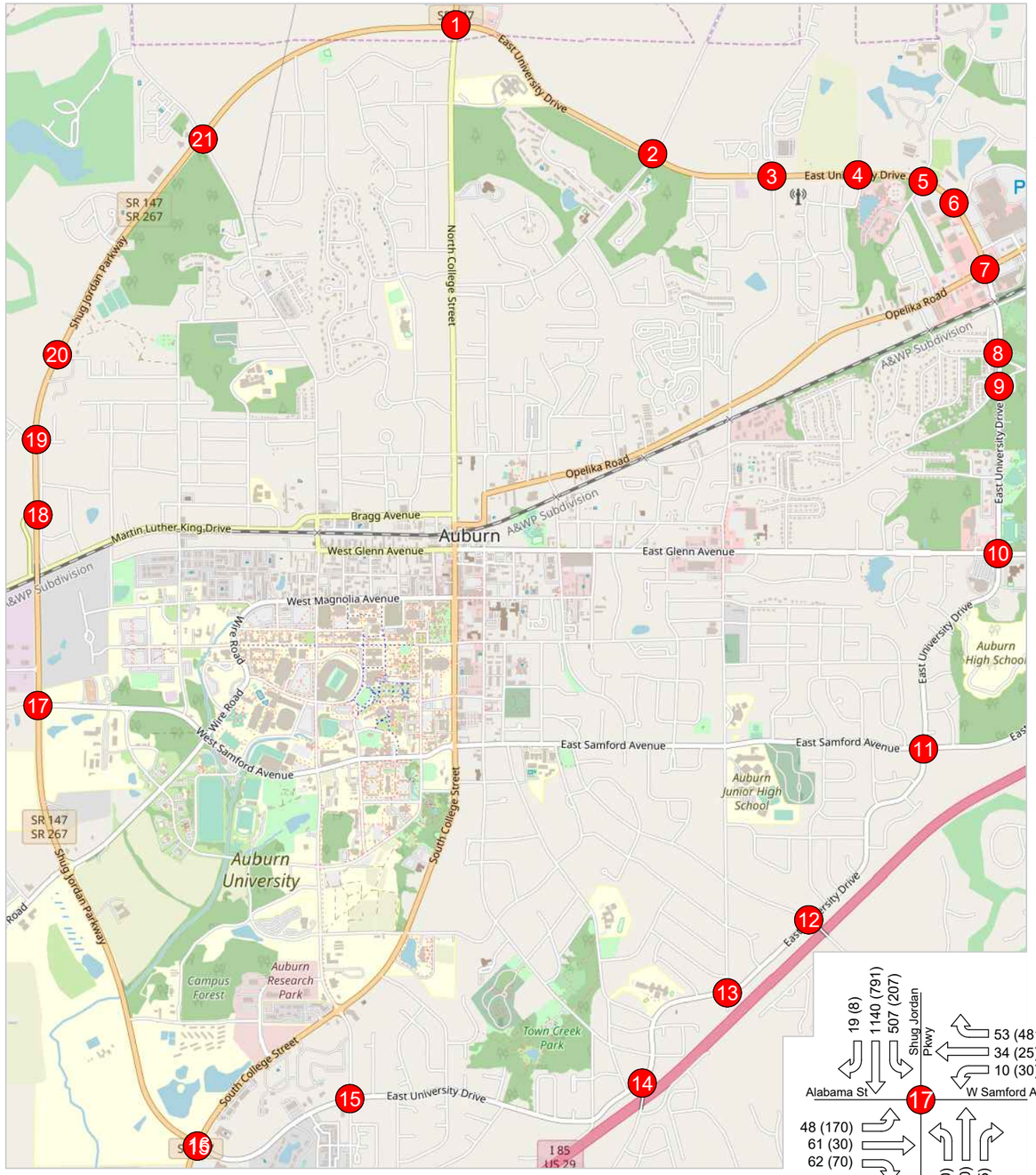
Analyses were conducted utilizing projected peak hour traffic volumes for the study area roadways and intersection to assess traffic operations within the corridor. Capacity deficiencies were identified for projected conditions to aid in development of potential roadway and traffic control improvements within the corridor to address capacity and traffic operations.

Intersection Capacity Analysis with Projected Traffic Growth

Analyses conducted for this scenario assumes projected traffic volumes for ten (10) years would be in place and the improvements recommended for existing conditions (previously introduced and illustrated) would also be in place. Capacity analyses for projected ten (10) year peak hour conditions were conducted for the study intersections along the East University Drive/Shug Jordan Parkway Corridor using methods outlined in the *Highway Capacity Manual, 2010*. Results of these capacity analyses are summarized in **Table 9**.

Table 9 - Intersection Capacity Analysis - Future Year Traffic Conditions

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
Shug Jordan Parkway/ East University Drive at North College Street (traffic signal)	NB North College Street	Left	D	D
		Through/Right	D	D
	SB North College Street	Left	D	D
		Through	D	D
		Right	A	A
	EB Shug Jordan Parkway	Left	B	D
		Through	C	C
		Right	A	A
	WB East University Drive	Left	C	C
		Through	C	C
		Right	A	A
	Overall Intersection LOS		**C**	**C**
East University Drive at Shelton Mill Road (traffic signal)	NB Shelton Mill Road	Left	D	D
		Through	D	D
		Right	A	A
	SB Shelton Mill Road	Left	D	D
		Through	D	D
		Right	A	A
	EB East University Drive	Left	B	B
		Through	C	B
		Right	A	A
	WB East University Drive	Left	B	B
		Through	B	B
		Right	A	A
	Overall LOS		**C**	**C**



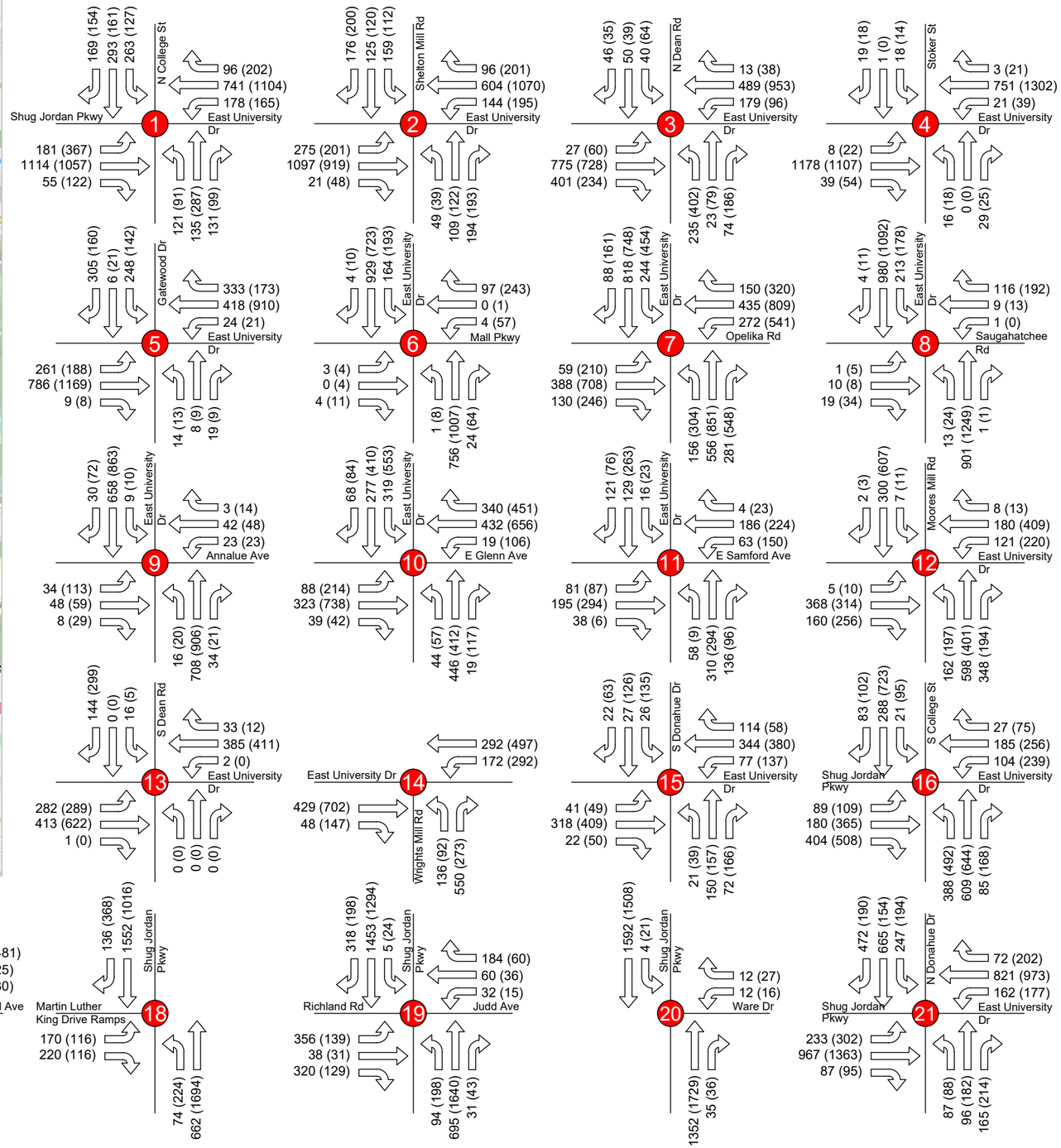


Figure 10 - Projected Traffic Volumes
East University Drive/Shug Jordan Parkway Corridor
Auburn, Alabama

SKIPPER CONSULTING INC

LEGEND

AM(PM) Peak Hour Volumes

X Study Intersection

Scale: Not to Scale
Date: FEB. 2019

Table 9 (continued) - Intersection Capacity Analysis - Future Year Traffic Conditions

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at North Dean Road (traffic signal)	NB North Dean Road	Left	B	D
		Through	B	B
		Right	B	C
	SB North Dean Road	Left	B	B
		Through/Right	C	C
	EB East University Drive	Left	B	B
		Through	C	C
		Right	A	A
	WB East University Drive	Left	B	B
		Through	B	D
		Right	A	A
	Overall LOS		**C**	**C**
East University Drive at Stoker Street (unsignalized)	NB Stoker Street	Right	B	B
	SB Stoker Street	Right	B	C
	EB East University Drive	Left	A	B
		Through	A	A
		Right	A	A
	WB East University Drive	Left	B	B
		Through/Right	A	A
East University Drive at Gatewood Drive (traffic signal)	NB Gatewood Drive	Left	D	D
		Through/Right	E	D
	SB Gatewood Drive	Left	D	D
		Through/Right	F	E
	EB East University Drive	Left	B	B
		Through/Right	B	B
	WB East University Drive	Left	B	B
		Through	C	C
		Right	A	A
	Overall LOS		**D**	**C**
East University Drive at Mall Parkway (traffic signal)	NB East University Drive	Left	A	D
		Through/Right	A	C
	SB East University Drive	Left	A	D
		Through/Right	A	B
	EB Mall Parkway	Left	D	A
		Through/Right	A	B
	WB Mall Parkway	Left	D	B
		Through/Right	B	A
	Overall LOS		**A**	A

Table 9 (continued) - Intersection Capacity Analysis - Future Year Traffic Conditions

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at Opelika Road (traffic signal)	NB East University Drive	Left	D	E
		Through	C	E
		Right	A	A
	SB East University Drive	Left	E	E
		Through	D	C
		Right	A	A
	EB Opelika Road	Left	D	E
		Through	C	E
		Right	A	A
	WB Opelika Road	Left	E	F
		Through	C	D
		Right	A	A
	Overall LOS		**D**	**E**
East University Drive at Saugahatchee Road (unsignalized)	NB East University Drive	Left	B	B
		Through/Right	A	A
	SB East University Drive	Left	C	C
		Through/Right	A	A
	EB Saugahatchee Road	Right	B	B
	WB Saugahatchee Road	Right	C	C
East University Drive at Annalue Drive (traffic signal)	NB East University Drive	Left	A	A
		Through/Right	A	A
	SB East University Drive	Left/Through	A	A
		Right	A	A
	EB Annalue Drive	Left/Through/Right	B	B
	WB Annalue Drive	Left/Through/Right	B	B
	Overall LOS		**A**	**B**
East University Drive at East Glenn Avenue (traffic signal)	NB East University Drive	Left	C	D
		Through	D	E
		Right	A	A
	SB East University Drive	Left	D	E
		Through	C	C
		Right	A	A
	EB East Glenn Avenue	Left	C	D
		Through/Right	C	D
	WB East Glenn Avenue	Left	C	D
		Through	D	E
		Right	A	A
	Overall LOS		**D**	**F**

Table 9 (continued) - Intersection Capacity Analysis - Future Year Traffic Conditions

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at East Samford Avenue (traffic signal)	NB East University Drive	Left	B	B
		Through	B	C
		Right	A	A
	SB East University Drive	Left	B	B
		Through/Right	B	B
	EB Samford Avenue	Left	C	B
		Through/Right	B	B
	WB Samford Avenue	Left	C	C
		Through/Right	B	B
	Overall LOS		**B**	**B**
East University Drive at Moores Mill Road (traffic signal)	NB East University Drive	Left	E	E
		Through	D	E
		Right	C	D
	SB East University Drive	Left	C	D
		Through/Right	C	D
	EB Moores Mill Road	Left	C	C
		Through/Right	D	E
	WB Moores Mill Road	Left	C	E
		Through	C	C
		Right	D	C
	Overall LOS		**D**	**D**
East University Drive at South Dean Road (unsignalized)	NB South Dean Road	Left/Through/Right	A	A
	SB South Dean Road	Left	F	F
		Through/Right	B	C
	EB East University Drive	Left	A	A
		Through/Right	A	A
	WB East University Drive	Left	A	A
		Through/Right	A	A
East University Drive at Wrights Mill Road (traffic signal)	NB Wrights Mill Road	Left/Right	C	C
	EB East University Drive	Through	B	C
		Right	B	A
	WB East University Drive	Left	A	C
		Through	A	A
	Overall LOS		**B**	**B**

Table 9 (continued) - Intersection Capacity Analysis - Future Year Traffic Conditions

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at South Donahue Drive (traffic signal)	NB South Donahue Drive	Left	B	B
		Through/Right	E	D
	SB South Donahue Drive	Left	C	B
		Through/Right	C	C
	EB East University Drive	Left	B	B
		Through/Right	B	F
	WB East University Drive	Left	B	B
		Through/Right	C	F
	Overall LOS		**C**	**D**
East University Drive/ Shug Jordan Parkway at South College Drive (traffic signal)	NB South College Street	Left	D	D
		Through	A	A
		Right	A	A
	SB South College Street	Left	E	E
		Through	C	D
		Right	A	A
	EB Shug Jordan Parkway	Left	D	D
		Through	D	E
		Right	A	A
	WB East University Drive	Left	D	E
		Through/Right	E	D
	Overall LOS		**C**	**D**
Shug Jordan Parkway at West Samford Avenue/ Alabama Street (traffic signal)	NB Shug Jordan Parkway	Left	B	B
		Through	B	C
		Right	A	A
	SB Shug Jordan Parkway	Left	A	C
		Through	B	B
		Right	A	A
	EB Alabama Street	Left	D	D
		Through	D	D
		Right	A	A
	WB West Samford Avenue	Left	D	D
		Through	D	D
		Right	A	A
	Overall LOS		**B**	**C**
Shug Jordan Parkway at Martin Luther King Drive Ramps (unsignalized)	NB Shug Jordan Parkway	Left	D	C
		Through	A	A
	SB Shug Jordan Parkway	Through	B	B
		Right	A	B
	EB Martin Luther King Drive Ramps	Left	D	C
		Right	C	C
	Overall LOS		**B**	**B**

Table 9 (continued) - Intersection Capacity Analysis - Future Year Traffic Conditions

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
Shug Jordan Parkway at Richland Road/ Judd Avenue (traffic signal)	NB Shug Jordan Parkway	Left	D	D
		Through/Right	C	D
	SB Shug Jordan Parkway	Left	C	C
		Through	F	C
		Right	A	A
	EB Richland Road	Left	E	E
		Through	C	D
		Right	A	A
	WB Judd Avenue	Left	E	D
		Through/Right	F	E
	Overall LOS		**F**	**D**
Shug Jordan Parkway at Ware Drive (unsignalized)	NB Shug Jordan Parkway	Through	A	A
		Right	A	A
	SB Shug Jordan Parkway	Left	B	C
		Through	A	A
	WB Ware Drive	Left/Right	F	F
Shug Jordan Parkway at North Donahue Drive (traffic signal)	NB North Donahue Drive	Left	D	D
		Through	D	D
		Right	A	A
	SB North Donahue Drive	Left	C	D
		Through	D	D
		Right	A	A
	EB Shug Jordan Parkway	Left	D	D
		Through	D	D
		Right	A	A
	WB Shug Jordan Parkway	Left	C	D
		Through	D	D
		Right	A	A
	Overall LOS		**D**	**D**

Arterial Segment Capacity Analysis with Projected Traffic Growth

Arterial segment capacity analyses for peak hour conditions along the East University Drive/Shug Jordan Parkway Corridor were conducted for the morning and afternoon peak hour periods using methods outlined in the *Highway Capacity Manual, 2010*. Levels of service for the arterial analyses conducted for East University Drive/Shug Jordan Parkway are summarized in **Table 10**.

Table 10 - Arterial Segment Analysis with Projected Growth

East University Drive/Shug Jordan Parkway Arterial Analysis				
From	To	Segment Length (miles)	Arterial LOS by Segment	
			AM Peak	PM Peak
East University Drive/Shug Jordan Parkway Arterial Analysis (Northbound)				
North Donahue Drive	Richland Road/Judd Avenue	1.29	D	C
Richland Road/Judd Avenue	Martin Luther King Drive Ramp	0.27	D	D
Martin Luther King Drive Ramp	West Samford Avenue	0.69	B	B
West Samford Avenue	South College Street	1.77	C	C
South College Street	South Donahue Drive	0.62	C	D
South Donahue Drive	Wrights Mill Road	1.13	C	B
Wrights Mill Road	Moores Mill Road	0.93	C	D
Moores Mill Road	East Samford Avenue	0.77	B	B
East Samford Avenue	East Glenn Avenue	0.82	C	D
East Glenn Avenue	Annalue Drive	0.61	B	B
Annalue Drive	Opelika Road	0.43	D	E
Opelika Road	Mall Parkway	0.27	B	C
Mall Parkway	Gatewood Drive	0.14	E	D
Gatewood Drive	North Dean Road	0.55	B	C
North Dean Road	Shelton Mill Road	0.44	C	D
Shelton Mill Road	North College Street	0.90	B	C
North College Street	North Donahue Street	1.07	A	B
East University Drive/Shug Jordan Parkway Arterial Analysis (Southbound)				
North College Street	North Donahue Street	1.07	C	C
North College Street	Shelton Mill Road	0.90	C	B
Shelton Mill Road	North Dean Road	0.44	C	C
North Dean Road	Gatewood Drive	0.55	C	B
Gatewood Drive	Mall Parkway	0.14	C	C
Mall Parkway	Opelika Road	0.27	E	E
Opelika Road	Annalue Drive	0.43	A	C
Annalue Drive	East Glenn Avenue	0.61	C	C
East Glenn Avenue	East Samford Avenue	0.82	B	B
East Samford Avenue	Moores Mill Road	0.77	C	C
Moores Mill Road	Wrights Mill Road	0.93	B	B
Wrights Mill Road	South Donahue Drive	1.13	B	C
South Donahue Drive	South College Street	0.62	D	C
South College Street	West Samford Avenue	1.77	B	B
West Samford Avenue	Martin Luther King Drive Ramp	0.69	B	B
Martin Luther King Parkway	Richland Road/Judd Avenue	0.27	D	E
Richland Road/Judd Avenue	North Donahue Drive	1.29	B	B

Right-Turn Lane Warrant Evaluations

An evaluation was conducted to determine the need for right turn lanes at study intersections. To complete this analysis, existing peak hour traffic volumes were compared with the right-turn lane warrant criteria outlined in the National Cooperative Highway Research Program (NCHRP) Report 457 *Evaluating Intersection Improvements: An Engineering Study Guide*, published by the Transportation Research Board. Evaluations were conducted for all study intersection approaches where right turn lanes do not currently exist and were not recommended to address existing deficiencies. It is assumed that turn lanes recommended earlier in this report would be constructed prior to future conditions. The results of the right-turn lane warrant evaluations indicate the following right-turn lanes are warranted for future conditions:

Table 11 – Future Traffic Conditions Right Turn Lane Warrant Review

Intersection	Approach	Turn Lane Warrant Status
East University Drive at Stoker Street	Westbound	Right Turn Lane Warranted
East University Drive at Gatewood Drive	Eastbound	Right Turn Lane Not Warranted
East University Drive at Saugahatchee Road	Northbound	Right Turn Lane Not Warranted
	Southbound	Right Turn Lane Not Warranted
East University Drive at East Glenn Avenue	Eastbound	Right Turn Lane Warranted
East University Drive at East Samford Avenue	Southbound	Right Turn Lane Not Warranted
East University Drive at Moores Mill Road	Southbound	Right Turn Lane Not Warranted
East University Drive at South Dean Road	Eastbound	Right Turn Lane Not Warranted
	Westbound	Right Turn Lane Not Warranted
East University Drive at Wrights Mill Road	Eastbound	Right Turn Lane Warranted
East University Drive at South Donahue Drive	Eastbound	Right Turn Lane Not Warranted
	Westbound	Right Turn Lane Not Warranted
East University Drive/Shug Jordan Parkway at South College Street	Westbound	Right Turn Lane Not Warranted
Shug Jordan Parkway at Judd Avenue	Northbound	Right Turn Lane Warranted **Not Recommended**

RECOMMENDED IMPROVEMENT PROJECTS – FUTURE TRAFFIC CONDITIONS

The following is a listing of recommended projects to address the noted deficiencies for future traffic conditions.

East University Drive at Opelika Road

Deficiencies are noted at this intersection. At this point, most reasonable improvements (based upon cost, ROW widths, etc.) should have been completed and implemented. From this point any improvements recommended would be very expensive require extensive ROW purchase and would likely not be cost effective. Therefore, no further improvements are recommended at this intersection to address future roadway deficiencies.

However, there are roadway improvements that could be completed to address the projected future deficiencies. For informational purposes, the following improvement would be required to achieve acceptable levels of service during peak periods:

- Modify the approaches on Opelika Road to provide three thru lanes eastbound and westbound;
- Modify the approaches on East University Drive to provide three lanes northbound and southbound;
- Modify the northbound approach of East University Drive to provide dual right turn lanes; and,
- Adjust the traffic signal timings to accommodate the recommended roadway improvements.

East University Drive at Moores Mill Road

This intersection is also included in the Moores Mill Road corridor study report. A recommended improvement to add a second through lane on Moores Mill Road eastbound is shown in the Moores Mill Road corridor report.

Shug Jordan Parkway at Ware Drive

The Ware Drive southbound left turn remains at a level of service “F” during the a.m. and p.m. peak hours. This effects only twelve (12) vehicles during the a.m. peak hour and sixteen (16) vehicles during the p.m. peak hour, so no additional improvements are recommended.

East University Drive at Gatewood Drive

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Construct a northbound right turn lane along Gatewood Drive; and,
- Construct a southbound right turn lane along Gatewood Drive.

Note, the southbound approach has a large retaining wall and grade difference along the west side of Gatewood. It is recommended that all recommended improvements be completed along the east side of Gatewood Drive. **Figure 11** illustrates the recommended roadway improvements for Gatewood Drive.

East University Drive at East Glenn Avenue

A project to address the listed deficiencies at this location is included in the East Glenn Avenue Corridor Report completed by Skipper Consulting Inc. The recommended improvements are as follows:

- Adjust signal timings to include a max 2 setting for the afternoon peak period (capacity)
- Install an additional northbound through lane along University Drive (capacity)
- Install an additional through receiving lane along University Drive (capacity)
- Install an eastbound right-turn lane along Glenn Avenue (capacity/warrants)

East University Drive at South Dean Road

To address the noted deficiencies at this study intersection, the following improvements are recommended:

- Construct a median along East University Drive to prevent left turns from South Dean Road.

Note, left turns from East University Drive onto South Dean Road would be allowed. This is not necessarily recommended, but is a strategy to mitigate the poor levels of service at this location.

Figure 12 illustrates the recommended roadway improvements for Gatewood Drive.

East University Drive at South College Street

A project to address the listed deficiencies at this location is included in the College Street Corridor Report completed by Skipper Consulting Inc. The recommended improvements are as follows:

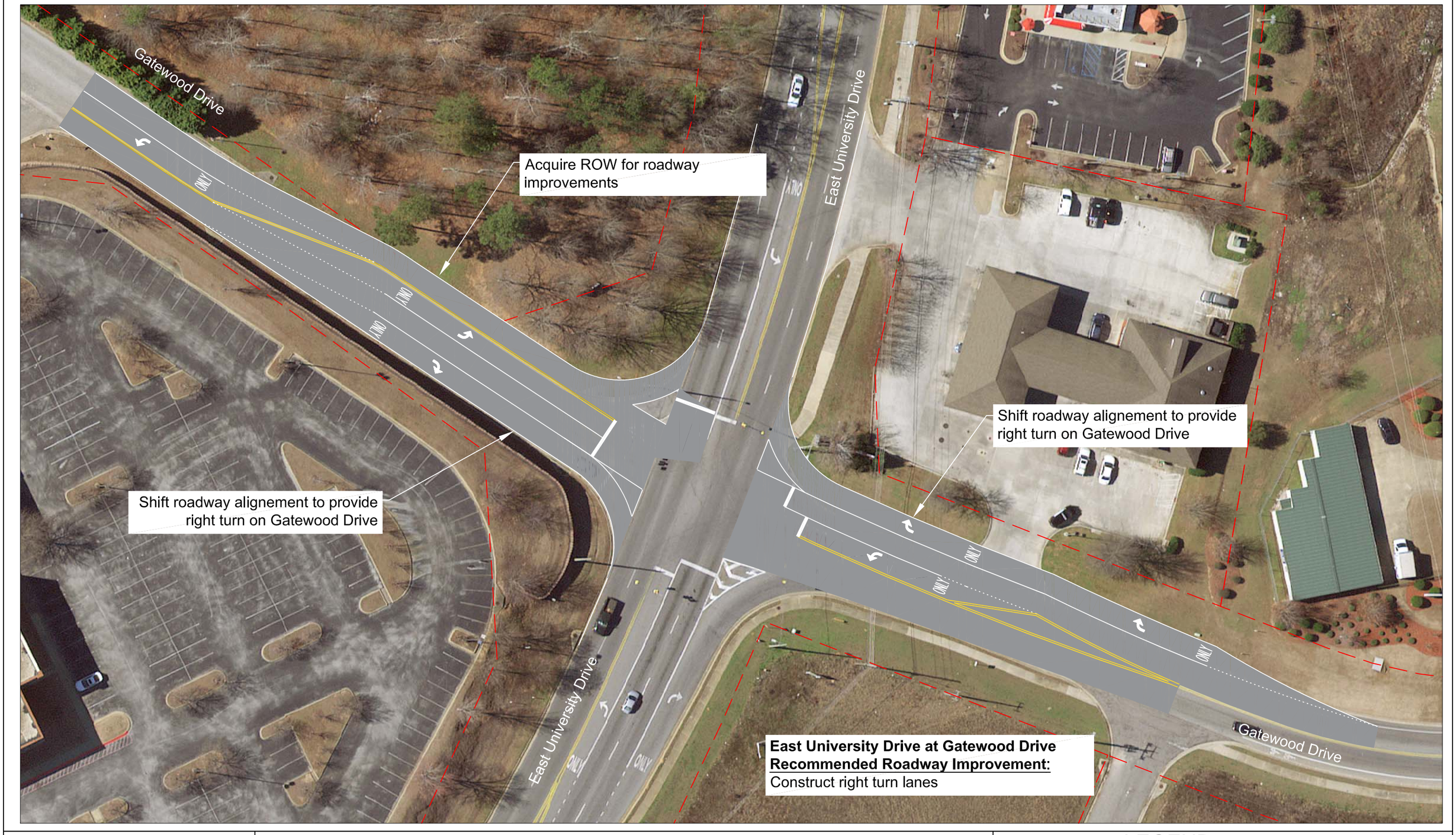
- Widen E. University Drive and Shug Jordan Parkway approaches to provide for offset left-turn lanes to improve visibility.

Future Intersection Capacity Analysis with Improvements

To test the effectiveness of the recommended roadway improvements, a capacity analysis was conducted for the recommended roadway improvements. It should be noted that:

- only intersection capacity analyses were conducted, since there were no roadway cross section recommendations made for East University Drive or Shug Jordan Parkway.
- only the intersections with recommended roadway improvements were analyzed.
- This analysis scenario assumes the recommended roadway improvements to be in place with existing traffic volumes.

As outlined previously, intersection capacity analyses were conducted using methods outlined in the *Highway Capacity Manual, 2010*. **Table 12** lists the results of the capacity analyses.



SKIPPER CONSULTING INC

Figure 11 - Recommended Roadway Improvements -Future Conditions
East University Drive at Gatewood Drive
Auburn, Alabama

LEGEND

Scale: Not to Scale
Date: January 2019

SKIPPER CONSULTING INC

Figure 12 - Recommended Roadway Improvements -Future Conditions
East University Drive at South Dean Road
Auburn, Alabama

LEGEND

Scale: Not to Scale
Date: April 2019

Table 12 - Intersection Capacity Analysis - Future Conditions with Improvements

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive at Gatewood Drive (traffic signal)	NB Gatewood Drive	Left	D	D
		Through/Right	D	D
	SB Gatewood Drive	Left	D	D
		Through/Right	D	D
	EB East University Drive	Left	B	B
		Through/Right	B	B
	WB East University Drive	Left	B	B
		Through	C	C
		Right	A	A
	Overall LOS		**C**	**C**
East University Drive at Opelika Road (traffic signal)	NB East University Drive	Left	C	D
		Through	B	D
		Right	A	A
	SB East University Drive	Left	C	D
		Through	B	C
		Right	A	A
	EB Opelika Road	Left	C	D
		Through	C	D
		Right	A	A
	WB Opelika Road	Left	C	D
		Through	B	C
		Right	A	A
	Overall LOS		**C**	**D**
East University Drive at East Glenn Avenue (traffic signal)	NB East University Drive	Left	C	C
		Through	C	D
		Right	A	A
	SB East University Drive	Left	D	C
		Through	C	D
		Right	A	D
	EB East Glenn Avenue	Left	C	C
		Through	C	D
		Right	A	C
	WB East Glenn Avenue	Left	C	C
		Through	C	C
		Right	A	C
	Overall LOS		**C**	**C**
East University Drive at South Dean Road (unsignalized)	NB South Dean Road	Right	A	A
	SB South Dean Road	Right	B	C
	EB East University Drive	Left	A	A
		Through/Right	A	A
	WB East University Drive	Left	A	A
		Through/Right	A	A

Table 12 (Continued) - Intersection Capacity Analysis - Future Conditions with Improvements

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			AM Peak Hour	PM Peak Hour
East University Drive/ Shug Jordan Parkway at South College Drive (traffic signal)	NB South College Street	Left	D	D
		Through	A	A
		Right	A	A
	SB South College Street	Left	E	E
		Through	C	D
		Right	A	A
	EB Shug Jordan Parkway	Left	D	D
		Through	D	E
		Right	A	A
	WB East University Drive	Left	D	E
		Through/Right	E	D
	Overall LOS		**C**	**D**