

College Street Corridor Traffic Operational Evaluation

PREPARED FOR:

THE CITY OF AUBURN

PREPARED BY:

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JANUARY 2007

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INTRODUCTION

This section documents the results of traffic operations and safety evaluations as well as traffic signal systems needs for the College Street Corridor from Shug Jordan Parkway/East University Drive (North) to Interstate 85 in Auburn, Alabama. The College Street intersections analyzed in this corridor include:

- Shug Jordan Pkwy/EUD (North);
- Shelton Mill Road;
- Drake Avenue;
- Bragg Avenue;
- Mitcham Avenue;
- Glenn Avenue;
- Magnolia Avenue;
- Thach Avenue;
- Roosevelt Drive/Miller Avenue;
- Samford Avenue;
- Woodfield Drive;
- Donahue Drive;
- Shug Jordan Parkway/EUD (South);
- Longleaf Drive;
- Southpark Drive/Wal-Mart;
- Veterans Boulevard;
- I-85 Southbound Ramps; and
- I-85 Northbound Ramps.

The locations of the study intersections along the College Street Corridor are illustrated in **Figure 1-1**.

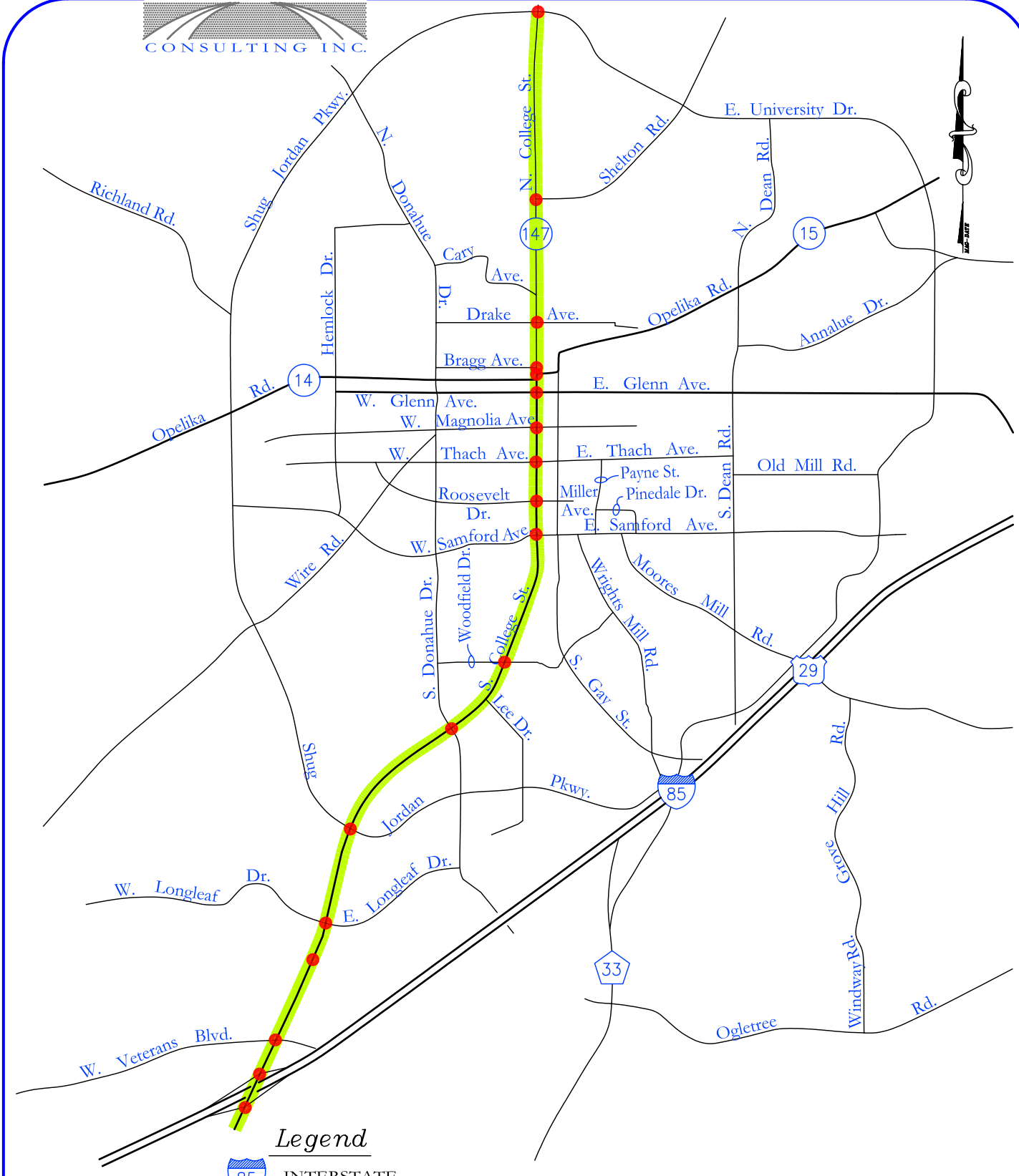
In order to accomplish the traffic operations and safety evaluations as well as determine the traffic signal systems needs at these locations within the study corridor, the following tasks were undertaken:

- existing peak hour turning movement counts were conducted for the study intersections;
- capacity analyses were conducted for the study intersections;
- current traffic operational deficiencies were identified;
- right turn and left turn lane warrants were conducted;
- geometric and traffic control improvements were developed for the study intersections to address operational and safety deficiencies; and

- traffic signal systems needs were identified to develop a coordinated signal system.

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.

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Legend

- 85 INTERSTATE
- 29 U.S. HIGHWAY
- 15 STATE ROUTE
- 33 COUNTY ROAD
- STUDY INTERSECTION
- STUDY LIMITS

DRAWING NOT TO SCALE

FIGURE 1-1
STUDY CORRIDORS AND INTERSECTIONS
COLLEGE STREET CORRIDOR

SEPTEMBER 2006 AUBURN, ALABAMA 1103.007

BACKGROUND INFORMATION

Study Area Roadways

The College Street Corridor from Shug Jordan Parkway/East University Drive (N) to Interstate 85 passes through the downtown business district, the Auburn University area, and Interstate 85 to the south. This segment of College Street is almost 6.0 miles in length. Characteristics for each study roadway evaluated in this corridor are provided in **Table 1-1**.

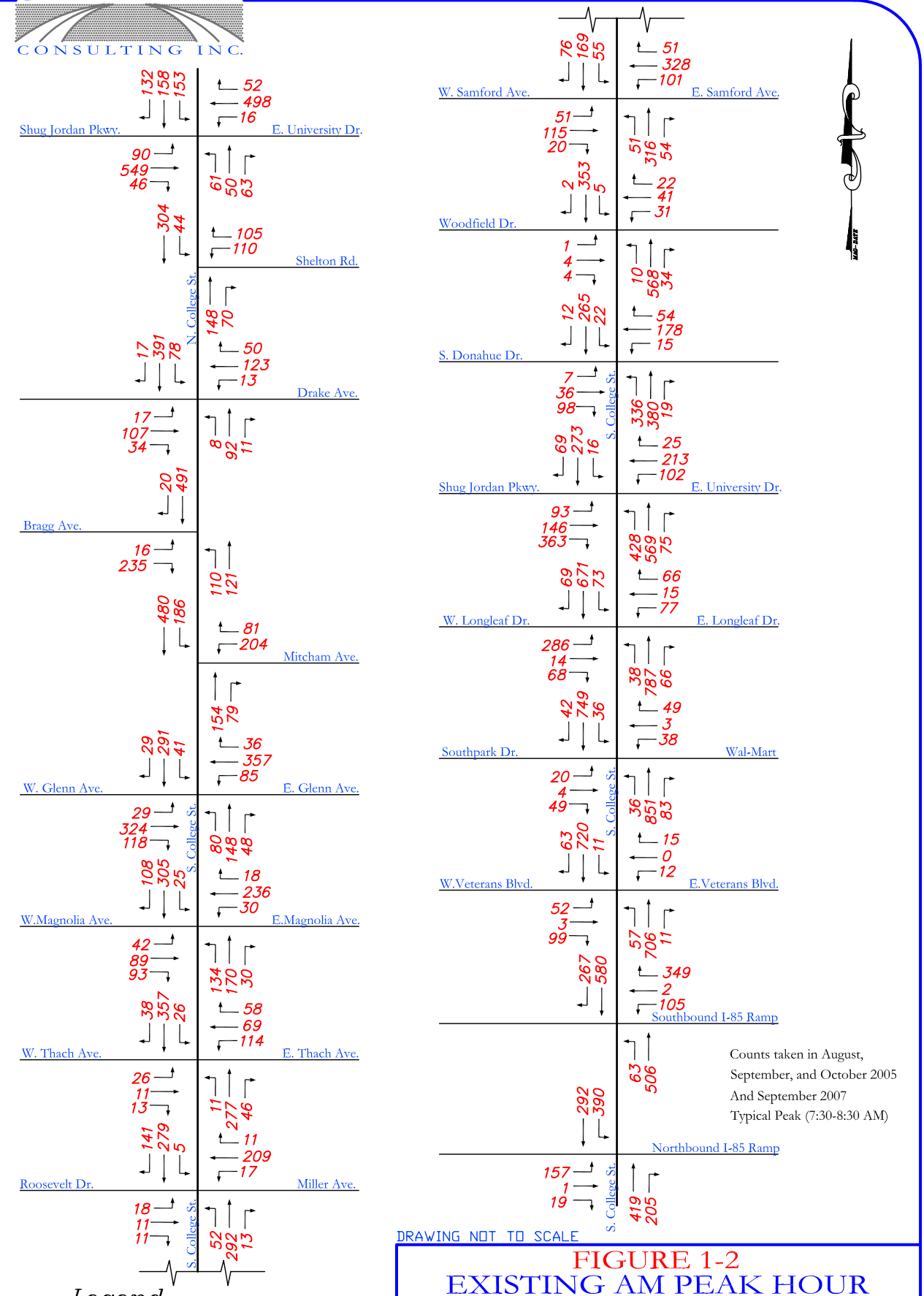
Table 1-1
Study Corridor Roadways Characteristics

Roadway	Parking	# of Lanes	Travel Direction	Travel Speeds (mph)	Classification
College Street (Shug Jordan/EUD (N) to Drake Avenue	None	2	North/South	35	Arterial
College Street (Drake Avenue to Mitcham Avenue)	None	2-3	North/South	35	Arterial
College Street (Mitcham Avenue to Glenn Avenue)	None	4	North/South	30	Arterial
College Street (Glenn Avenue to Magnolia Ave.)	Angle	2	North/South	30	Arterial
College Street (Magnolia Ave. to Samford Avenue)	Parallel NB	4	North/South	30	Arterial
College Street (Samford Avenue to Donahue Drive)	None	4-5	North/South	35	Arterial
College Street (Donahue Drive to I-85)	None	5	North/South	35	Arterial
Shug Jordan Parkway/E. University Dr (N)	None	4	Loop	45	Arterial
Shelton Mill Road	None	2	East/West	30	Arterial
Drake Avenue	None	2	East/West	25	Collector
Bragg Avenue	None	2	East/West	25	Collector
Mitcham Avenue	None	3	East/West	25	Arterial
Glenn Avenue	None	2-4	East/West	30	Arterial
Magnolia Avenue	Angled	2-3	East/West	25	Collector
Thach Avenue	None	2-3	East/West	25	Collector
Roosevelt Drive/Miller Avenue	None	2-3	East/West	25	Local
Samford Avenue	None	2-3	East/West	30	Arterial
Woodfield Drive	None	2	East/West	25	Collector
Donahue Drive	None	3	East/West	30	Arterial
Shug Jordan Parkway/E. University Dr (S)	None	4	Loop	45	Arterial
Longleaf Drive	None	2	East/West	25	Collector
Wal-Mart/Southpark Drive	None	2	East/West	25	Local/Access
Veterans Boulevard	None	2	East/West	25	Collector
Interstate 85	None	4	East/West	70	Interstate

Peak Hour Traffic Counts

Morning (7:00-9:00 am) and afternoon (4:00-6:00 pm) peak hour turning movement counts were conducted at the College Street Corridor intersections during the months of August, September, and October 2005. Traffic count data utilized for the analyses of these intersections is illustrated in **Figure 1-2** and **Figure 1-3**. Complete traffic count data is provided in **Appendix A** for reference.

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00 → TRAFFIC VOLUMES (VEHICLES)

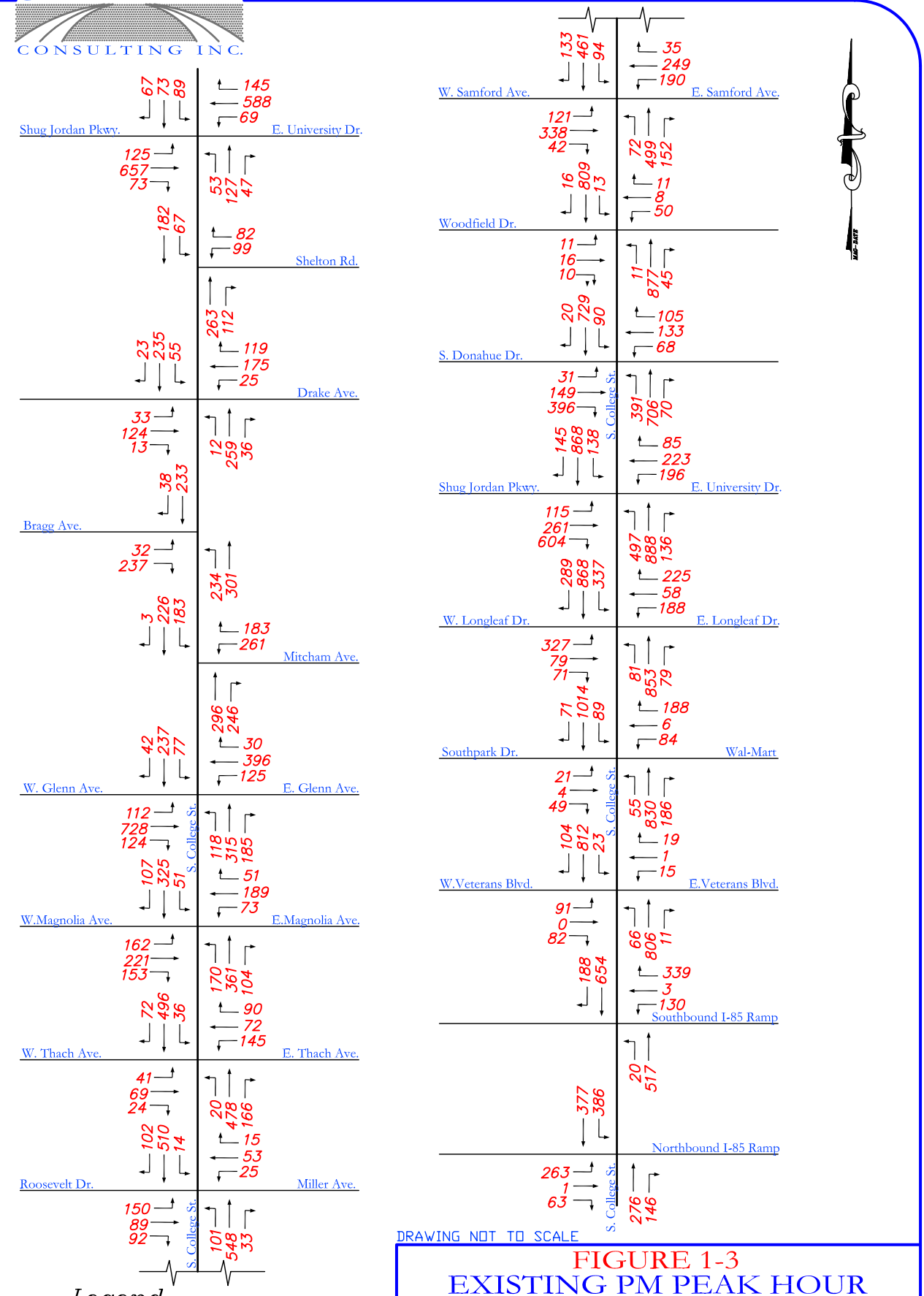
Counts taken in August, September, and October 2005
And September 2007
Typical Peak (7:30-8:30 AM)

DRAWING NOT TO SCALE

FIGURE 1-2
EXISTING AM PEAK HOUR TURNING MOVEMENT COUNTS
COLLEGE STREET CORRIDOR
AUBURN, ALABAMA

1103.007

SKIPPER
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Legend

00 → TRAFFIC VOLUMES (VEHICLES)

DRAWING NOT TO SCALE

FIGURE 1-3
EXISTING PM PEAK HOUR TURNING MOVEMENT COUNTS
COLLEGE STREET CORRIDOR
AUBURN, ALABAMA

1103.007

EXISTING INTERSECTION CAPACITY ANALYSIS

Capacity analyses for peak hour conditions at the study intersections along the College Street Corridor were conducted for morning and afternoon peak hours using methods outlined in the *Highway Capacity Manual, Third Edition*. According to methods of 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 1-2**. Existing intersection capacity printouts, which present details of the capacity analyses, are provided in **Appendix B** for reference.

Table 1-2
Existing Intersection Levels of Service

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			A.M. Peak Hour	P.M. Peak Hour
College Street at Shug Jordan Parkway (North) (traffic signal)	EB Shug Jordan	Left	C	C
		Through/Right	D	D
	WB Shug Jordan	Left	D	C
		Through/Right	*E*	*E*
	NB College Street	Left	B	B
		Through/Right	C	C
	SB College Street	Left	B	B
		Through	C	C
		Right	B	B
	Overall LOS		**D**	**D**
College Street at Shelton Mill Road (side street stop)	WB Shelton Mill	Left/Right	C	C
	SB College Street	Left/Through	A	A
College Street at Drake Avenue (traffic signal)	EB Drake Avenue	Left/Through/Right	B	B
	WB Drake Avenue	Left/Through/Right	B	B
	NB College Street	Left/Through/Right	A	A
	SB College Street	Left/Through/Right	B	A
	Overall LOS		**B**	**B**
College Street at Mitcham Avenue (traffic signal)	WB Mitcham Ave.	Left	C	D
		Right	B	B
	NB College Street	Through	C	C
		Right	A	A
	SB College Street	Left	A	B
		Through	B	A
	Overall LOS		**B**	**C**

Table 1-2 (continued)
Existing Intersection Levels of Service

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			A.M. Peak Hour	P.M. Peak Hour
College Street at Bragg Avenue (traffic signal)	EB Bragg Avenue	Left	C	C
		Right	C	B
	NB College Street	Left	A	A
College Street at Glenn Avenue (traffic signal)	EB Glenn Avenue	Left	C	B
		Through/Right	C	C
	WB Glenn Avenue	Left	C	C
		Through/Right	D	C
	NB College Street	Left	B	C
		Through	C	*E*
		Right	C	D
	SB College Street	Left	B	C
		Through	C	D
		Right	C	D
	Overall LOS		**C**	**D**
College Street at Magnolia Avenue (traffic signal)	EB Magnolia Ave.	Left	C	D
		Through/Right	D	*F*
	WB Magnolia Ave	Left	C	D
		Through/Right	D	D
	NB College Street	Left	C	D
		Through	B	C
		Right	B	C
	SB College Street	Left	B	C
		Through/Right	C	D
	Overall LOS		**C**	**D**
College Street at Thach Avenue (traffic signal)	EB Thach Avenue	Left	D	D
		Through	D	D
		Right	D	D
	WB Thach Avenue	Left	C	C
		Through	B	C
		Right	D	C
	NB College Street	Left	B	B
		Through/Right	D	C
	SB College Street	Left	B	B
		Through/Right	C	C
	Overall LOS		**C**	**C**
College Street at Miller Avenue/ Roosevelt Drive (traffic signal)	EB Miller Avenue/ Roosevelt Drive	Left	C	D
		Through/Right	C	D
	WB Miller Avenue/ Roosevelt	Left/Through/Right	C	D
	NB College Street	Left/Through/Right	C	A
	SB College Street	Left	B	A
		Through/Right	A	A
	Overall LOS		**B**	**B**

Table 1-2 (continued)
Existing Intersection Levels of Service

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			A.M. Peak Hour	P.M. Peak Hour
College Street at Samford Avenue (traffic signal)	EB Samford Ave.	Left	C	C
		Through	C	D
		Right	C	C
	WB Samford Ave	Left	B	*E*
		Through/Right	D	D
	NB College Street	Left	C	C
		Through/Right	C	D
	SB College Street	Left	B	C
		Through	B	C
		Right	B	C
	Overall LOS		**C**	**D**
College Street at Woodfield Drive (side street stop)	EB Woodfield Drive	Left/Through	D	*F*
		Right	A	B
	WB Woodfield Dr	Left/Through/Right	*F*	*F*
	NB College Street	Left	A	A
	SB College Street	Left	A	B
College Street at Donahue Drive (traffic signal)	EB Donahue Drive	Left	B	C
		Through/Right	B	D
	WB Donahue Dr	Left	B	C
		Through	C	C
		Right	B	C
	NB College Street	Left	A	C
		Through/Right	B	B
	SB College Street	Left	A	A
		Through/Right	B	B
	Overall LOS		**B**	**B**
College Street at Shug Jordan Parkway (South) (traffic signal)	EB Shug Jordan Parkway	Left	B	D
		Through	C	*E*
		Right	B	C
	WB Shug Jordan Parkway	Left	B	*F*
		Through/Right	C	*F*
	NB College Street	Left	D	D
		Through/Right	D	C
	SB College Street	Left	B	C
		Through/Right	C	*E*
	Overall LOS		**C**	**D**
College Street at Longleaf Drive (traffic signal)	EB Longleaf Drive	Left	B	C
		Through/Right	B	C
	WB Longleaf Dr	Left	B	C
		Through/Right	C	C
	NB College Street	Left	B	C
		Through	C	D
		Right	B	B
	SB College Street	Left	B	C
		Through/Right	C	D
	Overall LOS		**C**	**D**

Table 1-2 (continued)
Existing Intersection Levels of Service

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service	
			A.M. Peak Hour	P.M. Peak Hour
College Street at Wal-Mart/Southpark Drive (side street stop)	EB Wal-Mart/Southpark	Left/Through/Right	*F*	*F*
	WB Wal-Mart/Southpark	Left	*F*	*F*
		Through/Right	C	D
	NB College Street	Left	A	B
	SB College Street	Left	B	B
College Street at Veterans Boulevard (traffic signal)	EB Veterans Blvd.	Left	B	B
		Through	B	B
		Right	B	B
	WB Veterans Blvd	Left	B	B
		Through/Right	B	B
	NB College Street	Left	A	A
		Through/Right	B	B
	SB College Street	Left	A	A
		Through/Right	B	B
	Overall LOS		**B**	**B**
College Street at I-85 Southbound Ramps (traffic signal)	WB I-85 SB Ramps	Left	B	C
		Right	B	C
	NB College Street	Left	A	A
		Through	A	A
	SB College Street	Through	B	B
		Right	B	B
	Overall LOS		**B**	**B**
College Street at I-85 Northbound Ramps (traffic signal)	EB I-85 NB Ramps	Left	D	D
		Right	D	D
	NB College Street	Through	B	B
		Right	A	A
	SB College Street	Left	D	D
		Through	A	A
	Overall LOS		**C**	**C**

As shown in **Table 1-2**, each of the study intersections operates with an overall level of service "D" or better during both peak periods evaluated. The majority of the movements/lane groups evaluated along the College Street Corridor also operate with acceptable levels of service for both peak hours analyzed, with the exception of the following:

- During both peak hours evaluated, the westbound through/right turn lane group on Shug Jordan Parkway/East University Drive (North) at College Street operates at a level of service "E".

- During the afternoon peak hour, the northbound through movement on College Street at Glenn Avenue operates at a level of service "E".
- During the afternoon peak hour, the eastbound through/right turn lane group from Magnolia Avenue at College Street operates at a level of service "F".
- During the afternoon peak hour, the westbound left turn movement from Samford Avenue at College Street operates at a level of service "E".
- During the afternoon peak hour the westbound and eastbound left and through movements on Woodfield Drive experiences a level of service "F".
- During the afternoon peak hour, the eastbound through movement, the westbound approach, and the southbound through/right lane group operate with levels of service "E" or "F" at the College Street and Shug Jordan Parkway/East University Drive (South) intersection. However, the overall intersection operates at a level of service "D".
- During both peak hours, the side street approaches of Southpark and Wal-Mart at College Street operate with level of service "F".

EXISTING ARTERIAL SEGMENT CAPACITY ANALYSIS

Arterial segment capacity analyses for peak hour conditions along the College Street Corridor were conducted for the morning and afternoon peak hour periods using methods outlined in the *Highway Capacity Manual, Third Edition*. Based upon the characteristics of College Street, the corridor was divided into three segments for analyses. The segments and their respective arterial classifications are summarized in the following:

Roadway	Segment Limits	Classification
College Street	I-85 NB Ramps to Donahue Drive	II
College Street	Samford Avenue to Mitcham Avenue	IV
College Street	Drake Avenue to Shug Jordan Parkway/EUD (N).	III

Levels of service for the arterial analyses conducted for College Street are summarized in Table 1-3. Capacity printouts are provided in Appendix B.

Table 1-3
Existing Arterial Segment Levels of Service

Northbound College Street Arterial Analysis				
From	To	Segment Length (miles)	Arterial Level of Service by Section	
			AM Peak	PM Peak
I-85 NB Ramps	I-85 SB Ramps	0.19	C	C
I-85 SB Ramps	Veterans Parkway	0.20	D	D
Veterans Parkway	Longleaf Drive	0.75	B	C
Longleaf Drive	Shug Jordan/EUD (S)	0.33	D	D
Shug Jordan/EUD (S)	Donahue Drive	0.72	B	B
Total Urban Street LOS			**C**	**C**
Samford Avenue	Roosevelt/Miller	0.18	D	B
Roosevelt/Miller	Thach Avenue	0.19	D	D
Thach Avenue	Magnolia Avenue	0.17	C	D
Magnolia Avenue	Glenn Avenue	0.17	D	*E*
Glenn Avenue	Mitcham Avenue	0.10	*E*	*E*
Mitcham Avenue	Drake Avenue	0.25	B	B
Total Urban Street LOS			**C**	**D**
Drake Avenue	Shug Jordan/EUD (N)	1.56	B	B
Total Urban Street LOS			**B**	**B**

Southbound College Street Arterial Analysis				
From	To	Segment Length (miles)	Arterial Level of Service by Section	
			AM Peak	PM Peak
Shug Jordan/EUD (N)	Drake Avenue	1.56	A	A
Total Urban Street LOS			**A**	**A**
Drake Avenue	Mitcham Avenue	0.25	B	B
Mitcham Avenue	Glenn Avenue	0.10	*E*	*F*
Glenn Avenue	Magnolia Avenue	0.17	D	D
Magnolia Avenue	Thach Avenue	0.17	D	D
Thach Avenue	Roosevelt/Miller	0.19	B	B
Roosevelt/Miller	Samford Avenue	0.18	C	D
Total Urban Street LOS			**C**	**D**
Donahue Drive	Shug Jordan/EUD (S)	0.72	C	D
Shug Jordan/EUD (S)	Longleaf Drive	0.33	D	D
Longleaf Drive	Veterans Boulevard	0.75	B	B
Veterans Boulevard	I-85 SB Ramps	0.20	D	D
I-85 SB Ramps	I-85 NB Ramps	0.19	C	C
Total Urban Street LOS			**C**	**C**

Table 1-3 indicates the total urban street levels of service for the three segments of College Street, for both the northbound and southbound directions, operates with

acceptable levels of service. The following segments presently operate with less than acceptable levels of service:

- Northbound College Street from Magnolia Avenue to Glenn Avenue during the afternoon peak hour;
- Northbound College Street from Glenn Avenue to Mitcham Avenue during both the morning and afternoon peak hours;
- Southbound College Street from Mitcham Avenue to Glenn Avenue during both the morning and afternoon peak hours; and

RIGHT-TURN LANE WARRANT EVALUATIONS

An assessment of the need for right turn lanes along College Street and the intersecting roadways was conducted. This assessment was conducted for all approaches of College Street and the intersecting roadways at each of the study intersections. The criteria utilized were based upon information contained in the *Intersection Channelization Design Guide, Report 279,* published by the Transportation Research Board. Existing peak hour traffic volumes were compared with right-turn lane warrant criteria as presented in the *Intersection Channelization Design Guide, Report 279.* The results of these comparisons indicate current volumes are sufficient to meet the criteria for right-turn lanes, as described above, at the following locations:

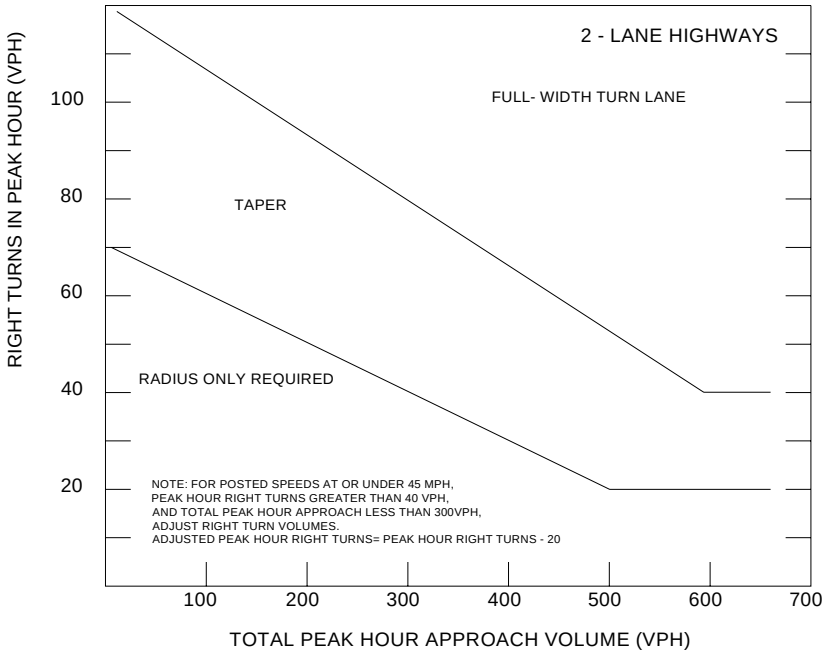
- Southbound College Street at Veterans Boulevard;
- Southbound College Street at Southpark/Wal-Mart;
- Southbound College Street at Longleaf Drive;
- Northbound and southbound on College Street at Shug Jordan/EUD (S);
- Eastbound Donahue Drive at College Street;
- Northbound College Street at Woodfield Drive;
- Northbound College Street at Samford Avenue;
- Southbound College Street at Roosevelt Drive/Miller Avenue;

- Northbound College Street at Thach Avenue;
- Southbound College Street at Magnolia Avenue;
- Eastbound Glenn Avenue at College Street;
- Southbound College Street at Bragg Avenue;
- Westbound Drake Avenue at College Street;
- Northbound College Street at Shelton Road; and
- Westbound East University Drive at College Street.

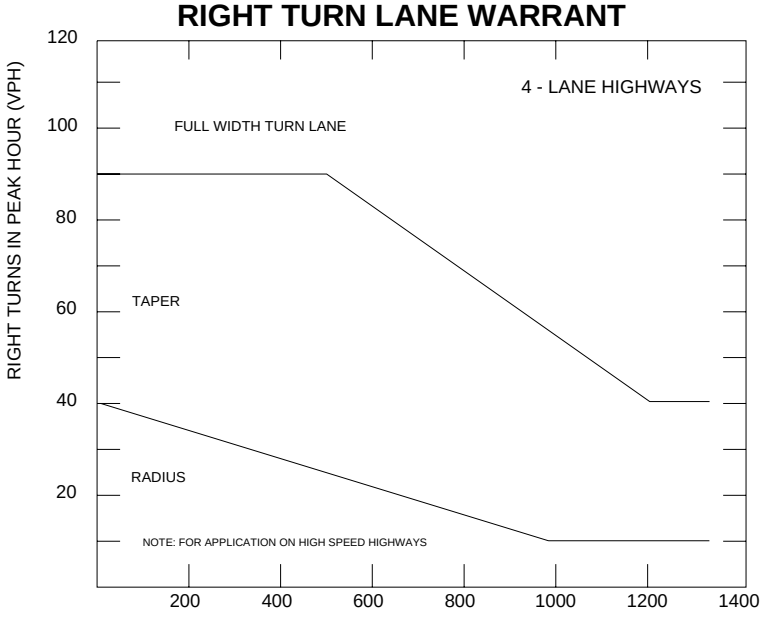
In addition to the turn lanes listed above, traffic volumes at various other locations were significant to meet the criteria for a right turn taper only. At these locations, the capacity of the shared through/right turn lane was used to determine the need for a right turn lane. Recommendations for additional right turn lanes are presented in following sections of this document.

Right turn lane guidelines, as presented in the *Intersection Channelization Design Guide, Report 279,* are provided for reference in the following charts.

RIGHT TURN LANE WARRANT



RIGHT TURN LANE WARRANT



** Taken from Figure 4-23, Intersection Channelization Design Guide, Report 279, published by the Transportation Research Board.*

LEFT-TURN LANE WARRANT EVALUATIONS

Left turn lanes are presently not provided at several locations in the College Street Corridor. As a result, these locations were evaluated to determine if left-turn lanes would be warranted based upon current traffic volumes. The criteria utilized were based upon information contained in the *Intersection Channelization Design Guide, Report 279*, published by the Transportation Research Board. Existing peak hour traffic volumes were compared with left-turn lane warrant criteria as presented in the *Intersection Channelization Design Guide, Report 279*.

The results of these comparisons indicate left turn lanes would be warranted at the following locations:

- Northbound College Street at Roosevelt Drive/Miller Avenue;
- Southbound College Street at Woodfield Drive; and
- Southbound College Street at Drake Avenue.

Additional left turn lanes may be recommended based upon capacity analyses and other evaluations. Recommendations for left turn lanes at other locations are discussed in following sections of this document.

For reference, left turn lane guidelines, as presented in the *Intersection Channelization Design Guide, Report 279*, are provided for reference in the following charts.

Left Turn Lane Warrant

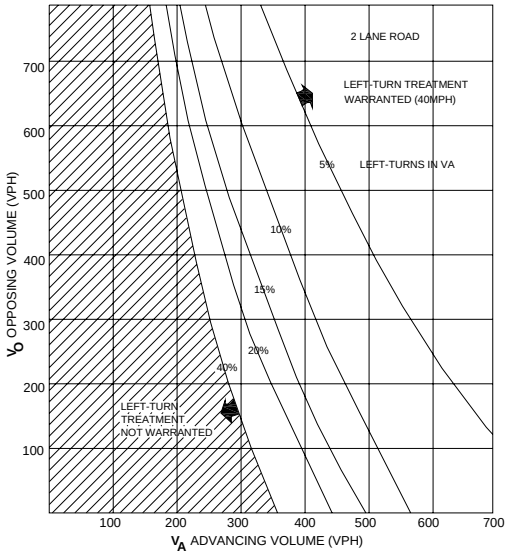


Figure taken from Figure 4-12 from the Intersection Channelization Design Guide, Report 279

NOTE: WHEN Vo<400 VPH {dashed line} A LEFT TURN LANE IS NOT NORMALLY WARRANTED UNLESS THE ADVANCING VOLUME (Va) IN THE SAME DIRECTION AS THE LEFT TURNING TRAFFIC EXCEEDS 400 VPH (Va>400 VHP).

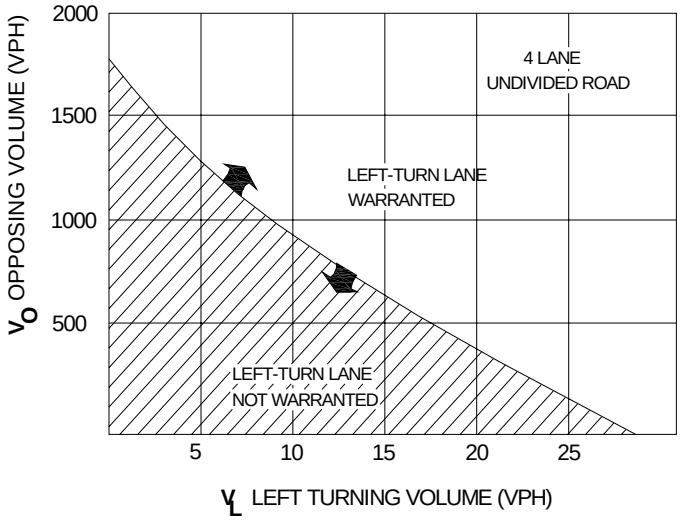


****Figure taken from Figure 4-12 from the Intersection Channelization Design Guide, Report 279***

INTERSECTION ACCIDENT ANALYSIS

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. A summary of the findings for the College Street Corridor is included in the paragraphs below.

The following intersections and roadway segments within the College Street Corridor were analyzed:

- College Street at Donahue Drive
- College Street at Longleaf Drive
- College Street at Magnolia Avenue
- College Street at Samford Avenue
- College Street at Shug Jordan Parkway/East University Drive
- College Street at Southpark Drive/Wal-Mart Access
- College Street from Shug Jordan Parkway/East University Drive to Longleaf Drive
- College Street from Roosevelt Drive to Samford Avenue
- College Street from Magnolia Avenue to Thach Avenue

The recommendations which were derived from the study process are as follows:

<u>College Street at Donahue Drive</u>

- Revise the northbound left turn radius to provide a broader turning radius to improve the operation of the northbound left turn movement.
- Revise intersection signal phasing to include protected only left turn phasing for main street left turns.
- Consider a coordinated traffic signal system that would adjust to main street traffic flows on a time period basis to help reduce congestion along South College Street.

<u>College Street at Longleaf Drive</u>

- Revise the northbound left turn radius to provide a broader turning radius to improve the operation of the northbound left turn volume.

- Widen the northbound left turn receiving lane to improve the operation of the northbound left turn movement.
- Revise intersection signal timing to provide more time for left turns from the main street.
- Consider a coordinated traffic signal system that would adjust to main street traffic flows on a time period basis to help reduce congestion along South College Street.

College Street at Magnolia Avenue

None recommended at this time

College Street at Samford Avenue

- Widen the southbound approach of the intersection along College Street to accommodate two through lanes

College Street at Shug Jordan Parkway/East University Drive

- Construct dual left turn lanes northbound to increase northbound left turn capacity.
- Widen the northbound left turn receiving lanes to accommodate the additional left turn lane.
- Revise intersection signal phasing to provide protected only left turn phasing for left turns from the main street.
- Consider a coordinated traffic signal system that would adjust to main street traffic flows on a time period basis to help reduce congestion along South College Street.

College Street at Southpark Drive/Wal-Mart Access

- Construct a concrete median along South College Streets that would allow only left turn from the main street and would prevent left turns from the side streets in the vicinity of the study intersection.
- Convert the side street driveways into right in right out driveways with concrete islands and paint striping.

College Street from Shug Jordan Parkway/ East University Drive to Longleaf Drive

- Examine the traffic signal timings along College Street in the vicinity of the study roadway segment

College Street from Roosevelt Drive to Samford Avenue

None recommended at this time

College Street from Magnolia Avenue to Thach Avenue

None recommended at this time

TRAFFIC SIGNAL SYSTEMS EVALUATION

As separate tasks included in the overall City of Auburn Traffic Study, Skipper Consulting, Inc. performed the following work related to traffic signalization on the College Street corridor:

- Development, implementation, and fine-tuning of traffic signal systems timing on College Street between Mitcham Avenue and Samford Avenue (plus the intersection of Gay Street at Glenn Street); and
- Preparation of a study for the feasibility of implementing traffic signal systems timing on College Street between Interstate 85 and Donahue Drive.

The results of these work tasks have been documented in separate bound reports. A summary of the findings is included in the paragraphs below.

College Street Signal System – Mitcham Avenue to Samford Avenue

Traffic signal systems timing was developed, implemented, and fine-tuned for seven (7) traffic signals:

- College Street at Mitcham Avenue
- College Street at Glenn Avenue
- College Street at Magnolia Avenue
- College Street at Thach Avenue
- College Street at Miller Avenue/Roosevelt Drive
- College Street at Samford Avenue
- Gay Street at Glenn Avenue

The proposed system was documented in a draft report prepared for the City of Auburn in November, 2005. Implementation and fine-tuning was performed on Monday-Tuesday, December 5-6, 2005.

College Street Signal System Feasibility Study – Interstate 85 to Donahue Drive

In November, 2005, Skipper Consulting, Inc. published a report for the City of Auburn documenting a process to determine the need for establishing a traffic signal system on College Street between Donahue Drive and Interstate 85. This study corridor is approximately 2.2 miles in length and contains six (6) existing traffic signals:

- College Street at Interstate 85 Northbound ramps
- College Street at Interstate 85 Southbound ramps
- College Street at Veteran's Boulevard
- College Sreet at Longleaf Drive
- College Street at East University Drive/Shug Jordan Parkway
- College Street at Donahue Drive

Multiple factors were included in the study process:

- the distance between signalized intersections;
- the hourly traffic flow variations and directionality;
- the historical growth in traffic;
- the percentage of heavy vehicles in the traffic stream;
- the number of intervening driveways and side streets between signalized intersections;
- the ratio of through vehicular traffic volumes to turning vehicular traffic volumes;
- the magnitude of mid-block generated traffic;
- the compatibility of the natural cycle lengths of each traffic signal;
- the change in individual intersection delays with and without traffic signal coordination;
- the change in arterial travel speeds and level of service with and without traffic signal coordination;

- the prospective green bands which could be expected if the signals were coordinated;
- the overall "Coordinatability Factor" as generated by the Synchro 6 software;
- the compatibility of the existing traffic signal equipment for time base and interconnected coordination;
- the locations of possible future traffic signals; and
- possible options for future traffic signal interconnection.

The recommendations which were derived from the study process are as follows:

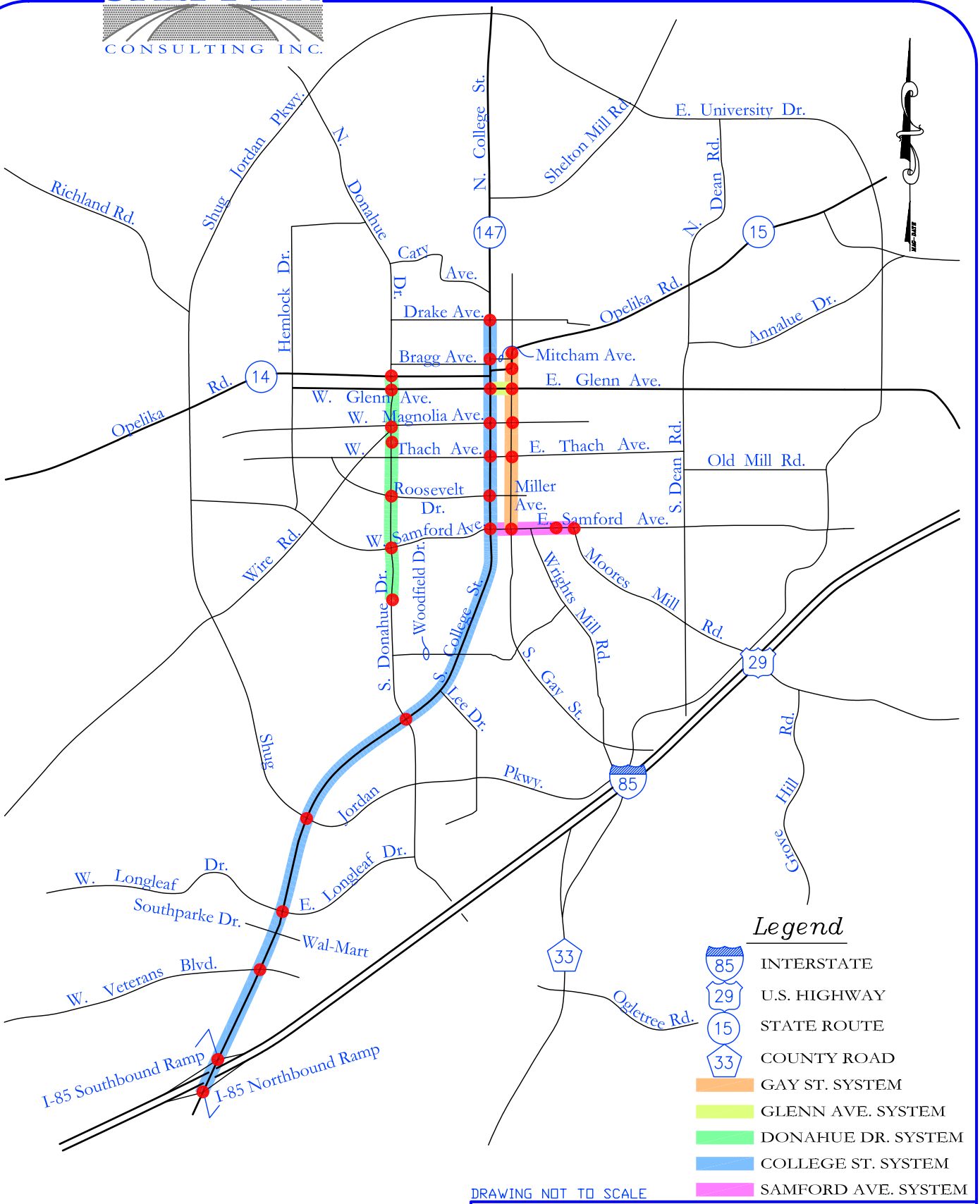
1. Replace the existing Naztec 900 controller at the intersection of South College Street at Longleaf Drive with a new Eagle EPAC 300 controller with a port 3 suitable for a spread spectrum radio.
2. Implement a time base coordination traffic signal system on South College Street between Longleaf Drive and East University Drive.
3. Implement a time base coordination traffic signal system on South College Street between the Interstate 85 Northbound Ramps and Veteran's Boulevard.
4. Perform a path profile analysis for the spread spectrum radio mounted on the Auburn municipal water tank to the six traffic signal locations included in this study.
5. Upgrade the cabinets at the six intersections and the Eagle EPAC 300 controllers to allow for spread spectrum communication. Set up the existing MARC 360 on-street master at the water tank for these signals if the path profile analysis is favorable. Otherwise, perform additional path profile analyses to determine the appropriate location for a new MARC 360 on-street master.
6. Be ready to implement traffic signal coordination timing on South College Street from the Interstate 85 Northbound Ramps to Donahue Drive within the next five years.
7. Do not install a traffic signal at the existing unsignalized intersection accessing the Wal-Mart adjacent to the Murphy Oil.

8. Evaluate future traffic signal requests in the study area in the light of the impact that they will have on traffic signal progression.

Traffic Signal System Recommendations

The traffic signal system recommendations for College Street as listed in the previous section of this report should be designed in an integrated manner within an overall traffic signal system plan for the City of Auburn. Recommendations are made concerning traffic signal systems in other sections of this report; however due to the overlapping nature of the corridors the signal systems are interdependent. For future planning efforts, the signal system for College Street should extend from the Interstate 85 ramps to the south northward to Drake Avenue, which is the next signal north of the end of the existing traffic signal system at Mitcham Avenue. It is not recommended that the signal system on College Street be extended to either East University Drive or to Shelton Mill Road (if a signal is installed at this location in the future) due to distance from the Drake Avenue intersection. The relationship of the College Street signal system with other signal systems recommended in this report is shown in **Figure 1-4**. As shown in this figure, the College Street traffic signal system is cross-linked with other signal systems at Glenn Avenue (existing) and Samford Avenue (proposed).

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DRAWING NOT TO SCALE

FIGURE 1-4
TRAFFIC SIGNAL SYSTEMS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA

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RECOMMENDED IMPROVEMENTS

Based upon the analyses and evaluations conducted for the College Street Corridor, recommendations are being made to improve traffic flow along the corridor at study intersections and to address any capacity or safety deficiencies identified. Several of the improvements developed for this corridor were taken from previous study efforts such as the Citywide Crash Study, Isolated Study Intersections, and College Street Signal Systems Studies. Additional turn lanes are also presented as recommendations at various study intersections which were not outlined as meeting the criteria previously presented. The recommendations for these turn lanes were based upon capacity improvements realized in the testing of various improvements in an effort to improve traffic operations. The following outlines the recommended improvements for the College Street Corridor:

College Street Signal System(s)

In previous sections of this report, recommendations have been made regarding signal systems for College Street. The following is a summary of the signal system recommendations previously introduced:

North College Street

- Signal system timings have recently been developed, implemented, and fine tuned for the signalized intersections on College Street from Mitcham Avenue to Samford Avenue. The signal timings currently in place were used in analyses of these intersections. Recommendations for these intersections were developed with minimal adjustments to signal timings.

South College Street

- It is recommended that a time base coordination traffic signal system be implemented on South College Street between Longleaf Drive and East University Drive.
- It is recommended that a time base coordination traffic signal system be implemented on South College Street between the Interstate 85 Northbound Ramps and Veteran's Boulevard.

For the purposes of this study effort, the two signal systems on South College Street (Longleaf Drive to Shug Jordan Parkway/EUD (S) and I-85 Ramps to Veterans Boulevard) are included in the analyses of these intersections with recommended improvements as outlined above.

Additional improvements were recommended as a part of the signal system studies. These improvements are not immediate, however they are presented in the following and include:

- Perform a path profile analysis for the spread spectrum radio mounted on the Auburn municipal water tank to the six traffic signals on College Street from I-85 to Donahue Drive.
- Upgrade the cabinets and controllers at these six intersections to allow for spread spectrum communication. Set up the existing MARC 360 on-street master at the water tank for these signals if the path profile analysis is favorable. Otherwise, perform additional path profile analyses to determine the appropriate location for a new MARC 360 on-street master.
- Be ready to implement traffic signal coordination timing on South College Street from the Interstate 85 Northbound Ramps to Donahue Drive within the next five years.
- Do not install a traffic signal at the existing unsignalized intersection accessing the Wal-Mart adjacent to the Murphy Oil.
- Evaluate future traffic signal requests in the study area in the light of the impact that they will have on traffic signal progression.

<u>College Street at Shug Jordan Pkwy/EUD (N)</u>

- Construct a right turn lane for westbound East University Drive.
- Construct a right turn lane for eastbound Shug Jordan Parkway.
- Adjust traffic signal timings.

<u>College Street at Shelton Mill Road</u>

- Construct a northbound right turn lane on College Street.

College Street at Drake Avenue

- Construct a southbound left turn lane on College Street.
- Construct a northbound left turn lane on College Street.

Although a westbound right turn lane on Drake Avenue is warranted based upon the turn lane criteria, it is not recommended based upon the acceptable levels of service for this approach resulting from the capacity analyses.

College Street at Bragg Avenue

- Construct a southbound right turn lane on College Street.

College Street at Mitcham Avenue

- Restripe the southbound approach to provide two through lanes on College Street at Mitcham Avenue.
- Adjust signal timings to compliment the lane additions.

College Street - Bragg Avenue to Mitcham Avenue

Although not a recommended improvement, it is important to note that the most effective corrective measure that could be implemented for this section of College Street would be the extension of Opelika Road from Gay Street to College Street align with Bragg Avenue. Since this is not practical at this time, it has been eliminated from consideration for this study effort.

College Street at Glenn Avenue

- Construct a right turn lane for the eastbound approach of Glenn Avenue.
- Extend the left turn lane for the eastbound approach of Glenn Avenue.
- Convert the existing northbound right turn lane on College Street to a northbound through lane.
- Construct a northbound right turn lane on College Street.
- Adjust signal timings.

College Street at Magnolia Avenue

- Construct an eastbound right turn lane on Magnolia Avenue.
- Modify signal phasing to remove the southbound College Street protected left turn phase.

A right turn lane is warranted on southbound College Street at Magnolia Avenue and construction of this lane would help to improve traffic flows on College Street. However, due to the geometry of College Street and the on-street parking, it was not considered to be a feasible option for construction and therefore was not included in the recommended improvements.

College Street at Thach Avenue

- Construct a right turn lane on northbound College Street.
- Modify signal phasing to remove the left turn protected phases on College Street.

College Street from Roosevelt Drive/Miller Avenue to South of Samford Avenue

To improve traffic operations for this segment of College Street, it is recommended that College Street be widened to provide a five-lane cross-section from Roosevelt Drive/Miller Avenue to the existing five-lane cross-section south of Samford Avenue on College Street. This would provide a five-lane cross-section on College Street through both the Roosevelt Drive/Miller Avenue and Samford Avenue intersections. The five-lane cross-section for this segment of College Street is included in the lane improvements at each intersection as summarized with the intersection specific recommended improvements.

College Street at Roosevelt Drive/Miller Avenue

- Construct a southbound right turn lane on College Street.
- Construct a northbound left turn lane on College Street. This would be provided by widening College Street to provide a five-lane cross-section as described above.

College Street at Samford Avenue

It is recommended that College Street be improved to provide two through lanes for the southbound approach to Samford Avenue. This is a result of data outlined in the Crash Study as well as capacity deficiencies identified in capacity analyses. This would be provided by widening College Street to provide a five-lane cross-section as described above. A signal system is in place on College Street including the Samford Avenue intersection as well as a proposed signal system along Samford Avenue to include College Street. The current and proposed signal systems, presented in previous work efforts, were included in the recommended improvements for the Samford Avenue and College Street intersection. Based upon the analyses conducted at this intersection, the following improvements are recommended:

- Widen southbound College Street to provide two through lanes at Samford Avenue.
- Construct a northbound right turn lane on College Street approaching Samford Avenue.
- Adjust signal timings to compliment the recommended lane additions.

College Street at Woodfield Drive

- Construct a southbound left turn lane on College Street.
- Construct a northbound right turn lane on College Street.
- Construct a left turn lane on northbound College Street at Woodfield Drive.
- Monitor traffic volumes on Woodfield Drive for warranting of a traffic signal as conditions dictate. Current volumes are near, but do not meet peak hour criteria for signal warranting.

Although current traffic volumes do not warrant a northbound left turn lane, the widening that would be required for the southbound left turn lane would extend into the left taper for the left turn lane southbound at the Jule Collins Smith Museum. As a result, it is recommended that a five-lane section be constructed to tie into the southbound left turn lane for the Jule Collins Smith Museum access.

College Street at Donahue Drive

- Construct a right turn lane for the eastbound approach of Donahue Drive.
- Widen the northbound approach of College Street to provide dual left turn lanes.
- Widen the westbound receiver lanes to accommodate the dual left turn lanes from northbound College Street.
- Implement protected only left turn movements for College Street.
- Modify signal timings and phasing to accommodate the recommended lane improvements.

College Street at Shug Jordan Pkwy/EUD (S)

- Construct dual left turn lanes for northbound College Street.
- Modify the westbound departure from the intersection to accept dual left turn lanes from northbound College Street.
- Implement protected only left turn movements for College Street.
- Construct full length right turn lanes for both the northbound and southbound approaches of College Street.
- Adjust and modify signal timings to compliment the recommended lane improvements and protected left turn movements as well as implementation of coordinated timings between Shug Jordan Parkway/EUD (S) and Longleaf Drive.

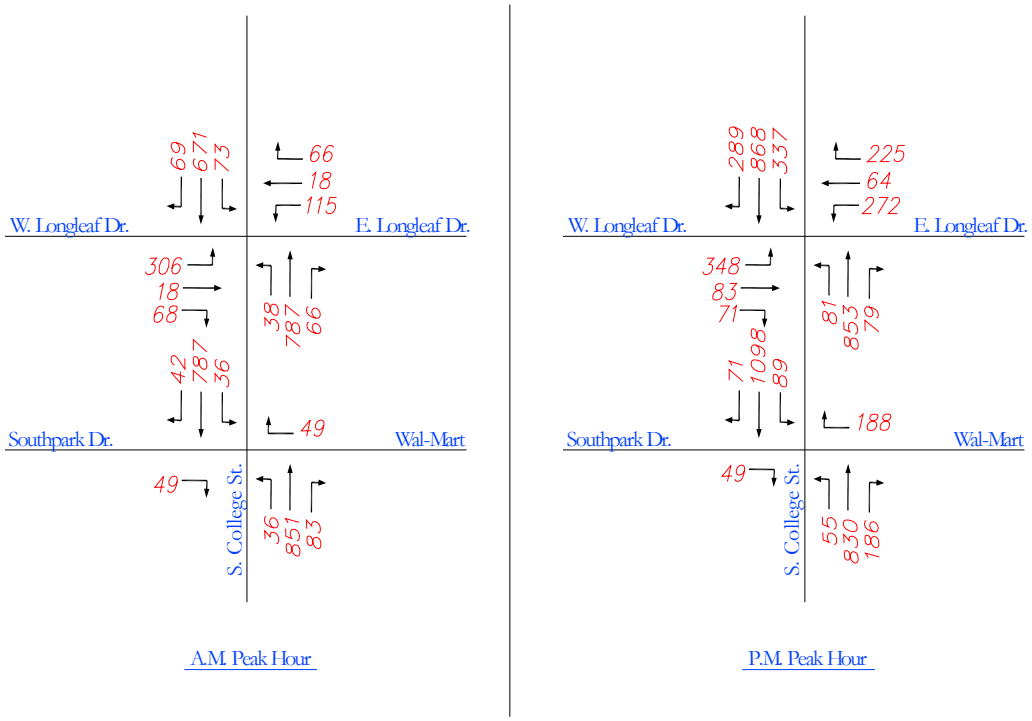
College Street at Longleaf Drive

- Improve the northbound left turn radius for traffic from College Street and the departure lane receiving the northbound left turn movement.
- Construct a southbound right turn lane and dual left turn lanes on College Street.
- Widen the eastbound approach to provide dual left turn lanes.
- Widen the westbound approach to provide dual left turn lanes and a separate right turn lane.
- Adjust signal timings and phasing to compliment recommended lane geometrics as well as implementation of coordinated timings between Shug Jordan Parkway/EUD (S) and Longleaf Drive.

College Street at Southpark Drive/Wal-Mart

- Modify the current median opening restricting left turns and through movements from the side street approaches at College Street.
- Construct a southbound right turn lane on College Street.

With the modification of the median, the left turn and through movements from the side streets were assumed to utilize Longleaf Drive to access and/or cross College Street. These volumes were added to the Longleaf Drive approaches in capacity analyses with the recommended improvements. The morning and afternoon peak hour resultant volumes are summarized in the following:



College Street at Veterans Boulevard

- Construct a right turn lane on College Street at Veterans Boulevard.
- Adjust signal timings with implementation of a coordinated signal system from the I-85 Ramp intersections through Veterans Boulevard.

College Street at I-85 SB Ramps

- Adjust signal timings with implementation of a coordinated signal system from the I-85 Ramp intersections through Veterans Boulevard.

College Street at I-85 NB Ramps

- Adjust signal timings with implementation of a coordinated signal system from the I-85 Ramp intersections through Veterans Boulevard.

Recommended improvements for College Street intersections are illustrated in figures as follows:

Figure 1-5 College Street at Shug Jordan Parkway/EUD (N) Improvements
Figure 1-6 College Street at Shelton Mill Road Improvements
Figure 1-7 College Street at Drake Avenue Improvements
Figure 1-8 College Street at Mitcham Avenue and Bragg Avenue Improvements
Figure 1-9 College Street at Glenn Avenue Improvements
Figure 1-10 College Street at Magnolia Avenue Improvements
Figure 1-11 College Street at Thach Avenue Improvements
Figure 1-12 College Street at Roosevelt Drive/Miller Avenue Improvements
Figure 1-13 College Street at Samford Avenue Improvements
Figure 1-14 College Street at Woodfield Drive Improvements
Figure 1-15 College Street at Donahue Drive Improvements
Figure 1-16 College Street at Shug Jordan Parkway/EUD (S) Improvements
Figure 1-17 College Street at Longleaf Drive Improvements
Figure 1-18 College Street at Southpark/Wal-Mart Improvements
Figure 1-19 College Street at Veterans Boulevard Improvements

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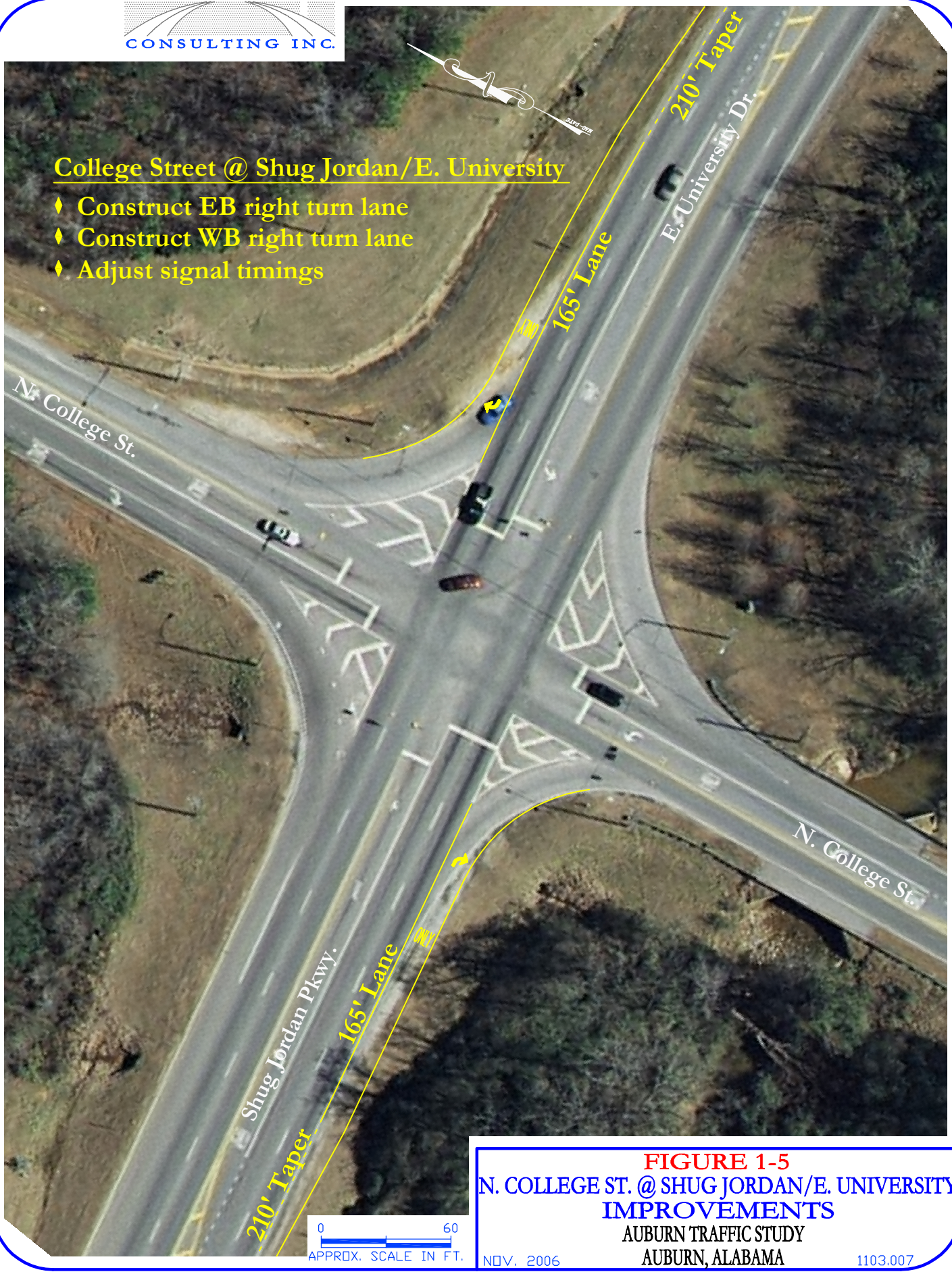


FIGURE 1-5
N. COLLEGE ST. @ SHUG JORDAN/E. UNIVERSITY
IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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FIGURE 1-6
N. COLLEGE ST. @ SHELTON MILL RD.
IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
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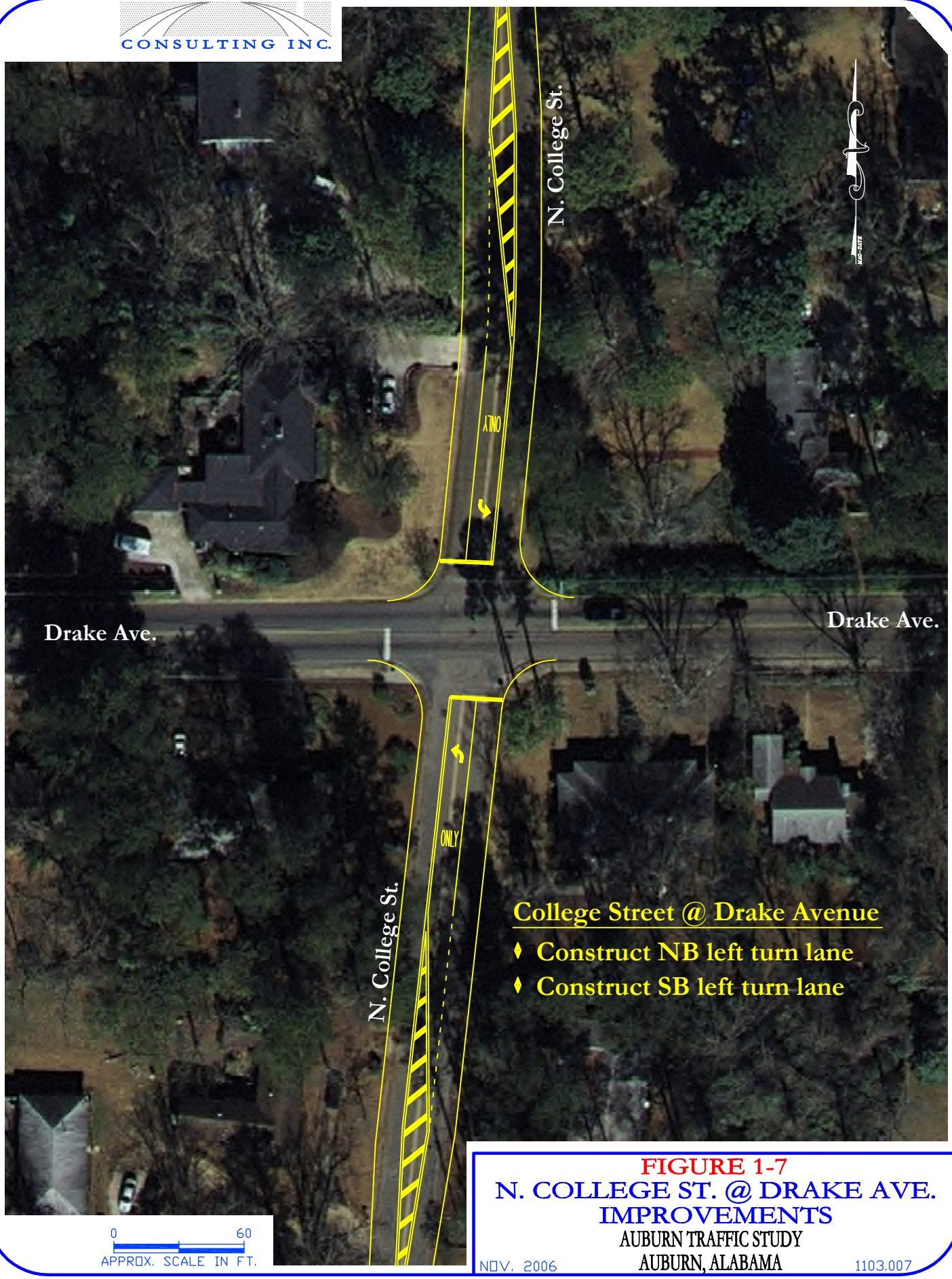


FIGURE 1-7
N. COLLEGE ST. @ DRAKE AVE.
IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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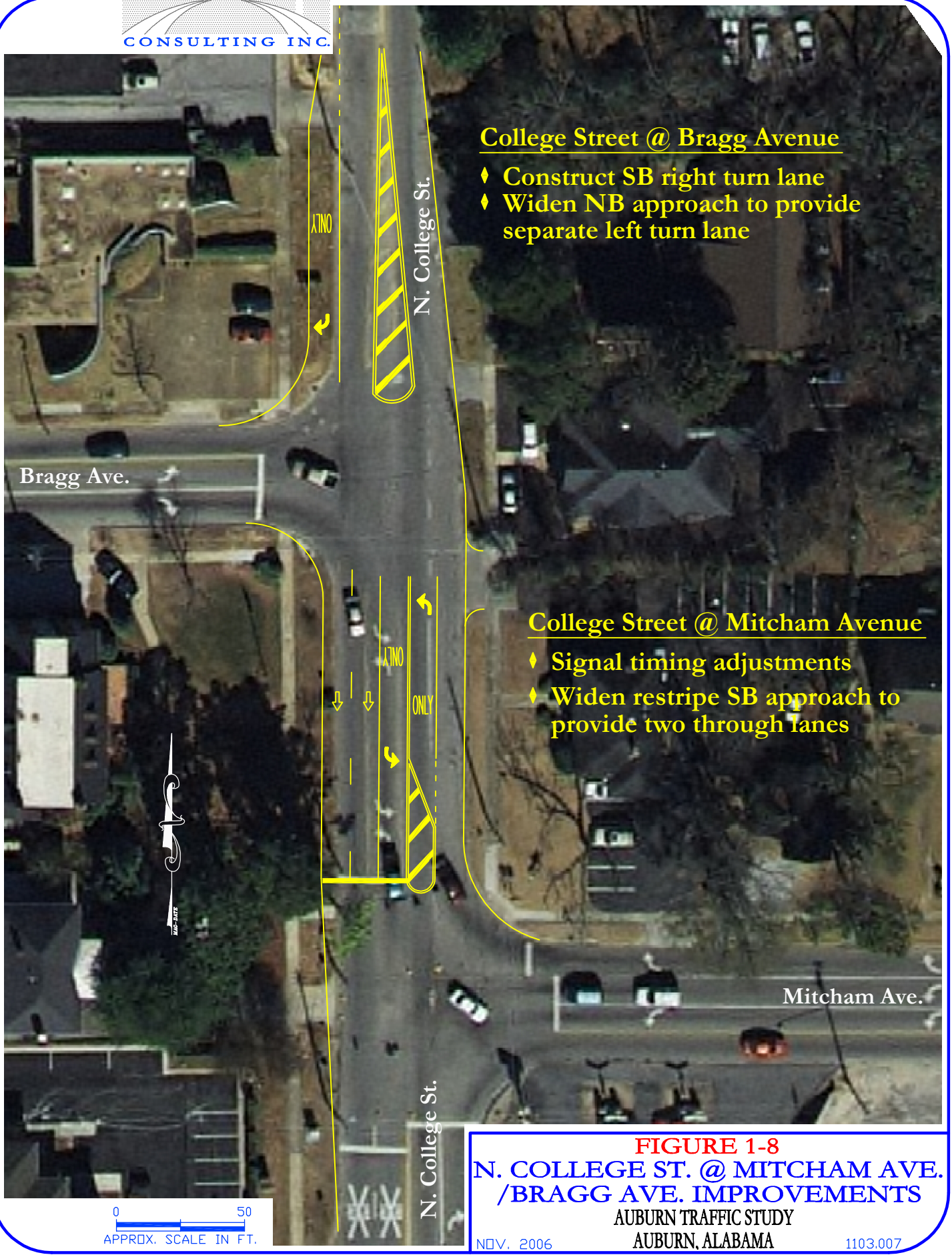
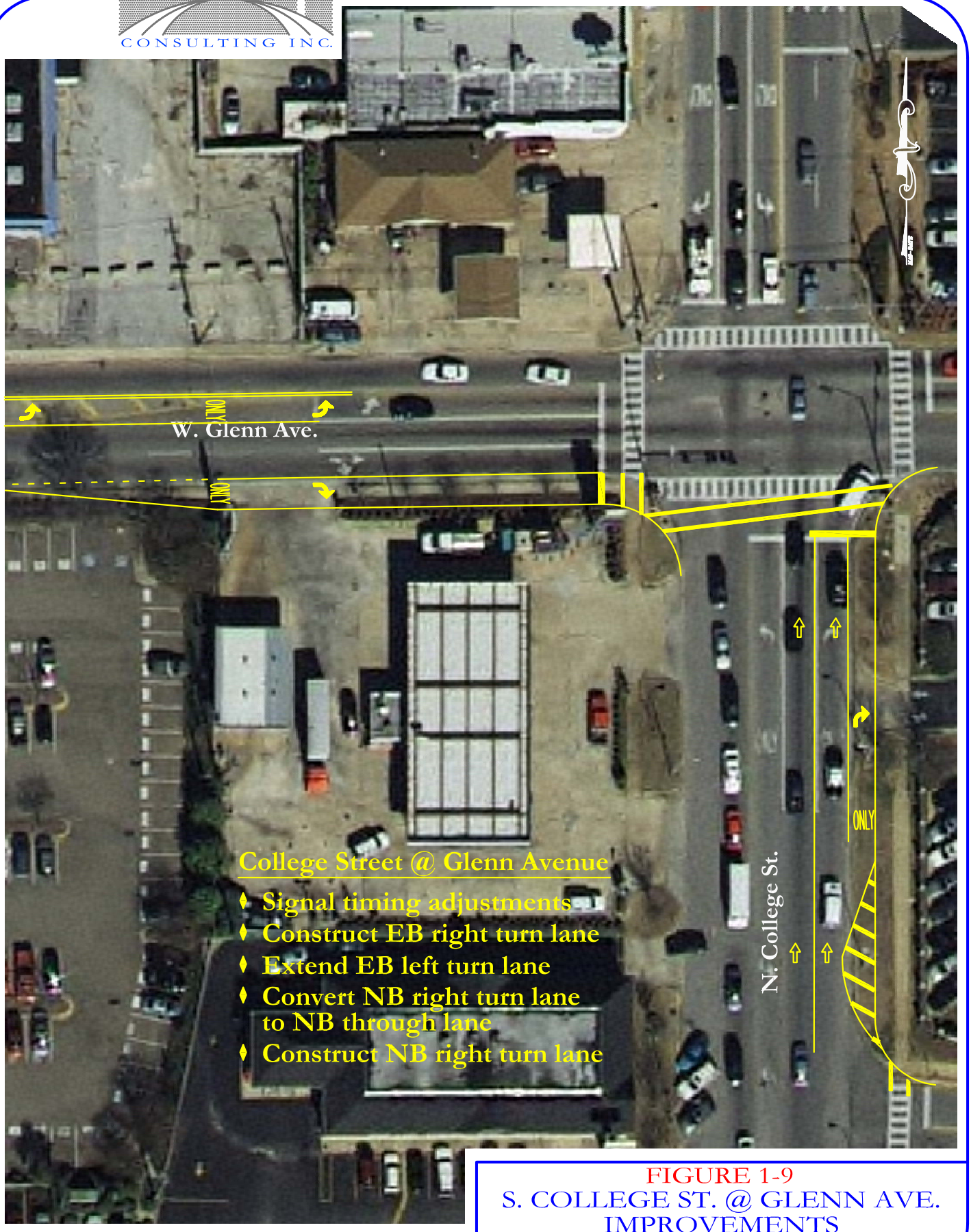


FIGURE 1-8
N. COLLEGE ST. @ MITCHAM AVE. /BRAGG AVE. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
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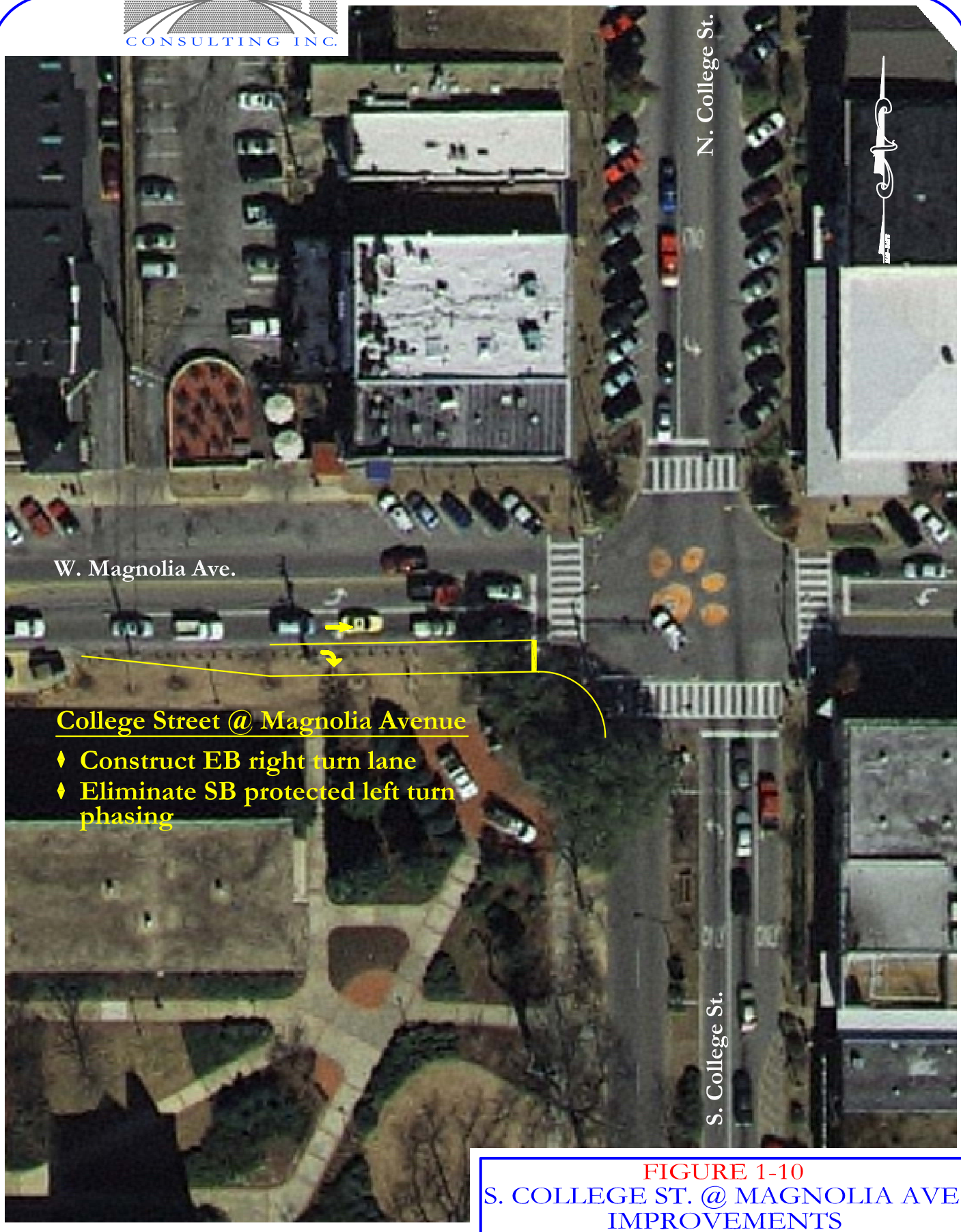
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CONSULTING INC.



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APPROX. SCALE IN FT.

FIGURE 1-9
S. COLLEGE ST. @ GLENN AVE. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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0 50
APPROX. SCALE IN FT.

FIGURE 1-10
S. COLLEGE ST. @ MAGNOLIA AVE. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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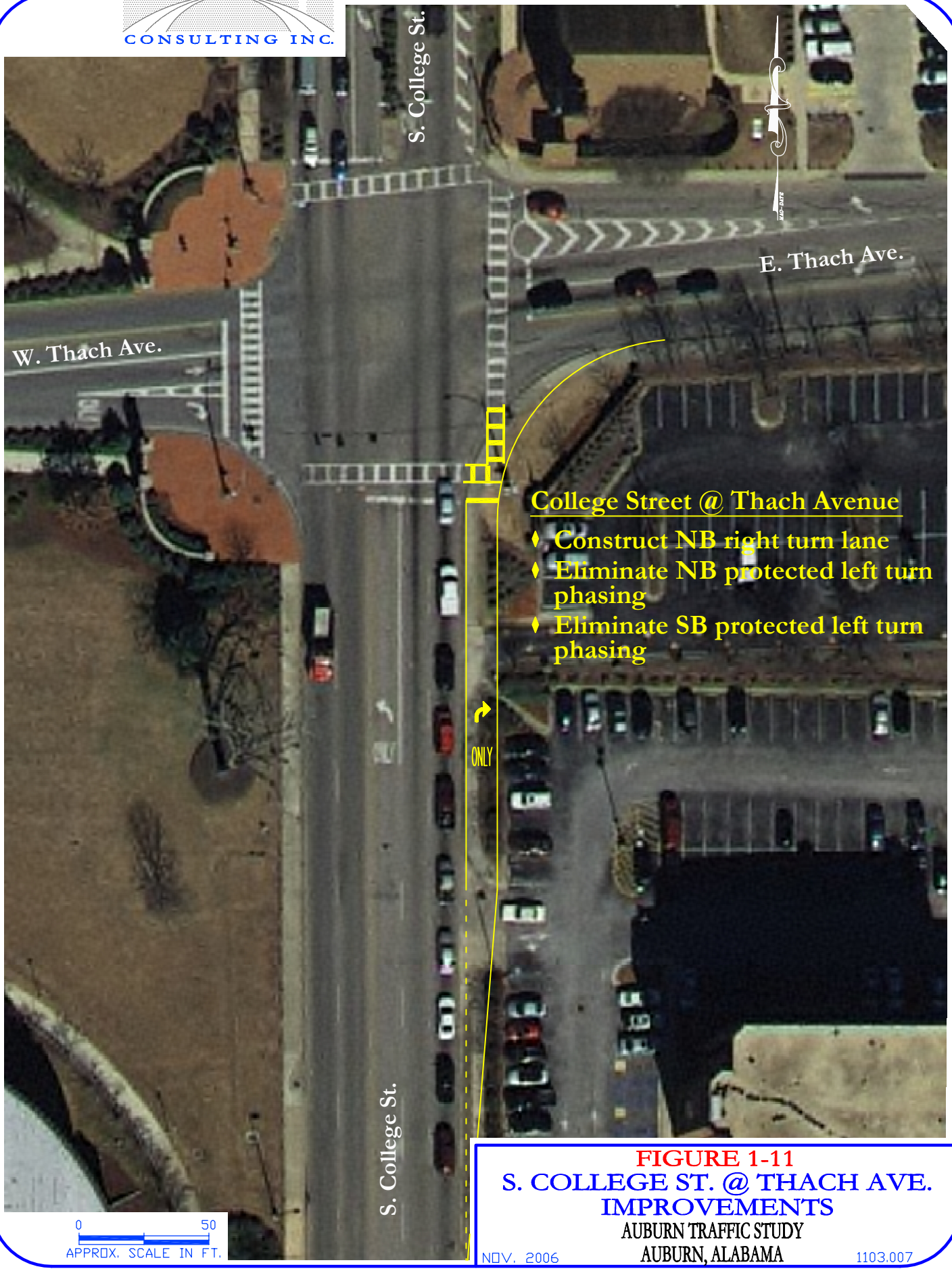


FIGURE 1-11
S. COLLEGE ST. @ THACH AVE. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
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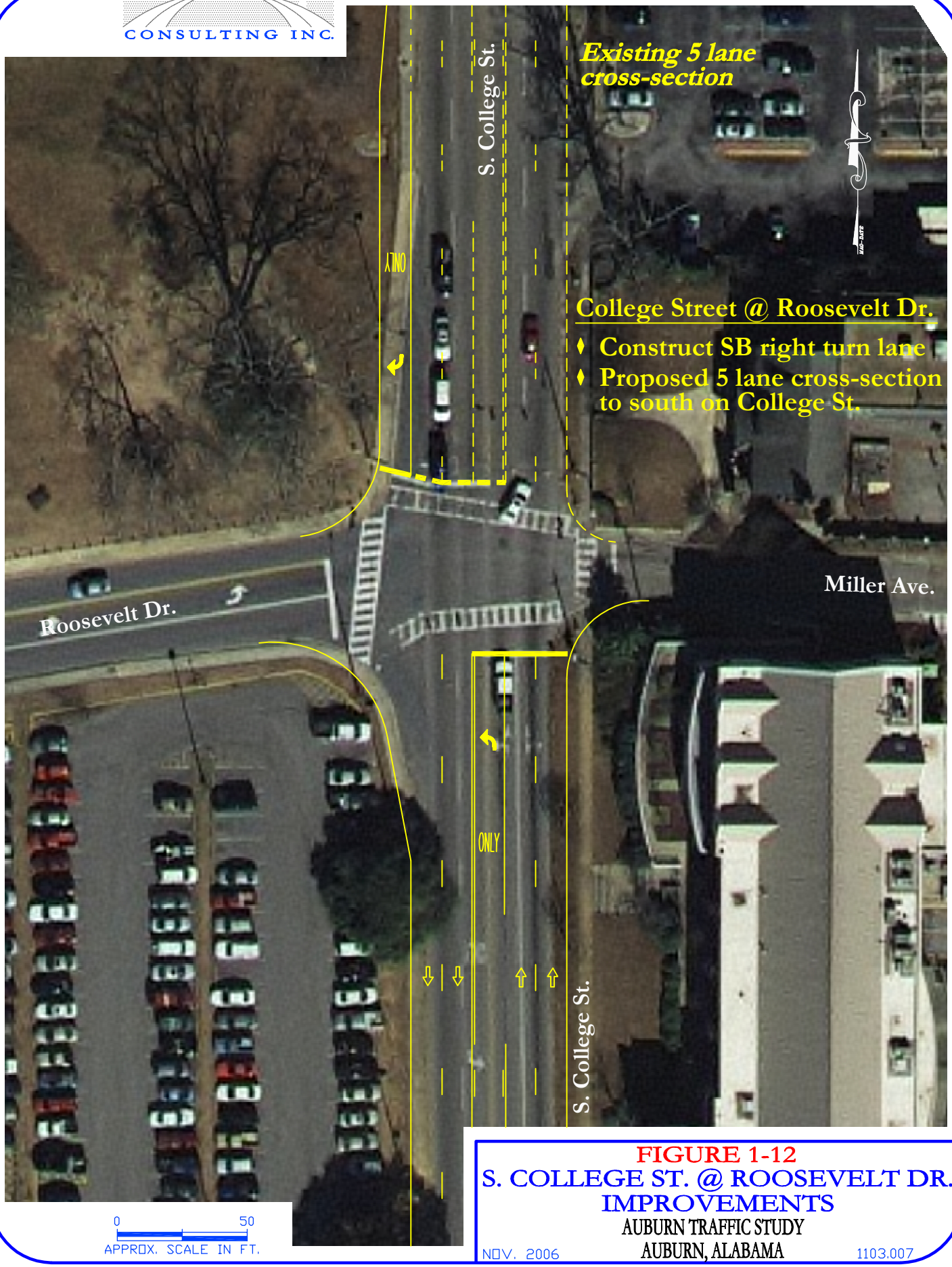


FIGURE 1-12
S. COLLEGE ST. @ ROOSEVELT DR. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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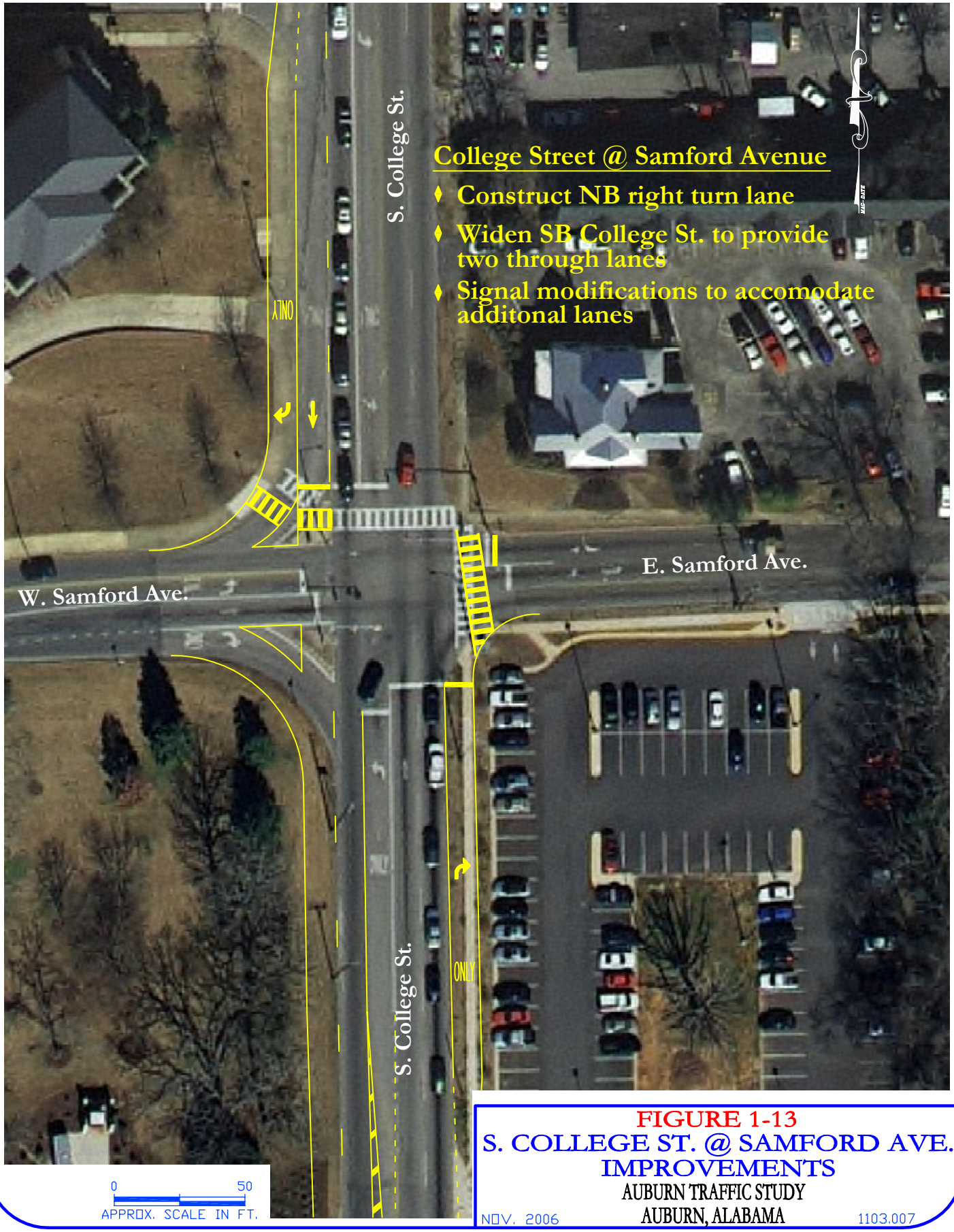


FIGURE 1-13
S. COLLEGE ST. @ SAMFORD AVE. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
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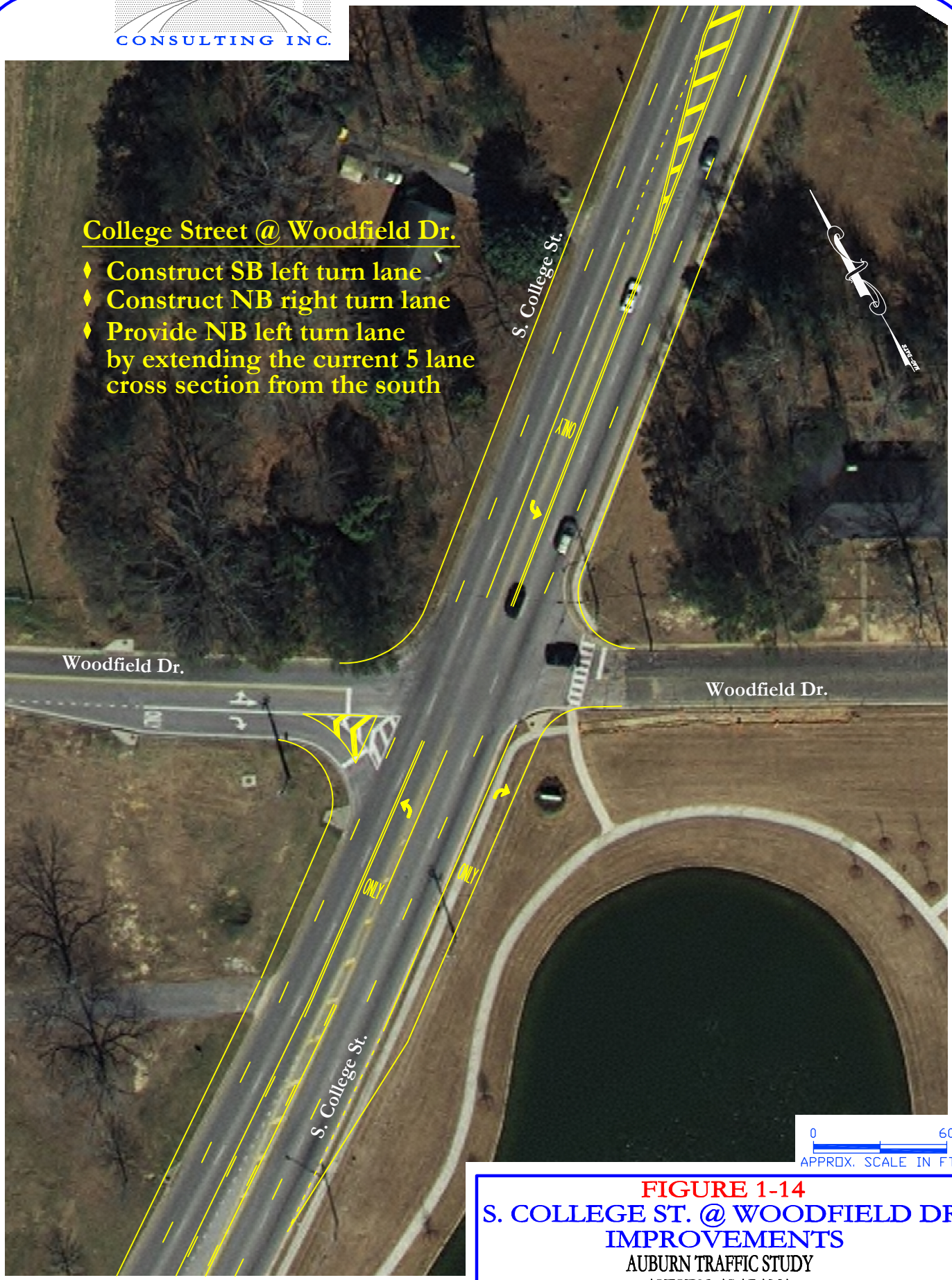


FIGURE 1-14
S. COLLEGE ST. @ WOODFIELD DR. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
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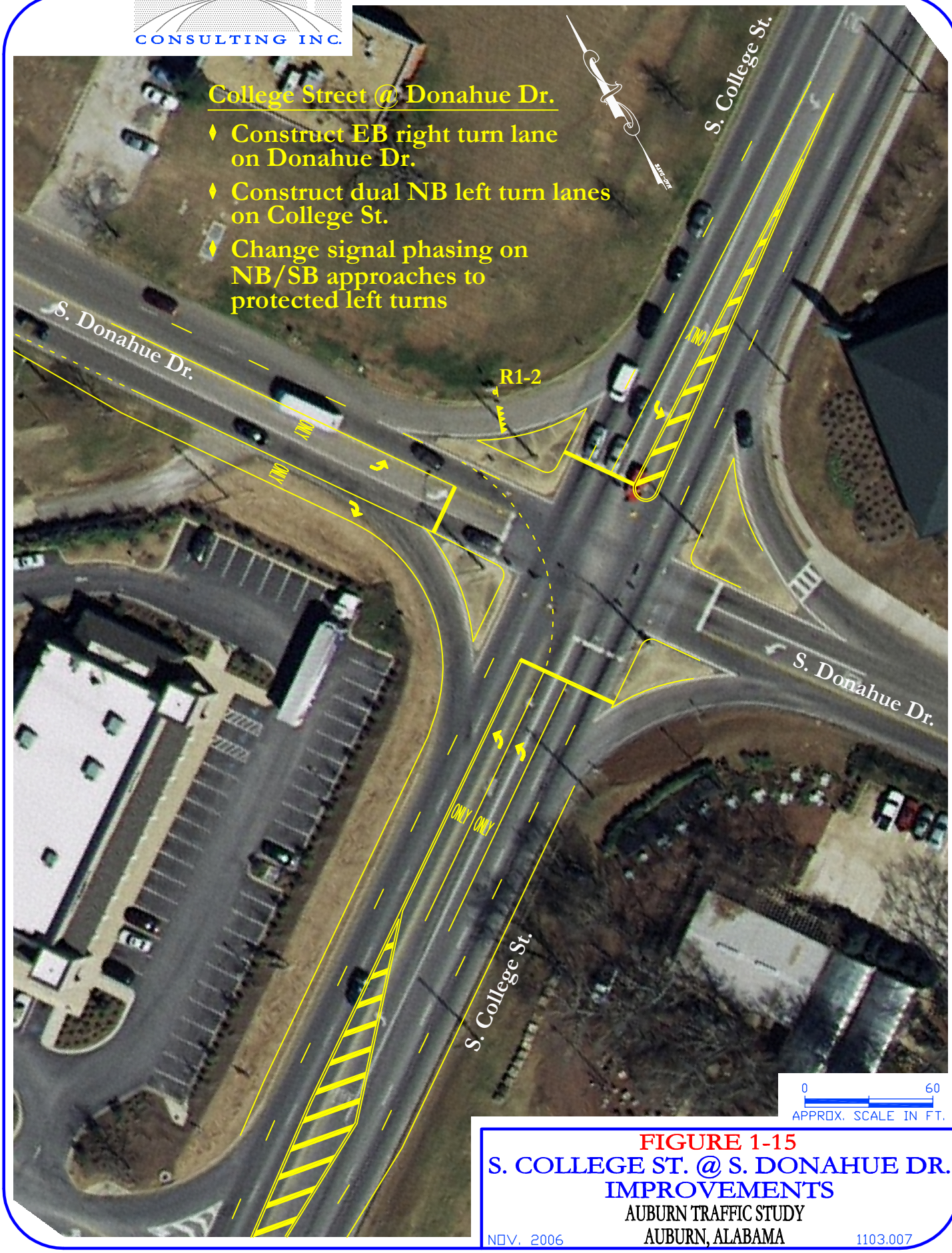


FIGURE 1-15
S. COLLEGE ST. @ S. DONAHUE DR. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
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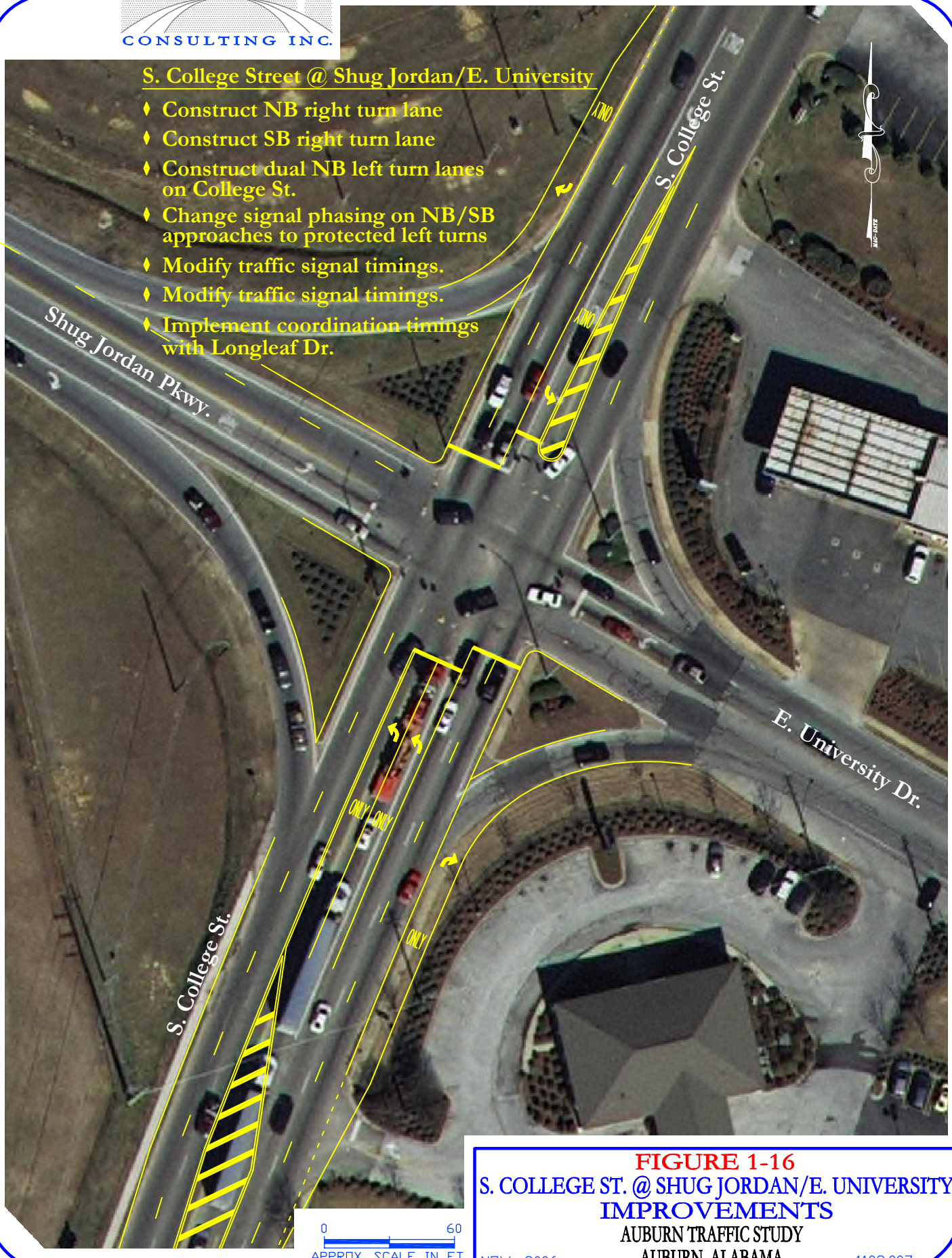


FIGURE 1-16
S. COLLEGE ST. @ SHUG JORDAN/E. UNIVERSITY
IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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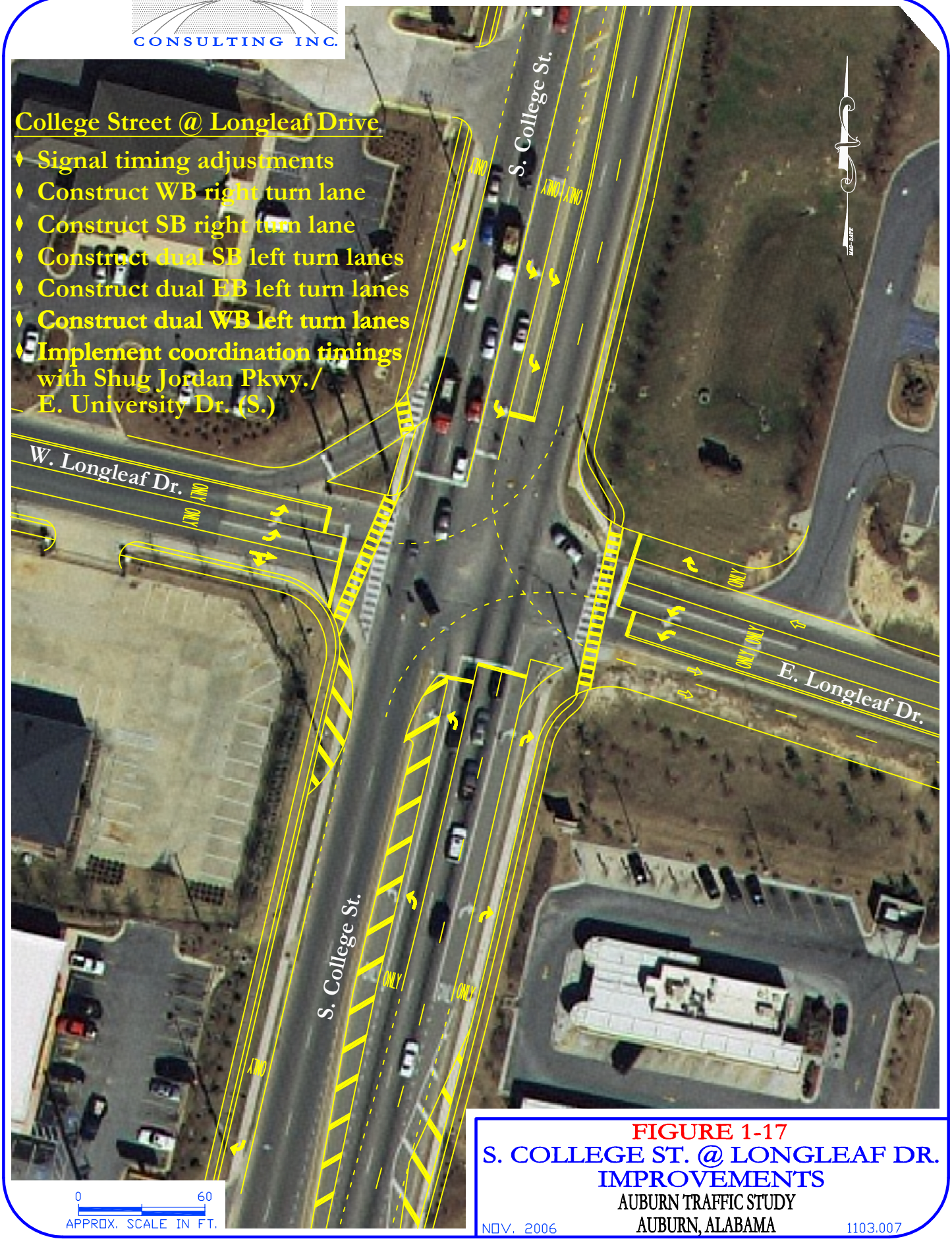


FIGURE 1-17
S. COLLEGE ST. @ LONGLEAF DR. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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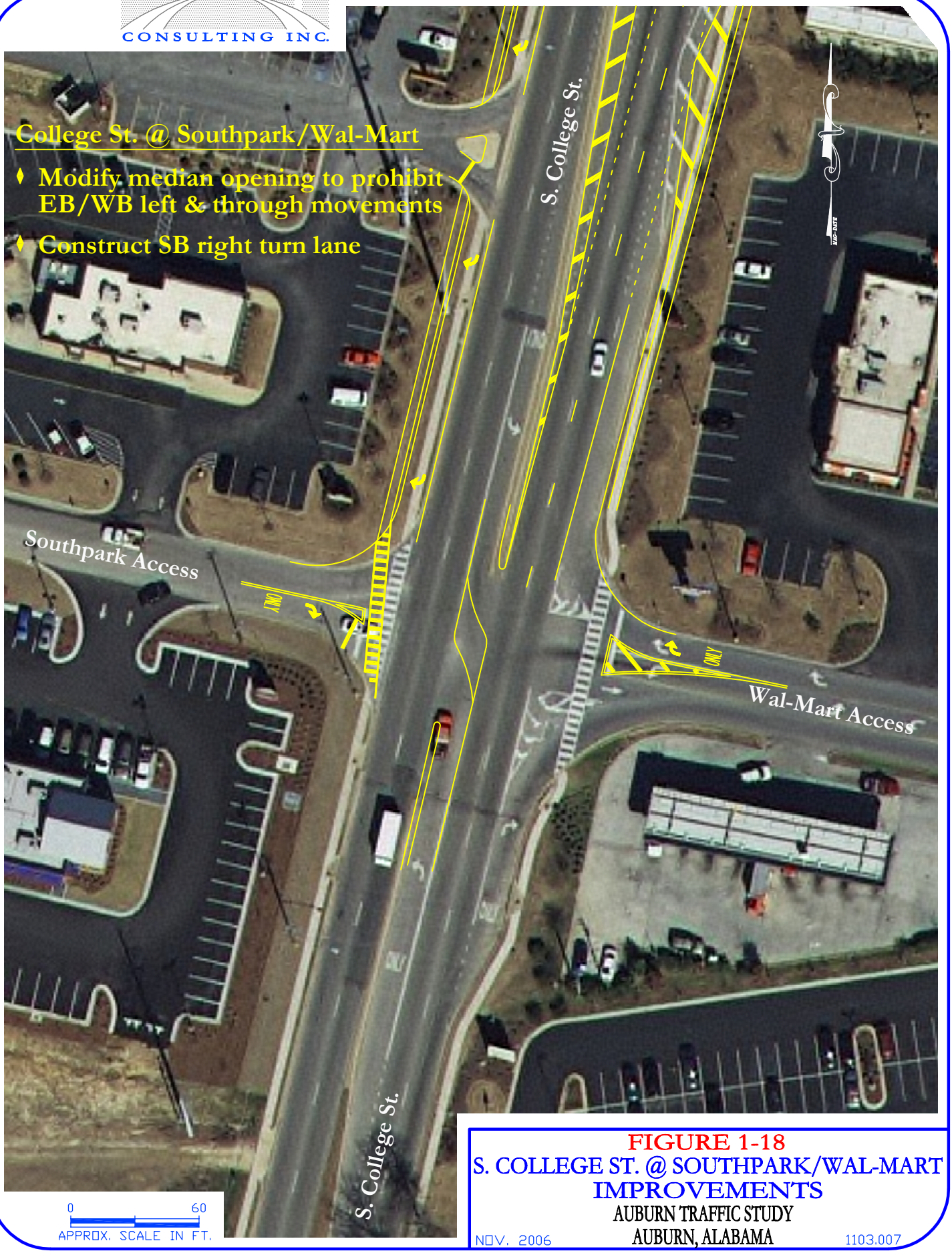


FIGURE 1-18
S. COLLEGE ST. @ SOUTHPARK/WAL-MART
IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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FIGURE 1-19
S. COLLEGE ST. @ VETERANS BLVD. IMPROVEMENTS
AUBURN TRAFFIC STUDY
AUBURN, ALABAMA
NOV. 2006
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INTERSECTION CAPACITY ANALYSIS WITH RECOMMENDED IMPROVEMENTS

Capacity analyses were conducted for study intersections which improvements were recommended and assumed to be in place. Capacity analyses were conducted using methods of the *Highway Capacity Manual*, as previously introduced. **Table 1-4** provides a summary of the levels of service for study intersections with the recommended improvements in place. For comparative purposes, existing levels of service are shown in red in **Table 1-4**. **Appendix C** provides capacity printouts for the study intersections with recommended improvements assumed to be in place.

Table 1-4 indicates each of the study intersections would operate with overall levels of service "D" or better. In fact, the majority of study intersections would operate with overall levels of service "C" or better. In addition, each movement/lane group would operate at a level of service "D" or better during both peak periods evaluated with the exception of the southbound left turn movement on College Street at Shug Jordan Parkway/EUD (S). The actual level of service for this movement would reduce to a level of service "E" as a result of protected only left turn phasing being recommended which is a result of dual left turn lanes for the northbound left turn movement on College Street at this intersection.

Also, the side street approaches on Woodfield Drive at College Street currently operate with less than acceptable levels of service during morning and afternoon peak periods. These results are typical during peak periods for a side street intersecting a major arterial roadway at a side-street stop condition. It should be noted that current peak hour volumes for Woodfield Drive at College Street are not sufficient to meet the criteria for the peak hour signal warrant at this location. However, peak hour volumes are close to meeting peak hour criteria for signalization. It is recommended that traffic volumes for Woodfield Drive be monitored and signalization considered should traffic volumes increase to a point that signalization would be warranted.

Table 1-4
Intersection Levels of Service with Recommended Improvements
(Existing LOS indicated in RED)

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service			
			A.M. Peak Hour		P.M. Peak Hour	
College Street at Shug Jordan Parkway (North) (traffic signal)	EB Shug Jordan	Left	C	C	C	C
		Through	C	D	C	D
		Right	C		B	
	WB Shug Jordan	Left	C	D	C	C
		Through	D	E	D	E
		Right	B		C	
	NB College Street	Left	C	B	B	B
		Through/Right	D	C	C	C
	SB College Street	Left	C	B	B	B
		Through	C	C	C	C
		Right	C	B	C	B
	Overall LOS		**C**	**D**	**C**	**D**
College Street at Shelton Mill Road (side street stop)	WB Shelton Mill	Left/Right	C	C	C	C
	SB College Street	Left/Through	A	A	A	A
College Street at Drake Avenue (traffic signal)	EB Drake Avenue	Left/Through/Right	B	B	B	B
	WB Drake Avenue	Left/Through/Right	B	B	B	B
	NB College Street	Left	A	A	A	A
		Through/Right	A		A	
	SB College Street	Left	A	B	A	A
		Through/Right	B		A	
	Overall LOS		**B**	**B**	**B**	**B**
College Street at Mitcham Avenue (traffic signal)	WB Mitcham Ave.	Left	D	C	D	D
		Right	C	B	C	B
	NB College Street	Through	B	C	B	C
		Right	A	A	A	A
	SB College Street	Left	A	A	A	B
		Through	A	B	A	A
	Overall LOS		**B**	**B**	**B**	**C**
College Street at Bragg Avenue (traffic signal)	EB Bragg Ave.	Left	C	C	C	C
		Right	C	C	B	B
	NB College Street	Left	A	A	A	A
College Street at Glenn Avenue (traffic signal)	EB Glenn Avenue	Left	C	C	C	B
		Through	C	C	D	C
		Right	B		B	
	WB Glenn Avenue	Left	C	C	C	C
		Through/Right	D	D	D	C
	NB College Street	Left	B	B	C	C
		Through	C	C	C	E
		Right	C	C	C	D
	SB College Street	Left	B	B	C	C
		Through	C	C	D	D
		Right	C	C	D	D
	Overall LOS		**C**	**C**	**C**	**D**

Table 1-4 (continued)
Intersection Levels of Service with Recommended Improvements
(Existing LOS indicated in RED)

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service			
			A.M. Peak Hour		P.M. Peak Hour	
College Street at Magnolia Avenue (traffic signal)	EB Magnolia Ave.	Left	C	C	D	D
		Through	C	D	D	F
		Right	C		D	
	WB Magnolia Ave	Left	C	C	C	D
		Through/Right	D	D	D	D
	NB College Street	Left	C	C	D	D
		Through	A	B	B	C
		Right	B	B	B	C
	SB College Street	Left	B	B	C	C
		Through/Right	C	C	D	D
	Overall LOS		**C**	**C**	**D**	**D**
College Street at Thach Avenue (traffic signal)	EB Thach Avenue	Left	C	D	D	D
		Through	C	D	D	D
		Right	C	D	D	D
	WB Thach Avenue	Left	B	C	C	C
		Through	B	B	C	C
		Right	B	D	C	C
	NB College Street	Left	C	B	B	B
		Through	C	D	B	C
		Right	B		B	
	SB College Street	Left	B	B	B	B
		Through/Right	C	C	C	C
	Overall LOS		**C**	**C**	**C**	**C**
College Street at Miller Avenue/ Roosevelt Drive (traffic signal)	EB Miller Avenue/ Roosevelt Drive	Left	C	C	D	D
		Through/Right	C	C	D	D
	WB Miller Avenue/ Roosevelt	Left/Through/Right	C	C	D	D
	NB College Street	Left	B	C	A	A
		Through/Right	C		A	
	SB College Street	Left	B	B	A	A
		Through	A	A	A	A
		Right	B		A	
	Overall LOS		**B**	**B**	**B**	**B**
College Street at Samford Avenue (traffic signal)	EB Samford Ave.	Left	C	C	C	C
		Through	C	C	D	D
		Right	C	C	C	C
	WB Samford Ave	Left	B	B	D	E
		Through/Right	D	D	D	D
	NB College Street	Left	C	C	C	C
		Through	C	C	C	D
		Right	C		C	
	SB College Street	Left	B	B	C	C
		Through	B	B	C	C
		Right	B	B	C	C
	Overall LOS		**C**	**C**	**D**	**D**

Table 1-4 (continued)
Intersection Levels of Service with Recommended Improvements
(Existing LOS indicated in RED)

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service			
			A.M. Peak Hour		P.M. Peak Hour	
College Street at Woodfield Drive (side street stop)	EB Woodfield Drive	Left/Through	D	D	F	F
		Right	A	A	B	B
	WB Woodfield Dr	Left/Through/Right	F	F	F	F
	NB College Street	Left	A	A	A	A
	SB College Street	Left	A	A	B	B
College Street at Donahue Drive (traffic signal)	EB Donahue Drive	Left	B	B	C	C
		Through	B	B	C	D
		Right	A		B	
	WB Donahue Dr	Left	B	B	C	C
		Through	C	C	C	C
		Right	B	B	C	C
	NB College Street	Left	C	A	C	C
		Through/Right	B	B	B	B
	SB College Street	Left	C	A	C	A
		Through/Right	B	B	B	B
	Overall LOS		**B**	**B**	**B**	**B**
College Street at Shug Jordan Parkway (South) (traffic signal)	EB Shug Jordan Parkway	Left	C	B	C	D
		Through	C	C	D	E
		Right	B	B	C	C
	WB Shug Jordan Parkway	Left	C	B	D	F
		Through/Right	D	C	D	F
	NB College Street	Left	D	D	D	D
		Through	C	D	C	C
		Right	B		B	
	SB College Street	Left	D	B	D	C
		Through	C	C	D	E
		Right	B		C	
	Overall LOS		**C**	**C**	**D**	**D**
College Street at Longleaf Drive (traffic signal)	EB Longleaf Drive	Left	C	B	D	C
		Through/Right	C	B	D	C
	WB Longleaf Dr	Left	D	B	D	C
		Through	C	C	D	C
		Right	C		D	
	NB College Street	Left	B	B	C	C
		Through	C	C	D	D
		Right	A	B	B	B
	SB College Street	Left	B	B	D	C
		Through	C	C	C	D
		Right	C		C	
	Overall LOS		**C**	**C**	**D**	**D**
College Street at Wal-Mart/ Southpark Drive (side street stop)	EB Southpark	Right	B	F	B	F
	WB Wal-Mart	Right	B	C	C	D
	NB College Street	Left	B	A	B	B
	SB College Street	Left	B	B	B	B

Table 1-4 (continued)
Intersection Levels of Service with Recommended Improvements
(Existing LOS indicated in RED)

Intersection (traffic control)	Approach	Movement/Lane Group	Level of Service			
			A.M. Peak Hour		P.M. Peak Hour	
College Street at Veterans Boulevard (traffic signal)	EB Veterans Blvd.	Left	C	B	D	B
		Through	C	B	C	B
		Right	C	B	C	B
	WB Veterans Blvd	Left	C	B	D	B
		Through/Right	C	B	C	B
	NB College Street	Left	A	A	A	A
		Through/Right	B	B	B	B
	SB College Street	Left	A	A	A	A
		Through	B	B	B	B
		Right	B		B	
	Overall LOS		**B**	**B**	**B**	**B**
College Street at I-85 Southbound Ramps (traffic signal)	WB I-85 SB Ramps	Left	C	B	D	C
		Right	C	B	D	C
	NB College Street	Left	A	A	A	A
		Through	A	A	A	A
	SB College Street	Through	B	B	B	B
		Right	B	B	B	B
	Overall LOS		**B**	**B**	**B**	**B**
College Street at I-85 Northbound Ramps (traffic signal)	EB I-85 NB Ramps	Left	D	D	D	D
		Right	D	D	D	D
	NB College Street	Through	B	B	B	B
		Right	B	A	B	A
	SB College Street	Left	D	D	D	D
		Through	A	A	A	A
	Overall LOS		**C**	**C**	**C**	**C**

ARTERIAL SEGMENT CAPACITY ANALYSIS WITH RECOMMENDED IMPROVEMENTS

Arterial segment capacity analyses for peak hour conditions along the College Street Corridor were conducted for the morning and afternoon peak hour periods using methods outlined in the *Highway Capacity Manual, Third Edition*. These capacity analyses were conducted assuming the recommended roadway and traffic control improvements outlined in previous sections of this document would be in place. Levels of service for the arterial analyses conducted for College Street with the recommended improvements in place are summarized in **Table 1-5**. For comparative purposes, existing levels of service are shown in red in **Table 1-5.** Capacity printouts are provided in **Appendix C**.

Table 1-5 indicates that the segments of College Street evaluated would operate with acceptable total urban street levels of service during each peak period evaluated. The only segment which would operate with less than acceptable levels of service would be southbound College Street from Mitcham Avenue to Glenn Avenue.

Table 1-5
Arterial Segment Levels of Service with Recommended Improvements
(Existing LOS indicated in RED)

Northbound College Street Arterial Analysis						
From	To	Segment Length (miles)	Arterial Level of Service by Section			
			AM Peak		PM Peak	
I-85 NB Ramps	I-85 SB Ramps	0.19	C	C	C	C
I-85 SB Ramps	Veterans Parkway	0.20	D	D	D	D
Veterans Parkway	Longleaf Drive	0.75	B	B	C	C
Longleaf Drive	Shug Jordan/EUD (S)	0.33	D	D	D	D
Shug Jordan/EUD (S)	Donahue Drive	0.72	C	B	B	B
Total Urban Street LOS			**C**	**C**	**C**	**C**
Samford Avenue	Roosevelt/Miller	0.18	C	D	B	B
Roosevelt/Miller	Thach Avenue	0.19	D	D	C	D
Thach Avenue	Magnolia Avenue	0.17	B	C	C	D
Magnolia Avenue	Glenn Avenue	0.17	D	D	D	*E*
Glenn Avenue	Mitcham Avenue	0.10	D	*E*	D	*E*
Mitcham Avenue	Drake Avenue	0.25	B	B	B	B
Total Urban Street LOS			**C**	**C**	**C**	**D**
Drake Avenue	Shug Jordan/EUD (N)	1.56	B	B	B	B
Total Urban Street LOS			**B**	**B**	**B**	**B**

Southbound College Street Arterial Analysis						
From	To	Segment Length (miles)	Arterial Level of Service by Section			
			AM Peak		PM Peak	
Shug Jordan/EUD (N)	Drake Avenue	1.56	A	A	A	A
Total Urban Street LOS			**A**	**A**	**A**	**A**
Drake Avenue	Mitcham Avenue	0.25	B	B	B	B
Mitcham Avenue	Glenn Avenue	0.10	*E*	*E*	*F*	*F*
Glenn Avenue	Magnolia Avenue	0.17	D	D	D	D
Magnolia Avenue	Thach Avenue	0.17	C	D	C	D
Thach Avenue	Roosevelt/Miller	0.19	B	B	B	B
Roosevelt/Miller	Samford Avenue	0.18	C	C	C	D
Total Urban Street LOS			**C**	**C**	**C**	**D**
Donahue Drive	Shug Jordan/EUD (S)	0.72	C	C	C	D
Shug Jordan/EUD (S)	Longleaf Drive	0.33	D	D	D	D
Longleaf Drive	Veterans Boulevard	0.75	B	B	B	B
Veterans Boulevard	I-85 SB Ramps	0.20	D	D	D	D
I-85 SB Ramps	I-85 NB Ramps	0.19	C	C	C	C
Total Urban Street LOS			**C**	**C**	**C**	**C**

The primary factor for poor levels of service calculated in the arterial analyses for College Street between Glenn Avenue and Mitcham Avenue is due to the spacing

between these signalized intersections. With spacing of approximately 525 feet, the travel speeds for this segment would be relatively low resulting in poor levels of service. The following summarizes the travel speeds calculated for this segment of College Street:

		Calculated Travel Speeds	
Direction	Segment	AM Peak	PM Peak
Southbound	Mitcham Avenue to Glenn Avenue	7.5 mph	6.3 mph

These resultant speeds reflect delay for the through movements at these signalized intersections. Intersection capacity analyses indicate levels of service ranging from "A" to "D" would be provided for the through movements on College Street at these intersections.

With the implementation of the recommended improvements at the College Street intersections, increases in average travel speed for the overall arterial would be realized. **Table 1-6** provides a summary of the increases in travel speeds calculated for existing conditions compared to conditions expected with the implementation of the recommended improvements for the College Street intersections.

Table 1-6
Overall Arterial Segment Travel Speed Comparisons

Condition	Northbound College Street		Southbound College Street	
	AM Peak	PM Peak	AM Peak	PM Peak
Existing	13.5 mph	12.6 mph	13.9 mph	12.2 mph
With Improvements	15.3 mpg	15.9 mph	14.5 mph	13.3 mph
Average Travel Speed Increase	**1.8 mph**	**3.2 mph**	**0.6 mph**	**1.1 mph**

Based upon the intersection capacity analyses and the overall College Street urban street levels of service and calculated travel speeds, it is anticipated that the traffic flows on College Street would be improved with the recommended improvements in place. As a result of the capacity analyses for the intersections and overall urban street operations, no additional improvements on this segment of College Street are recommended at this time.

Potential Arterial Modifications

As outlined above, the current spacing of traffic signals along College Street appears to be the primary factor impacting arterial segment levels of service. In order to address the southbound College Street arterial segment from Mitcham Avenue to Glenn Avenue operating at levels of service "E" or "F", modifications would be required that either adjust the signal spacing or significantly widen the roadway within those segments where levels of service are below acceptable levels. The following provides a summary of the potential modifications which would be required along these College Street segments in order to achieve levels of service "D" or better:

- Remove the traffic signal at Mitcham Avenue to increase signal spacing and in turn increase travel speeds along the arterial.
- Relocate Mitcham Avenue to the north, as a minimum to align with Bragg Avenue, or extend Opelika Road from Gay Street to increase signal spacing and in turn increase travel speeds along the arterial.
- Reallocate traffic signal timings to further prioritize College Street.
- Significantly widen College Street from Bragg Avenue to Glenn Avenue.

Although these potential modifications would improve arterial levels of service on College Street, the practicality of implementing these modifications with the associated negative impacts on adjacent roadways and land uses would be significant. Brief descriptions of the implications of implementing these modifications are summarized as follows:

- Removing the traffic signal at Mitcham Avenue and College Street would most like result in significant changes in area travel patterns to an extent that additional improvements would be required on adjacent roadways to accommodate these changes in travel patterns.
- Relocating Mitcham Avenue to the north or extending Opelika Road (as previously discussed in this document) would require a new roadway to be built along with the substantial acquisition of right or way for the new roadway alignment.

- Reallocation of green time to further prioritize College Street would have significant negative impacts on Glenn Avenue and Mitcham Avenue and their ability to accommodate traffic flows. In addition, decreasing green time for Glenn Avenue and Mitcham Avenue would result in significant negative impacts on the flow of traffic along Glenn Avenue. The results of reallocating green time for College Street would likely require significant roadway improvements for Glenn Avenue and Mitcham Avenue in order to maintain acceptable levels of service.
- The widening that would be required for College Street from Bragg Avenue to Glenn Avenue to obtain roadway segment levels of service "D" or better would be extensive. For example, a minimum of three southbound through lanes plus turn lanes would likely be required along these segments of College Street. This extensive widening would require additional right of way and impact several adjacent properties in order to provide the roadway width required to achieve desirable arterial level of service.

Overall, the arterial levels of service along southbound College Street would be acceptable (levels of service "C"). The exception along College Street would be the segment from Mitcham Avenue to Glenn Avenue operating at levels of service "E" or "F". Based upon the intersection levels of service, overall arterial levels of service, improvements in travel speed for College Street with the recommended improvements, and the level of improvements (outlined above) that would be required to accomplish an acceptable level of service for the southbound College Street arterial from Mitcham Avenue to Glenn Avenue, it is suggested that such modifications are not practical and should not be considered for implementation at this time.

However, it is recommended that these segments along College Street be monitored and should conditions deteriorate beyond current levels, further investigation of potential improvements would be needed. Additionally, it is recommended that the City of Auburn apply access management techniques to these segments of College Street where

levels of service fall below acceptable levels. Such techniques would include combining driveways to reduce access points to College Street, modifications of current access points to restrict left turn movements and investigate alternative access from adjacent streets and land uses. This recommendation is based on the premise that the maximum utilization of the current roadway should be obtained by limiting conflict points along the deficient segments prior to implementing other modifications.