ORIGINAL TO GENERAL FILES

D.O.T. 66

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE STP-2688(4) Hall County
P. I. No. 170735
SR 347 Widening Phases 1 and 2

OFFICE Preconstruction

DATE March 1, 2005

FROM For Margaret B. Pirkle, P.E., Assistant Director of Preconstruction

TO SEE DISTRIBUTION

SUBJECT PROJECT CONCEPT REPORT APPROVAL

Attached for your files is the approval for subject project.

MBP/cj

Attachment

DISTRIBUTION:

David Mulling
Harvey Keepler
Ken Thompson
Jamie Simpson
Michael Henry
Keith Golden
Joe Palladi (file copy)
Paul Liles
Babs Abubakari
Russell McMurry
BOARD MEMBER

D.O.T. 66

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE STP-2688(4) Hall County
P.I. No. 170735
SR 347 Widening Phases 1 and 2

OFFICE Preconstruction

DATE February 21, 2005

FROM Margaret B. Pirkle, P.E., Assistant Director of Preconstruction

TO Paul V. Mullins, P.E., Chief Engineer

SUBJECT PROJECT CONCEPT REPORT

This project is the widening and reconstruction of SR 347/Friendship Road from I-985 to Lake Lanier in two phases. Phase 1 will consist of widening Friendship Road/SR 347 from I-985 to McEver Road for a total of 1.70 miles. Phase 2 will consist of widening the facility from McEver Road to Lake Lanier for a total of 2.40 miles. State Route 347 within the project limits is functionally classified as a rural major collector. It currently consists of two lanes that are typically 12' in width from I-985 to North Water Works Road and 11' from North Water Works Road to the gate at Lake Lanier. The speed limit along this portion varies from 45 to 50 MPH. According to 2002 traffic counts, the AADT along Phase 1 was 19,900 VPD. The facility operates at level-of-service (LOS) "E." By the year 2013, this facility will have an estimated 24,300 VPD and a failing level of service. With the proposed improvements, the facility will operate at LOS "B" in 2013. Traffic counts from 2002 along Phase 2 of the improvements record an AADT of 3,400. The facility operates at LOS "B." By 2033, this portion of the facility will have an estimated 6,100 VPD. At this rate, the facility will maintain LOS "B." Phase 1 widening of Friendship Road/SR 347 is necessary to improve travel conditions and accessibility to the heavily traveled Lake Sidney Lanier Recreation area. The Phase 2 improvements can be delayed as travel along this segment is expected to maintain acceptable levels of service through 2033.

STP-2688(4) Hall - I-985 to McEver Road, Phase 1

The proposed construction will provide an urban roadway section consisting of two lanes in each direction divided by a 20' raised median. By using retaining walls at 3 locations, additional rights-of-way will not be necessary for the construction of this project.

It is requested that another project be programmed for upgrading the section of SR 347 from McEver Road to its terminus as Lake Lanier Islands Park entrance.

Proposed new Project # - McEver Road to Lake Lanier, Phase 2

The proposed construction will provide a five lane (flush median) roadway section for the entire length.

STP-2688(4) Hall
February 21, 2005

Environmental concerns include requiring a Categorical Exclusion be prepared; a public information open house has been held; time saving procedures are appropriate.

The estimated costs for these projects are:

STP-2688(4) Hall - Phase 1

	PROPOSED	APPROVED	FUNDING	PROG DATE
Construction (includes E&C and inflation)	$5,398,000	$5,398,000	Q24	2013
Right-of-Way & Utilities*	-0-	-0-		

Proposed New Project - Phase 2

	PROPOSED	APPROVED	FUNDING	PROG DATE
Construction (includes E&C and inflation)	$9,104,000	$9,104,000	Q24	LR(Proposed)
Right-of-Way	$2,120,000	$2,120,000		
Utilities*	LGPA	LGPA		

*Hall County signed LGPA 7-10-98 for utilities/cities signed 6-20-89 for utilities.

I recommend these project concepts be approved.

MBP:JDQ/cj

Attachment

CONCUR Buddy Gratton
Buddy Gratton, P.E., Director of Preconstruction

APPROVE Paul V. Mullins
Paul V. Mullins, P.E., Chief Engineer

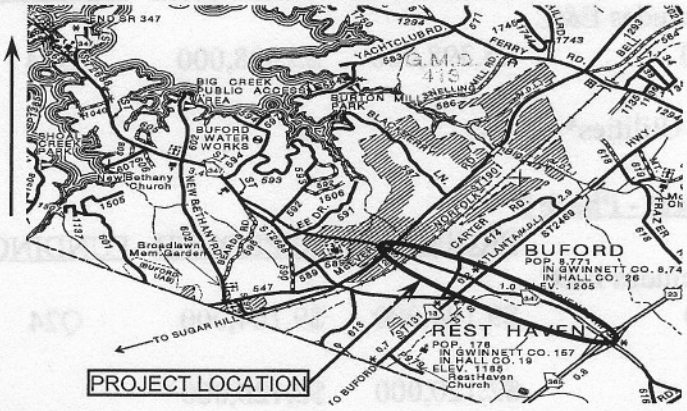
DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

District One

PROJECT CONCEPT REPORT

Project Number: STP-2688(4)
County: Hall
P. I. Number: 170735

Federal Route Number: None
State Route Number: 347



Recommendation for approval:

DATE 11-16-2004 _____ Project Manager

DATE 11-16-2004 _____ Office Head/District Engineer

The concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Improvement Program (RTP) and the State Transportation Improvement Program (STIP).

DATE _____ _____ State Transportation Planning Administrator

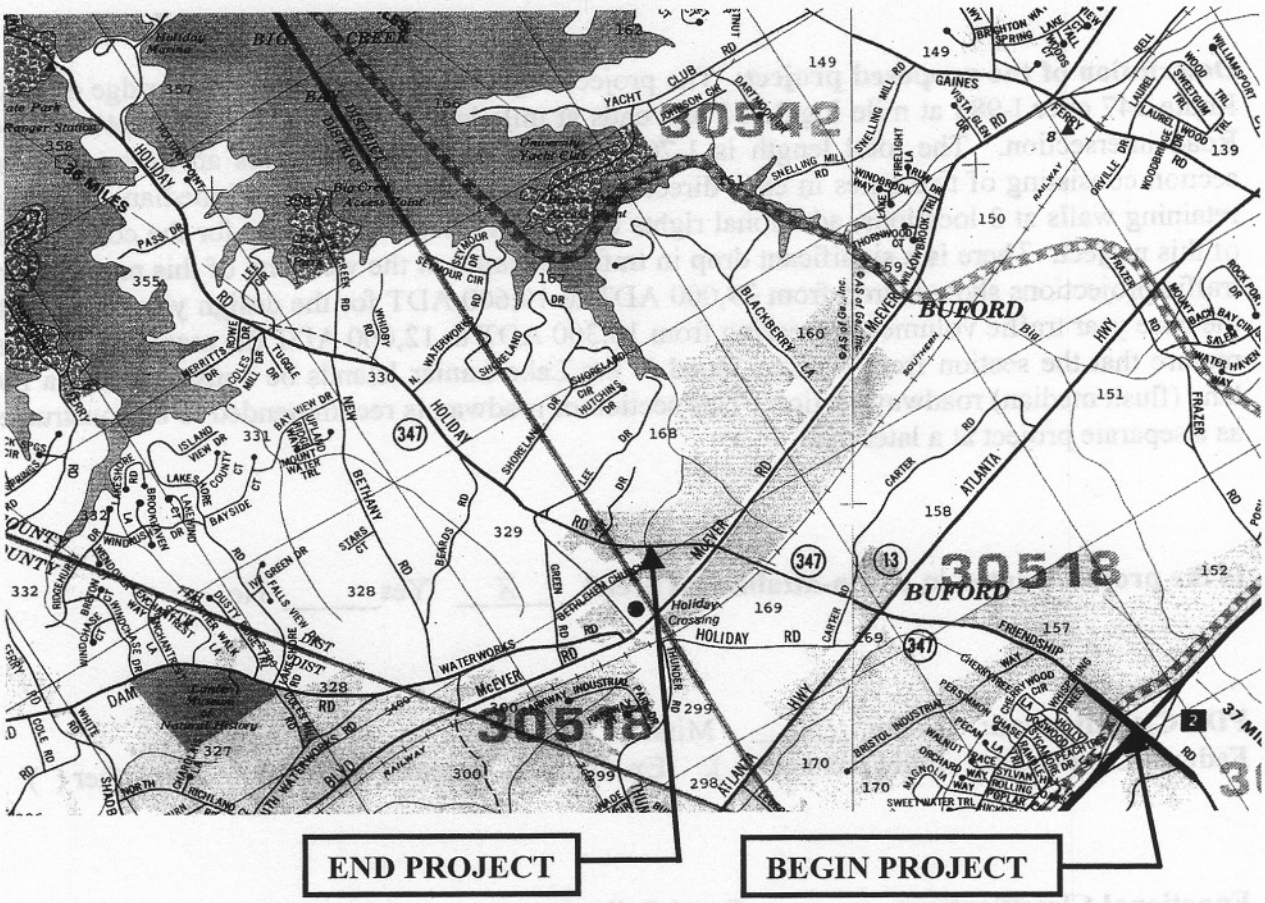
DATE _____ _____ State Transportation Financial Management Administrator

DATE _____ _____ State Environmental/Location Engineer

DATE _____ _____ State Traffic Safety & Design Engineer

DATE _____ _____ Project Review Engineer

DATE _____ _____ State Bridge and Structural Design Engineer



LOCATION SKETCH
PROJECT NUMBER: STP-2688(4) **P.I. NO.:** 170735

DESCRIPTION:
Widening and Reconstruction of SR 347 from I-985 to McEver Road

Need and Purpose:

See attachment 3

Description of the proposed project: The project begins at the west end of the bridge on State Route 347 over I-985 at mile log 3.935 and ends at mile log 2.239 west of the SR 347/McEver Road intersection. The total length is 1.70 miles. This project provides an urban roadway section consisting of two lanes in each direction, divided by a 20 foot raised median. By using retaining walls at 3 locations, additional rights of way will not be necessary for the construction of this project. There is a significant drop in traffic volumes at the west end of this project. The traffic projections show a drop from 29,000 ADT to 19,600 ADT for the design year. Also, with the base year traffic volumes decreasing from 18,300 ADT to 12,000 ADT the median guidelines require that the section from McEver Road to the Lake Lanier Islands be constructed as a five lane (flush median) roadway section. This section of roadway is recommended to be constructed as a separate project at a later date.

Is the project located in a Non-attainment area? __X__ Yes_____ No.

PDP Classification: Major _____ Minor __X__
Federal Oversight: Full Oversight ( ), Exempt(X), State Funded( ), or Other ( )

Functional Classification: Rural Collector

U. S. Route Number(s): None **State Route Number(s):** 347

Traffic (AADT):
Current Year: (2010) 32,550 Design Year: (2030) 49,850

Existing design features:

- Typical Section: Two lane rural section with variable width grass shoulders
- Posted speed 45 mph Minimum radius for curve: 1145'

- Maximum grade: Mainline = 4.7%; Side Street = 4%; Driveway = 12%
- Width of right of way: Min 130 ft.
- Major structures: Bridge over RR
- Major interchanges or intersections along the project: (1) SR 13 (2) McEver Road

Proposed Design Features:

- Proposed typical section: Divided Four Lane (20' raised median) with 20' shoulders, curb and gutter and sidewalks
- Proposed Design Speed Mainline 45 mph
- Proposed Maximum grade Mainline 4.7 %Maximum grade allowable 7 %.
- Proposed Maximum grade Side St 4 %Maximum grade allowable 10 %.
- Proposed Maximum grade driveway 12% Commercial
- Proposed Minimum radius for curve 1145 Minimum radius allowable 600
- Proposed Maximum degree of curve 5 Maximum degree allowable 9.5
- Right of way
  - Width Existing
  - Easements: Temporary ( ), Permanent ( ), Utility ( ), Other (X) none.
  - Type of access control: Full ( ), Partial ( ), By Permit (X), Other ( ).
  - Number of parcels: 0 Number of displacements:
    - Business: ---
    - Residences: ---
    - Mobile homes: ---
    - Other:
- Structures:
  - Bridges: Bridge widening over RR
  - Retaining walls: Type 6A & 6B Concrete Side Barrier Walls
- Major intersections and interchanges: (1) SR 13 (2) McEver Road
- Traffic control during construction: Roadway to remain open to traffic during construction.
- Design Exceptions to controlling criteria anticipated:

	UNDETERMINED	YES	NO
HORIZONTAL ALIGNMENT:	()	()	(X)
ROADWAY WIDTH:	()	()	(X)
SHOULDER WIDTH:	()	()	(X)
VERTICAL GRADES:	()	()	(X)
CROSS SLOPES:	()	()	(X)
STOPPING SIGHT DISTANCE:	()	()	(X)
SUPERELEVATION RATES:	()	()	(X)
HORIZONTAL CLEARANCE:	()	()	(X)
SPEED DESIGN:	()	()	(X)
VERTICAL CLEARANCE:	()	()	(X)
BRIDGE WIDTH:	()	()	(X)
BRIDGE STRUCTURAL CAPACITY:	()	()	(X)

- Design Variances: Median width across bridge
- Environmental concerns: None
- Level of environmental analysis:
  - Are Time Savings Procedures appropriate? Yes (X), No ( ),
  - Categorical exclusion (X),
  - Environmental Assessment/Finding of No Significant Impact (FONSI) ( ), or
  - Environmental Impact Statement (EIS) ( ).
- Utility involvements:
  - Atlanta Gas Light
  - Atmos Energy
  - Bellsouth
  - Charter Communications
  - City of Buford
  - City of Gainesville
  - Georgia Power
  - Hall County
  - Jackson EMC

Project responsibilities:

- Design - GDOT
- Right of Way Acquisition - None
- Relocation of Utilities – None
- Letting to contract - GDOT
- Supervision of construction - GDOT
- Providing material pits - Contractor
- Providing detours – N/A

Coordination

- Concept meeting date and brief summary. November 4, 2004 (Minutes attached)
- Public involvement. To be scheduled: Public Information Open House, Public Hearing Open House
- Local government comments. None
- Other projects in the area:
  - P.I. 001821, McEver Road widening
  - P.I. 162430, SR 347 – Friendship/Thompson Mill Road widening I-985 to SR211
  - P.I. 132950, SR 13 – Buford/Atlanta Highway from Thompson Mill to SR 347
- Other coordination to date. None
- Railroad Coordination: Norfolk Southern

Scheduling – Responsible Parties' Estimate

- Time to complete the environmental process: 18 Months.
- Time to complete preliminary construction plans: 12 Months.
- Time to complete right of way plans: N/A.
- Time to complete the Section 404 Permit: N/A
- Time to complete final construction plans: 6 Months.
- Time to complete to purchase right of way: N/A
- List other major items that will affect the project schedule: None

Other alternates considered: No Build

Comments: None

Attachments:

1. Cost Estimate
2. Typical sections
3. Need and Purpose
4. Concept Team Meeting Minutes
5. Conforming plan's network schematics showing thru lanes
6. Capacity Analysis

SCORING RESULTS AS PER TOPPS 2440-2

Project Number:	County:	PI No.:

Report Date:	Concept By:
	DOT Office:
☐ CONCEPT	
	Consultant:

Project Type: Choose One From Each Column			
	☐ Major	☐ Urban	☐ ATMS
	☐ Minor	☐ Rural	☐ Bridge
			☐ Building
			☐ Interchange
			☐ Intersection
			☐ Interstate
			☐ New Location
			☐ Widening & Reconstruction
			☐ Miscellaneous

FOCUS AREAS	SCORE	RESULTS
Presentation		
Judgement		
Environmental		
Right of Way		
Utility		
Constructability		
Schedule		

PRELIMINARY COST ESTIMATE

PROJECT NUMBER: STP-2688(4) COUNTY: Hall

DATE: August 2004 ESTIMATED LETTING DATE: 2006

PREPARED BY: Attaway PROJECT LENGTH: 1.706

( ) PROGRAMMING PROCESS (X) CONCEPT DEVELOPMENT ( ) DURING PROJECT DEV.

PROJECT COST			
A. RIGHT-OF-WAY:	GDOT		
1. PROPERTY (LAND & EASEMENT)		$	-
2. DISPLACEMENTS; RES: , BUS:		$	-
3. OTHER COST (ADM./COST, INFLATION)		$	-
	SUBTOTAL: A	$	-
B. REIMBURSABLE UTILITIES:	LGPA		
1. RAILROAD		$	-
2. TRANSMISSION LINES		$	-
3. SERVICES		$	-
	SUBTOTAL: B	$	-
C. CONSTRUCTION:			
1. MAJOR STRUCTURES			
a. BRIDGES			
Modify Existing Bridge over RR		$	150,000
		$	-
	SUBTOTAL: C-1.a	$	150,000
b. OTHER			
Side Barrier Walls	725 LF Type 6A and 600 LF Type 6B	$	295,000
Retaining Wall, Class B	50 CY	$	15,000
Bridge Culverts (0)		$	-
	SUBTOTAL: C-1.b	$	310,000
	SUBTOTAL: C-1	$	460,000
2. GRADING AND DRAINAGE:			
a. EARTHWORK			
Grading Complete		$	350,000
b. DRAINAGE			
1) Curb and Gutter	15780 LF Type2 and 14694 LF Type 7	$	304,740
2) Longitudinal System	3000 LF 18" / 1700 LF 24" / 700 LF 36"	$	290,000
49 - 1033 CB's / 18 1034 CB's / 5 D.I.'s / 2 J.B's		$	
	SUBTOTAL: C-2.b	$	594,740
	SUBTOTAL: C-2	$	944,740

P. I. NO.: 170735

PRELIMINARY COST ESTIMATE

PROJECT NUMBER: STP-2688(4) COUNTY: Hall

DATE: August 2004 ESTIMATED LETTING DATE: 2006

PREPARED BY: Attaway PROJECT LENGTH: 1.706

( ) PROGRAMMING PROCESS (X) CONCEPT DEVELOPMENT ( ) DURING PROJECT DEV.

PROJECT COST				
3. BASE AND PAVING:				
a. AGGREGATE BASE	22,000 - tons @	$13.39	$	$294,580.00
b. ASPHALT PAVING (Mainline):				
Aggr Surface Crs	1,000 - tons @	$15.81	$	$15,810.00
Leveling	750 - tons @	$35.95	$	$26,962.50
Surface - Superpave	6,000 - tons @	$35.09	$	$210,540.00
Binder - SMA	- - tons @	$56.90	$	
Binder - Superpave	6,900 - tons @	$36.22	$	$249,918.00
Base - Superpave	24,200 - tons @	$34.52	$	$835,384.00
Pavement Reinf. Fabric Strips	-		$	
	SUBTOTAL: C-3.b		$	1,338,615
c. CONCRETE PAVING	- -		$	-
d. OTHER (Tack Coat)	2300 Gals		$	2,001
	SUBTOTAL: C-3		$	1,635,196
4. LUMP ITEMS				
a. SIGNAL INSTALLATION	4 intersections		$	367,200
b. CLEARING AND GRUBBING			$	-
c. LANDSCAPING			$	-
d. EROSION CONTROL			$	400,000
e. TRAFFIC CONTROL			$	150,000
	SUBTOTAL: C-4		$	917,200
5. MISCELLANEOUS:				
a. LIGHTING			$	-
b. SIGNING - MARKING			$	75,000
c. GUARDRAIL				
Single-Faced			$	-
Double-Faced			$	-
Anchors			$	-
	SUBTOTAL: C-5.c		$	75,000
d. SIDEWALK	8600SY		$	180,600
e. MEDIAN PVMT / DRWY CONC	7130 SY / 100 SY		$	193,445
f. MOVABLE BARRIER SECTION			$	
g. CONC VALLEY GUTTER	1600 SY 8" / 62 SY 6"		$	62,722
h. CL A CONC / CL B CONC / SAWED JTS			$	5,000
i. R/W MARKERS			$	-
j. REMOVAL				
Concrete Paving			$	-
Bridges			$	-
	SUBTOTAL: C-5.j		$	-
k. ATMS Conduit	- -		$	-
l. OTHER			$	-
	SUBTOTAL: C-5		$ $	516,767.00

PRELIMINARY COST ESTIMATE

PROJECT NUMBER: STP-2688(4) COUNTY: Hall

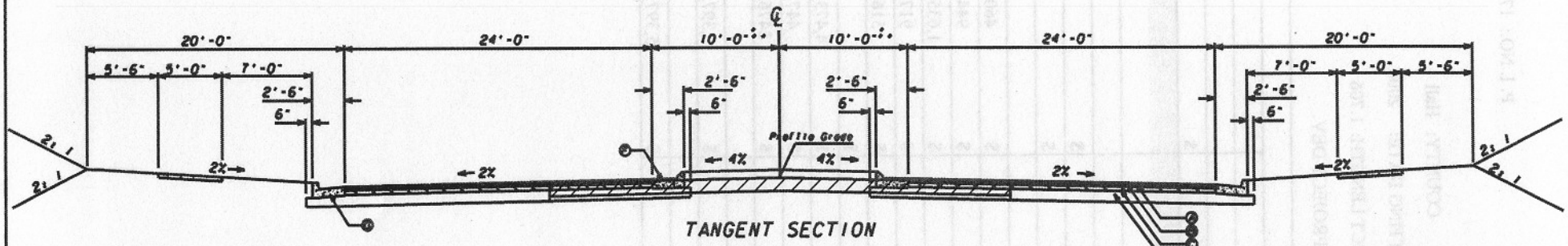
DATE: August 2004 ESTIMATED LETTING DATE: 2006

PREPARED BY: Attaway PROJECT LENGTH: 1.706

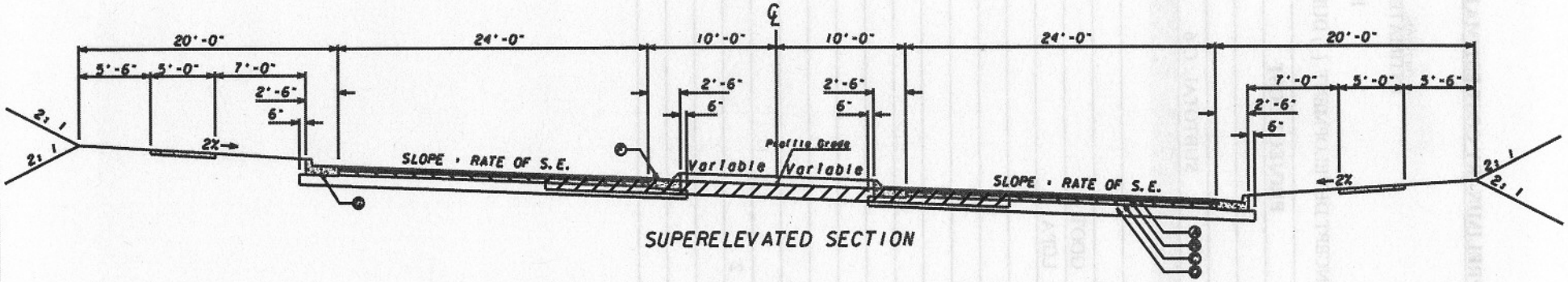
( ) PROGRAMMING PROCESS (X) CONCEPT DEVELOPMENT ( ) DURING PROJECT DEV.

PROJECT COST			
6. SPECIAL FEATURES			
	SUBTOTAL: C-6	$	
SUMMARY			
A. RIGHT-OF-WAY	GDOT	$	-
B. REIMBURSABLE UTILITIES	LGPA	$	-
C. CONSTRUCTION			
1. MAJOR STRUCTURES		$	460,000
2. GRADING AND DRAINAGE		$	944,740
3. BASE AND PAVING		$	1,635,196
4. LUMP ITEMS		$	917,200
5. MISCELLANEOUS		$	516,767
6. SPECIAL FEATURES		$	-
SUBTOTAL CONSTRUCTION COST		$	4,473,903
E. & C. (10%)		$	447,390
INFLATION (5% PER YEAR)		$	$476,471
NUMBER OF YEARS	2		
TOTAL CONSTRUCTION COST		$	5,397,763
GRAND TOTAL PROJECT COST		$	5,397,763

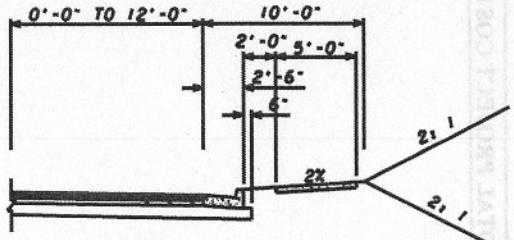
TYPICAL SECTIONS



TANGENT SECTION

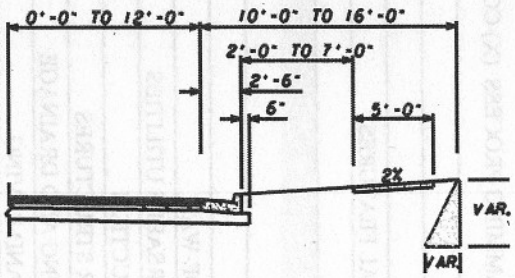


SUPERELEVATED SECTION



DETAIL FOR RIGHT TURN LANE AND SHOULDER WITH NO RETAINING WALL

SEE PLAN SHEETS FOR LOCATION



DETAIL FOR RIGHT TURN LANE AND SHOULDER WITH RETAINING WALL

SEE PLAN SHEETS FOR LOCATION

NEED AND PURPOSE STATEMENT
STP-2688(4), PI 170735
Hall County
SR 347/Friendship Road from I-985 to Lake (Phase 2 – Lanes 3&4)

Background

The widening of SR 347/ Friendship Road first entered the Department's construction work program in 1986 upon request from the State Highway Engineer. At that time, the project was identified under PI 170730 as a widening and paving project from I-985 to the Holiday Marina. The purpose of the project was to provide for the projected future traffic accessing the heavily traveled Lake Lanier recreational area. The project's purpose also includes the correction of geometric deficiencies along the segment closest to the Lake. In 1993, this project was broken into two phases. The first phase remained under PI 170730 and consisted of grading, drainage, and base and paving in preparation for future widening. It also included construction of a bridge over the Southern Railway. The second phase was listed under PI 170735 and consisted of widening Friendship Road/SR 347 from 2 to 4 lanes from I-985 to Lake Lanier. The project is presently scheduled for right of way acquisition in 2009 and construction in 2011.

To satisfy federal air quality and planning requirements, this project was submitted to the Atlanta Regional Commission for the purpose of air quality modeling in the spring of 2004. It is also presently included in the Gainesville-Hall Metropolitan Planning Organization's Draft Long Range Transportation Plan. The plan is scheduled for adoption in December of 2004.

Other projects in the area include the following:

- PI 0001821, McEver Road Widening from SR 347 to CR 537/Jim Crow Road
- PI 162430, SR 347/ Friendship & Thompson Mill Road Widening from I-985 to SR 211
- PI 132950, SR 13-Buford/Atlanta highway from Thompson Mill Road to SR 347

Existing Roadway Characteristics

Friendship Road/SR 347 within the proposed project limits is functionally classified as a rural major collector. It currently consists of two lanes that are typically 12 feet in width from I-985 to North Water Works Road and 11 feet from North Water Works Road to the gate of Lake Lanier. The rural type roadway has variable width grass shoulders. The speed limit along this portion of the facility varies from 45 to 50 mph. The landscape is classified as "rolling terrain". The section of roadway along the proposed improvement is along a school bus route. It is not along a state bike route.

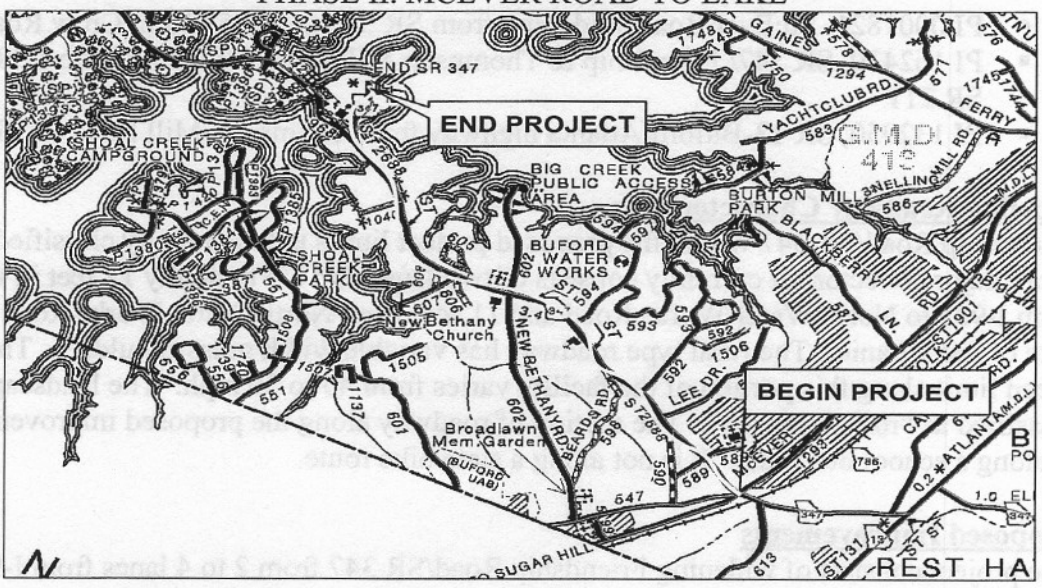
Proposed Improvements

The project consists of widening Friendship Road/SR 347 from 2 to 4 lanes from I-985 to Lake Lanier. It also includes reconstruction/rehabilitation of the intersection at McEver Road. The project termini are logical as the project would provide the necessary access to Lake Lanier to the west and tie into the existing four lanes at I-985/SR 365 to the east.

The Department proposes to construct the widening in two phases. The first phase would consist of widening Friendship Road/SR 347 from I-985 to McEver Road. The second phase would consist of widening the facility from McEver Road to Lake Lanier. The proposed construction phases are logical as phase one is the more congested portion with immediate need for improvement, while phase two widening could be delayed and perform equally as well as the improved phase one portion.

PHASE I: I-985 TO MCEVER ROAD

PHASE II: MCEVER ROAD TO LAKE



Travel Demand and Operational Characteristics

According to 2002 traffic counts, the AADT along the phase one portion of the improvement from I-985 to McEver Road was 19,900 vehicles. The facility operates at LOS E. By the 2013 date of anticipated construction completion, this facility will have an estimated AADT of 24,300 and a failing level of service. With the proposed improvement however, the facility will operate at LOS B in 2013. By 2033, the improved facility will have an estimated AADT of 36,000 and operate at LOS D.

Traffic counts from 2002 along phase two of the improvement from McEver Road to Lake Lanier record an AADT of 3,400. The facility operates at LOS B. By 2033, this portion of the facility will have an estimated AADT of 6,100 vehicles. At this rate, the facility will maintain LOS B.

Safety

Phase I (I-985 to McEver Road)

During 2000, 2001, and 2002, crash rates were reported along the phase one segment of the proposed project. In 2000, there were 20 crashes with 5 injuries and 0 fatalities. In 2001, there were 13 crashes with 2 injuries and 0 fatalities. In 2002, there were 22 crashes with 10 injuries and 0 fatalities. Following are comparable statewide averages:

Crashes from M.P. 2.48 to 4.34; A total of 1.86 miles

Year	**2000**		**2001**		**2002**	
	SR 347	**Statewide**	**SR 347**	**Statewide**	**SR 347**	**Statewide**
Crashes	20		13		22	
Crashes Per 100 MVMT	75	188	48	180	83	195
Injuries	5		2		10	
Injuries Per 100 MVMT	19	62	7	62	38	68
Fatalities	0		0		0	
Fatalities Per 100 MVMT	0	2.53	0	2.29	0	2.37

(MVMT: Million Vehicle Miles Traveled)

Most of the crashes recorded during this time period were rear end collisions. These type incidents are perhaps indicative of the high levels of congestion along the facility.

Phase II (McEver Road to Lake Lanier)

During 2000, 2001, and 2002 high crash rates were also reported along the phase two segment of the proposed project. In 2000, there were 16 crashes with 4 injuries and 0 fatalities. In 2001, there were 16 crashes with 8 injuries and 0 fatalities. In 2002, there were 37 crashes with 9 injuries and 0 fatalities. Following are comparable statewide averages:

Crashes from M.P. 0.00 to 2.48; A total of 2.48 miles

Year	2000		2001		2002	
	SR 347	Statewide	SR 347	Statewide	SR 347	Statewide
Crashes	16		16		37	
Crashes Per 100 MVMT	127	188	160	180	463	195
Injuries	4		8		9	
Injuries Per 100 MVMT	32	62	80	62	113	68
Fatalities	0		0		0	
Fatalities Per 100 MVMT	0	2.53	0	2.29	0	2.37

(MVMT: Million Vehicle Miles Traveled)

Most of the crashes recorded during this time period in the phase two area were also rear end collisions. During 2002, the crash rates rose tremendously and almost all incidents occurred at the McEver Road intersection between milepoints 2.46 and 2.48. Improvements at this intersection will be coordinated as part of the proposed widening project and should assist in alleviating the present congestion leading to crashes.

Community Issues

This project is located in Hall County, Georgia which under the 2000 census was identified as having a population of 139,277. Like much of metropolitan Atlanta, this is a rapidly growing residential and commercial area. Hall County's population has risen 46% since the 1990 census count of 95,428. Of the population sampled in 2000, 19.6% were Hispanic and 7.3% were Black. Approximately 12% of the population was recorded as living below the poverty level.

Phase I:

Within the census block covering the phase one portion of the project, there are 3,169 residents according to the 2000 census. Of these residents, 4.17% are Hispanic and 3.19% are Black. Approximately 16% of these residents posses a household income less than $20,000.

Environmental concerns in phase one include nearby residential communities.

Phase II:

Within the census blocks covering the phase two portion of the project, there are 3,348 residents according to the 2000 census. Of these residents, 1.67% are Hispanic and 1.08% are Black. Approximately 9% of these residents possess a household income less than $20,000.00.

Environmental concerns in phase two include Lake Sidney Lanier.

Detailed analysis of project impact upon the surrounding area will be determined through environmental review.

Need and Purpose

The Phase I widening of the Friendship Rd/SR 347 is necessary to improve travel conditions and accessibility to the heavily traveled Lake Sidney Lanier recreational area. This segment of roadway is presently experiencing high levels of congestion. Increased traffic resulting from planned residential and commercial development is expected to further degrade existing conditions. Improvement of the facility will also improve conditions presently contributing to rising crash rates. This phase of the project is desirable as soon as possible.

The Phase II improvements along the remainder of the facility, from McEver Road to Lake Lanier can be delayed however, as travel along this segment of roadway is expected to maintain acceptable levels of service through 2033. The Office of Planning along with the District 1 Office recommends separating Phase II and establishing it as a separate project.

Department of Transportation

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COMMISSIONER
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PAUL V. MULLINS
CHIEF ENGINEER
(404) 656-5277

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LARRY E. DENT
DEPUTY COMMISSIONER
(404) 656-5212

EARL L. MAHFUZ
TREASURER
(404) 656-5224

November 10, 2004

CONCEPT TEAM MEETING MINUTES

STP-2688 (4), Hall County
SR 347 from I-985 to McEver Road
P.I. 170735

Date of Meeting: November 4, 2004

Location: District One Office

Attendees: See attachment

The Concept Team Meeting was held to present and review the proposed concept for the widening and reconstruction of SR 347 from a two (2) lane section to a four (4) lane section with a raised median from I-985 to McEver Road.

Russell McMurry began the meeting by team member introductions. The concept report sequence was followed as Mr. McMurry discussed each section. The concept layouts were reviewed by all team members.

The following are generalized comments made by team members:

> Currently conflicting traffic movements occur at the Publix Supermarket intersection and the McDonald's driveway. Consideration during design should be given to trying to correct or alleviate this problem.
>
> The existing need of a right turn lane on Bristol Industrial Blvd. and a traffic signal at the intersection was discussed. Also a continuous right turn lane from Bristol Industrial Blvd to the I-985 south bound ramp was suggested.
>
> The topo along the section from SR 13 to the railroad should be updated and a median break provided in the area between Carter Road and the railroad as required.

The City of Buford officials discussed the possibilities of shoulder and median construction that would accommodate landscaping which they would provide.

Utility representatives from Georgia Power, BellSouth, City of Gainesville and City of Buford were in attendance. Utility relocation work is expected within the existing R/W at various locations, especially along State Route 13. It was pointed out that even though the project has a wide existing right of way, it does not necessarily mean that the existing utilities are located at the back of the right of way outside of the new construction limits. The utility companies want existing utility mark-up drawings in order to provide any additional information.

The meeting was adjourned.

CONCEPT TEAM MEETING

STP-2688(4), P.I. 170735
HALL COUNTY

Date: Nov 4, 2004

SIGN-IN SHEET

Name	Office	Phone Number
Don Attaway	GDOT	770-532-5521
Todd Sumption	GDOT - Design	770-718-5007
Don Stephens	R&S G.O R/W	770 983-1072
Stan Aiken	City of Gainesville PUD	770 538 2408
Jack Dokter	GA. Power	770-995-4818
Verdell Hawkins	GDOT Planning	404-463-4396
Robby Oliver	GDOT Utilities	770-532-5510
Mike Dover	GDOT D-1 Const	770-532-5528
Jennifer Fulbright	GDOT Environmental	770-532-5582
Brent Cook	GDOT - Traffic Ops	770-532-5530
James S Moore	GDOT Const	770 532 5523
Russell McMurry	GDOT - Proj Mgt	—
Todd Long	GDOT - D1	770-532-5526
Bill Meyer	Hall County	770-297-5542
John McHenry	Gainesville-Hall MPO	770 531-6809 x 286
Eddie King	BST	770-483-2006
Phillip Beard	City of Buford	770-945-9991
Bryan Kerlin	City of Buford	770-945-6761

Lanes, Volumes, Timings
3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		300	300		400	0		0	0		0
Storage Lanes	0		1	2		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3505	1568	3400	3505	0	0	0	0	1752	0	1568
Flt Permitted				0.200						0.950		
Satd. Flow (perm)	0	3505	1568	716	3505	0	0	0	0	1752	0	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			568									12
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		5984			7280			4816			5232	
Travel Time (s)		90.7			110.3			109.5			118.9	
Volume (vph)	0	980	800	800	1980	0	0	0	0	365	0	680
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	0	980	800	800	1980	0	0	0	0	365	0	680
Lane Group Flow (vph)	0	980	800	800	1980	0	0	0	0	365	0	680
Turn Type			Perm	pm+pt						custom		custom
Protected Phases		4		3	8					6		
Permitted Phases			4	8						6		6
Minimum Split (s)		20.0	20.0	20.0	20.0					20.0		20.0
Total Split (s)	0.0	20.0	20.0	20.0	40.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0
Total Split (%)	0%	33%	33%	33%	67%	0%	0%	0%	0%	33%	0%	33%
Maximum Green (s)		16.0	16.0	16.0	36.0					16.0		16.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		0.5	0.5	0.5	0.5					0.5		0.5
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Walk Time (s)		5.0	5.0	5.0	5.0					5.0		5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0					11.0		11.0
Pedestrian Calls (#/hr)		0	0	0	0					0		0
Act Effct Green (s)		16.0	16.0	36.0	36.0					16.0		16.0
Actuated g/C Ratio		0.27	0.27	0.60	0.60					0.27		0.27
v/c Ratio		1.05	0.96	0.70	0.94					0.78		1.59
Uniform Delay, d1		22.0	6.1	7.7	11.0					20.4		21.4
Delay		58.1	23.9	8.9	17.8					27.3		197.1
LOS		E	C	A	B					C		F
Approach Delay		42.7			15.2							
Approach LOS		D			B							
Stops (vph)		1336	403	437	1680					334		2348
Fuel Used(gal)		66	40	45	122					19		68
CO Emmisions (g/hr)		4633	2795	3124	8503					1311		4753
NOx Emmisions (g/hr)		901	544	608	1654					255		925

STP2688 SB RAMP a

Lanes, Volumes, Timings

3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
VOC Emmisions (g/hr)		1074	648	724	1971					304		1102
Dilemma Vehicles (#)		72	0	0	159					0		0
Queue Length 50th (ft)		~210	77	75	299					122		~367
Queue Length 95th (ft)		#316	#320	131	#508					#244		#553
Internal Link Dist (ft)		5904			7200			4736			5152	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)			300	300								
50th Bay Block Time %					8%							
95th Bay Block Time %		10%	15%		23%							
Queuing Penalty (veh)		41	35		126							

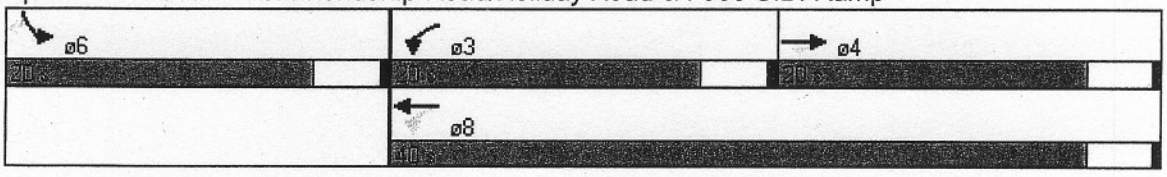
Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 6:SBL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 1.59
Intersection Signal Delay: 46.8 Intersection LOS: D
Intersection Capacity Utilization 103.5% ICU Level of Service F

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Friendship Road/Holiday Road & I-985 S.B. Ramp



Volume

3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	980	800	800	1980	0	0	0	0	365	0	680
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	980	800	800	1980	0	0	0	0	365	0	680
Lane Group Flow (vph)	0	980	800	800	1980	0	0	0	0	365	0	680

Intersection Summary

Timings

3: Friendship Road/Holiday Road & I-985 S.B. Ramp

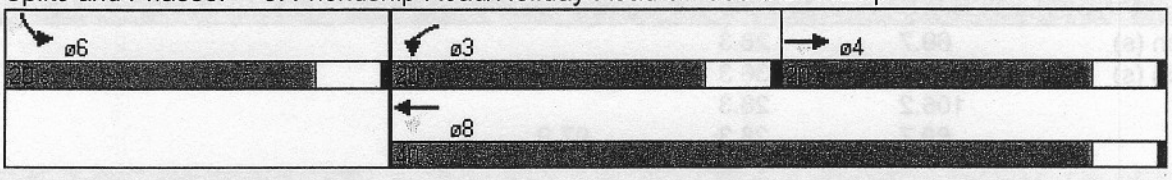
3/19/2004

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Configurations	↑↑	↱	↰↰	↑↑	↰	↱
Volume (vph)	980	800	800	1980	365	680
Turn Type		Perm	pm+pt		custom	custom
Protected Phases	4		3	8	6	
Permitted Phases		4	8		6	6
Detector Phases	4	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	20.0	20.0	40.0	20.0	20.0
Total Split (%)	33%	33%	33%	67%	33%	33%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	16.0	16.0	36.0	36.0	16.0	16.0
Actuated g/C Ratio	0.27	0.27	0.60	0.60	0.27	0.27
v/c Ratio	1.05	0.96	0.70	0.94	0.78	1.59
Uniform Delay, d1	22.0	6.1	7.7	11.0	20.4	21.4
Delay	58.1	23.9	8.9	17.8	27.3	197.1
LOS	E	C	A	B	C	F
Approach Delay	42.7			15.2		
Approach LOS	D			B		

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 6:SBL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 1.59
Intersection Signal Delay: 46.8 Intersection LOS: D
Intersection Capacity Utilization 103.5% ICU Level of Service F

Splits and Phases: 3: Friendship Road/Holiday Road & I-985 S.B. Ramp



Intersection Capacity Utilization

3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	980	800	800	1980	0	0	0	0	365	0	680
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Adjusted Volume (vph)	0	980	800	800	1980	0	0	0	0	365	0	680
Volume Combined (vph)	0	980	800	800	1980	0	0	0	0	365	0	680
Lane Utilization Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	0	3618	1615	3505	3618	0	0	0	0	1805	0	1615
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	0.0	32.5	59.4	27.4	65.7	0.0	0.0	0.0	0.0	24.3	0.0	50.5
Adj Reference Time (s)	0.0	36.5	63.4	31.4	69.7	0.0	0.0	0.0	0.0	28.3	0.0	54.5
Permitted Option Allowed		No			No			Yes			Yes	
Adj Saturation A (vph)								0			NA	
Reference Time A (s)								0.0			NA	
Adj Saturation B (vph							0	0		0	0	
Reference Time B (s)							0.0	0.0		32.3	0.0	
Reference Time (s)								0.0			32.3	
Adj Reference Time (s)								8.0			36.3	
Split Option												
Ref Time Combined (s)	0.0	32.5		27.4	65.7		0.0	0.0		24.3	0.0	
Ref Time Seperate (s)	0.0	32.5		27.4	65.7		0.0	0.0		24.3	0.0	
Reference Time (s)	32.5	32.5		65.7	65.7		0.0	0.0		24.3	24.3	
Adj Reference Time (s)	36.5	36.5		69.7	69.7		0.0	0.0		28.3	28.3	

Summary	EB WB	NB SB	Combined
Protected Option (s)	69.7	28.3	
Permitted Option (s)	NA	36.3	
Split Option (s)	106.2	28.3	
Minimum (s)	69.7	28.3	97.9

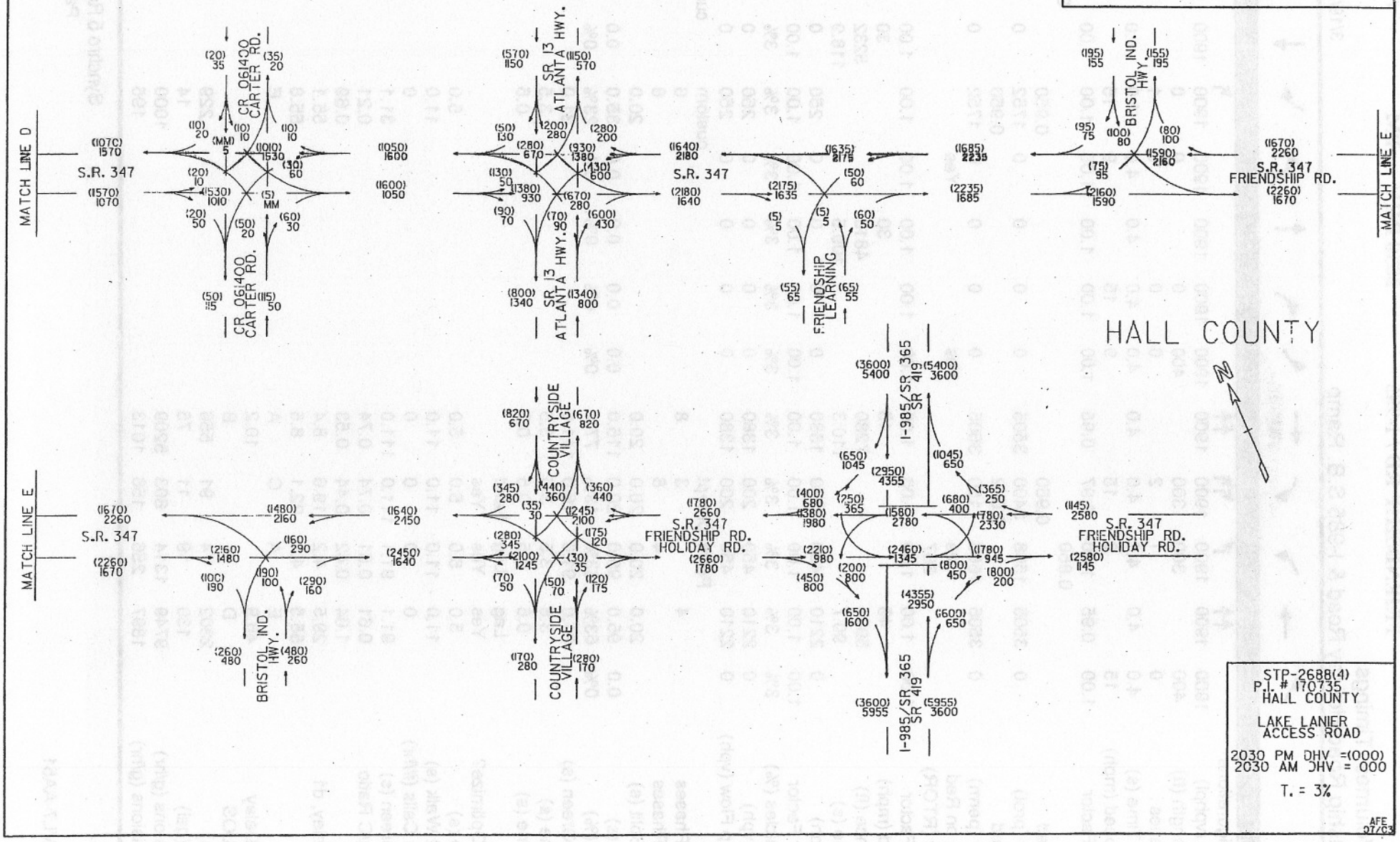
Right Turns	EBR	SBR
Adj Reference Time (s)	63.4	54.5
Cross Thru Ref Time (s)	0.0	69.7
Oncoming Left Ref Time (s)	31.4	0.0
Combined (s)	94.8	124.2

Intersection Summary			
Intersection Capacity Utilization	103.5%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

SHEET 6 OF 6

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION



STP-2688(4)
P.I. # 170735
HALL COUNTY

LAKE LANIER ACCESS ROAD

2030 PM DHV =(000)
2030 AM DHV = 000

T. = 3%

AFE 07/03

FRIENDSHIP RD / I-985 2030 DHV AM

6 of 6

1/2004 7:16:38 AM \\GDOT-DSN1\GOPLOT\OCF\D1_8830_HALFSIZE_PAPER.OCF TSUMPTION Y:\170735\TRAFFICA06.PRF D1-GAINESVILLE

Lanes, Volumes, Timings
3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		300	300		400	0		0	0		0
Storage Lanes	0		1	2		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3505	1568	3400	3505	0	0	0	0	1752	0	1568
Flt Permitted				0.042						0.950		
Satd. Flow (perm)	0	3505	1568	150	3505	0	0	0	0	1752	0	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			307									92
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		5984			7280			4816			5232	
Travel Time (s)		90.7			110.3			109.5			118.9	
Volume (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400
Lane Group Flow (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400
Turn Type			Perm	pm+pt						custom		custom
Protected Phases		4		3	8					6		
Permitted Phases			4	8						6		6
Minimum Split (s)		20.0	20.0	20.0	20.0					20.0		20.0
Total Split (s)	0.0	95.0	95.0	20.0	115.0	0.0	0.0	0.0	0.0	35.0	0.0	35.0
Total Split (%)	0%	63%	63%	13%	77%	0%	0%	0%	0%	23%	0%	23%
Maximum Green (s)		91.0	91.0	16.0	111.0					31.0		31.0
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5		3.5
All-Red Time (s)		0.5	0.5	0.5	0.5					0.5		0.5
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Walk Time (s)		5.0	5.0	5.0	5.0					5.0		5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0					11.0		11.0
Pedestrian Calls (#/hr)		0	0	0	0					0		0
Act Effct Green (s)		91.1	91.1	111.0	111.0					31.1		31.1
Actuated g/C Ratio		0.61	0.61	0.74	0.74					0.21		0.21
v/c Ratio		1.04	0.42	0.44	0.53					0.69		1.01
Uniform Delay, d1		29.5	4.2	19.6	8.4					55.1		45.7
Delay		55.5	4.4	22.1	8.5					55.8		79.4
LOS		E	A	C	A					E		E
Approach Delay		46.9			10.2							
Approach LOS		D			B							
Stops (vph)		2302	74	91	556					229		359
Fuel Used(gal)		139	19	11	75					14		25
CO Emmisions (g/hr)		9749	1314	803	5209					1000		1731
NOx Emmisions (g/hr)		1897	256	156	1013					195		337

STP26 SB RAMP D

Lanes, Volumes, Timings
3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
VOC Emmisions (g/hr)		2259	305	186	1207					232		401
Dilemma Vehicles (#)		69	0	0	46					0		0
Queue Length 50th (ft)		~1224	58	43	275					229		~317
Queue Length 95th (ft)		#1352	124	85	320					330		#550
Internal Link Dist (ft)		5904			7200			4736			5152	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)			300	300								
50th Bay Block Time %		31%			1%							
95th Bay Block Time %		33%			4%							
Queuing Penalty (veh)		143			4							

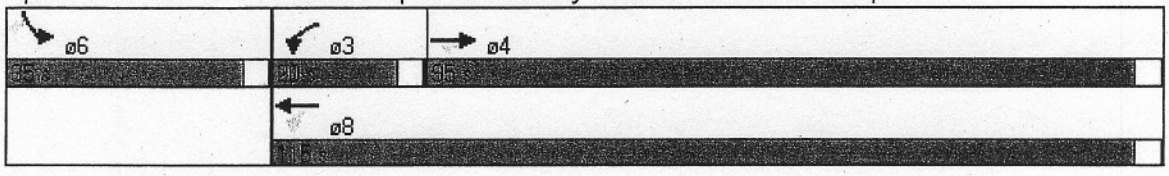
Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 6:SBL, Start of Green
Natural Cycle: 150
Control Type: Pretimed
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 38.2 Intersection LOS: D
Intersection Capacity Utilization 90.6% ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Friendship Road/Holiday Road & I-985 S.B. Ramp



Volume

3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400
Lane Group Flow (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400

Intersection Summary

Timings

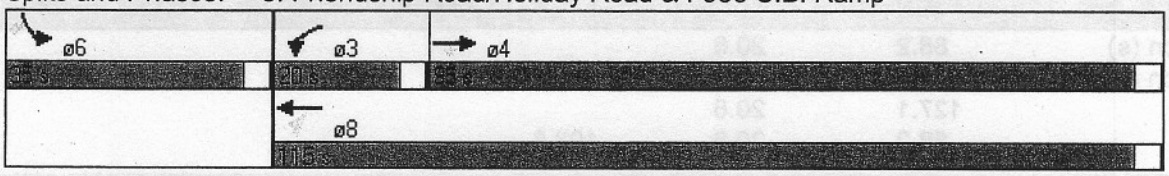
3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Configurations	↑↑	↱	↰↰	↑↑	↰	↱
Volume (vph)	2210	450	200	1380	250	400
Turn Type		Perm	pm+pt		custom	custom
Protected Phases	4		3	8	6	
Permitted Phases		4	8		6	6
Detector Phases	4	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	95.0	95.0	20.0	115.0	35.0	35.0
Total Split (%)	63%	63%	13%	77%	23%	23%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	91.1	91.1	111.0	111.0	31.1	31.1
Actuated g/C Ratio	0.61	0.61	0.74	0.74	0.21	0.21
v/c Ratio	1.04	0.42	0.44	0.53	0.69	1.01
Uniform Delay, d1	29.5	4.2	19.6	8.4	55.1	45.7
Delay	55.5	4.4	22.1	8.5	55.8	79.4
LOS	E	A	C	A	E	E
Approach Delay	46.9			10.2		
Approach LOS	D			B		

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 6:SBL, Start of Green
Natural Cycle: 150
Control Type: Pretimed
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 38.2 Intersection LOS: D
Intersection Capacity Utilization 90.6% ICU Level of Service E

Splits and Phases: 3: Friendship Road/Holiday Road & I-985 S.B. Ramp



Intersection Capacity Utilization

3: Friendship Road/Holiday Road & I-985 S.B. Ramp 3/19/2004

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Adjusted Volume (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400
Volume Combined (vph)	0	2210	450	200	1380	0	0	0	0	250	0	400
Lane Utilization Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	0	3618	1615	3505	3618	0	0	0	0	1805	0	1615
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	0.0	73.3	33.4	6.8	45.8	0.0	0.0	0.0	0.0	16.6	0.0	29.7
Adj Reference Time (s)	0.0	77.3	37.4	10.8	49.8	0.0	0.0	0.0	0.0	20.6	0.0	33.7
Permitted Option Allowed		No			No			Yes			Yes	
Adj Saturation A (vph)								0			NA	
Reference Time A (s)								0.0			NA	
Adj Saturation B (vph							0	0		0	0	
Reference Time B (s)							0.0	0.0		24.6	0.0	
Reference Time (s)								0.0			24.6	
Adj Reference Time (s)								8.0			28.6	
Split Option												
Ref Time Combined (s)	0.0	73.3		6.8	45.8		0.0	0.0		16.6	0.0	
Ref Time Seperate (s)	0.0	73.3		6.8	45.8		0.0	0.0		16.6	0.0	
Reference Time (s)	73.3	73.3		45.8	45.8		0.0	0.0		16.6	16.6	
Adj Reference Time (s)	77.3	77.3		49.8	49.8		0.0	0.0		20.6	20.6	

Summary	EB WB	NB SB	Combined
Protected Option (s)	88.2	20.6	
Permitted Option (s)	NA	28.6	
Split Option (s)	127.1	20.6	
Minimum (s)	88.2	20.6	108.8

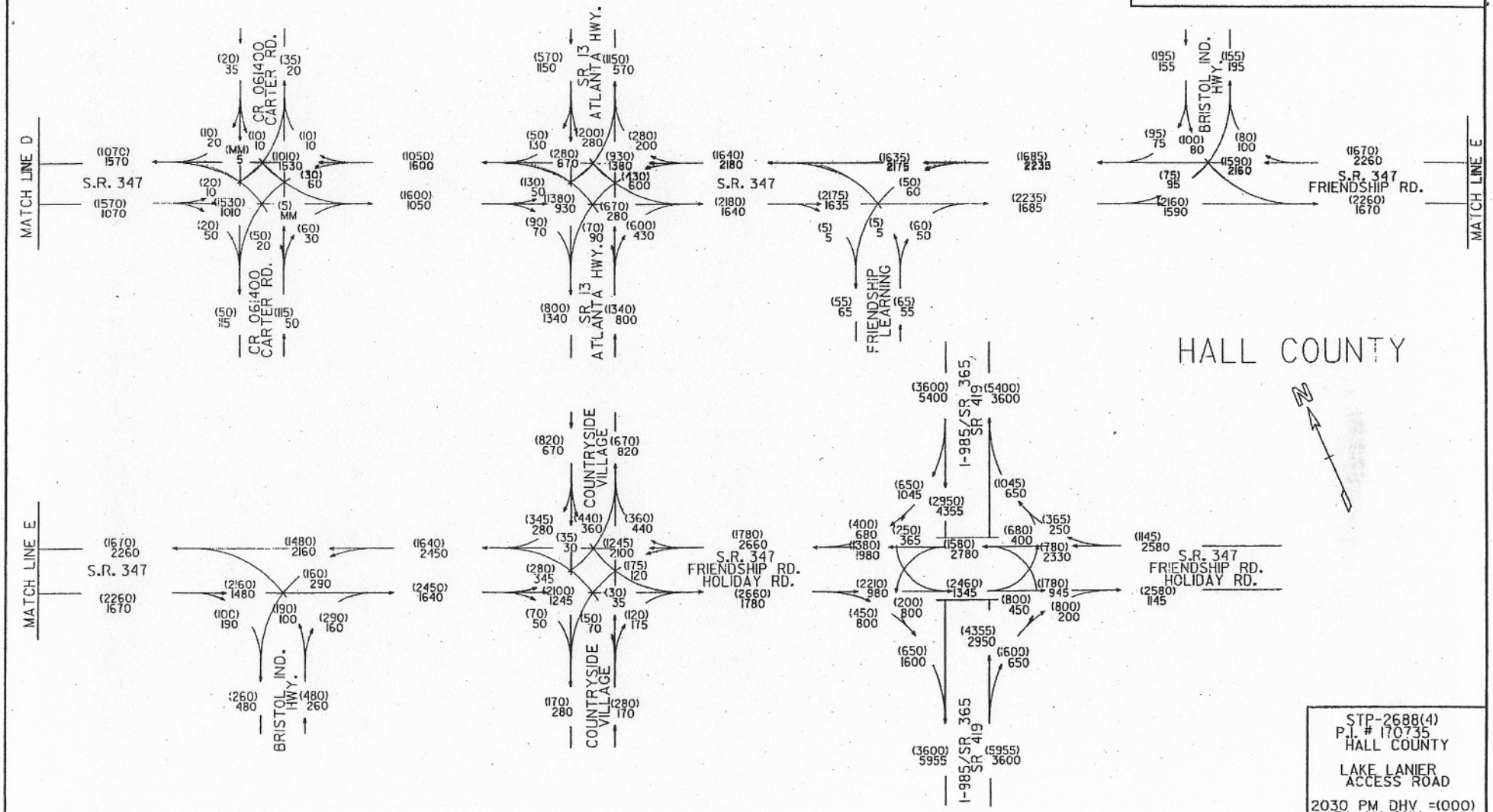
Right Turns	EBR	SBR
Adj Reference Time (s)	37.4	33.7
Cross Thru Ref Time (s)	0.0	49.8
Oncoming Left Ref Time (s)	10.8	0.0
Combined (s)	48.3	83.5

Intersection Summary			
Intersection Capacity Utilization	90.6%	ICU Level of Service	E

Reference Times and Phasing Options do not represent an optimized timing plan.

SHEET 6 OF 6

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION



STP-2688(4)
P.I. # 170735
HALL COUNTY

LAKE LANIER
ACCESS ROAD

2030 PM DHV =(000)
2030 AM DHV = 000

T. = 3%

AFE
07/03

FRIENDSHIP RD / I-985 2030 DHV PM

6 of 6

1/2004 7:16:38 AM \\GDOT-DSN1\GOPLOT\OCF\01_8830_HALFSIZE_PAPER.OCF TSUMPTION Y:\170735\TRAFFICAO6.PRF D1-GAINESVILLE

Lanes, Volumes, Timings
3: Friendship Road/Holiday Road & CountrySide Village 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		250	300		400	0		0	0		0
Storage Lanes	1		1	1		1	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.962	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568	1665	1752	1568	1665	1686	1568
Flt Permitted	0.048			0.147			0.321			0.733	0.962	
Satd. Flow (perm)	89	3505	1568	271	3505	1568	563	1752	1568	1285	1686	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			47			343			175			260
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		5984			7280			4816			5232	
Travel Time (s)		90.7			110.3			109.5			118.9	
Volume (vph)	345	1245	50	120	2100	440	70	35	175	360	30	280
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	345	1245	50	120	2100	440	70	35	175	360	30	280
Lane Group Flow (vph)	345	1245	50	120	2100	440	70	35	175	241	149	280
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	26.0	89.0	89.0	20.0	83.0	83.0	20.0	21.0	21.0	20.0	21.0	21.0
Total Split (%)	17%	59%	59%	13%	55%	55%	13%	14%	14%	13%	14%	14%
Maximum Green (s)	22.0	85.0	85.0	16.0	79.0	79.0	16.0	17.0	17.0	16.0	17.0	17.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	105.0	85.1	85.1	95.0	79.1	79.1	33.0	17.0	17.0	33.0	37.1	17.0
Actuated g/C Ratio	0.70	0.57	0.57	0.63	0.53	0.53	0.22	0.11	0.11	0.22	0.25	0.11
v/c Ratio	1.13	0.63	0.06	0.36	1.14	0.45	0.29	0.18	0.53	0.75	0.36	0.69
Uniform Delay, d1	48.3	21.8	0.8	7.8	35.5	4.0	44.5	60.2	0.0	50.5	46.7	4.3
Delay	116.1	22.1	4.1	8.1	97.4	4.6	45.0	60.8	8.3	53.9	47.3	9.5
LOS	F	C	A	A	F	A	D	E	A	D	D	A
Approach Delay		41.3			78.0			24.0			33.9	
Approach LOS		D			E			C			C	
Stops (vph)	397	810	6	42	2649	66	56	32	41	233	122	80
Fuel Used(gal)	26	64	2	6	174	22	4	2	7	14	8	12
CO Emmisions (g/hr)	1852	4477	144	447	12150	1540	250	135	496	962	572	867
NOx Emmisions (g/hr)	360	871	28	87	2364	300	49	26	96	187	111	169

STP-26BBCOUNTRY2

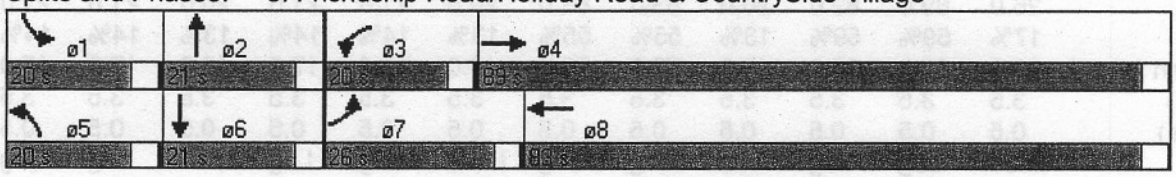
Lanes, Volumes, Timings
3: Friendship Road/Holiday Road & CountrySide Village 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
VOC Emmisions (g/hr)	429	1037	33	104	2816	357	58	31	115	223	133	201
Dilemma Vehicles (#)	0	42	0	0	62	0	0	0	0	0	0	0
Queue Length 50th (ft)	~339	416	1	35	~1256	47	56	33	0	220	127	14
Queue Length 95th (ft)	#547	488	21	57	#1386	120	104	72	74	#328	200	118
Internal Link Dist (ft)		5904			7200			4736			5152	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	400		250	300		400						
50th Bay Block Time %		4%			39%							
95th Bay Block Time %	36%	9%			42%							
Queuing Penalty (veh)	110	22			48							

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 16 (11%), Referenced to phase 2:NBTL, Start of Green
Natural Cycle: 150
Control Type: Pretimed
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 58.0 Intersection LOS: E
Intersection Capacity Utilization 104.6% ICU Level of Service F
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Friendship Road/Holiday Road & CountrySide Village



Volume

3: Friendship Road/Holiday Road & CountrySide Village 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	345	1245	50	120	2100	440	70	35	175	360	30	280
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	345	1245	50	120	2100	440	70	35	175	360	30	280
Lane Group Flow (vph)	345	1245	50	120	2100	440	70	35	175	241	149	280

Intersection Summary

Timings

3: Friendship Road/Holiday Road & CountrySide Village

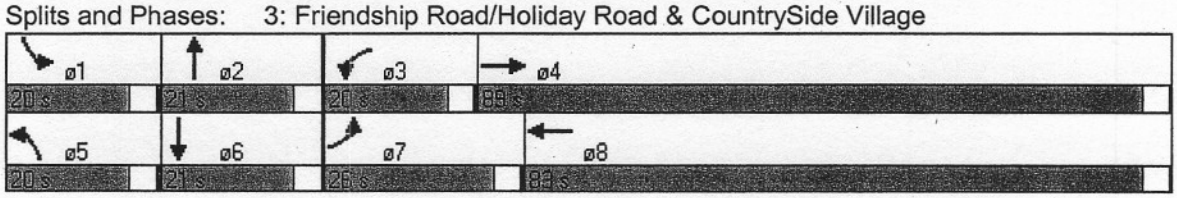
3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	345	1245	50	120	2100	440	70	35	175	360	30	280
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	7	4	4	3	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	26.0	89.0	89.0	20.0	83.0	83.0	20.0	21.0	21.0	20.0	21.0	21.0
Total Split (%)	17%	59%	59%	13%	55%	55%	13%	14%	14%	13%	14%	14%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	105.0	85.1	85.1	95.0	79.1	79.1	33.0	17.0	17.0	33.0	37.1	17.0
Actuated g/C Ratio	0.70	0.57	0.57	0.63	0.53	0.53	0.22	0.11	0.11	0.22	0.25	0.11
v/c Ratio	1.13	0.63	0.06	0.36	1.14	0.45	0.29	0.18	0.53	0.75	0.36	0.69
Uniform Delay, d1	48.3	21.8	0.8	7.8	35.5	4.0	44.5	60.2	0.0	50.5	46.7	4.3
Delay	116.1	22.1	4.1	8.1	97.4	4.6	45.0	60.8	8.3	53.9	47.3	9.5
LOS	F	C	A	A	F	A	D	E	A	D	D	A
Approach Delay		41.3			78.0			24.0			33.9	
Approach LOS		D			E			C			C	

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 16 (11%), Referenced to phase 2:NBTL, Start of Green
Natural Cycle: 150
Control Type: Pretimed
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 58.0 Intersection LOS: E
Intersection Capacity Utilization 104.6% ICU Level of Service F

Splits and Phases: 3: Friendship Road/Holiday Road & CountrySide Village



Intersection Capacity Utilization
3: Friendship Road/Holiday Road & CountrySide Village

3/16/2004

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	345	1245	50	120	2100	440	70	35	175	360	30	280
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Adjusted Volume (vph)	345	1245	50	120	2100	440	70	35	175	360	30	280
Volume Combined (vph)	345	1245	50	120	2100	440	0	105	175	0	390	280
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.97	0.85	0.95	0.95	0.85
Saturated Flow (vph)	1805	3618	1615	1805	3618	1615	0	3673	1615	0	3625	1615
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	22.9	41.3	3.7	8.0	69.7	32.7			13.0			20.8
Adj Reference Time (s)	26.9	45.3	8.0	12.0	73.7	36.7			17.0			24.8
Permitted Option Allowed		No			No			Yes			Yes	
Adj Saturation A (vph)								NA			NA	
Reference Time A (s)								NA			NA	
Adj Saturation B (vph							0	0		0	0	
Reference Time B (s)							10.3	11.4		20.0	20.9	
Reference Time (s)								11.4			20.9	
Adj Reference Time (s)								15.4			24.9	
Split Option												
Ref Time Combined (s)	22.9	41.3		8.0	69.7		0.0	3.4		0.0	12.9	
Ref Time Seperate (s)	22.9	41.3		8.0	69.7		2.3	2.2		12.0	1.9	
Reference Time (s)	41.3	41.3		69.7	69.7		3.4	3.4		12.9	12.9	
Adj Reference Time (s)	45.3	45.3		73.7	73.7		8.0	8.0		16.9	16.9	

Summary	EB WB	NB SB	Combined
Protected Option (s)	100.6	NA	
Permitted Option (s)	NA	24.9	
Split Option (s)	119.0	24.9	
Minimum (s)	100.6	24.9	125.5

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	8.0	36.7	17.0	24.8
Cross Thru Ref Time (s)	16.9	8.0	45.3	73.7
Oncoming Left Ref Time (s)	12.0	26.9	16.9	8.0
Combined (s)	36.9	71.6	79.2	106.5

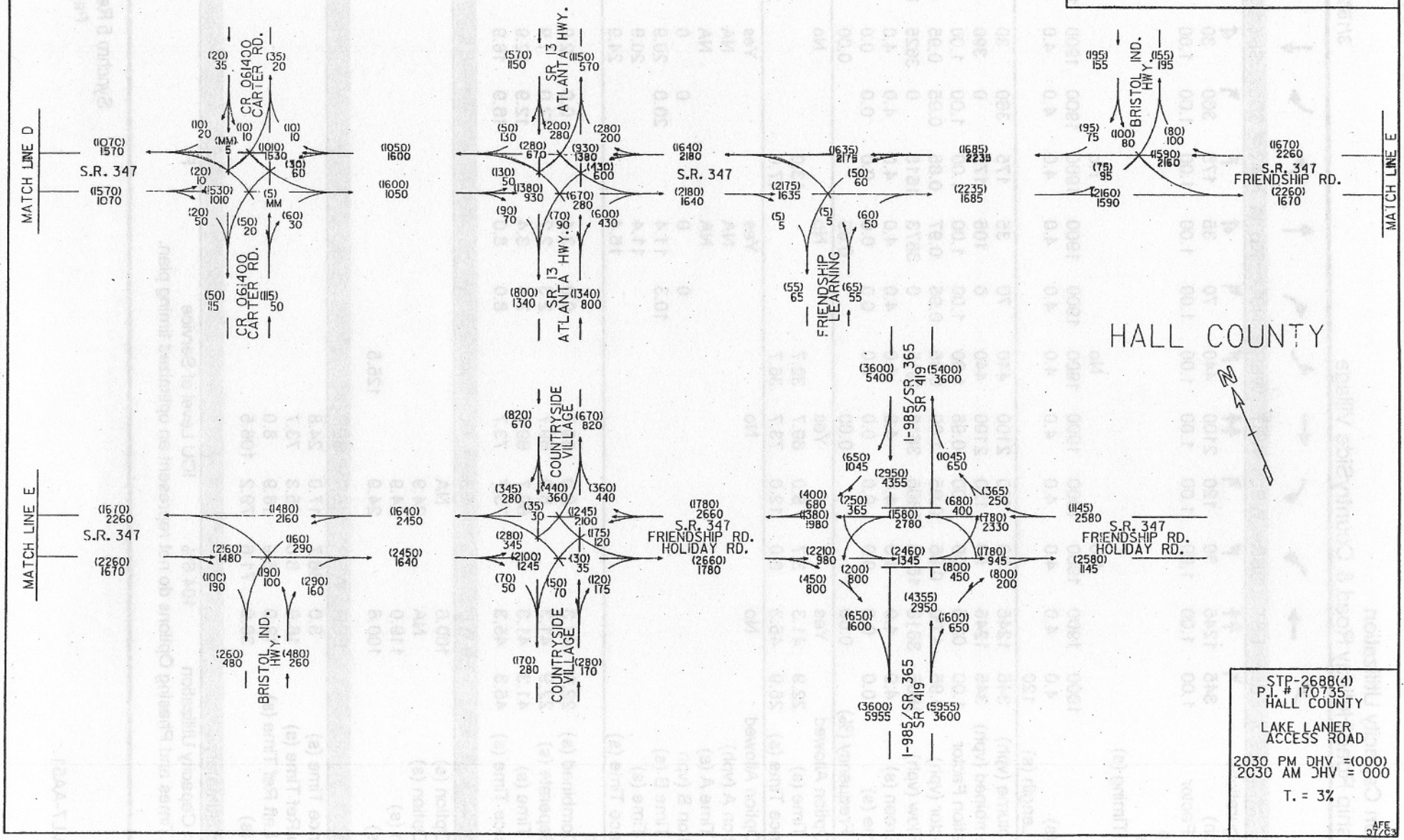
Intersection Summary

Intersection Capacity Utilization 104.6% ICU Level of Service F

Reference Times and Phasing Options do not represent an optimized timing plan.

SHEET 6 OF 6

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION



STP-2688(4)
P.I. # 170735
HALL COUNTY

LAKE LANIER ACCESS ROAD

2030 PM DHV =(000)
2030 AM DHV = 000

T. = 3%

AFE 07/03

Lanes, Volumes, Timings
3: Friendship Road/Holiday Road & CountrySide Village 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		250	300		400	0		0	0		0
Storage Lanes	1		1	1		1	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950	0.961	
Satd. Flow (prot)	1752	3505	1568	1752	3505	1568	1665	1752	1568	1665	1684	1568
Flt Permitted	0.096			0.055			0.250			0.737	0.961	
Satd. Flow (perm)	177	3505	1568	101	3505	1568	438	1752	1568	1292	1684	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			39			360			120			345
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		5984			7280			4816			5232	
Travel Time (s)		90.7			110.3			109.5			118.9	
Volume (vph)	280	2100	70	175	1245	360	50	30	120	440	35	345
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	280	2100	70	175	1245	360	50	30	120	440	35	345
Lane Group Flow (vph)	280	2100	70	175	1245	360	50	30	120	298	177	345
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	33.0	90.0	90.0	20.0	77.0	77.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	22%	60%	60%	13%	51%	51%	13%	13%	13%	13%	13%	13%
Maximum Green (s)	29.0	86.0	86.0	16.0	73.0	73.0	16.0	16.0	16.0	16.0	16.0	16.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	106.1	86.0	86.0	89.0	73.1	73.1	32.0	16.1	16.1	32.0	36.0	16.1
Actuated g/C Ratio	0.71	0.57	0.57	0.59	0.49	0.49	0.21	0.11	0.11	0.21	0.24	0.11
v/c Ratio	0.65	1.04	0.08	0.74	0.73	0.38	0.22	0.16	0.44	0.95	0.44	0.73
Uniform Delay, d1	25.3	32.0	6.2	40.3	30.6	0.0	44.7	60.9	0.0	54.7	48.4	0.0
Delay	26.2	59.9	7.2	45.6	31.0	2.0	45.2	61.5	10.1	79.3	49.1	6.2
LOS	C	E	A	D	C	A	D	E	B	E	D	A
Approach Delay		54.6			26.6			26.6			42.0	
Approach LOS		D			C			C			D	
Stops (vph)	158	2224	17	136	966	22	40	28	33	329	149	68
Fuel Used(gal)	14	135	3	12	79	17	3	2	5	19	10	15
CO Emmisions (g/hr)	1002	9427	212	810	5502	1219	179	116	345	1313	686	1041
NOx Emmisions (g/hr)	195	1834	41	158	1071	237	35	23	67	255	133	202

STP2688 COUNTRY

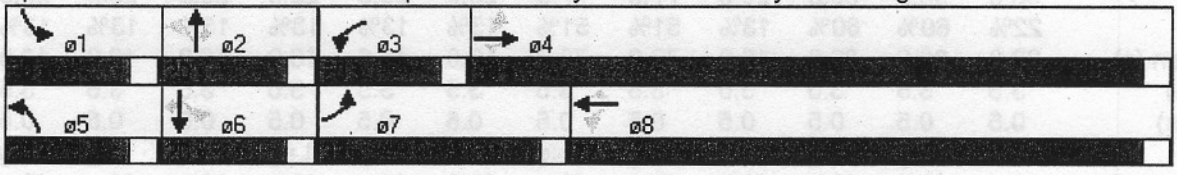
Lanes, Volumes, Timings
3: Friendship Road/Holiday Road & CountrySide Village 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
VOC Emmisions (g/hr)	232	2185	49	188	1275	282	41	27	80	304	159	241
Dilemma Vehicles (#)	0	65	0	0	42	0	0	0	0	0	0	0
Queue Length 50th (ft)	154	~1169	13	116	501	0	41	28	0	286	155	0
Queue Length 95th (ft)	260	#1299	36	#225	588	54	80	65	61	#502	237	105
Internal Link Dist (ft)		5904			7200			4736			5152	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	400		250	300		400						
50th Bay Block Time %		30%			21%							
95th Bay Block Time %		33%			26%							
Queuing Penalty (veh)		88			41							

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 16 (11%), Referenced to phase 2:NBTL, Start of Green
Natural Cycle: 150
Control Type: Pretimed
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 42.1 Intersection LOS: D
Intersection Capacity Utilization 97.5% ICU Level of Service E
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Friendship Road/Holiday Road & CountrySide Village



Volume

3: Friendship Road/Holiday Road & CountrySide Village 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	280	2100	70	175	1245	360	50	30	120	440	35	345
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	280	2100	70	175	1245	360	50	30	120	440	35	345
Lane Group Flow (vph)	280	2100	70	175	1245	360	50	30	120	298	177	345

Intersection Summary

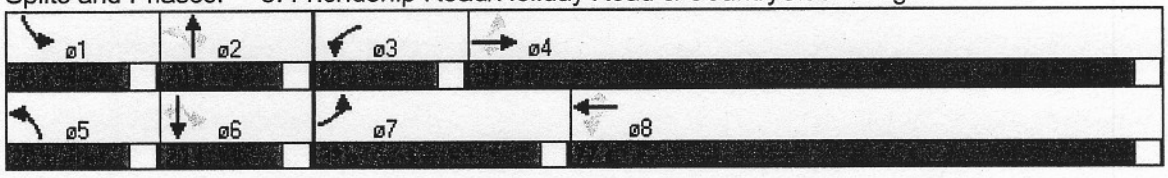
Timings
3: Friendship Road/Holiday Road & CountrySide Village 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	2100	70	175	1245	360	50	30	120	440	35	345
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	7	4	4	3	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	33.0	90.0	90.0	20.0	77.0	77.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	22%	60%	60%	13%	51%	51%	13%	13%	13%	13%	13%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	106.1	86.0	86.0	89.0	73.1	73.1	32.0	16.1	16.1	32.0	36.0	16.1
Actuated g/C Ratio	0.71	0.57	0.57	0.59	0.49	0.49	0.21	0.11	0.11	0.21	0.24	0.11
v/c Ratio	0.65	1.04	0.08	0.74	0.73	0.38	0.22	0.16	0.44	0.95	0.44	0.73
Uniform Delay, d1	25.3	32.0	6.2	40.3	30.6	0.0	44.7	60.9	0.0	54.7	48.4	0.0
Delay	26.2	59.9	7.2	45.6	31.0	2.0	45.2	61.5	10.1	79.3	49.1	6.2
LOS	C	E	A	D	C	A	D	E	B	E	D	A
Approach Delay		54.6			26.6			26.6			42.0	
Approach LOS		D			C			C			D	

Intersection Summary

Cycle Length: 150
Actuated Cycle Length: 150
Offset: 16 (11%), Referenced to phase 2:NBTL, Start of Green
Natural Cycle: 150
Control Type: Pretimed
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 42.1 Intersection LOS: D
Intersection Capacity Utilization 97.5% ICU Level of Service E

Splits and Phases: 3: Friendship Road/Holiday Road & CountrySide Village



Intersection Capacity Utilization
3: Friendship Road/Holiday Road & CountrySide Village

3/16/2004

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	2100	70	175	1245	360	50	30	120	440	35	345
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Adjusted Volume (vph)	280	2100	70	175	1245	360	50	30	120	440	35	345
Volume Combined (vph)	280	2100	70	175	1245	360	0	80	120	0	475	345
Lane Utilization Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	0.97	0.85	0.95	0.95	0.85
Saturated Flow (vph)	1805	3618	1615	1805	3618	1615	0	3681	1615	0	3624	1615
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			No			No	
Reference Time (s)	18.6	69.7	5.2	11.6	41.3	26.7			8.9			25.6
Adj Reference Time (s)	22.6	73.7	9.2	15.6	45.3	30.7			12.9			29.6
Permitted Option Allowed		No			No			Yes			Yes	
Adj Saturation A (vph)								317			NA	
Reference Time A (s)								11.4			NA	
Adj Saturation B (vph							0	0		0	0	
Reference Time B (s)							9.7	10.6		22.6	23.7	
Reference Time (s)								10.6			23.7	
Adj Reference Time (s)								14.6			27.7	
Split Option												
Ref Time Combined (s)	18.6	69.7		11.6	41.3		0.0	2.6		0.0	15.7	
Ref Time Seperate (s)	18.6	69.7		11.6	41.3		1.7	1.9		14.6	2.2	
Reference Time (s)	69.7	69.7		41.3	41.3		2.6	2.6		15.7	15.7	
Adj Reference Time (s)	73.7	73.7		45.3	45.3		8.0	8.0		19.7	19.7	

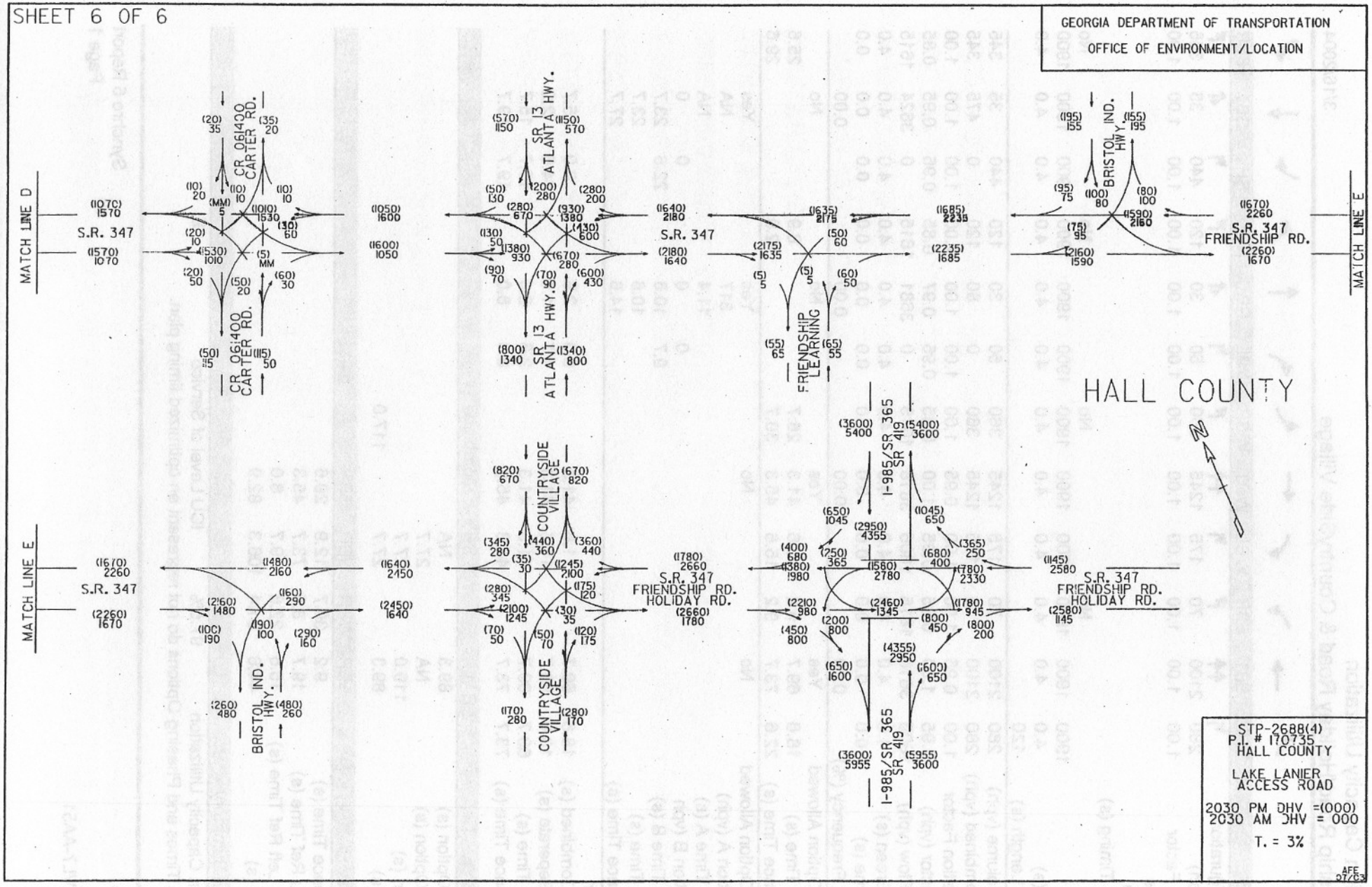
Summary	EB WB	NB SB	Combined
Protected Option (s)	89.3	NA	
Permitted Option (s)	NA	27.7	
Split Option (s)	119.0	27.7	
Minimum (s)	89.3	27.7	117.0

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	9.2	30.7	12.9	29.6
Cross Thru Ref Time (s)	19.7	8.0	73.7	45.3
Oncoming Left Ref Time (s)	15.6	22.6	19.7	8.0
Combined (s)	44.6	61.4	106.3	82.9

Intersection Summary

Intersection Capacity Utilization 97.5% ICU Level of Service E

Reference Times and Phasing Options do not represent an optimized timing plan.


SHEET 6 OF 6
GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION
MATCH LINE D
MATCH LINE E
S.R. 347
CR 061400 CARTER RD.
SR 13 ATLANTA HWY.
FRIENDSHIP LEARNING
BRISTOL IND. HWY.
S.R. 347 FRIENDSHIP RD.
HALL COUNTY
COUNTRYSIDE VILLAGE
I-985/SR 365 SR 419
S.R. 347 FRIENDSHIP RD. HOLIDAY RD.
STP-2688(4)
P.I. # 170735
HALL COUNTY
LAKE LANIER ACCESS ROAD
2030 PM DHV =(000)
2030 AM DHV = 000
T. = 3%
AFF 07/03

Lanes, Volumes, Timings
3: Friendship Rd/Holiday Rd & SR 13 3/11/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	325		300	325		300	250		250	250		250
Storage Lanes	2		1	2		1	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3505	1568	3400	3505	1568	1752	3505	1568	1752	3505	1568
Flt Permitted	0.950			0.950			0.950			0.414		
Satd. Flow (perm)	3400	3505	1568	3400	3505	1568	1752	3505	1568	764	3505	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			76			217			355			129
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3344			6036			4461			4307	
Travel Time (s)		76.0			137.2			101.4			97.9	
Volume (vph)	50	930	70	600	1380	200	90	280	430	280	670	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	1011	76	652	1500	217	98	304	467	304	728	141
Lane Group Flow (vph)	54	1011	76	652	1500	217	98	304	467	304	728	141
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2	6		6
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	8.0	32.0	32.0	22.0	46.0	46.0	10.0	23.0	23.0	13.0	26.0	26.0
Total Split (%)	9%	36%	36%	24%	51%	51%	11%	26%	26%	14%	29%	29%
Maximum Green (s)	4.5	28.5	28.5	18.5	42.5	42.5	6.5	19.5	19.5	9.5	22.5	22.5
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	0
Act Effct Green (s)	4.0	28.0	28.0	18.0	42.0	42.0	6.0	19.0	19.0	31.0	22.0	22.0
Actuated g/C Ratio	0.04	0.31	0.31	0.20	0.47	0.47	0.07	0.21	0.21	0.34	0.24	0.24
v/c Ratio	0.36	0.93	0.14	0.96	0.92	0.26	0.84	0.41	0.76	0.84	0.85	0.29
Uniform Delay, d1	41.7	30.0	0.0	35.6	22.4	0.0	41.5	30.6	7.4	23.5	32.4	2.2
Delay	42.1	39.0	5.8	55.4	27.3	2.1	77.2	31.0	10.8	35.8	36.7	6.6
LOS	D	D	A	E	C	A	E	C	B	D	D	A
Approach Delay		36.9			32.7			25.3			32.9	
Approach LOS		D			C			C			C	
Stops (vph)	49	901	16	646	1242	21	107	234	122	233	624	26
Fuel Used(gal)	2	37	2	39	79	10	5	13	17	13	31	5
CO Emmisions (g/hr)	140	2559	140	2696	5556	672	359	895	1158	890	2164	327
NOx Emmisions (g/hr)	27	498	27	525	1081	131	70	174	225	173	421	64
VOC Emmisions (g/hr)	32	593	32	625	1288	156	83	207	268	206	501	76

STP2688SR13a

Lanes, Volumes, Timings
3: Friendship Rd/Holiday Rd & SR 13

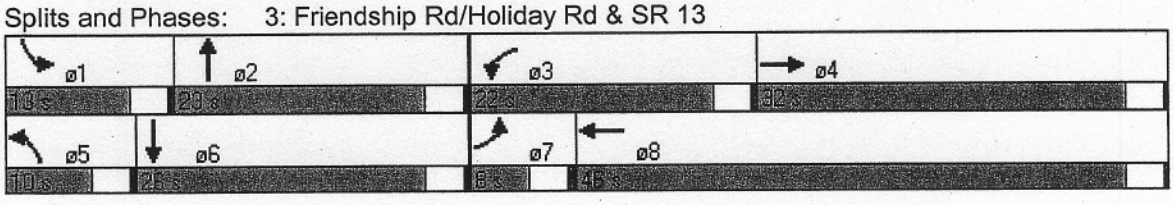
3/11/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Dilemma Vehicles (#)	0	0	0	0	0	0	0	0	0	0	0	0
Queue Length 50th (ft)	15	291	0	190	402	0	56	78	52	133	208	5
Queue Length 95th (ft)	34	#416	30	#299	#563	36	#147	118	#181	#267	#301	51
Internal Link Dist (ft)		3264			5956			4381			4227	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	325		300	325		300	250		250	250		250
50th Bay Block Time %					14%							
95th Bay Block Time %		20%			25%					10%	15%	
Queuing Penalty (veh)		5			125					18	22	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green
Natural Cycle: 90
Control Type: Pretimed
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 32.5 Intersection LOS: C
Intersection Capacity Utilization 85.4% ICU Level of Service D
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Friendship Rd/Holiday Rd & SR 13



Volume
3: Friendship Rd/Holiday Rd & SR 13 3/11/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	930	70	600	1380	200	90	280	430	280	670	130
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	54	1011	76	652	1500	217	98	304	467	304	728	141
Lane Group Flow (vph)	54	1011	76	652	1500	217	98	304	467	304	728	141

Intersection Summary

Timings

3: Friendship Rd/Holiday Rd & SR 13

3/12/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	930	70	600	1380	200	90	280	430	280	670	130
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2	6		6
Detector Phases	7	4	4	3	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	8.0	32.0	32.0	22.0	46.0	46.0	10.0	23.0	23.0	13.0	26.0	26.0
Total Split (%)	9%	36%	36%	24%	51%	51%	11%	26%	26%	14%	29%	29%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	4.0	28.0	28.0	18.0	42.0	42.0	6.0	19.0	19.0	31.0	22.0	22.0
Actuated g/C Ratio	0.04	0.31	0.31	0.20	0.47	0.47	0.07	0.21	0.21	0.34	0.24	0.24
v/c Ratio	0.36	0.93	0.14	0.96	0.92	0.26	0.84	0.41	0.76	0.84	0.85	0.29
Uniform Delay, d1	41.7	30.0	0.0	35.6	22.4	0.0	41.5	30.6	7.4	23.5	32.4	2.2
Delay	42.1	39.0	5.8	55.4	27.3	2.1	77.2	31.0	10.8	35.8	36.7	6.6
LOS	D	D	A	E	C	A	E	C	B	D	D	A
Approach Delay		36.9			32.7			25.3			32.9	
Approach LOS		D			C			C			C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 90

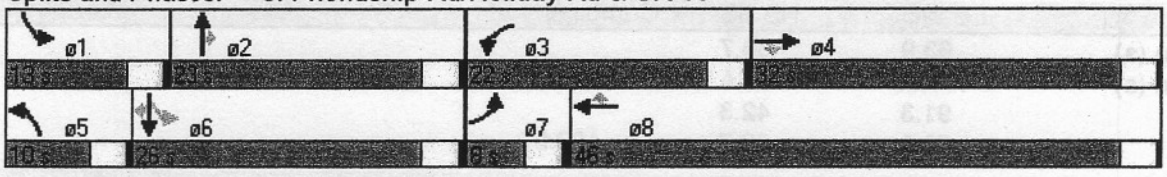
Control Type: Pretimed

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 32.5 Intersection LOS: C

Intersection Capacity Utilization 85.4% ICU Level of Service D

Splits and Phases: 3: Friendship Rd/Holiday Rd & SR 13



Intersection Capacity Utilization
3: Friendship Rd/Holiday Rd & SR 13 3/11/2004

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	930	70	600	1380	200	90	280	430	280	670	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Adjusted Volume (vph)	54	1011	76	652	1500	217	98	304	467	304	728	141
Volume Combined (vph)	54	1011	76	652	1500	217	98	304	467	304	728	141
Lane Utilization Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3505	3618	1615	3505	3618	1615	1805	3618	1615	1805	3618	1615
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	1.9	33.5	5.7	22.3	49.8	16.2	6.5	10.1	34.7	20.2	24.2	10.5
Adj Reference Time (s)	8.0	37.5	9.7	26.3	53.8	20.2	10.5	14.1	38.7	24.2	28.2	14.5
Permitted Option Allowed		No			No			No			No	
Adj Saturation A (vph)												
Reference Time A (s)												
Adj Saturation B (vph												
Reference Time B (s)												
Reference Time (s)												
Adj Reference Time (s)												
Split Option												
Ref Time Combined (s)	1.9	33.5		22.3	49.8		6.5	10.1		20.2	24.2	
Ref Time Seperate (s)	1.9	33.5		22.3	49.8		6.5	10.1		20.2	24.2	
Reference Time (s)	33.5	33.5		49.8	49.8		10.1	10.1		24.2	24.2	
Adj Reference Time (s)	37.5	37.5		53.8	53.8		14.1	14.1		28.2	28.2	

Summary	EB WB	NB SB	Combined
Protected Option (s)	63.9	38.7	
Permitted Option (s)	NA	NA	
Split Option (s)	91.3	42.3	
Minimum (s)	63.9	38.7	102.5

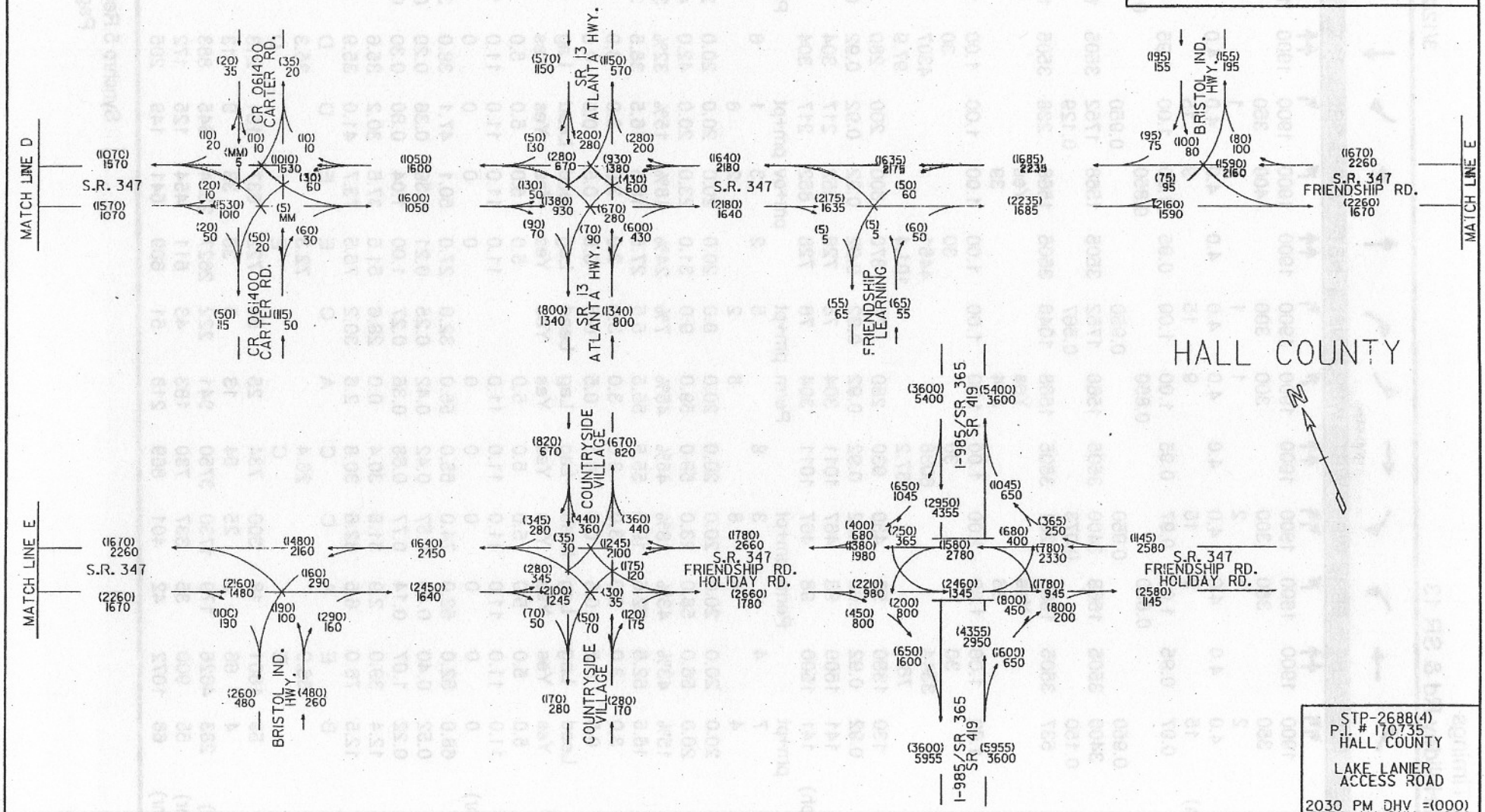
Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	9.7	20.2	38.7	14.5
Cross Thru Ref Time (s)	28.2	14.1	37.5	53.8
Oncoming Left Ref Time (s)	26.3	8.0	24.2	10.5
Combined (s)	64.1	42.2	100.5	78.8

Intersection Summary			
Intersection Capacity Utilization	85.4%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.

SHEET 6 OF 6

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION



STP-2688(4)
P.I. # 170735
HALL COUNTY

LAKE LANIER ACCESS ROAD

2030 PM DHV =(000)
2030 AM DHV = 000

T. = 3%

AFE 07/03

FRIENDSHIP RD / SR 13 2030 DHV AM 6 of 6

1/2004 7:16:38 AM \\GDOT-DSN1\GOPLOT\OCE\01_8830_HALFSIZE_PAPER.OCE TSUMPTION Y:\170735\TRAFFICA06.PRF D1-GAINESVILLE

Lanes, Volumes, Timings
3: Friendship Rd/Holiday Rd & SR 13 3/12/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	350		350	300		300	300		400	350		300
Storage Lanes	2		1	2		1	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3505	1568	3400	3505	1568	1752	3505	1568	1752	3505	1568
Flt Permitted	0.150			0.073			0.567			0.129		
Satd. Flow (perm)	537	3505	1568	261	3505	1568	1046	3505	1568	238	3505	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			86			304			39			54
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3344			6036			4461			4307	
Travel Time (s)		76.0			137.2			101.4			97.9	
Volume (vph)	130	1380	90	430	930	280	70	670	600	200	280	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	1500	98	467	1011	304	76	728	652	217	304	54
Lane Group Flow (vph)	141	1500	98	467	1011	304	76	728	652	217	304	54
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		pm+ov	pm+pt		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	56.0	56.0	23.0	59.0	59.0	9.0	31.0	23.0	20.0	42.0	42.0
Total Split (%)	15%	43%	43%	18%	45%	45%	7%	24%	18%	15%	32%	32%
Maximum Green (s)	16.5	52.5	52.5	19.5	55.5	55.5	5.5	27.5	19.5	16.5	38.5	38.5
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0	0	0	0
Act Effct Green (s)	68.0	52.0	52.0	74.0	55.0	55.0	32.0	27.0	50.1	47.1	38.0	38.0
Actuated g/C Ratio	0.52	0.40	0.40	0.57	0.42	0.42	0.25	0.21	0.39	0.36	0.29	0.29
v/c Ratio	0.22	1.07	0.14	0.77	0.68	0.36	0.27	1.00	1.04	0.80	0.30	0.11
Uniform Delay, d1	12.4	39.0	2.9	31.8	30.4	0.0	28.6	51.5	37.5	30.2	35.6	0.0
Delay	12.5	76.0	6.5	32.6	30.8	2.6	30.2	75.5	73.7	41.0	35.9	8.7
LOS	B	E	A	C	C	A	C	E	E	D	D	A
Approach Delay		66.9			26.4			72.3			35.3	
Approach LOS		E			C			E			D	
Stops (vph)	59	1601	18	300	734	25	56	722	637	151	213	9
Fuel Used(gal)	4	66	3	25	54	13	3	38	33	9	13	2
CO Emmisions (g/hr)	283	4626	179	1730	3750	941	222	2627	2334	645	883	127
NOx Emmisions (g/hr)	55	900	35	337	730	183	43	511	454	125	172	25
VOC Emmisions (g/hr)	66	1072	42	401	869	218	51	609	541	149	205	29

STP 268 SR 130

Lanes, Volumes, Timings
3: Friendship Rd/Holiday Rd & SR 13 3/12/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Dilemma Vehicles (#)	0	0	0	0	0	0	0	0	0	0	0	0
Queue Length 50th (ft)	25	~736	6	143	358	0	42	~325	~572	133	104	0
Queue Length 95th (ft)	41	#876	42	205	435	54	79	#462	#811	#256	145	32
Internal Link Dist (ft)		3264			5956			4381			4227	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	350		350	300		300	300		400	350		300
50th Bay Block Time %		34%			11%			7%	20%			
95th Bay Block Time %		41%			19%			32%	44%			
Queuing Penalty (veh)		52			70			14	117			

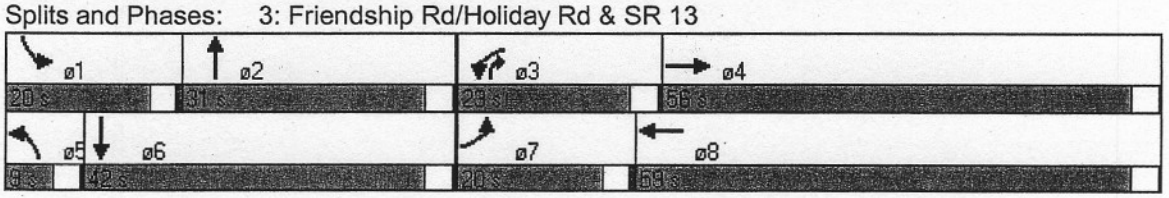
Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Natural Cycle: 130
Control Type: Pretimed
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 52.1 Intersection LOS: D
Intersection Capacity Utilization 103.9% ICU Level of Service F

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Friendship Rd/Holiday Rd & SR 13



Volume

3: Friendship Rd/Holiday Rd & SR 13 3/12/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	130	1380	90	430	930	280	70	670	600	200	280	50
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	141	1500	98	467	1011	304	76	728	652	217	304	54
Lane Group Flow (vph)	141	1500	98	467	1011	304	76	728	652	217	304	54

Intersection Summary

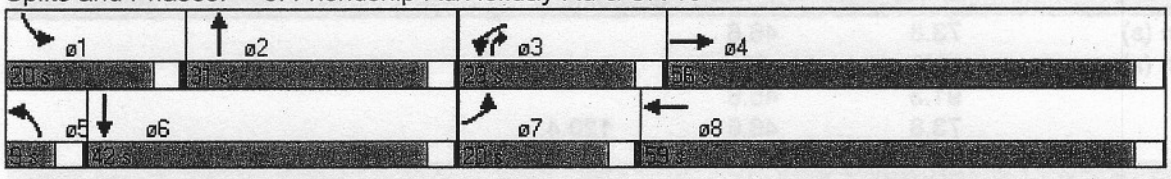
Timings
3: Friendship Rd/Holiday Rd & SR 13 3/12/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1380	90	430	930	280	70	670	600	200	280	50
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		pm+ov	pm+pt		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	7	4	4	3	8	8	5	2	3	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	20.0	56.0	56.0	23.0	59.0	59.0	9.0	31.0	23.0	20.0	42.0	42.0
Total Split (%)	15%	43%	43%	18%	45%	45%	7%	24%	18%	15%	32%	32%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	68.0	52.0	52.0	74.0	55.0	55.0	32.0	27.0	50.1	47.1	38.0	38.0
Actuated g/C Ratio	0.52	0.40	0.40	0.57	0.42	0.42	0.25	0.21	0.39	0.36	0.29	0.29
v/c Ratio	0.22	1.07	0.14	0.77	0.68	0.36	0.27	1.00	1.04	0.80	0.30	0.11
Uniform Delay, d1	12.4	39.0	2.9	31.8	30.4	0.0	28.6	51.5	37.5	30.2	35.6	0.0
Delay	12.5	76.0	6.5	32.6	30.8	2.6	30.2	75.5	73.7	41.0	35.9	8.7
LOS	B	E	A	C	C	A	C	E	E	D	D	A
Approach Delay		66.9			26.4			72.3			35.3	
Approach LOS		E			C			E			D	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
Natural Cycle: 130
Control Type: Pretimed
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 52.1 Intersection LOS: D
Intersection Capacity Utilization 103.9% ICU Level of Service F

Splits and Phases: 3: Friendship Rd/Holiday Rd & SR 13



Intersection Capacity Utilization
3: Friendship Rd/Holiday Rd & SR 13 3/12/2004

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1380	90	430	930	280	70	670	600	200	280	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Adjusted Volume (vph)	141	1500	98	467	1011	304	76	728	652	217	304	54
Volume Combined (vph)	141	1500	98	467	1011	304	76	728	652	217	304	54
Lane Utilization Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3505	3618	1615	3505	3618	1615	1805	3618	1615	1805	3618	1615
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	4.8	49.8	7.3	16.0	33.5	22.6	5.1	24.2	48.5	14.5	10.1	4.0
Adj Reference Time (s)	8.8	53.8	11.3	20.0	37.5	26.6	9.1	28.2	52.5	18.5	14.1	8.0
Permitted Option Allowed		No			No			No			No	
Adj Saturation A (vph)												
Reference Time A (s)												
Adj Saturation B (vph												
Reference Time B (s)												
Reference Time (s)												
Adj Reference Time (s)												
Split Option												
Ref Time Combined (s)	4.8	49.8		16.0	33.5		5.1	24.2		14.5	10.1	
Ref Time Seperate (s)	4.8	49.8		16.0	33.5		5.1	24.2		14.5	10.1	
Reference Time (s)	49.8	49.8		33.5	33.5		24.2	24.2		14.5	14.5	
Adj Reference Time (s)	53.8	53.8		37.5	37.5		28.2	28.2		18.5	18.5	

Summary	EB WB	NB SB	Combined
Protected Option (s)	73.8	46.6	
Permitted Option (s)	NA	NA	
Split Option (s)	91.3	46.6	
Minimum (s)	73.8	46.6	120.4

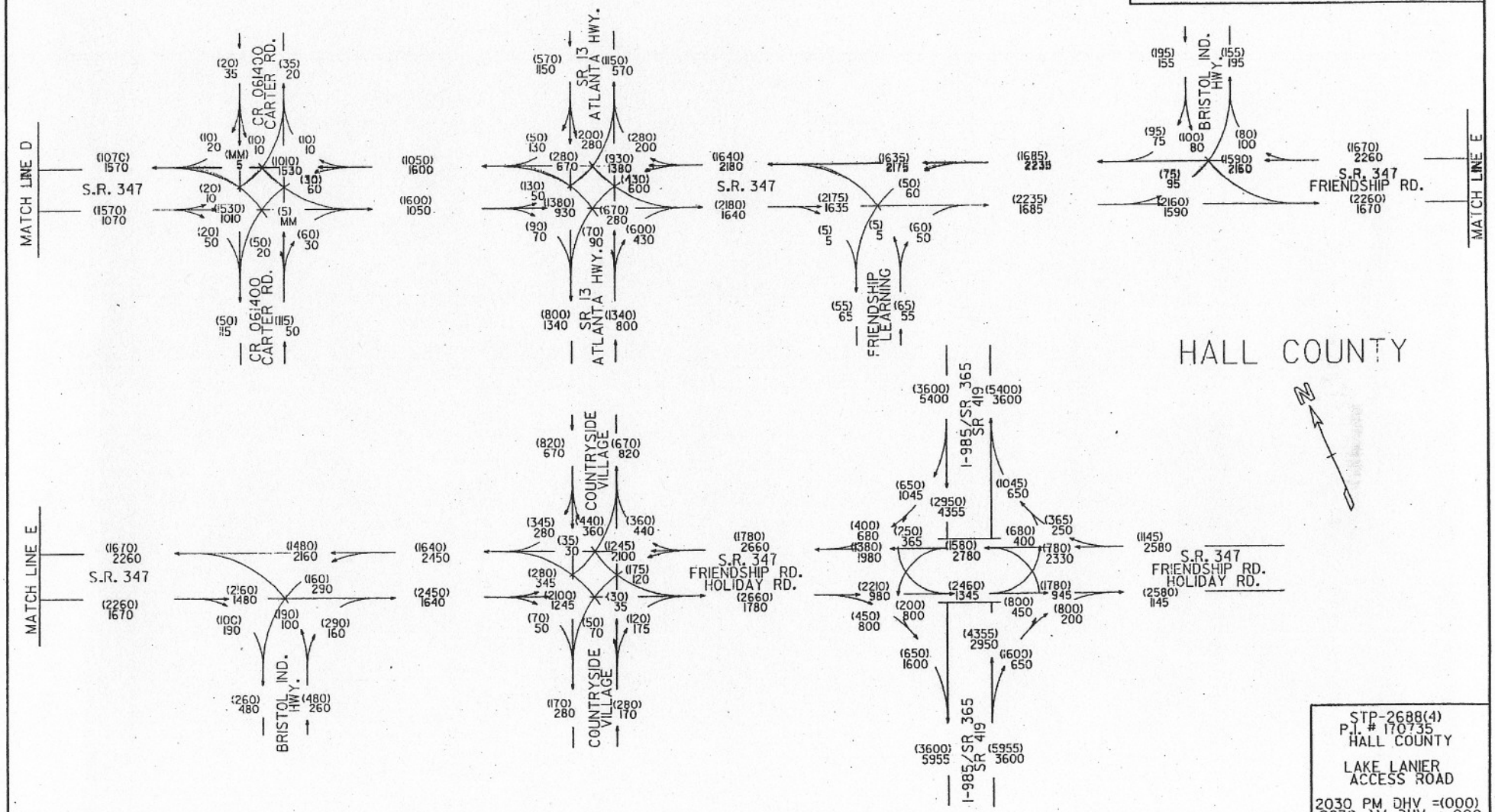
Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	11.3	26.6	52.5	8.0
Cross Thru Ref Time (s)	14.1	28.2	53.8	37.5
Oncoming Left Ref Time (s)	20.0	8.8	18.5	9.1
Combined (s)	45.4	63.6	124.7	54.6

Intersection Summary			
Intersection Capacity Utilization	103.9%	ICU Level of Service	F

Reference Times and Phasing Options do not represent an optimized timing plan.

SHEET 6 OF 6

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION



STP-2688(4)
P.I. # 170735
HALL COUNTY

LAKE LANIER ACCESS ROAD

2030 PM DHV =(000)
2030 AM DHV = 000

T. = 3%

AFE 07/03

FRIENDSHIP RD / SR 13 2030 DHV PM 6 of 6

1/2004 7:16:38 AM \\GDOT-DSN1\GOPLOT\OCF\D1_8830_HALFSIZE_PAPER.OCF TSUMPTION Y:\170735\TRAFFICA06.PRF D1-GAINESVILLE

Lanes, Volumes, Timings
3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	250		250	200		200	200		200
Storage Lanes	2		1	2		1	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3505	1568	3400	3505	1568	1752	3505	1568	1752	3505	1568
Flt Permitted	0.250			0.300			0.285			0.515		
Satd. Flow (perm)	895	3505	1568	1074	3505	1568	526	3505	1568	950	3505	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			179			158			305			251
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		3344			6036			4461			4307	
Travel Time (s)		76.0			137.2			67.6			65.3	
Volume (vph)	65	425	165	650	775	145	115	215	300	345	640	290
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	71	462	179	707	842	158	125	234	326	375	696	315
Lane Group Flow (vph)	71	462	179	707	842	158	125	234	326	375	696	315
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	8.0	20.0	20.0	13.0	25.0	25.0	8.0	21.0	21.0	11.0	24.0	24.0
Total Split (%)	12%	31%	31%	20%	38%	38%	12%	32%	32%	17%	37%	37%
Maximum Green (s)	4.0	16.0	16.0	9.0	21.0	21.0	4.0	17.0	17.0	7.0	20.0	20.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	20.0	16.0	16.0	29.0	21.0	21.0	21.0	17.0	17.0	27.0	20.0	20.0
Actuated g/C Ratio	0.31	0.25	0.25	0.45	0.32	0.32	0.32	0.26	0.26	0.42	0.31	0.31
v/c Ratio	0.17	0.54	0.34	0.88	0.74	0.26	0.51	0.26	0.51	0.78	0.65	0.48
Uniform Delay, d1	10.8	21.3	0.0	12.6	19.6	0.0	11.8	19.0	1.2	14.1	19.4	3.3
Delay	11.0	21.6	4.0	21.5	20.0	3.4	13.2	19.2	3.8	21.0	19.8	4.9
LOS	B	C	A	C	C	A	B	B	A	C	B	A
Approach Delay		16.1			19.1			10.8			16.7	
Approach LOS		B			B			B			B	
Stops (vph)	42	352	31	461	658	27	80	162	47	256	526	64
Fuel Used(gal)	2	15	5	36	43	7	5	9	10	14	27	9
CO Emmisions (g/hr)	145	1041	322	2515	3024	494	324	635	664	1000	1888	643
NOx Emmisions (g/hr)	28	203	63	489	588	96	63	124	129	195	367	125

STP2688 MCEVER a

Lanes, Volumes, Timings
3: Friendship Rd/Holiday Rd & McEver Road

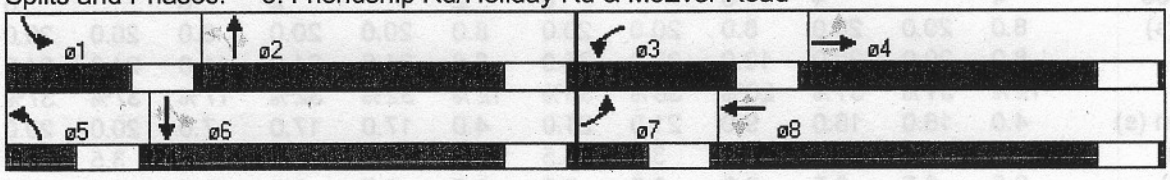
3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
VOC Emmisions (g/hr)	34	241	75	583	701	115	75	147	154	232	438	149
Dilemma Vehicles (#)	0	0	0	0	0	0	0	17	0	0	49	0
Queue Length 50th (ft)	7	83	0	95	154	0	29	38	0	103	123	18
Queue Length 95th (ft)	17	126	42	#172	216	34	59	65	58	#212	177	74
Internal Link Dist (ft)		3264			5956			4381			4227	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	200		200	250		250	200		200	200		200
50th Bay Block Time %												
95th Bay Block Time %										12%		
Queuing Penalty (veh)										20		

Intersection Summary

Area Type: Other
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 16.6 Intersection LOS: B
Intersection Capacity Utilization 73.5% ICU Level of Service C
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Friendship Rd/Holiday Rd & McEver Road



Volume

3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	425	165	650	775	145	115	215	300	345	640	290
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	71	462	179	707	842	158	125	234	326	375	696	315
Lane Group Flow (vph)	71	462	179	707	842	158	125	234	326	375	696	315

Intersection Summary

Timings

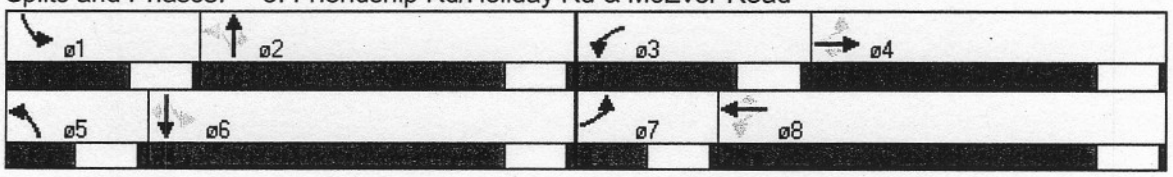
3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	425	165	650	775	145	115	215	300	345	640	290
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	7	4	4	3	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	8.0	20.0	20.0	13.0	25.0	25.0	8.0	21.0	21.0	11.0	24.0	24.0
Total Split (%)	12%	31%	31%	20%	38%	38%	12%	32%	32%	17%	37%	37%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	20.0	16.0	16.0	29.0	21.0	21.0	21.0	17.0	17.0	27.0	20.0	20.0
Actuated g/C Ratio	0.31	0.25	0.25	0.45	0.32	0.32	0.32	0.26	0.26	0.42	0.31	0.31
v/c Ratio	0.17	0.54	0.34	0.88	0.74	0.26	0.51	0.26	0.51	0.78	0.65	0.48
Uniform Delay, d1	10.8	21.3	0.0	12.6	19.6	0.0	11.8	19.0	1.2	14.1	19.4	3.3
Delay	11.0	21.6	4.0	21.5	20.0	3.4	13.2	19.2	3.8	21.0	19.8	4.9
LOS	B	C	A	C	C	A	B	B	A	C	B	A
Approach Delay		16.1			19.1			10.8			16.7	
Approach LOS		B			B			B			B	

Intersection Summary

Cycle Length: 65
Actuated Cycle Length: 65
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 16.6 Intersection LOS: B
Intersection Capacity Utilization 73.5% ICU Level of Service C

Splits and Phases: 3: Friendship Rd/Holiday Rd & McEver Road



Intersection Capacity Utilization
3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	425	165	650	775	145	115	215	300	345	640	290
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Adjusted Volume (vph)	71	462	179	707	842	158	125	234	326	375	696	315
Volume Combined (vph)	71	462	179	707	842	158	125	234	326	375	696	315
Lane Utilization Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3505	3618	1615	3505	3618	1615	1805	3618	1615	1805	3618	1615
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	2.4	15.3	13.3	24.2	27.9	11.7	8.3	7.8	24.2	24.9	23.1	23.4
Adj Reference Time (s)	8.0	19.3	17.3	28.2	31.9	15.7	12.3	11.8	28.2	28.9	27.1	27.4
Permitted Option Allowed		No			No			No			No	
Adj Saturation A (vph)												
Reference Time A (s)												
Adj Saturation B (vph												
Reference Time B (s)												
Reference Time (s)												
Adj Reference Time (s)												
Split Option												
Ref Time Combined (s)	2.4	15.3		24.2	27.9		8.3	7.8		24.9	23.1	
Ref Time Seperate (s)	2.4	15.3		24.2	27.9		8.3	7.8		24.9	23.1	
Reference Time (s)	15.3	15.3		27.9	27.9		8.3	8.3		24.9	24.9	
Adj Reference Time (s)	19.3	19.3		31.9	31.9		12.3	12.3		28.9	28.9	

Summary	EB WB	NB SB	Combined
Protected Option (s)	47.5	40.7	
Permitted Option (s)	NA	NA	
Split Option (s)	51.3	41.2	
Minimum (s)	47.5	40.7	88.2

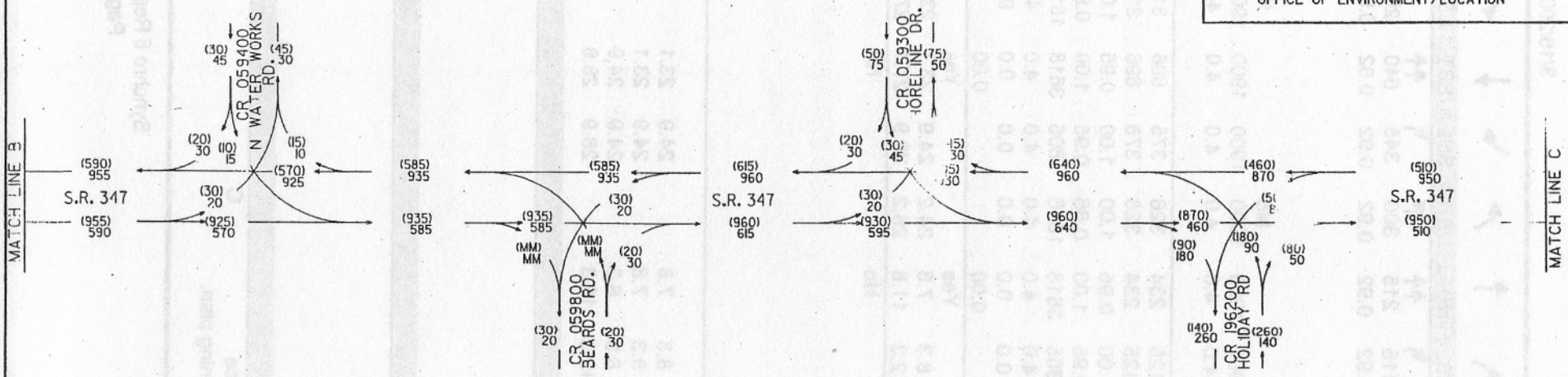
Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	17.3	15.7	28.2	27.4
Cross Thru Ref Time (s)	27.1	11.8	19.3	31.9
Oncoming Left Ref Time (s)	28.2	8.0	28.9	12.3
Combined (s)	72.6	35.5	76.5	71.7

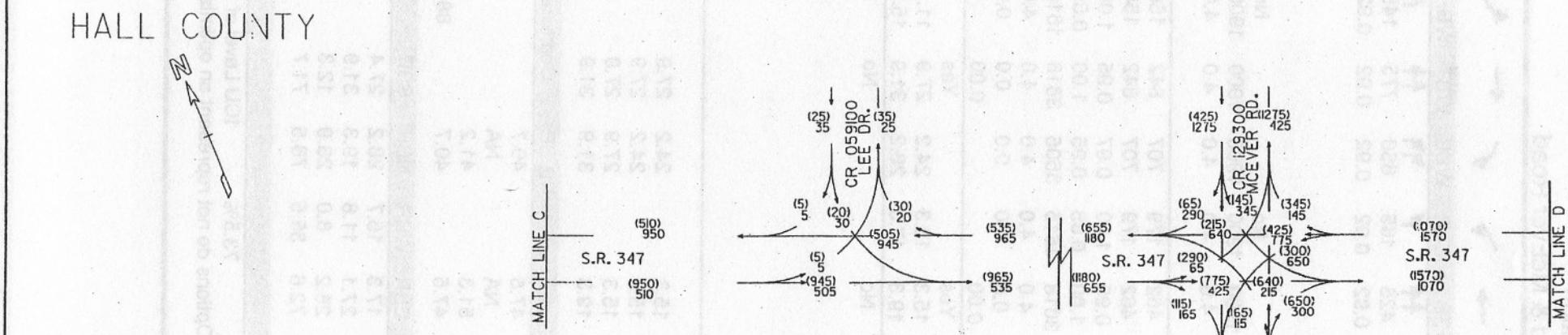
Intersection Summary			
Intersection Capacity Utilization	73.5%	ICU Level of Service	C

Reference Times and Phasing Options do not represent an optimized timing plan.

SHEET 5 OF 6

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION





STP-2688(4)
P.I. # 170735
HALL COUNTY

LAKE LANIER
ACCESS ROAD

2030 PM DHV =(000)
2030 AM DHV = 000

T. = 3%

AFE
07/03

Lanes, Volumes, Timings
3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	250		250	200		200	200		200
Storage Lanes	2		1	2		1	1		1	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3400	3505	1568	3400	3505	1568	1752	3505	1568	1752	3505	1568
Flt Permitted	0.375			0.222			0.563			0.317		
Satd. Flow (perm)	1342	3505	1568	794	3505	1568	1039	3505	1568	585	3505	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			125			221			231			71
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		3344			6036			4461			4307	
Travel Time (s)		76.0			137.2			67.6			65.3	
Volume (vph)	290	775	115	300	425	345	165	640	650	145	215	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	315	842	125	326	462	375	179	696	707	158	234	71
Lane Group Flow (vph)	315	842	125	326	462	375	179	696	707	158	234	71
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	8.0	22.0	22.0	8.0	22.0	22.0	10.0	32.0	32.0	8.0	30.0	30.0
Total Split (%)	11%	31%	31%	11%	31%	31%	14%	46%	46%	11%	43%	43%
Maximum Green (s)	4.0	18.0	18.0	4.0	18.0	18.0	6.0	28.0	28.0	4.0	26.0	26.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	22.0	18.0	18.0	22.0	18.0	18.0	34.0	28.0	28.0	30.0	26.0	26.0
Actuated g/C Ratio	0.31	0.26	0.26	0.31	0.26	0.26	0.49	0.40	0.40	0.43	0.37	0.37
v/c Ratio	0.58	0.93	0.25	0.82	0.51	0.66	0.32	0.50	0.92	0.50	0.18	0.11
Uniform Delay, d1	15.8	25.4	0.0	16.3	22.2	9.0	9.2	15.7	13.2	9.4	14.8	0.0
Delay	16.8	37.5	4.8	26.4	22.6	10.0	9.6	16.0	25.8	10.8	15.0	4.4
LOS	B	D	A	C	C	B	A	B	C	B	B	A
Approach Delay		29.2			19.6			19.6			11.9	
Approach LOS		C			B			B			B	
Stops (vph)	216	778	24	236	349	161	87	453	474	87	136	18
Fuel Used(gal)	10	30	3	17	24	18	6	26	28	5	8	2
CO Emmisions (g/hr)	681	2126	227	1191	1669	1246	432	1835	1966	381	584	147
NOx Emmisions (g/hr)	133	414	44	232	325	242	84	357	383	74	114	29

STP 268B MCEVER P

Lanes, Volumes, Timings

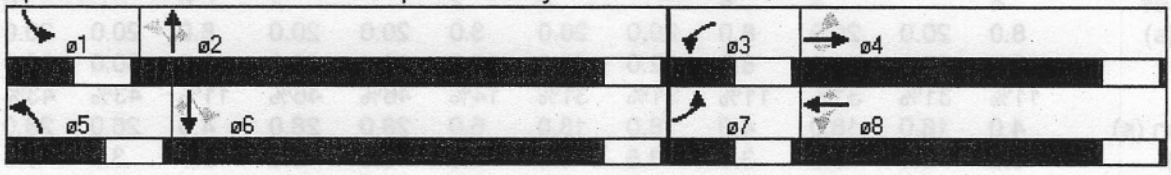
3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
VOC Emmisions (g/hr)	158	493	53	276	387	289	100	425	456	88	135	34
Dilemma Vehicles (#)	0	0	0	0	0	0	0	46	0	0	16	0
Queue Length 50th (ft)	47	186	0	48	89	54	39	114	197	34	34	0
Queue Length 95th (ft)	74	#297	36	#98	133	143	71	160	#429	64	57	0
Internal Link Dist (ft)		3264			5956			4381			4227	
50th Up Block Time (%)												
95th Up Block Time (%)												
Turn Bay Length (ft)	200		200	250		250	200		200	200		200
50th Bay Block Time %									8%			
95th Bay Block Time %		31%							42%			
Queuing Penalty (veh)		48							87			

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Pretimed
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 21.6 Intersection LOS: C
Intersection Capacity Utilization 85.8% ICU Level of Service D
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Friendship Rd/Holiday Rd & McEver Road



Volume

3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	290	775	115	300	425	345	165	640	650	145	215	65
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	315	842	125	326	462	375	179	696	707	158	234	71
Lane Group Flow (vph)	315	842	125	326	462	375	179	696	707	158	234	71

Intersection Summary

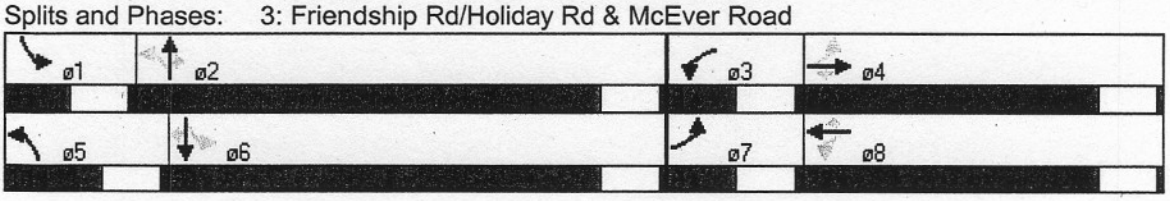
Timings
3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	775	115	300	425	345	165	640	650	145	215	65
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phases	7	4	4	3	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	8.0	22.0	22.0	8.0	22.0	22.0	10.0	32.0	32.0	8.0	30.0	30.0
Total Split (%)	11%	31%	31%	11%	31%	31%	14%	46%	46%	11%	43%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	22.0	18.0	18.0	22.0	18.0	18.0	34.0	28.0	28.0	30.0	26.0	26.0
Actuated g/C Ratio	0.31	0.26	0.26	0.31	0.26	0.26	0.49	0.40	0.40	0.43	0.37	0.37
v/c Ratio	0.58	0.93	0.25	0.82	0.51	0.66	0.32	0.50	0.92	0.50	0.18	0.11
Uniform Delay, d1	15.8	25.4	0.0	16.3	22.2	9.0	9.2	15.7	13.2	9.4	14.8	0.0
Delay	16.8	37.5	4.8	26.4	22.6	10.0	9.6	16.0	25.8	10.8	15.0	4.4
LOS	B	D	A	C	C	B	A	B	C	B	B	A
Approach Delay		29.2			19.6			19.6			11.9	
Approach LOS		C			B			B			B	

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Pretimed
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 21.6 Intersection LOS: C
Intersection Capacity Utilization 85.8% ICU Level of Service D

Splits and Phases: 3: Friendship Rd/Holiday Rd & McEver Road



Intersection Capacity Utilization
3: Friendship Rd/Holiday Rd & McEver Road 3/16/2004

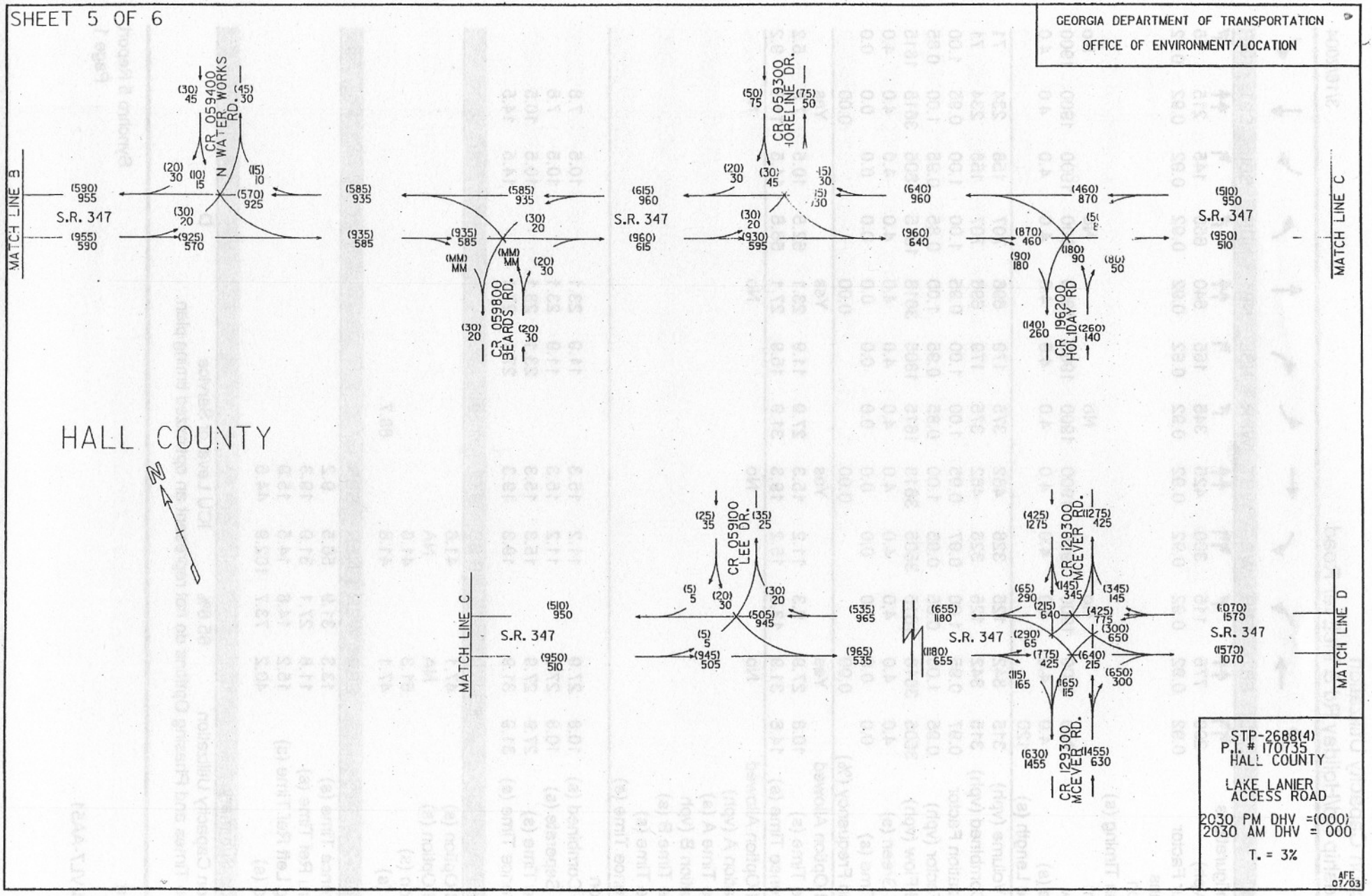
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	775	115	300	425	345	165	640	650	145	215	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Adjusted Volume (vph)	315	842	125	326	462	375	179	696	707	158	234	71
Volume Combined (vph)	315	842	125	326	462	375	179	696	707	158	234	71
Lane Utilization Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85	0.95	1.00	0.85
Saturated Flow (vph)	3505	3618	1615	3505	3618	1615	1805	3618	1615	1805	3618	1615
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		Yes			Yes			Yes			Yes	
Reference Time (s)	10.8	27.9	9.3	11.2	15.3	27.9	11.9	23.1	52.5	10.5	7.8	5.2
Adj Reference Time (s)	14.8	31.9	13.3	15.2	19.3	31.9	15.9	27.1	56.5	14.5	11.8	9.2
Permitted Option Allowed		No			No			No			No	
Adj Saturation A (vph)												
Reference Time A (s)												
Adj Saturation B (vph												
Reference Time B (s)												
Reference Time (s)												
Adj Reference Time (s)												
Split Option												
Ref Time Combined (s)	10.8	27.9		11.2	15.3		11.9	23.1		10.5	7.8	
Ref Time Seperate (s)	10.8	27.9		11.2	15.3		11.9	23.1		10.5	7.8	
Reference Time (s)	27.9	27.9		15.3	15.3		23.1	23.1		10.5	10.5	
Adj Reference Time (s)	31.9	31.9		19.3	19.3		27.1	27.1		14.5	14.5	

Summary	EB WB	NB SB	Combined
Protected Option (s)	47.1	41.6	
Permitted Option (s)	NA	NA	
Split Option (s)	51.3	41.6	
Minimum (s)	47.1	41.6	88.7

Right Turns	EBR	WBR	NBR	SBR
Adj Reference Time (s)	13.3	31.9	56.5	9.2
Cross Thru Ref Time (s)	11.8	27.1	31.9	19.3
Oncoming Left Ref Time (s)	15.2	14.8	14.5	15.9
Combined (s)	40.2	73.7	102.9	44.5

Intersection Summary			
Intersection Capacity Utilization	85.8%	ICU Level of Service	D

Reference Times and Phasing Options do not represent an optimized timing plan.


SHEET 5 OF 6
GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION
MATCH LINE B
MATCH LINE C
MATCH LINE D
S.R. 347
CR 059400 N WATER WORKS RD.
CR 059300 FORELINE DR.
CR 059800 BEARDS RD.
CR 196200 HOLIDAY RD
CR 059100 LEE DR.
CR 129300 MCEVER RD.
HALL COUNTY
N
STP-2688(4)
P.I. # 170735
HALL COUNTY
LAKE LANIER ACCESS ROAD
2030 PM DHV =(000)
2030 AM DHV = 000
T. = 3%
AFE 07/03

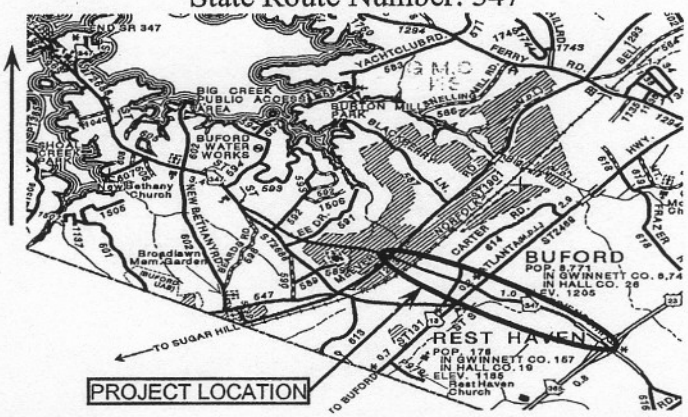
DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

District One

PROJECT CONCEPT REPORT

Project Number: STP-2688(4)
County: Hall
P. I. Number: 170735

Federal Route Number: None
State Route Number: 347



Recommendation for approval:

DATE 11-16-2004 Russell R. McMurry
Project Manager

DATE 11-16-2004
Office Head/District Engineer

The concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Improvement Program (RTP) and the State Transportation Improvement Program (STIP).

DATE _____
State Transportation Planning Administrator

DATE 11-22-04 James Simpson
State Transportation Financial Management Administrator

DATE _____
State Environmental/Location Engineer

DATE _____
State Traffic Safety & Design Engineer

DATE _____
Project Review Engineer

DATE _____
State Bridge and Structural Design Engineer