ORIGINAL TO GENERAL FILES

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

OFFICE OF DESIGN POLICY & SUPPORT
INTERDEPARTMENTAL CORRESPONDENCE

FILE P.I. #731830
STP00-0186-01(038)
GDOT District 7 - Metro Atlanta
Fulton County
Campbellton Road @ Boat Rock Road/New Hope Road

OFFICE Design Policy & Support

DATE 7/27/2011

FROM for Brent Story, State Design Policy Engineer

TO SEE DISTRIBUTION

SUBJECT **APPROVED CONCEPT REPORT**

Attached is the approved Concept Report for the above subject project.

Attachment

DISTRIBUTION:

Genetha Rice-Singleton, Program Control Administrator
Bobby Hilliard, State Program Delivery Engineer
Cindy VanDyke, State Transportation Planning Administrator
Angela Robinson, Financial Management Administrator
Glenn Bowman, State Environmental Administrator
Kathy Zahul, State Traffic Engineer
Georgene Geary, State Materials & Research Engineer
Ron Wishon, State Project Review Engineer
Jeff Baker, State Utilities Engineer
Ken Thompson, Statewide Location Bureau Chief
Michael Henry, Systems & Classification Branch Chief
Bryant Poole, District Engineer
Scott Lee, District Preconstruction Engineer
Jonathan Walker, District Utilities Engineer
Ernay Robinson, Project Manager
BOARD MEMBER - 5th Congressional District

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PROJECT CONCEPT REPORT

Project Number: STP00-0186-01(038)
County: Fulton
P. I. Number: 731830
Federal Route Number: N/A
State Route Number: 154/166

Campbellton Road @ Boat Rock Road / New Hope Road
Intersection Improvement

Submitted for approval:

DATE 4/11/11 — Jeffrey W. Dyer, P.E. (Jeffrey W Dyer)
Qk4

DATE 4.11.11 — Richard Coates, P.E. (Richard Coates)
Fulton County

DATE 8/4/2010 — BOBBY HILLARD*
Office Head

DATE 8/10/2010 — ERNAY ROBINSON*
Project Manager

Recommended for approval:

DATE 5/17/2011 — GENETHA RICE-SINGLETON*
Project Control Administrator

DATE 5/12/2011 — GLENN BOWMAN*
State Environmental Administrator

DATE 5/26/2011 — KATHY ZAHUL*
State Traffic Engineer

DATE 5/5/2011 — RON WISHON*
Project Review Engineer

DATE 5/5/2011 — JEFF BAKER*
State Utilities Engineer

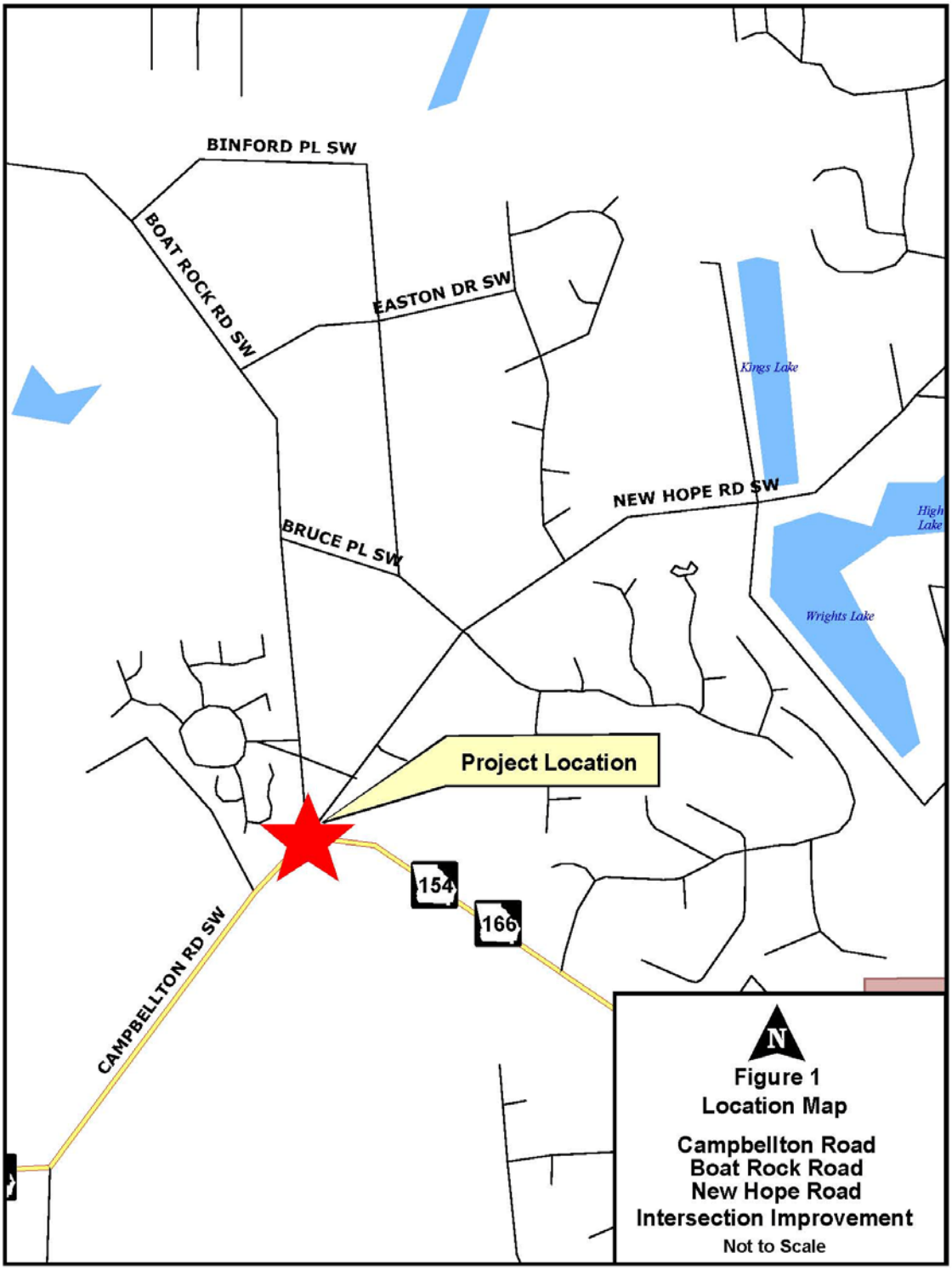
DATE _____ — _____
District Engineer/District Utilities Engineer

DATE _____ — _____
State Transportation financial Management Administrator

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

DATE 5-10-11 — Cynthia L VanDyke
State Transportation Planning Administrator

* RECOMMENDATION ON FILE


BINFORD PL SW
BOAT ROCK RD SW
EASTON DR SW
Kings Lake
NEW HOPE RD SW
BRUCE PL SW
Wrights Lake
Project Location
154
166
CAMPBELLTON RD SW
N
Figure 1
Location Map
Campbellton Road
Boat Rock Road
New Hope Road
Intersection Improvement
Not to Scale

Project Description and Location:

Project STP00-0186-01(038) will combine the separate intersections of Campbellton Road @ Boat Rock Road and Boat Rock Road @ New Hope Road into a single intersection. This project will construct a roundabout at this combined intersection.

This project is located in southwestern Fulton County, approximately 4 miles west of the Campbellton Road (SR 154/166) interchange with I-285. The project is also less than two miles from the intersection of Campbellton Road @ Camp Creek Parkway. This project lies within land lot 92 of the 14th District of Fulton County, Georgia.

Need and Purpose:

The proposed project is an intersection improvement of the intersection of SR 154/166 (Campbellton Road) and Boat Rock Road and the nearby intersection of Boat Rock Road and New Hope Road. These intersections are located in southwest Fulton County (see Location Map – Previous Page). Campbellton Road extends from the Douglas/Fulton County line to downtown Atlanta. Boat Rock Road and New Hope Road are classified as urban collector streets. Boat Rock Road intersects Campbellton Road, which is classified as a minor urban arterial street. New Hope Road intersects Boat Rock Road within 100 feet of the Campbellton Road/Boat Rock Road intersection. The two separate 3-legged intersections, in effect, form a closely spaced, four-legged intersection.

This project is included as part of the Regional Transportation Plan (RTP) developed by the Atlanta Regional Commission (Project FS-217). This project proposes to improve operational efficiency by combining the two separate intersections that are located within 100 feet into a single roundabout intersection.

Existing Conditions

In the northwest corner of the Campbellton Road/Boat Rock intersection is a Citgo Gas station, along with a small attached commercial building that has driveways on both Campbellton Road and Boat Rock Road. The building is set back from the existing roadways and will not affect the potential scope of this project.

The remaining properties in the immediate vicinity are either undeveloped or single-family residential. Properties along Campbellton Road on the south side of the roadway are residential with deep front yards. The land in northeast quadrant of both intersections is currently undeveloped. North and west of the project are established residential subdivisions.

According to the 2025 future land use map from the Fulton County Comprehensive Plan, the land in the immediate vicinity of both intersections, but on the north side of Campbellton Road, is classified as "Living Working-Community". The land on the south side of Campbellton Road, and along both Boat Rock and New Hope Roads north of the intersection is classified as "Residential – 2 to 3 units per acre.

Campbellton Road is an important thoroughfare in Fulton County that has an interchange with I-285. It connects established residential areas west of Atlanta with both I-285 and I-75/85 via Langford Parkway. Campbellton Road is the southern terminus for Boat Rock Road. Boat Rock Road continues north and west towards Camp Creek Parkway and Fulton Industrial Boulevard, serving as a connector between Campbellton Road and the warehouse/industrial land uses along the Fulton Industrial Boulevard corridor. New Hope Road begins at Boat Rock Road and continues east and north towards its terminus at Cascade Road. It primarily serves residential areas.

The existing Campbellton Road/Boat Rock Road intersection is three-legged and currently unsignalized, with Campbellton Road having the right-of-way through the intersection. The existing intersection (skew) angle is 78 degrees, which is allowable under both GDOT and AASHTO guidelines. There are no left-turn lanes provided on any approach, and right-turn lanes provided on the westbound and southbound approaches. The only channelization provided is a raised corner island for the southbound to westbound right-turn movement in the northwest quadrant of the intersection.

The existing Boat Rock Road/New Hope Road intersection is unsignalized, with Boat Rock Road having the right-of-way. The intersection (skew) angle is 85 degrees. There are no turn lanes provided on any approach. The only existing sidewalks in the project area are along the west side of Boat Rock Road and along a short section of Campbellton in front of the Citgo gas station.

Existing Deficiencies

The existing Boat Rock Road/New Hope Road intersection is located within 100 feet of the center of the Campbellton Road intersection. The proximity of these two intersections creates operational issues along both Boat Rock Road and New Hope Road and is the primary problem that this project would rectify.

During the morning and afternoon peak hours, southbound Boat Rock Road traffic experiences delay as it waits for gaps in the Campbellton Road traffic flow to turn onto Campbellton Road. Vehicles wanting to turn left onto Boat Rock to reach Campbellton Road can find no storage on Campbellton Road, causing considerable vehicle queuing along New Hope Road.

Accident data collected from the Georgia DOT accident reporting system between 2006 and 2008 indicate a history of rear-end and angle accidents, with the overall number increasing with each succeeding year. Of the three years studied, the accident rate in the project area has increased each year and exceeds the statewide average rate for both non-NHS urban minor arterials and urban collectors in 2008. The accident rate information is summarized in Table 1. Table 2 summarizes the injury rates for the same roadway classifications. The results of that table mirror Table 1. Table 3 summarizes the fatal accident rates which are zero for each year, since no fatal accidents occurred in this vicinity. Table 4 summarizes the crash types obtained from the vicinity of the intersections.

Table 1: Accident Summary – Campbellton Road / Boat Rock Road / New Hope Road (MP range – 18-13-19.65)

Year	Number of Accidents	Computed Accident Rate	Statewide Average Rate (Minor Arterial, non NHS Urban)	Statewide Average Rate (Collector, Urban)
2006	9	312	548	510
2007	15	486	513	475
2008	18	625	469	443

Table 2: Non-Fatal Accident Summary – Campbellton Road / Boat Rock Road / New Hope Road (MP range – 18-13-19.65)

Year	Number of Injury Accidents	Computed Injury Accident Rate	Statewide Average Rate (Minor Arterial, non NHS Urban)	Statewide Average Rate (Collector, Urban)
2006	3	104	137	123
2007	3	104	126	114
2008	7	243	117	105

Table 3: Fatal Accident Summary – Campbellton Road / Boat Rock Road / New Hope Road (MP range – 18-13-19.65)

Year	Number of Fatal Accidents	Computed Injury Accident Rate	Statewide Average Rate (Minor Arterial, non NHS Urban)	Statewide Average Rate (Collector, Urban)
2006	0	0	1.43	1.6
2007	0	0	1.36	1.25
2008	0	0	1.33	1.08

Table 4: Summary of Crashes
Intersection of Campbellton Road at Boat Rock Road and New Hope Road

2006							
Intersection	**Total Crashes**	**Crash Type**				**Injury Crashes/ Tot. Injuries**	**Fatality**
		Sideswipe	**Rear End**	**Angle**	**Other**		
Campbellton @ Boat Rock	8	2	3	2	1	3/5	0
Boat Rock @ New Hope	1	0	1	0	0	0/0	0
Total	**9**	**2**	**4**	**2**	**1**	**3/5**	**0**
2007							
Intersection	**Total Crashes**	**Crash Type**				**Injury Crashes/ Tot. Injuries**	**Fatality**
		Sideswipe	**Rear End**	**Angle**	**Tot. Injuries**		
Campbellton @ Boat Rock	14	0	6	7	1	3/3	0
Boat Rock @ New Hope	1	0	0	1	0	0/0	0
Total	**15**	**0**	**6**	**8**	**1**	**3/3**	**0**
2008							
Intersection	**Total Crashes**	**Crash Type**				**Injury Crashes/ Tot. Injuries**	**Fatality**
		Sideswipe	**Rear End**	**Angle**	**Tot. Injuries**		
Campbellton @ Boat Rock	18	0	10	7	1	7/17	0
Boat Rock @ New Hope	0	0	0	0	0	0/0	0
Total	**18**	**0**	**10**	**7**	**1**	**7/17**	**0**

As can be seen in Table 4, the largest numbers of crashes are rear-end and angle. Rear end crashes are usually caused by vehicles stopping suddenly, with close-following vehicles behind them hitting them. At an unsignalized intersection, this type of accident is often caused by vehicles stopping in the through lane to turn left. Providing an exclusive left-turn lane can reduce this type of accident by getting the left-turn vehicles waiting for a gap in oncoming traffic out of the through lane.

Angle crashes are often caused when vehicles traveling through the intersection on one approach are hit by a vehicle going through the same intersection in a different direction. Signalization is the best solution for this type of crash. A signal restricts the use of intersection right-of-way to one set of approaches at a time, thus minimizing the potential conflicts between the conflicting traffic streams.

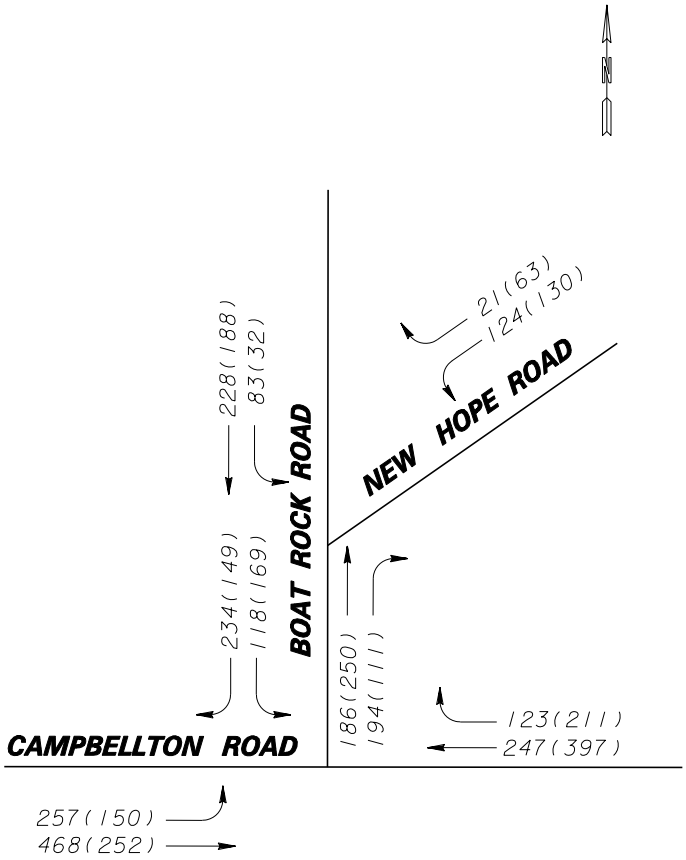
"No-Build" Level of Service Analysis

Existing, build year and design year a.m. and p.m. peak hour traffic volumes for both intersections are shown on (Figure 2 – Traffic Flow Diagrams). The volume projections were reviewed and approved by the GDOT Office of Planning. Intersection level of service analysis was conducted for both Campbellton Road @ Boat Rock Road and Boat Rock Road @ New Hope Road, assuming the existing (No-Build) intersection and roadway configurations. This was done for the existing (2010), build year (2014) and design year (2034).

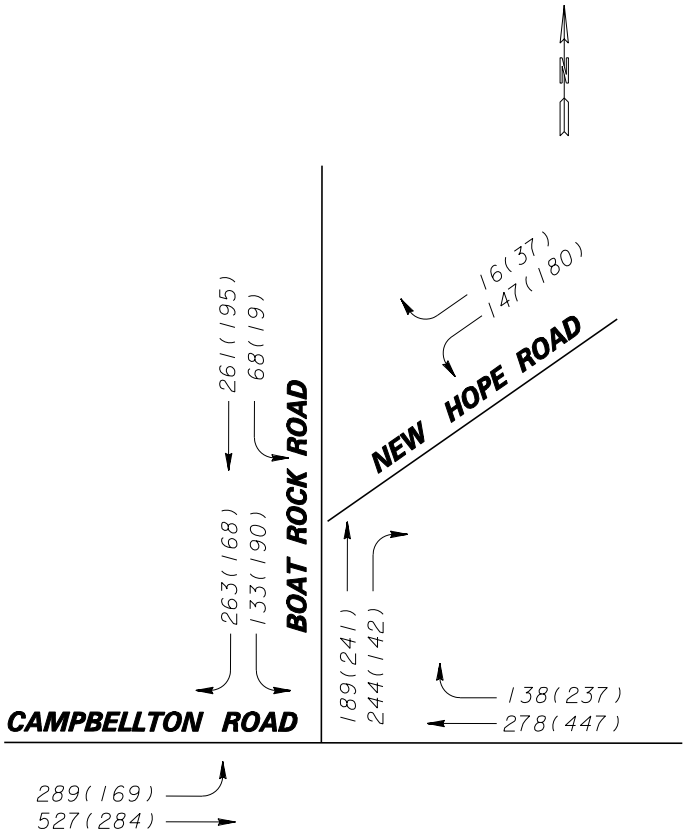
Intersection operational efficiency is expressed in terms of level of service (LOS), which is a measure of the amount of delay and congested expressed by motorists as they pass through an intersection. LOS is designated by the letters "A" through "F". LOS A represents free-flowing conditions with very little delay and LOS F indicates forced flow, extreme congestion and long delays. The LOS methodologies are from the current edition of the *Highway Capacity Manual*.

Table 5 summarizes the level of service results for the "No-Build" condition for the existing (2010), opening (2014) and design years (2034). Both intersections are currently unsignalized. The LOS methodology for unsignalized intersections provides individual levels of service for each movement that does not have the right-of-way at the intersection.

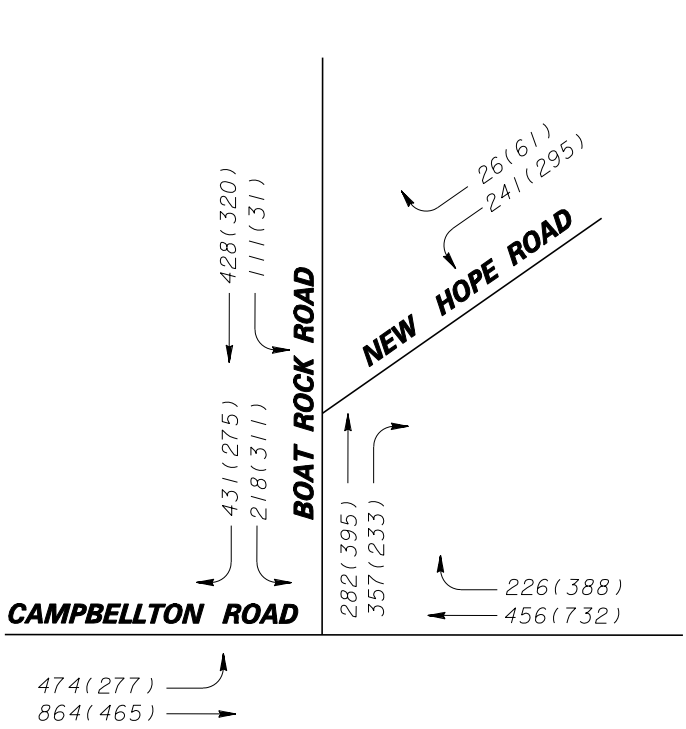
Table 5 lists the LOS for the worst approach, along with the approach delay (in seconds) that is associated with each level of service. The unsignalized intersection methodology does not provide an overall level of service or condition of the intersection as a whole. The problems at these intersections are caused by the movements that have the excessive delay associated with them. The remaining movements at these intersections that do not have the right-of-way (SB RT at Campbellton @ Boat Rock and SB LT at Boat Rock @ New Hope) have levels of service no worse than LOS D in 2034, with most being A or B.



EXISTING (2010)
PEAK HOUR TRAFFIC



BUILD YEAR (2014)
PEAK HOUR TRAFFIC



DESIGN YEAR (2034)
PEAK HOUR TRAFFIC

AM = 000
PM = (000)

Engineering
Planning
Construction Mgmt
QK4
3619 Holcomb Bridge Rd, Suite 455
Norcross, Georgia 300071
(404) 329-5900

FIGURE 2

CAMPBELLTON RD @
BOAT ROCK RD /NEW HOPE RD
INTERSECTION IMPROVEMENTS

TRAFFIC FLOW DIAGRAMS

Table 5: Existing and "No-Build" - Level of Service Summary

Intersection Name	Year	Time Period	Worst Approach (2-way unsig)	Level of Service (worst approach)	Approach Delay (sec)
Campbellton Rd @ Boat Rock Rd	2010	a.m. peak	SB LT	F	82.3
Boat Rock Rd @ New Hope Rd	2010	a.m. peak	WB	C	18.2
Campbellton Rd @ Boat Rock Rd	2014	a.m. peak	SB LT	F	195.7
Boat Rock Rd @ New Hope Rd	2014	a.m. peak	WB	C	22.4
Campbellton Rd @ Boat Rock Rd	2034	a.m. peak	SB LT	F	4580.0
Boat Rock Rd @ New Hope Rd	2034	a.m. peak	WB	F	317.9
Campbellton Rd @ Boat Rock Rd	2010	p.m. peak	SB LT	E	48.3
Boat Rock Rd @ New Hope Rd	2010	p.m. peak	WB	C	15.4
Campbellton Rd @ Boat Rock Rd	2014	p.m. peak	SB LT	F	104.7
Boat Rock Rd @ New Hope Rd	2014	p.m. peak	WB	C	17.9
Campbellton Rd @ Boat Rock Rd	2034	p.m. peak	SB LT	F	2451.0
Boat Rock Rd @ New Hope Rd	2034	p.m. peak	WB	F	160.8

On approaches where more than one lane exists, the worst approach is identified by the approach and movement (SB LT in table). On approaches where there is only a single lane, only the approach direction is given (WB in table). For those approaches, all movements made from that approach are included. For Boat Rock @ New Hope Road the single-lane westbound approach lane includes both the left-turn and right-turn movements.

Table 5 shows LOS F in the a.m. peak and LOS E in the p.m. peak for the southbound left-turn movement from Boat Rock Road onto Campbellton Road in 2010. The delay increases substantially as the traffic volumes increase for 2014 and 2034. The LOS in the p.m. peak hour deteriorates to LOS F by 2014.

Even though the LOS doesn't fall below LOS C for the westbound left-turn movement from New Hope Road onto southbound Boat Rock Road, the more important issue is that the queuing of the southbound left-turn movement from Boat Rock to Campbellton blocks the New Hope Road intersection, and correspondingly creates a back-up of the New Hope Road approach traffic.

As this area grows in population and traffic, this intersection will experience increasing congestion and potential for accidents.

There are two possible approaches to improving the operation of both of these intersections. One is to separate each existing intersection far enough apart so that they don't interfere with each other. The other is to combine Campbellton Road, Boat Rock Road, and New Hope Road into a single 4-legged intersection.

Signal Warrant Analysis

A Traffic Signal Warrant Evaluation was conducted for the existing intersections of Campbellton Road @ Boat Rock Road and Boat Rock Road @ New Hope Road to determine if the installation of traffic signals is warranted under the criteria presented in the *Manual of Uniform Traffic Control Devices* (MUTCD), published by the Federal Highway Administration.

Two or more warrants are satisfied for the existing, opening and design years for Campbellton Road @ Boat Rock Road. No signal warrant is satisfied for Boat Rock Road @ New Hope Road. Table 6 (next page) summarizes the signal warrant analysis for Campbellton Road @ Boat Rock Road.

Table 6 - Signal Warrant Analysis Summary
Intersection of Campbellton Road at Boat Rock Road

Warrant	Description	2010 Analysis Results	2014 Analysis Results	2034 Analysis Results
1	Eight-Hour Vehicular Volume	Not Satisfied	Not Satisfied	Satisfied
2	Four-Hour Vehicular Volume	Satisfied	Satisfied	Satisfied
3	Peak Hour	Satisfied	Satisfied	Satisfied
4	Pedestrian Volume	Not Applicable	Not Applicable	Not Applicable
5	School Crossing	Not Applicable	Not Applicable	Not Applicable
6	Coordinated Signal System	Not Applicable	Not Applicable	Not Applicable
7	Crash Experience	See Note	See Note	See Note
8	Roadway Network	Not Applicable	Not Applicable	Not Applicable
9	Intersection Near A Grade Crossing	Not Applicable	Not Applicable	Not Applicable

Note: Right-angle accidents are often susceptible to correction by a traffic signal. Table 1 indicates that warrant #7 may be satisfied in 2007 and 2008. However, police reports are needed to verify the details of the individual accidents before it can be determined if this warrant is satisfied.

Table 6 shows a minimum of two traffic signal warrants being satisfied for the existing year (2010) and proposed opening year (2014) for Campbellton Road @ Boat Rock Road. A minimum of three signal warrants are satisfied for the design year (2034). Only one warrant needs to be satisfied before the installation of a traffic signal can be considered.

The other potential solution for this project is to create a single four-legged intersection immediately east of existing Campbellton Road @ Boat Rock Road. This intersection would be oriented approximately 45 degrees from the existing configuration. Campbellton Road would serve as the southeast and southwest quadrants, Boat Rock Road would serve as the northwest quadrant, and New Hope Road would serve as the northeast quadrant. Although this combined intersection would meet at least the same number of signal warrants as Campbellton Road @ Boat Rock Road (discussed above), the favored traffic control/configuration for this single intersection would be a partial multi-lane roundabout. Based on factors discussed later in this report, a single roundabout is the preferred alternative for this project.

Community Characteristics

The project area is located within census tracts 78.02 and 103.03. Boat Rock Road serves as the boundary between the two tracts, with 78.02 being east of Boat Rock Road and 103.03 west of Boat Rock Road. Table 7 summarizes population, % minority (defined as non-white) population, and population percent below the poverty line, compared with similar data for Fulton County and the State of Georgia.

Table 7: Community Summary (2000 Census)

Area	Total Population	Percent Minority Population	Percent of Population living below Poverty Line
Census Tract 78.02	6325	97.3	6.5
Census Tract 103.03	5486	97.5	9.6
Fulton County	816,006	51.9	15.7
State of Georgia	8,186,453	34.9	12.6

As can be seen in Table 7, the two census tracts that include this project are predominantly minority in population but with poverty levels below the County and State averages.

Logical Termini and Capacity Issues

This project proposes to improve two adjacent existing intersections. Logical termini for the intersection approaches are determined by approach lane length and taper requirements and/or the length of necessary roadway relocations.

The logical terminus for the southwest Campbellton Road approach is approximately 1000 feet west of the proposed roundabout. This provides length for an eastbound left turn bay into the Citgo Station and provides adequate distance for a multi-lane approach into a proposed roundabout. This also allows the extension of the two-lanes leaving the roundabout to connect into two existing lanes that are located east of the Sandtown School.

The logical terminus for the southeast Campbellton Road approach is approximately 1100 feet east of the proposed roundabout. This provides length for two lanes to exit the roundabout and continue for a minimum of 500 feet, plus a transition taper to a single eastbound through lane.

The logical terminus for the New Hope Road approach is approximately 500’ northeast of the proposed roundabout. This provides length for the New Hope Road approach to tie into the existing roadway.

The logical terminus for the Boat Rock approach is approximately 500’ north of the proposed roundabout. This provides length for the Boat Rock Road approach to tie into the existing roadway.

This project falls within the Atlanta region nonattainment area for air quality. This project was designed to improve traffic operational efficiency and safety and does not provide additional capacity to any of the intersecting roadways. This project is exempt from air quality analysis according to the Atlanta regions RTP/TIP.

Build Alternative Level of Service Summary:

The “Build” alternative proposes the construction of a single roundabout to accommodate the approaches from both existing intersections. It relocates all four approaches to a single intersection located approximately 200 feet northeast of the existing intersection of Campbellton Road @ New Hope Road.

Level of service/capacity analysis was performed by Kittelson & Associates as part of an overall operational evaluation of a single roundabout intersection for this project. Analysis was performed using both NCHRP-572 methodology and SIDRA analysis software.

The complete analyses using both methodologies and all lane configuration alternatives are included in the Kittleson Report which is included as one of the attachments. Table 8 summarizes the overall SIDRA intersection level of service results for the preferred alternative.

Table 8: SIDRA "Build" Level of Service Summary–Campbellton Rd @ Boat Rock Rd/New Hope Rd

Traffic Control	Year	Time Period	Level of Service	Average Delay (sec)
Roundabout	2014	a.m. peak	B	13.7
Roundabout	2034	a.m. peak	C*	12.3*
Roundabout	2014	p.m. peak	B	10.7
Roundabout	2034	p.m. peak	B	13.2

* Level of service is better for 2034 due to addition of second approach lane for Boat Rock Rd that was not included in 2014 approach.

Is the project located in a PM 2.5 Non-attainment area? __X__ Yes _____No

Is the project located in an Ozone Non-attainment area? __X__ Yes _____No

This project is air quality exempt because it does not increase capacity.

PDP Classification: Major _____ Minor __X____

Federal Oversight: Full Oversight ( ), Exempt(X), State Funded( ), or Other ( )

Federal Functional Classification: Campbellton Road – Urban Minor Arterial
Boat Rock Rd. / New Hope Rd. – Urban Collector Street

U. S. Route Number(s): N/A **State Route Number(s):** SR 154 / SR 166

Traffic (AADT):

Campbellton Road
Opening Year: (2014) 11,150 Design Year: (2034) 18,300

Boat Rock Road

Opening Year: (2014) 7,700 Design Year: (2034) 12,700

New Hope Road
Opening Year: (2014) 3,800 Design Year: (2034) 6,200

Existing design features:

Campbellton Road

- Typical Section: Rural facility with two 12' lanes and variable shoulder widths
- Posted speed: 45 MPH Minimum curve radius: 891 feet
- Maximum super-elevation rate for curve: 7%
- Maximum grade: 4.7 %
- Width of right of way: 80 feet
- Major structures: none
- Major interchanges or intersections along the project: Boat Rock Road
- Existing length of roadway: 1000 feet within project limits

Boat Rock Road

- Typical Section: Rural facility with two 12' lanes and variable shoulder widths
- Posted speed: 40 MPH Minimum curve radius: 1000 feet
- Maximum super-elevation rate for curve: 8%
- Maximum grade: 1.6 %
- Width of right of way: Variable (65 feet minimum)
- Major structures: none
- Major interchanges or intersections along the project: New Hope Road, Campbellton Road
- Existing length of roadway: 750 feet within project limits

New Hope Road

- Typical Section: Rural facility with two 10' lanes and variable shoulder widths
- Posted speed: 35 MPH Minimum curve radius: 300 feet
- Maximum super-elevation rate for curve: No Curve/No Superelevation
- Maximum grade: 1.6%
- Width of right of way: 50 feet
- Major structures: none
- Major interchanges or intersections along the project: Boat Rock Rd.
- Existing length of roadway: approx. 720 feet within project limits

Proposed Design Features:

Campbellton Road

- Proposed typical section(s): One to two 12' through lanes and eastbound and westbound with and exclusive left-turn lane for the Citgo station, 15.5' urban shoulders w/ 10 sidewalk
- Proposed Design Speed Mainline 45 mph
- Proposed Maximum grade Mainline 4.7% Maximum grade allowable 6 %.
- Proposed Maximum grade Side Street N/A% Maximum grade allowable N/A %.
- Proposed Maximum grade driveway 25% Residential, 11% Commercial
- Proposed Minimum radius of curve 230 feet approaching roundabout from southwest, 830 feet elsewhere
- Minimum radius allowable: 711 feet on normal section
- Maximum allowable superelevation rate: 8%
- Proposed maximum superelevation rate: 7%
- Right of way

- Width: variable 80' – 100'.
- Easements: Temporary (X), Permanent ( ), Utility ( ), Other ( ).
- Type of access control: Full ( ), Partial ( ), By Permit (X), Other ( ).
- Number of parcels: ____12_____ Number of displacements: None

- Structures:
  - Bridges: None
  - Retaining walls: None expected
- Major interchanges or intersections along the project: Boat Rock Road/New Hope Road
- Traffic control during construction: Traffic will be maintained during construction.

Boat Rock Road

- Proposed typical section(s): One to Two 12' through lanes southbound, one 12' lane northbound with 13.5' urban shoulders w/ 8' sidewalk
- Proposed Design Speed Mainline _40 mph
- Proposed Maximum grade Mainline __1.4% Maximum grade allowable _8_%.
- Proposed Maximum grade Side Street __N/A% Maximum grade allowable _N/A_%.
- Proposed Maximum grade driveway 25% Residential, 11% Commercial
- Proposed Minimum radius of curve _250 feet approaching roundabout.
- Minimum radius allowable: 533' on normal section
- Maximum allowable superelevation rate: 4%
- Proposed maximum superelevation rate: 2%
- Right of way
  - Width: Variable 65' to 100'.
  - Easements: Temporary (X), Permanent ( ), Utility ( ), Other ( ).
  - Type of access control: Full ( ), Partial ( ), By Permit (X), Other ( ).
  - Number of parcels: ____3_____ Number of displacements: None
- Structures:
  - Bridges: None
  - Retaining walls: None expected
- Major interchanges or intersections along the project: New Hope Road / Campbellton Road

- Traffic control during construction: Traffic will be maintained during construction.

New Hope Road

- Proposed typical section(s): Two 12' through lanes with 12' urban shoulders with 6' sidewalks
- Proposed Design Speed Mainline _35 mph
- Proposed Maximum grade Mainline _4.0% Maximum grade allowable _8_%.
- Proposed Maximum grade Side Street __N/A% Maximum grade allowable _N/A_%.
- Proposed Maximum grade driveway _25% Residential, 11% Commercial
- Proposed Minimum radius of curve _5000 feet .
- Minimum radius allowable: 371 feet
- Maximum allowable superelevation rate: 4%
- Proposed maximum superelevation rate: 2%
- Right of way
  - Width: Variable, 50' minimum .
  - Easements: Temporary (X), Permanent ( ), Utility ( ), Other ( ).
  - Type of access control: Full ( ), Partial ( ), By Permit (X), Other ( ).
  - Number of parcels: ____4_____ Number of displacements: None

- Structures:
  - Bridges: None
  - Retaining walls: None expected
- Major interchanges or intersections along the project:

Campbellton Rd / Boat Rock Road

- No ITS devices anticipated on this project:
- Transportation Management Plan Anticipated: Yes( ) No(X):

- Traffic control during construction: Traffic will be maintained during construction.

Campbellton Road @ Boat Rock Road / New Hope Road

- Design Exceptions to controlling criteria anticipated:

	UNDETERMINED	YES	NO
HORIZONTAL ALIGNMENT:	(X)	( )	(.)
VERTICAL ALIGNMENT:	( )	( )	(X)
LANE WIDTH:	( )	( )	(X)
SHOULDER WIDTH:	( )	( )	(X)
VERTICAL GRADES:	( )	( )	(X)
CROSS SLOPES:	( )	( )	(X)
STOPPING SIGHT DISTANCE:	( )	( )	(X)
SUPERELEVATION RATES:	( )	( )	(X)
SPEED DESIGN*:	( )	( )	(X)
VERTICAL CLEARANCE:	( )	( )	(X)
BRIDGE WIDTH:	( )	( )	(X)
BRIDGE STRUCTURAL CAPACITY:	( )	( )	(X)
LATERAL OFFSET TO OBSTRUCTION	( )	(.)	(X)

- Design Variances: None anticipated.
- Environmental concerns: - None anticipated
- Level of environmental analysis:
  - Are Time Savings Procedures appropriate? Yes (**X**), No ( ),
  - Categorical exclusion anticipated (**X**),
  - Environmental Assessment/Finding of No Significant Impact (FONSI) ( ), or
  - Environmental Impact Statement (EIS) ( ).

- Utility involvements:

  Atlanta Gas Light Company
  AT&T Telecommunications
  Comcast
  City of Atlanta Water
  Georgia Power
  Greystone Power
- VE Study Anticipated: Yes( ) No(X)
- Benefit/Cost Ratio: 10.02
- Other Projects in area: STP-0006-00(275) – Sandown Community Sidewalks

Project Cost Estimate and Funding Responsibilities:

	PE	ROW	UTILITY	CST	MITIGATION
By Whom	GDOT	GDOT	GDOT	GDOT	GDOT
$ Amount	$230,000	$1,902,149	$375,000	$1,454,090	$0,000

**CST Cost includes: Construction, Engineering and Inspection, Fuel Cost Adjustment, and Asphalt Cement Cost Adjustment:*

Project responsibilities:

- Design, Fulton County
- Right of Way Acquisition, Fulton County
- Right-of-Way funding (real property): Georgia DOT
- Relocation of Utilities, GDOT & Local Utilities
- Letting to contract, GDOT
- Supervision of construction, GDOT
- Providing material pits, Contractor
- Providing detours. Contractor
- Environmental Studies/Documents/Permits: GDOT
- Environmental Mitigation: GDOT
- Railroads N/A

Coordination

- Initial Public Information Open House – 2/11/2010
- Initial Concept Team Meeting – 6/15/2010
- PAR meetings, dates and results – (N/A)
- Second Public Information Open House – 6/21/2010
- Field Meeting – 11/15/2010
- Coordination Meeting – 2/7/2011
- Roundabout Peer Review – 3/3/2011

Scheduling – Responsible Parties' Estimate*:

- Time to complete the environmental process*****: July 2011 to July 2012.
- Time to complete preliminary construction plans*****: July 2011 to September 2012.
- Time to complete right of way plans: November 2012 to June 2013.
- Time to complete the Section 404 Permit: N/A
- Time to complete final construction plans***** : November 2012 to April 2014.
- Time to complete to purchase right of way***** : June 2013 to May 2014.

* Note: These activities are to be done concurrently where possible.

Build Alternatives Considered:

Five alternatives have been considered for implementing this project: Alternatives 1 through 3 incorporated the signalization of the intersection of Campbellton Road @ Boat Rock Road, and the addition of an eastbound left-turn lane and the lengthening of the existing westbound right-turn lane. Each of these alternatives differed in how they treat the Boat Rock Road/New Hope Road intersection.

The first three alternatives were presented at the initial PIOH on 2/11/10. Based on the feedback gained from the PIOH and subsequent analysis, Alternative 1 was modified and Alternative 3 was eliminated from further consideration.

A second PIOH was held on 6/21/10. Alternatives 1 and 2 were presented. Based upon input from that meeting, Alternative 1 was eliminated from further consideration.

Further analysis of Alternative 2, including VISSIM simulation, revealed potential operational problems at the roundabout that could be caused by long southbound queues at the Campbellton Road intersection.

In order to eliminate the issues associated with Alternative 2, Alternatives 4 and 5 were subsequently developed. Both Alternatives 4 and 5 proposed a single primary intersection to handle all three roadways.

Alternative 4 was a single "K-shaped" signalized intersection that would handle the various traffic movements though multiple signal phases. Despite the single intersection, a separate connector roadway would still be required for Boat Rock-New Hope traffic movements. Poor level of service for Campbellton Road through movements coupled with complexity of this alternative eliminated this alternative from further consideration.

Alternative 5 is a single partial multi-lane roundabout. All four existing approaches would be routed into this intersection. It accommodates the projected traffic demands without the operational issues of Alternative 2. It also does not require signalization.

Each alternative is briefly described below.

<u>Alternative 1 (No Further Consideration):</u>

This alternative would relocate New Hope Road approximately 225 feet north from its existing intersection, centered in a 50'-wide right-of-way corridor already owned by Fulton County. This intersection would be unsignalized with stop sign control on the New Hope Road approach. Left-turn and right-turn lanes would be provided on all approaches, plus corner islands.

The traffic control for Alternative 1 would be a multi-way stop. A separate turning roadway, separated from the intersection by a large island is provided for the heavy northbound movement from northbound Boat Rock Road to eastbound New Hope Road. This movement would be controlled by a yield sign, giving the right-of-way to the light southbound to eastbound movement.

This alternative was originally presented at the PIOH on 2/11/10 with side-street stop control, but feedback from that meeting requested that a multi-way stop be looked at. The relatively balanced approach volumes plus level of service analysis led to the change of this alternative to a multi-way stop intersection. This alternative was subsequently shown at the 6/21/10 Public Information Open House. Alternative 1 was less favored compared to Alternative 2 due to the preference of the meeting attendees for a roundabout at Boat Rock Road @ New Hope Road.

<u>Alternative 2 (No Further Consideration)</u>

Alternative 2 would also relocate New Hope Road to the same 50' wide right-of-way corridor as Alternative 1. It differs in that Alternative 2 would provide an urban single-lane roundabout for the Boat Rock Road/New Hope Road intersection. The footprint of the roundabout had been shifted approximately 60 feet to the east in order to minimize impacts to the adjacent residential neighborhood, whose backyards adjoin the Boat Rock Road right-of-way.

Level of service analysis based on NCHRP-572 methodology showed a roundabout would operate satisfactorily at this location. However there was some skepticism of roundabouts among attendees at the initial PIOH, due to poor experience with a neighborhood roundabout in the general vicinity as well as misunderstanding of roundabouts in general. There had also been concern among some at GDOT that

excessive southbound queuing from the nearby signalized intersection at Campbellton Road @ Boat Rock Road, especially vehicles originating from New Hope Road could block the roundabout to northbound through traffic leaving Campbellton Road, causing a "locking" of the roundabout during the design year. This situation would cause the northbound queue to spill into Campbellton Road @ Boat Rock Road intersection, impairing its operation.

In order to further evaluate this potential condition, VISSIM simulation was run for both the roundabout and the nearby signalized intersection at Campbellton Road, assuming Alternative 2. The results implied that the "locking" of the roundabout could happen under some conditions. For this reason, it was decided to pursue other potential preferred alternatives.

Alternative 3 (No Further Consideration):

Alternative 3 would relocate New Hope Road to intersect directly with Boat Rock Road, and relocate Boat Rock Road to intersect New Hope Road at a new three-legged intersection. This alternative would require much new right-of-way and roadway reconstruction. For these reasons, it would be the most costly of the three alternatives initially considered. This alternative was popular among some of the attendees at the first PIOH, since most of the attendees lived along New Hope Road, and they would now have the right-of-way and direct access to Campbellton Road. However, northbound Boat Rock Road traffic would have to use a 125-foot left-turn lane in order to continue north. Due to the limited distance from Campbellton Road (300 feet), the potential of queuing interference between the adjacent intersections is greater than other alternatives. This alternative was not preferred due to the combination of the higher construction and right-of-way costs and the operational issues.

Alternative 4 (No Further Consideration)

Following rejection of Alternative 2, an alternative was developed that created a single signalized intersection at the existing location of Campbellton Road @ Boat Rock Road. This alternative would create an intersection shaped like a "K" that would leave the Campbellton Road and Boat Rock approaches in their current locations while relocating the New Hope Road approach to intersect Campbellton Road adjacent to the existing Boat Rock Road approach.

The Pros for this alternative are listed below:

- Makes good utilization of existing New Hope Road right-of-way
- Allows a dual left-turn configuration for the heavy EB left-turn movement , since each lane would turn into a separate roadway.

The Cons for this alternative are listed below:

- The provision for dual EB left-turn lanes requires longer transition tapers along Campbellton Road, increasing the project length and cost.
- Even though the primary movements would be handled by the single "K- intersection", vehicles traveling between Boat Rock and New Hope Roads would still need a connector roadway, since the "K- intersection" is not set up to easily accommodate these movements. This tends to mitigate or eliminate a potential cost advantage.
- Signing and marking for this intersection would have to be carefully done. There is potential for driver confusion for unfamiliar or inattentive drivers using this unconventional intersection configuration.
- Bringing all four approaches to a single intersection would require an extra phase compared to other signalization alternatives. This would tend to increase the cycle length and increase queue

storage requirements. The extra phase would also take more of the signal cycle away from the heavy through movements along Campbellton Road.

A Synchro level of service analysis was performed for this Alternative that resulted in level of service "F" for the Campbellton Road through movements in both directions during the peak hour design year as well as some of the left-turn movements. The major issue responsible for the poor level of service is the fact that Campbellton Road is a two-lane facility, coupled with the requirement of signalization that would require at least four phases.

If Campbellton Road were a four-lane facility, the level of service results would likely improve, compared to a two-lane facility. The peak hour through volumes along Campbellton Road are high enough that the introduction of the extra signal phase for the "K-intersection" becomes a critical factor in breaking down this intersection. The extra through capacity would alleviate that situation.

Beyond the level of service issue, this alternative has an unusual configuration and may have issues with driver expectation. Also, it is not physically possible for vehicles traveling between Boat Rock Road and New Hope Road to use the signalized intersection. For that reason, a separate two-lane connector road would need to be constructed, utilizing the right-of-way that Fulton County had acquired for the relocation of New Hope Road. For these reasons, this concept was not selected as the preferred alternative.

Alternative 5 (Preferred Alternative)

An alternative was developed that consolidates all four approaches to the existing two intersections into a single four-legged intersection, located immediately east of the existing Campbellton Road @ Boat Rock Road intersection. The orientation of this intersection would be NE-NW-SE-SW, being that this orientation best fits the horizontal alignment of the approach roadways.

The southwest approach would connect to the existing Campbellton Road west approach, the southeast approach to the existing Campbellton east approach, the northeast approach to the existing New Hope east approach, and the northwest approach to the existing Boat Rock north approach.

Since the heaviest traffic movements through this intersection would be the SE-SW movement (left-turn through intersection) and its inverse, a roundabout would be the optimum form of traffic control for this intersection. If this intersection were signalized, the left-turn storage requirement for westbound Campbellton Road traffic would be excessive, since this is the primary movement through the intersection.

The majority of the land in the vicinity of this intersection is currently undeveloped. The presence of the Citgo Station in the northwest quadrant is the primary constraint in locating the single intersection. It influences the proposed location of this intersection as well as the alignment of the Campbellton Road SW approach.

One advantage of the proposed roundabout location is the ability to construct the majority of the roundabout on new location while maintaining traffic at the existing Campbellton Road @ Boat Rock Road intersection. New Hope Road could be detoured via the Fulton County right-of-way corridor, allowing the roundabout to be constructed while existing traffic operates in a temporary configuration similar to Alternative 1.

Various lane configurations were studied for this alternative. It was found that a single-lane roundabout was inadequate to accommodate the Campbellton Road through volumes. It was also found that a dual-lane roundabout is not necessary to accommodate the Boat Rock Road and New Hope Road approaches.

In order to determine the optimum lane configuration and overall footprint for this roundabout concept, Kittelson & Associates was hired to prepare an Operational Evaluation.

The Kittelson evaluation performed level of service analysis for various lane configuration alternatives, and recommends a partial multi-lane roundabout. It recommends dual lanes for Campbellton Road traffic though the roundabout, and single lanes for other movements. For the design year, it also recommends a second southbound approach lane for Boat Rock Road. It also includes discussion of an optional bypass lane for eastbound Campbellton Road traffic that could be studied during the preliminary design phase of this project.

The Pros for this alternative are listed below:

- Both existing intersections would be consolidated into a single roundabout intersection.
- Simplicity of a single intersection makes it easier for motorists to understand and navigate.
- No need for signalization, reducing vehicular delay, especially during non-peak hours.
- All possible turning movements and U-turns could be accommodated at the single roundabout. A separate connector roadway between Boat Rock Road and New Hope Road would not be necessary.
- Construction Staging would be relatively straightforward, despite the significant change from existing conditions.
- Compatible with potential future widening of Campbellton Road to a four-lane facility without reconstructing the roundabout, since dual lanes will be carried through the roundabout to accommodate Campbellton Road traffic.

The Cons for this alternative are listed below:

- A single roundabout at this location does not efficiently utilize existing right-of-way.
- The Campbellton Road SW approach has to be “bent” in order to minimize impacts to the Citgo station.
- The existing full-movement entrance to Boat Rock Road will probably have to be converted to right-in-right-out operation due to its proximity to the roundabout, and the existing right-in-right-out entrance to Campbellton Road will probably need to be converted to full movement operation.
- High traffic volumes along Campbellton Road will require dual lanes through the roundabout for relevant movements. The logical termini for Campbellton Road will be longer for this alternative than for others.

After long and careful analysis of five alternatives, and after weighing the pros and cons of each, the single roundabout concept alternative was selected as the preferred alternative.

Attachments:

1. Cost Estimate for Preferred Alternative
2. Typical sections
3. Concept Plan for each Alternative
4. Design Traffic Approval Letter
5. Traffic Diagrams
6. Traffic Analysis Memorandum with Attachments (Includes Capacity Analysis Summaries and Signal Warrant Studies)
7. Minutes of Concept Meetings
8. Summary of Comments received during PIOH's
9. Street Lighting commitment Letter
10. Roundabout Operational Evaluation prepared by Kittelson & Assoc, dated 3/3/2011
11. Project Schedule
12. Benefit/Cost Analysis
13. Completed Fuel/Asphalt price adjustment form

Concur: _____
Director of Engineering

Approve: _____ Date: 7/21/2011
Chief Engineer

Campbellton Road @ Boat Rock Road / New Hope Road
Project Number STP-186-1(38), P.I. # 731830

Conceptual Cost Estimate - Preferred Alternative
April 27, 2011

Section Grading and Drainage					
Item Number	**Quantity**	**Units**	**Unit Price**	**Item Description**	**Cost**
210-0100	1	LS	$120,000.00	Grading Complete	$120,000.00
	1	LS	$100,000.00	Typical Drainage - Urban Section	$100,000.00
			Section Sub Total		**$220,000.00**

Section Base and Paving					
Item Number	**Quantity**	**Units**	**Unit Price**	**Item Description**	**Cost**
310-1101	5496	TN	$14.89	GR Aggr Base Course, Incl Matl	$81,835.44
402-1811	70	TN	$60.74	Asphalt Concrete Leveling	$4,251.80
402-3141	1235	TN	$56.36	Asph Conc 12.5 mm Superpave	$69,604.60
402-3190	1100	TN	$58.42	Recycled Asph Conc 19 mm Superpave	$64,262.00
402-3121	2198	TN	$54.72	Recycled Asph Conc 25 mm Superpave	$120,274.56
413-1000	400	GL	$1.74	Bitum Tack Coat	$696.00
					$340,924.40

Section Lump Sums					
Item Number	**Quantity**	**Units**	**Unit Price**	**Item Description**	**Cost**
150-1000	1	LS	$150,000.00	Traffic Control	$150,000.00
					$150,000.00

Section Miscelaneous					
Item Number	**Quantity**	**Units**	**Unit Price**	**Item Description**	**Cost**
153-1300	1	LS	$63,997.00	Field Engineers Office TP 3	$63,997.00
N/A	1	LS	$10,000.00	Pedestrian Lighting	$10,000.00
N/A	1	LS	$20,000.00	Roundabout Lighting	$20,000.00
					$93,997.00

Section Pavement Marking					
Item Number	**Quantity**	**Units**	**Unit Price**	**Item Description**	**Cost**
653-1501	1200	LF	$0.31	Thermo Solid Traffic Stripe, 5" White	$372.00
653-1502	6100	LF	$0.32	Thermo Solid Traffic Stripe, 5" Yellow	$1,952.00
653-1804	1960	LF	$1.69	Thermo Solid Traffic Stripe, 8" White	$3,312.40
653-6004	150	SY	$2.51	Thermo Traffic Striping, White	$376.50
653-6006	260	SY	$2.57	Thermo Traffic Striping, Yellow	$668.20
654-1001	150	EA	$2.93	RPM, TP 1	$439.50
654-1003	250	EA	$3.29	RPM, TP 3	$822.50
					$7,943.10

Section Roadway Items					
Item Number	**Quantity**	**Units**	**Unit Price**	**Item Description**	**Cost**
441-0018	200	SY	$34.54	Driveway Concrete, 8"	$6,908.00
441-0104	5288	SY	$23.60	Conc. Sidewalk, 4"	$124,796.80
441-0754	1611	SY	$41.07	Conc. Median, 7.5"	$66,163.77
441-6222	7724	LF	$12.00	Concrete Curb and Gutter, 8"x30", TP 2 or 7	$92,688.00
702-6000	6032	SF	$5.00	Brick Pavers - Std. - Red	$30,160.00
					$320,716.57

Estimated Construction Cost	$1,133,581.07
Total Estimated Construction Cost	**$1,133,581.07**
E & I Rate 15%	$170,037.16
Total Fuel Price Adjustment	$150,471.34
Total Construction Cost	**$1,454,089.57**

Section R/W and Easements					
Item Number	**Quantity**	**Units**	**Unit Price**	**Item Description**	**Cost**
	77565	SF	$17.00	Right-of-Way*	$1,318,605.00
	44888	SF	$13.00	Easements*	$583,544.00

* Includes Admin/ Court Costs/Inflation

Right-of-Way Cost	**$1,902,149.00**
Environmental Mitigation Cost	**$0.00**
Reimbursable Utility Cost	**$375,000.00**
Preliminary Engineering	**$230,000.00**
Grand Project Total Estimate	**$3,961,238.57**

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE STP00-0186-01(038) Fulton County
SR 166 – Campbellton Road @ Boat Rock/ New Roads
P.I. No. 731830

OFFICE District 7
Chamblee

DATE September 9, 2010

FROM Bryant R. Poole
District Engineer

TO Bobby Hilliard P.E., State Program Delivery Engineer
ATTN Ernay Robinson

SUBJECT PRELIMINARY UTILITY COST (ESTIMATE)

As requested by your office, we are furnishing you with a Preliminary Utility Cost estimates for each utility with facilities potentially located within the project limits.

FACILITY OWNER	NON-REIMBURSABLE	REIMBURSABLE
Atlanta Gas Light Company	$ 30,000.00	
AT&T Formerly BellSouth	$200,000.00	$240,000.00
Georgia Power Distribution		$135,000.00
Totals	$230,000.00	$375,000.00

Total reimbursable cost for the above project is $375,000.00.

If you have any questions, please contact Yulonda Pride-Foster at 770-986-1117.

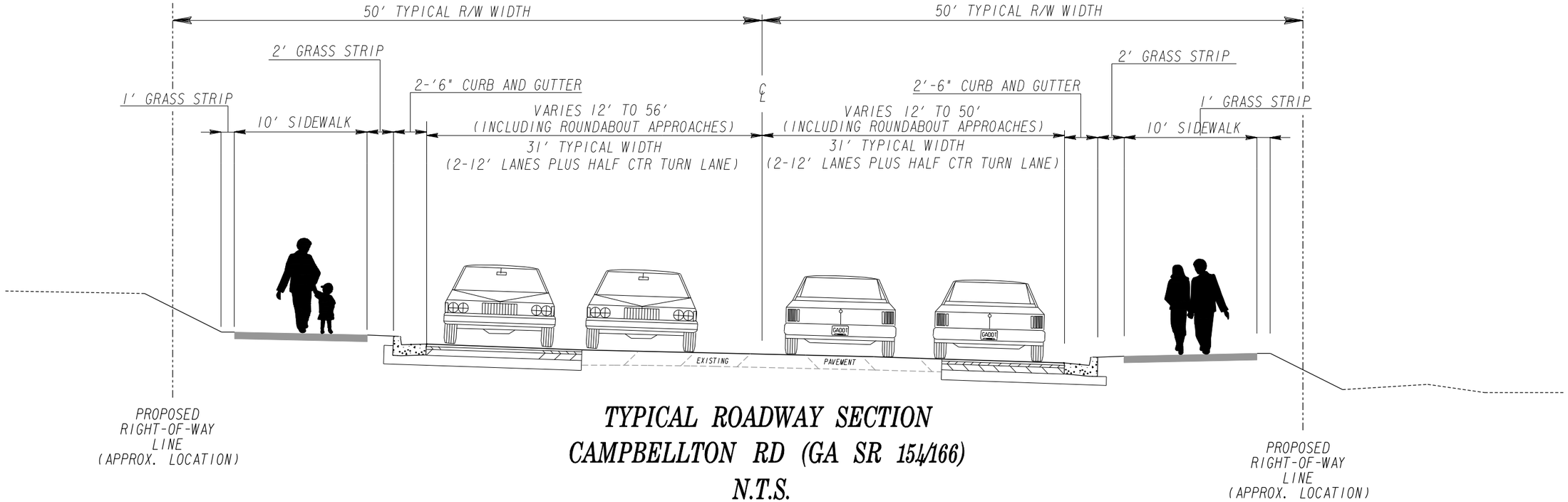
Sincerely,

Bryant R. Poole
District Engineer

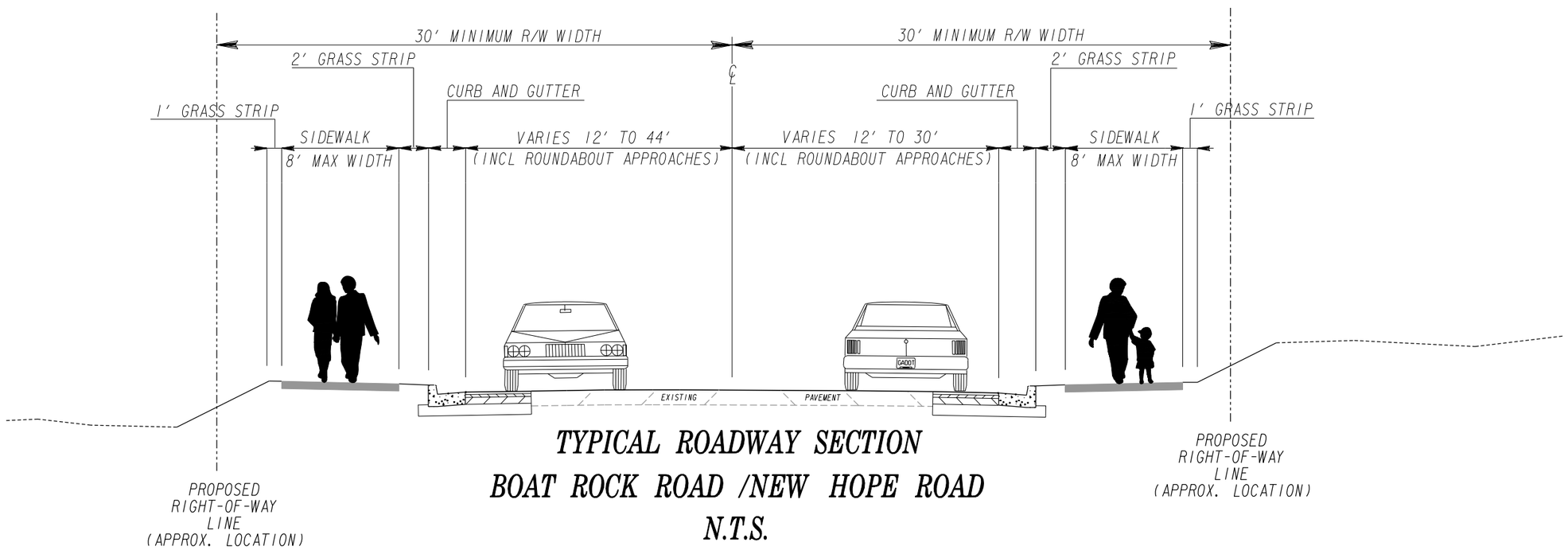
By: Jonathan Walker
District Utilities Engineer

BRP/JW/YPF

C: Jeff Baker, P.E., State Utilities Engineer
Angela Robinson, Office of Financial Management
Mike Hill, Area Engineer



TYPICAL ROADWAY SECTION
CAMPBELLTON RD (GA SR 154/166)
N.T.S.



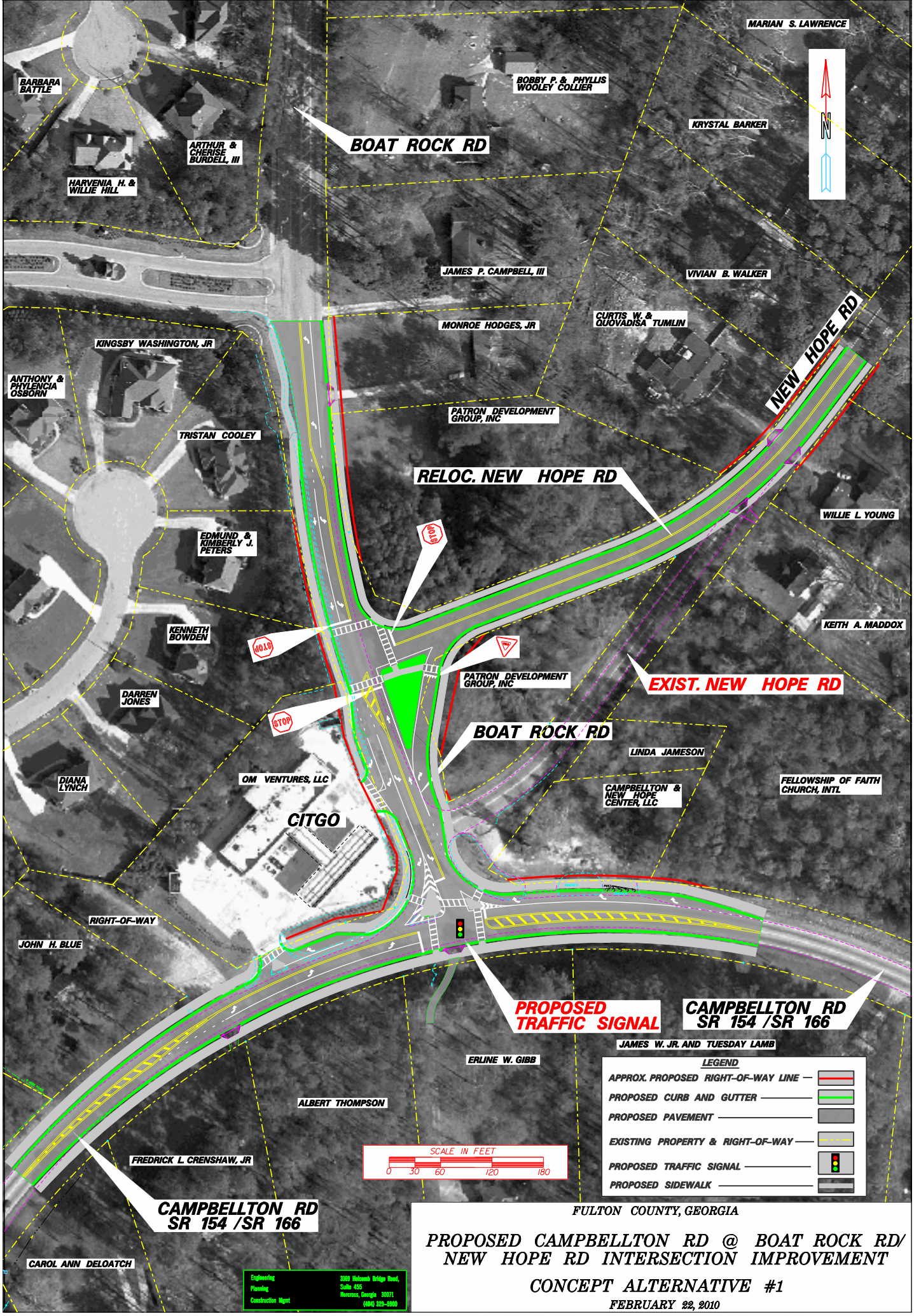
TYPICAL ROADWAY SECTION
BOAT ROCK ROAD /NEW HOPE ROAD
N.T.S.

Engineering
Planning
Construction Mgmt
3169 Holcomb Bridge Road,
Suite 455
Norcross, Georgia 30071
(404) 329-5900

FULTON COUNTY, GEORGIA *PI#731830*

TYICAL SECTIONS
PROPOSED CAMPBELLTON RD @ BOAT ROCK RD/ NEW HOPE RD INTERSECTION IMPROVEMENT

MARCH 28, 2011

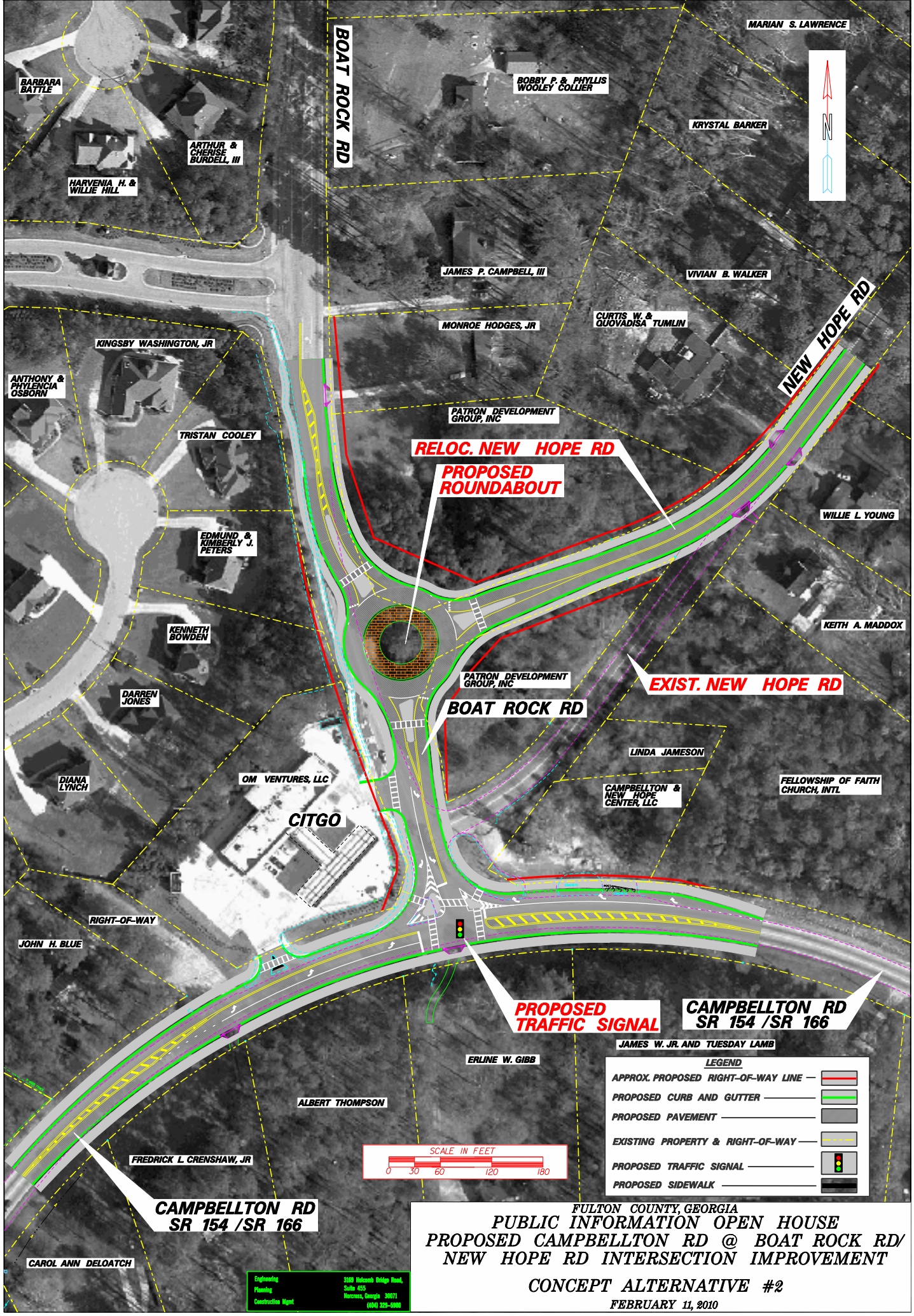


FULTON COUNTY, GEORGIA

PROPOSED CAMPBELLTON RD @ BOAT ROCK RD/ NEW HOPE RD INTERSECTION IMPROVEMENT

CONCEPT ALTERNATIVE #1

FEBRUARY 22, 2010

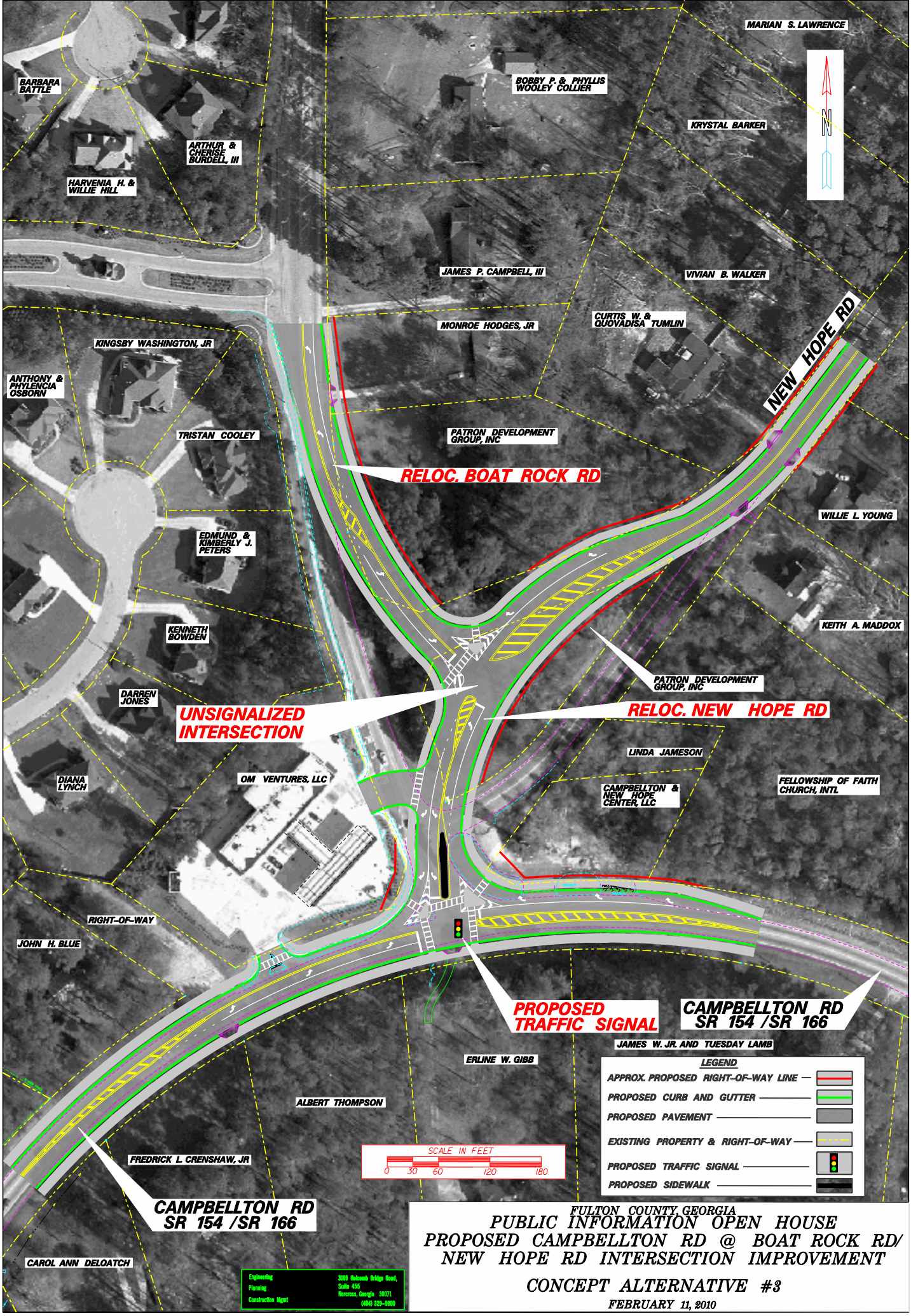


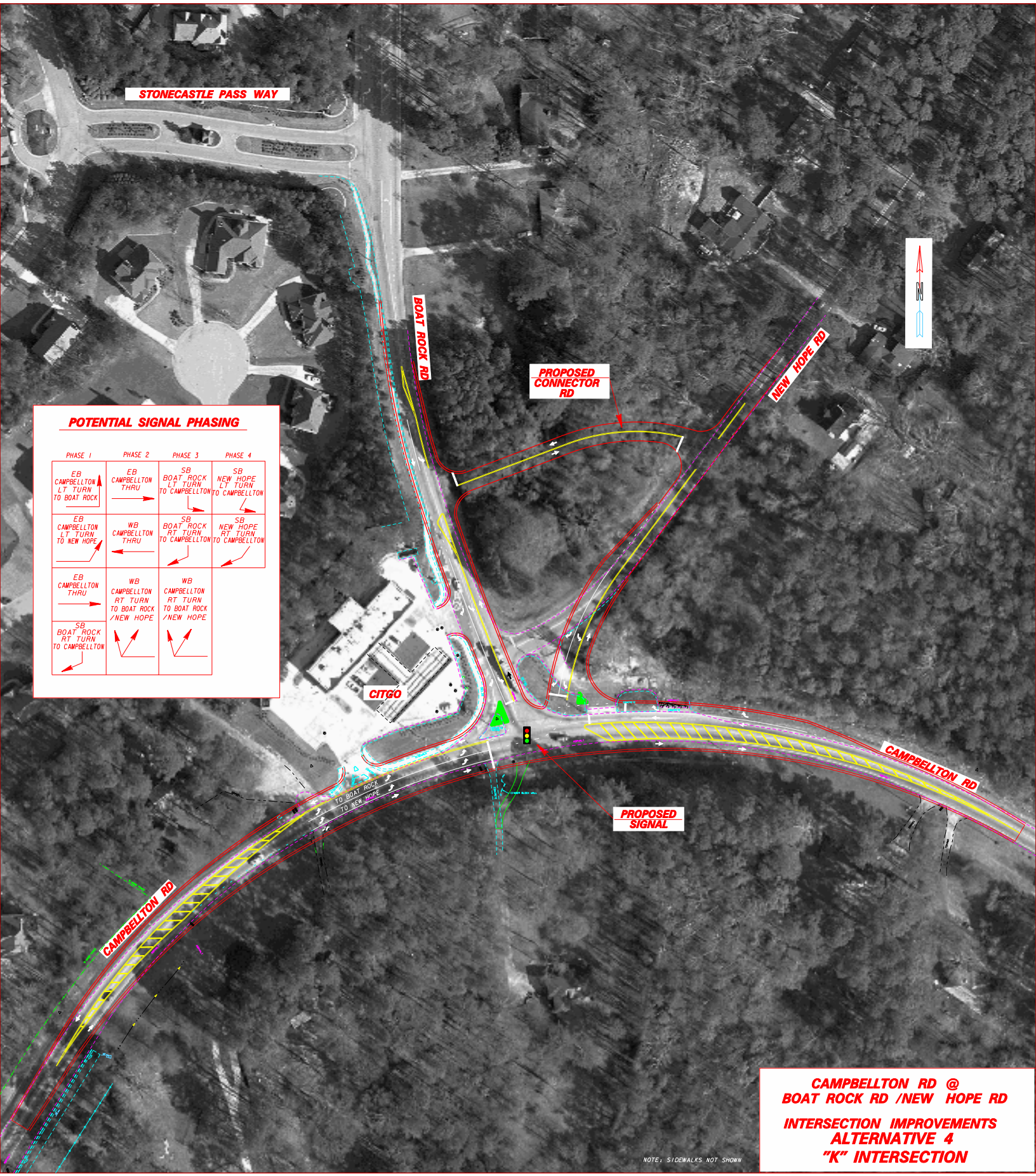
FULTON COUNTY, GEORGIA

PUBLIC INFORMATION OPEN HOUSE
PROPOSED CAMPBELLTON RD @ BOAT ROCK RD/ NEW HOPE RD INTERSECTION IMPROVEMENT

CONCEPT ALTERNATIVE #2

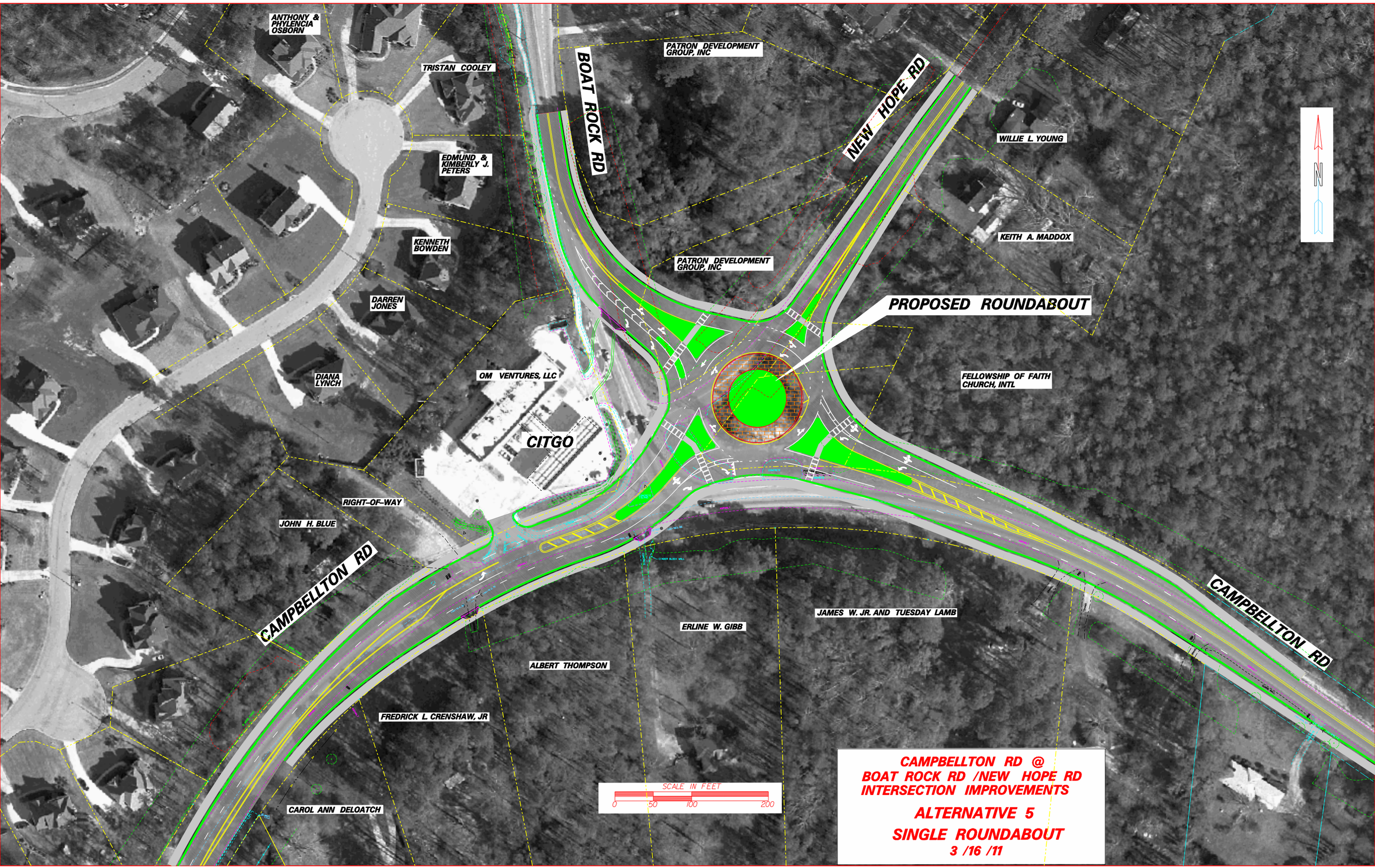
FEBRUARY 11, 2010


MARIAN S. LAWRENCE
BARBARA BATTLE
BOBBY P. & PHYLLIS WOOLEY COLLIER
KRYSTAL BARKER
ARTHUR & CHERISE BURDELL, III
HARVENIA H. & WILLIE HILL
JAMES P. CAMPBELL, III
VIVIAN B. WALKER
MONROE HODGES, JR
CURTIS W. & QUOVADISA TUMLIN
KINGSBY WASHINGTON, JR
ANTHONY & PHYLENCIA OSBORN
NEW HOPE RD
TRISTAN COOLEY
PATRON DEVELOPMENT GROUP, INC
RELOC. BOAT ROCK RD
WILLIE L. YOUNG
EDMUND & KIMBERLY J. PETERS
KENNETH BOWDEN
KEITH A. MADDOX
PATRON DEVELOPMENT GROUP, INC
DARREN JONES
UNSIGNALIZED INTERSECTION
RELOC. NEW HOPE RD
LINDA JAMESON
DIANA LYNCH
OM VENTURES, LLC
CAMPBELLTON & NEW HOPE CENTER, LLC
FELLOWSHIP OF FAITH CHURCH, INTL
RIGHT-OF-WAY
JOHN H. BLUE
PROPOSED TRAFFIC SIGNAL
CAMPBELLTON RD SR 154 /SR 166
JAMES W. JR. AND TUESDAY LAMB
ERLINE W. GIBB
ALBERT THOMPSON
FREDRICK L. CRENSHAW, JR
CAMPBELLTON RD SR 154 /SR 166
CAROL ANN DELOATCH
N
SCALE IN FEET
0 30 60 120 180
LEGEND
APPROX. PROPOSED RIGHT-OF-WAY LINE
PROPOSED CURB AND GUTTER
PROPOSED PAVEMENT
EXISTING PROPERTY & RIGHT-OF-WAY
PROPOSED TRAFFIC SIGNAL
PROPOSED SIDEWALK
Engineering
Planning
Construction Mgmt
3389 Holcomb Bridge Road, Suite 455
Norcross, Georgia 30071
(404) 329-8900
FULTON COUNTY, GEORGIA
PUBLIC INFORMATION OPEN HOUSE
PROPOSED CAMPBELLTON RD @ BOAT ROCK RD/
NEW HOPE RD INTERSECTION IMPROVEMENT
CONCEPT ALTERNATIVE #3
FEBRUARY 11, 2010



CAMPBELLTON RD @ BOAT ROCK RD /NEW HOPE RD

INTERSECTION IMPROVEMENTS
ALTERNATIVE 4
"K" INTERSECTION


ANTHONY & PHYLENCIA OSBORN
TRISTAN COOLEY
EDMUND & KIMBERLY J. PETERS
KENNETH BOWDEN
DARREN JONES
DIANA LYNCH
OM VENTURES, LLC
CITGO
RIGHT-OF-WAY
JOHN H. BLUE
CAMPBELLTON RD
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FREDRICK L CRENSHAW, JR
ALBERT THOMPSON
ERLINE W. GIBB
JAMES W. JR. AND TUESDAY LAMB
BOAT ROCK RD
PATRON DEVELOPMENT GROUP, INC
PATRON DEVELOPMENT GROUP, INC
NEW HOPE RD
WILLIE L. YOUNG
KEITH A. MADDOX
PROPOSED ROUNDABOUT
FELLOWSHIP OF FAITH CHURCH, INTL
CAMPBELLTON RD
N
SCALE IN FEET
0 50 100 200
CAMPBELLTON RD @
BOAT ROCK RD /NEW HOPE RD
INTERSECTION IMPROVEMENTS
ALTERNATIVE 5
SINGLE ROUNDABOUT
3 /16 /11

Department of Transportation
State of Georgia

INTERDEPARTMENT CORRESPONDENCE

FILE STP00-0186-01(038), Fulton County
P.I. # 731830

OFFICE Planning

DATE April 13, 2010

FROM Angela T. Alexander, State Transportation Planning Administrator

TO Bryant Poole, District Engineer
Attention: Ernay Robinson

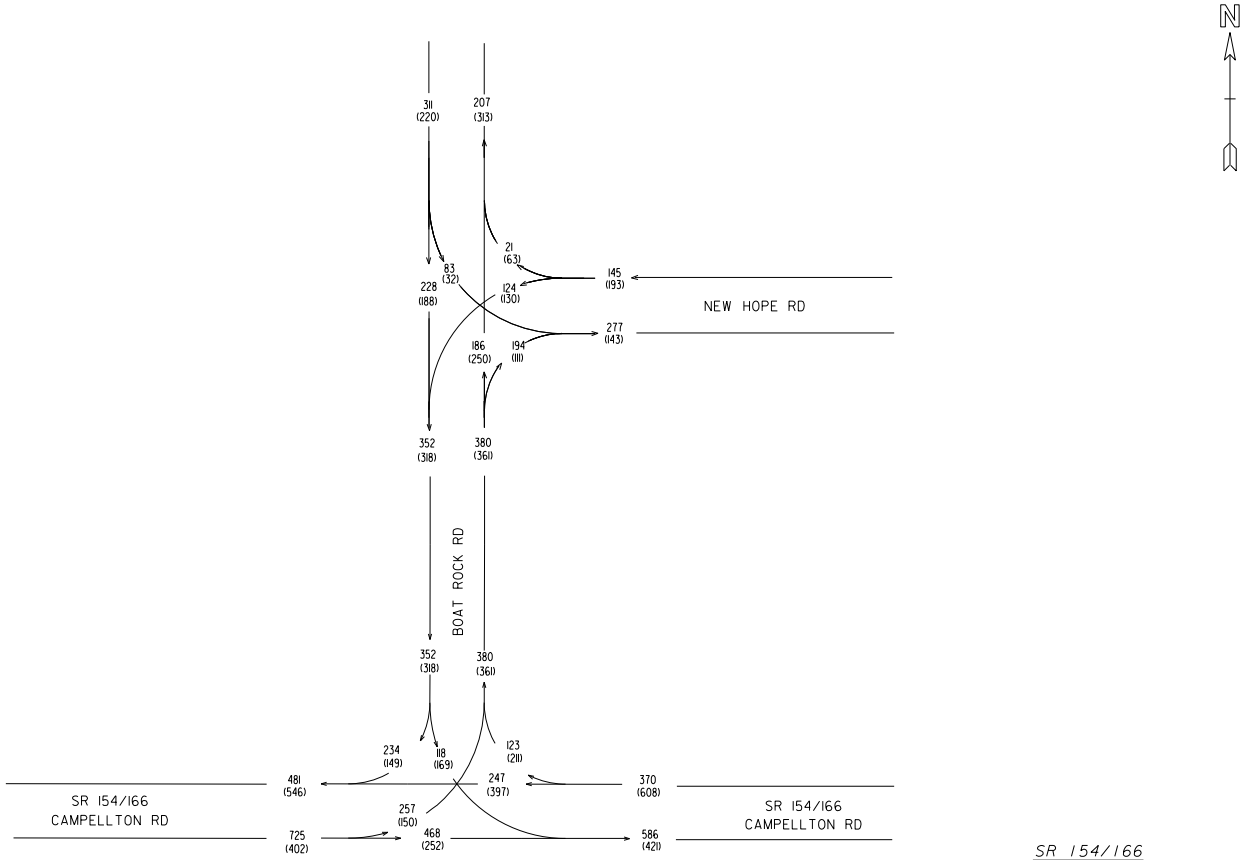
SUBJECT **Reviewed** Design Traffic S.R. 166/Campbellton Road at Boat Rock/New Hope Roads.

Reviewed Design Traffic for the above project and the projections are approved based on the information furnished.

If you have any questions concerning this information please contact Abby Ebodaghe at (404) 631-1923.

ATA/afe

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
FULTON	STP00-0186-01(0383)		



SR 154/166
T=6%

BOAT ROCK RD
T=4%

NEW HOPE RD
T=2%

2010 EXISTING
PEAK HOUR
PM = (000) AM = 000

PI#731830

JD
04/10

GPLN

• Engineering
• Architecture
• Planning
• Construction Management

2987 Clairmont Road, Suite 500
Atlanta, Georgia 30329
(404) 320-0005

GEORGIA
DEPARTMENT OF TRANSPORTATION

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

OFFICE: PROGRAM DELIVERY

TRAFFIC DIAGRAM
SR 154/166 @
BOAT ROCK RD/NEW HOPE RD

DRAWING No.
10-01

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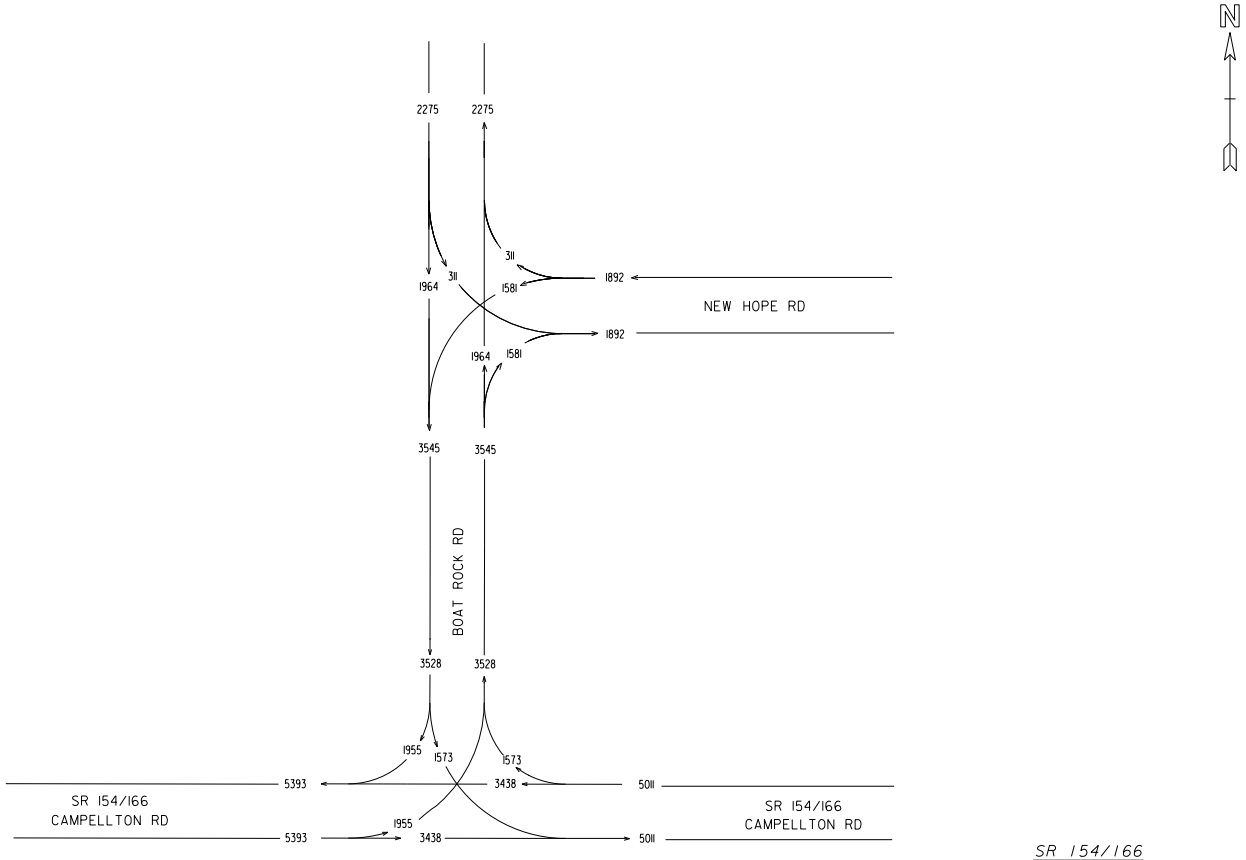

SR 154/166
T=6%

BOAT ROCK RD
T=4%

NEW HOPE RD
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2010 EXISTING
ADT = 000

PI#731830

JD
04/10

REVISION DATES		

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TRAFFIC DIAGRAM
SR 154/166 @
BOAT ROCK RD/NEW HOPE RD

DRAWING No.
10-02

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Atlanta, Georgia 30329
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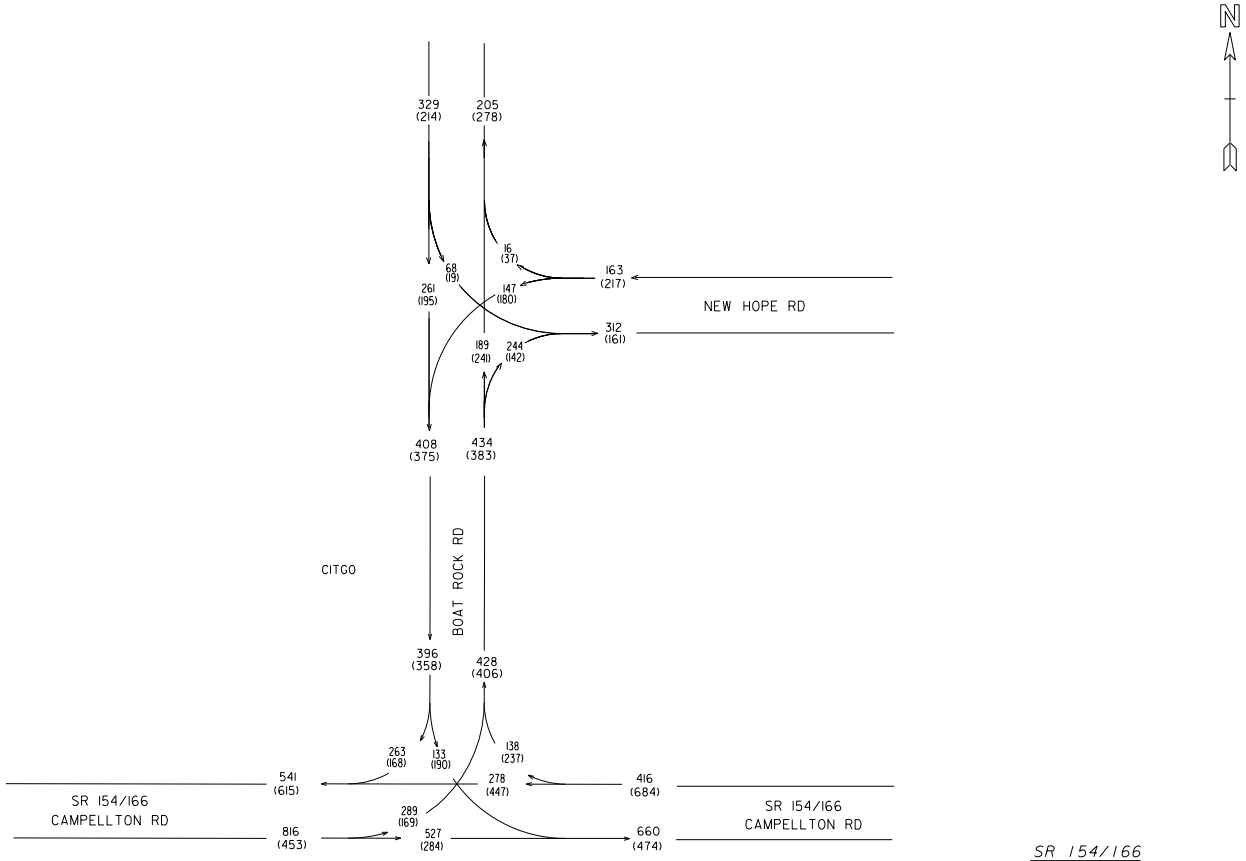

SR 154/166
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BOAT ROCK RD
T=4%

NEW HOPE RD
T=2%

2014 DHV
PM = (000)
AM = 000

PI#731830
NO-BUILD

JD
04/10

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TRAFFIC DIAGRAM
SR 154/166 @
BOAT ROCK RD/NEW HOPE RD

DRAWING No.
10-03

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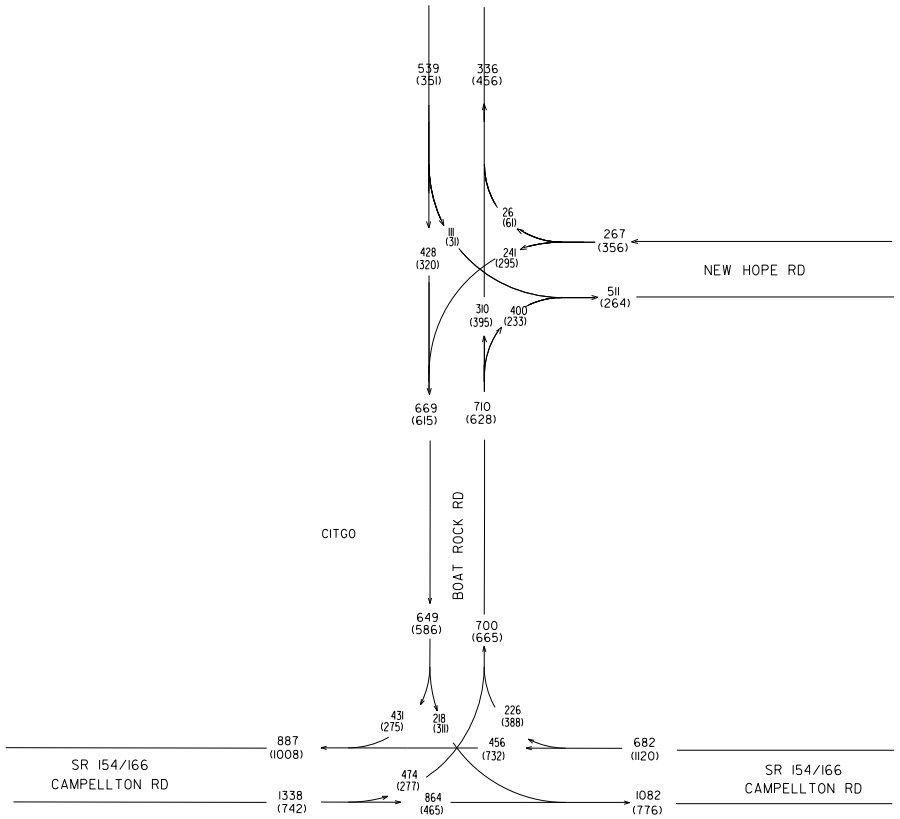

N

SR 154/166
T=6%

BOAT ROCK RD
T=4%

NEW HOPE RD
T=2%

2034 DHV
PM = (000)
AM = 000

PI#731830
NO-BUILD

JD
04/10

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GEORGIA
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TRAFFIC DIAGRAM
SR 154/166 @
BOAT ROCK RD/NEW HOPE RD

DRAWING No.
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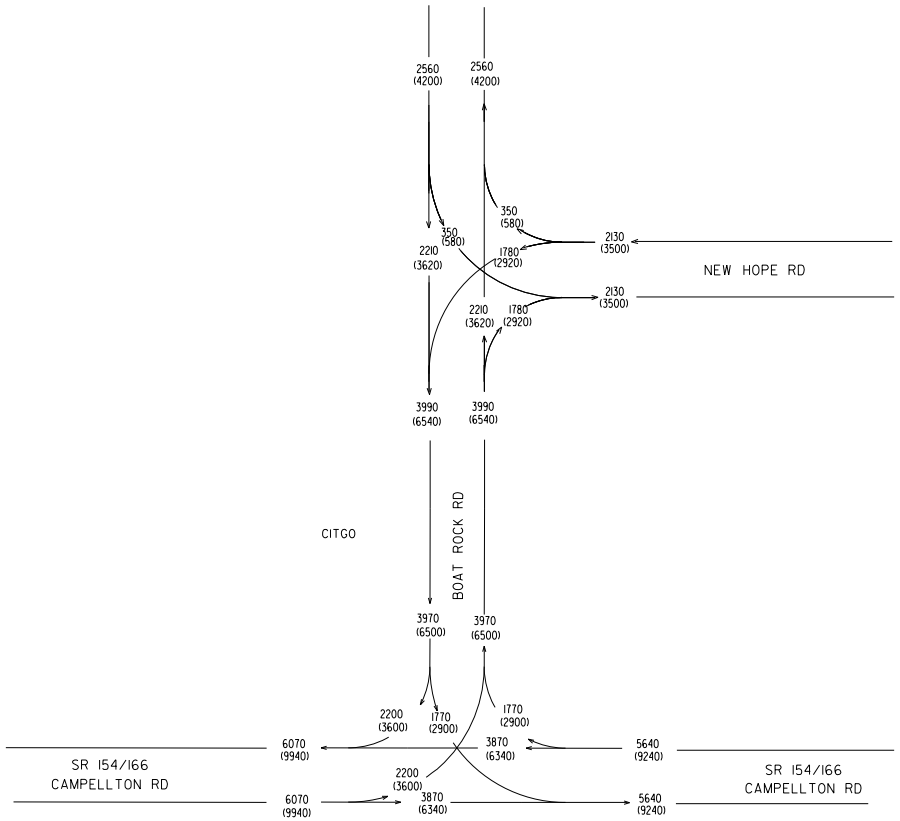

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SR 154/166

24-hr T = 6%
SU = 4%
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2034 AADT = (000)
2004 AADT = 000

PI#731830
NO-BUILD

JD
04/10

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TRAFFIC DIAGRAM
SR 154/166 @
BOAT ROCK RD/NEW HOPE RD

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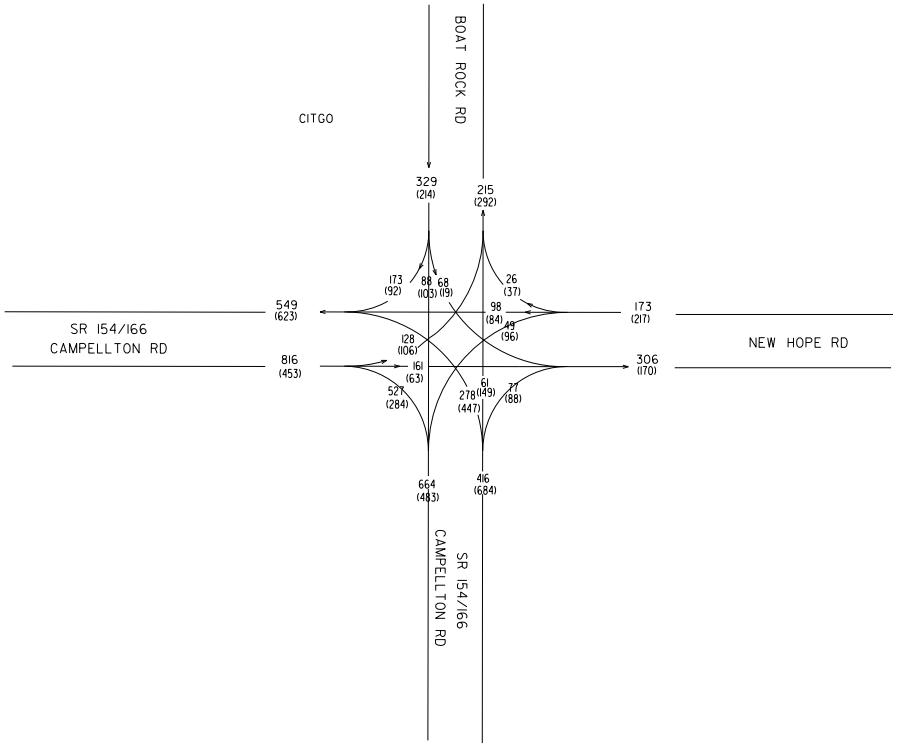

SR 154/166
T=6%

BOAT ROCK RD
T=4%

NEW HOPE RD
T=2%

2014 DHV
PM = (000)
AM = 000

PI#731830
BUILD

JD
03/11

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TRAFFIC DIAGRAM
SR 154/166 @
BOAT ROCK RD/NEW HOPE RD

DRAWING No.
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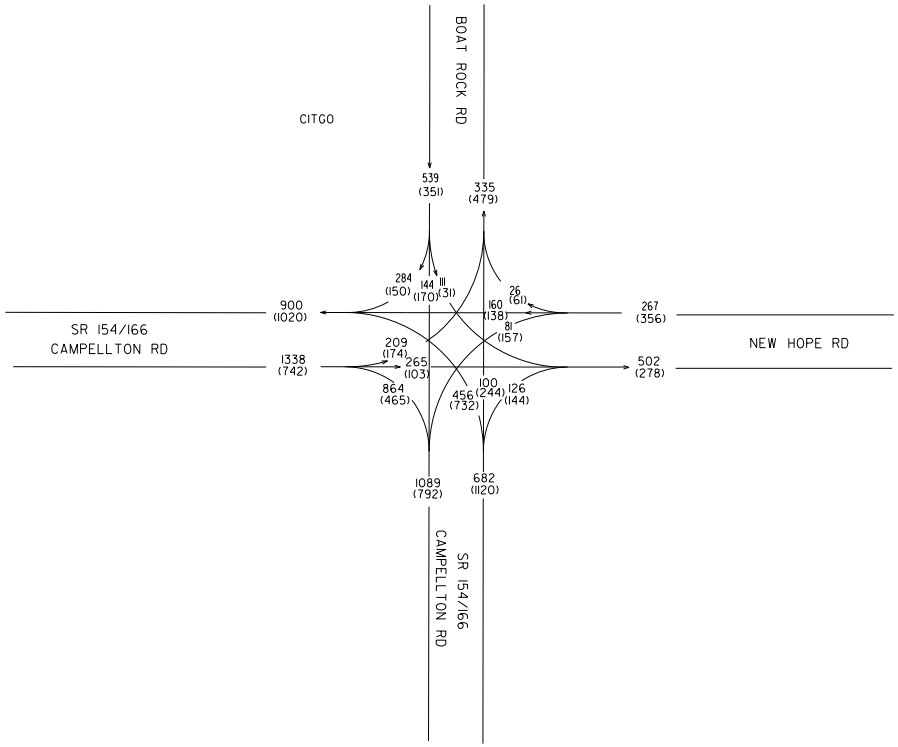

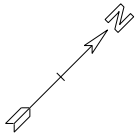

SR 154/166
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BOAT ROCK RD
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NEW HOPE RD
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2034 DHV
PM = (000)
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PI#731830
BUILD

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REVISION DATES		

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OFFICE: PROGRAM DELIVERY

TRAFFIC DIAGRAM
SR 154/166 @
BOAT ROCK RD/NEW HOPE RD

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10-07

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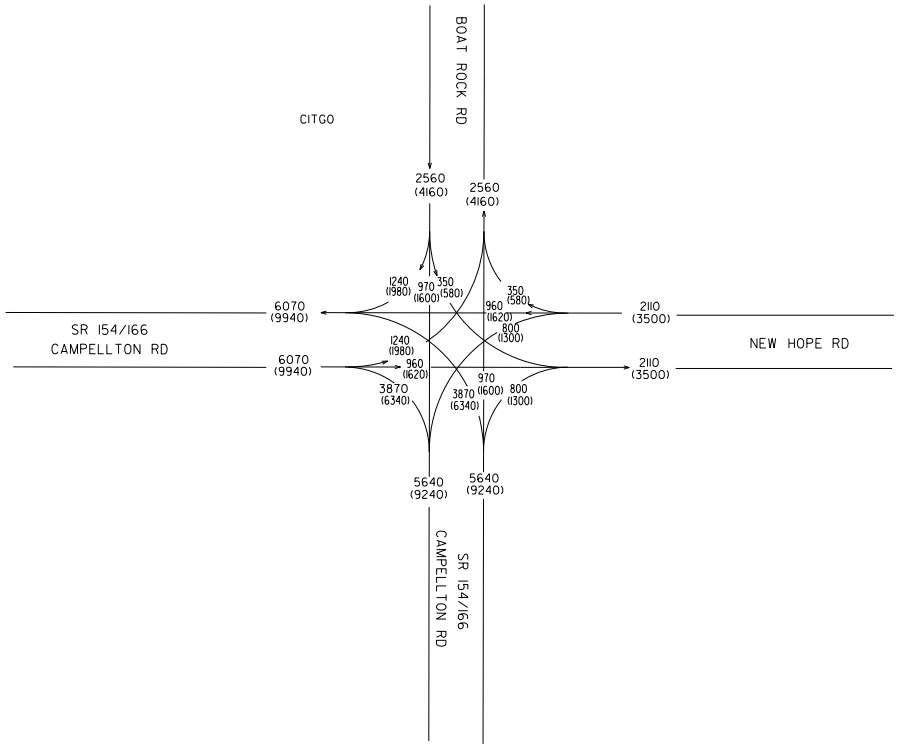

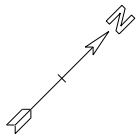

SR 154/166

24-hr T = 6%
SU = 4%
COMB = 2%

2034 AADT = (000)
2004 AADT = 000

PI#731830
BUILD

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03/11

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TRAFFIC DIAGRAM
SR 154/166 @
BOAT ROCK RD/NEW HOPE RD

DRAWING No.
10-08

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Architecture

Engineering

Construction

MEMORANDUM

TO: Antonio Valenzuela

FROM: Jeff Dyer

SUBJECT: Build and Design Year Level of Service Summary – "No-Build" and "Build Alternatives"

DATE: 9/21/10, Revised 3/31/11

PROJECT: PI#731830 - Campbellton Road @ Boat Rock Road / New Hope Road

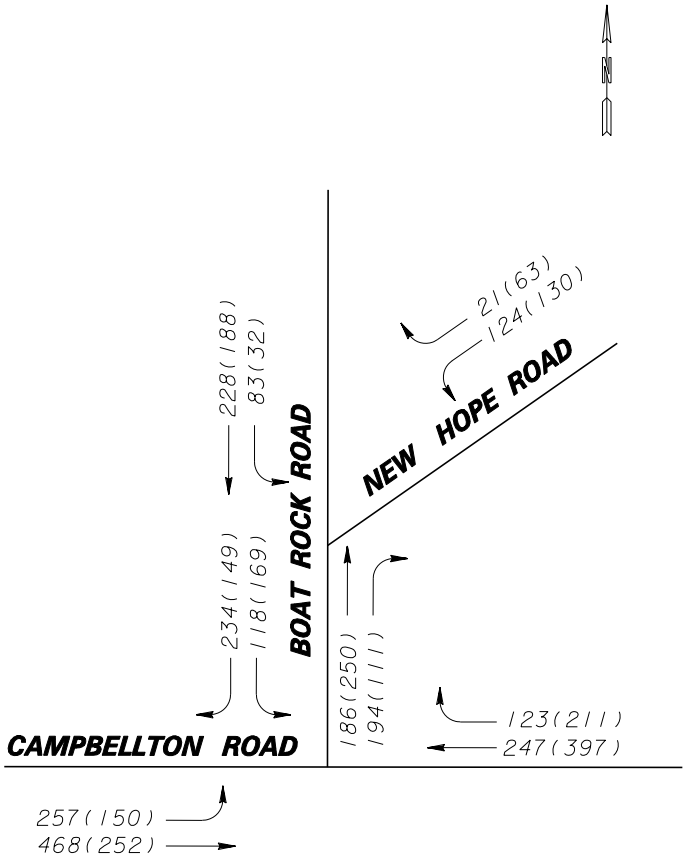
"No-Build" Level of Service Analysis

Existing, build year and design year a.m. and p.m. peak hour traffic volumes for both intersections are shown on (Figure 1 – Traffic Flow Diagrams) on the following page. Intersection level of service analysis was conducted for both Campbellton Road @ Boat Rock Road and Boat Rock Road @ New Hope Road, assuming the existing (No-Build) intersection and roadway configurations. This was done for the existing (2010), build year (2014) and design year (2034).

Intersection operational efficiency is expressed in terms of level of service (LOS), which is a measure of the amount of delay and congested expressed by motorists as they pass through an intersection. LOS is designated by the letters "A" through "F". LOS "A" represents free-flowing conditions with very little delay and LOS "F" indicates forced flow, extreme congestion and long delays. The LOS methodologies are from the current edition of the *Highway Capacity Manual*.

Table 1 summarizes the level of service results for the "No-Build" condition for the existing (2010), opening (2014) and design years (2034). Both intersections are currently unsignalized. The LOS methodology for unsignalized intersections provides individual levels of service for each movement that does not have the right-of-way at the intersection. Table 1 lists the LOS for the worst approach, along with the approach delay (in seconds) that is associated with each level of service.

Appendix A contains the level of service printouts that Table 1 is based on.



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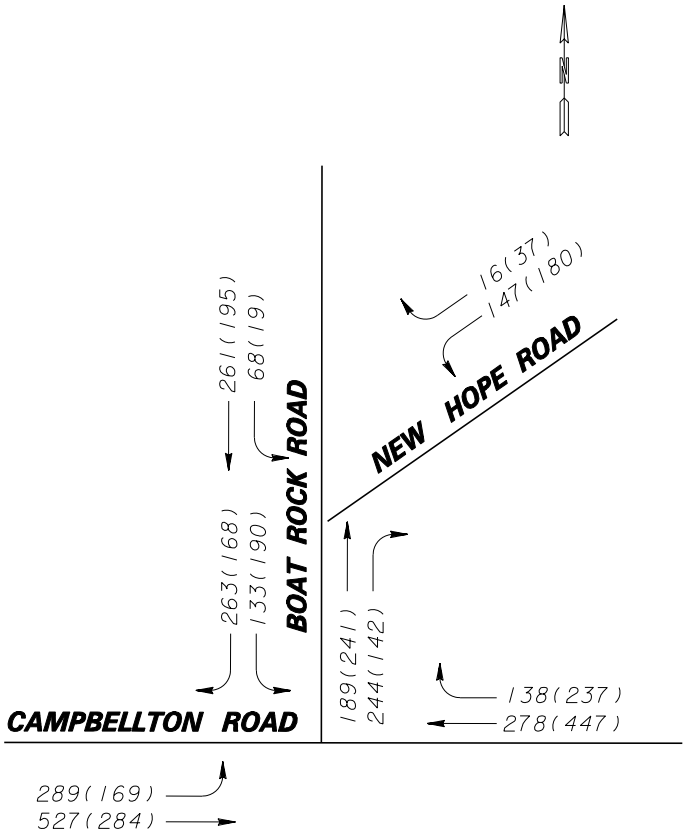
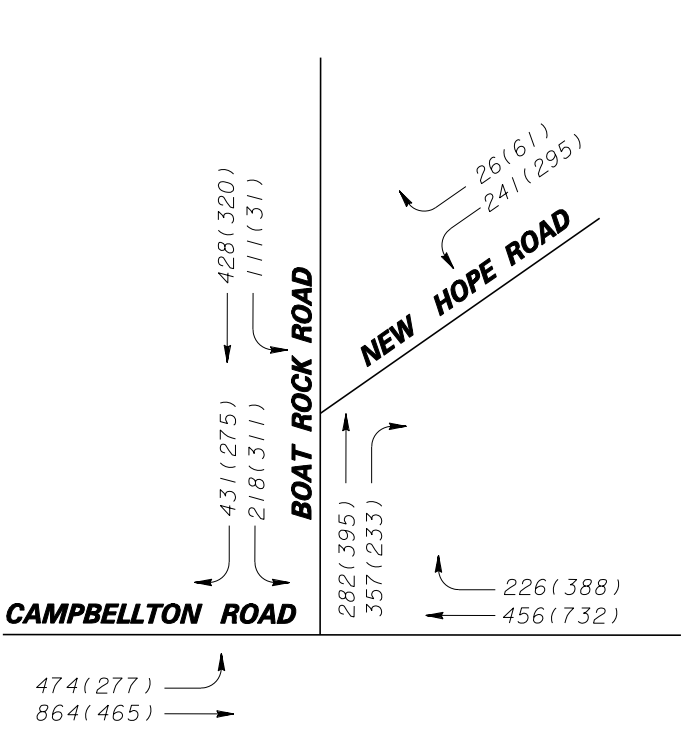
PEAK HOUR TRAFFIC



BUILD YEAR (2014)
PEAK HOUR TRAFFIC



DESIGN YEAR (2034)
PEAK HOUR TRAFFIC

AM = 000
PM = (000)

Engineering
Planning
Construction Mgmt
QK4
3619 Holcomb Bridge Rd, Suite 455
Norcross, Georgia 300071
(404) 329-5900

FIGURE 1

CAMPBELLTON RD @
BOAT ROCK RD /NEW HOPE RD
INTERSECTION IMPROVEMENTS

TRAFFIC FLOW DIAGRAMS

MEMORANDUM

Table 1: Existing and "No-Build" - Level of Service Summary

Intersection Name	Year	Time Period	Worst Approach (2-way unsig)	Level of Service (worst approach)	Approach Delay (sec)
Campbellton Rd @ Boat Rock Rd	2010	a.m. peak	SB LT	F	82.3
Boat Rock Rd @ New Hope Rd	2010	a.m. peak	WB	C	18.2
Campbellton Rd @ Boat Rock Rd	2014	a.m. peak	SB LT	F	195.7
Boat Rock Rd @ New Hope Rd	2014	a.m. peak	WB	C	22.4
Campbellton Rd @ Boat Rock Rd	2034	a.m. peak	SB LT	F	4580.0
Boat Rock Rd @ New Hope Rd	2034	a.m. peak	WB	F	317.9
Campbellton Rd @ Boat Rock Rd	2010	p.m. peak	SB LT	E	48.3
Boat Rock Rd @ New Hope Rd	2010	p.m. peak	WB	C	15.4
Campbellton Rd @ Boat Rock Rd	2014	p.m. peak	SB LT	F	104.7
Boat Rock Rd @ New Hope Rd	2014	p.m. peak	WB	C	17.9
Campbellton Rd @ Boat Rock Rd	2034	p.m. peak	SB LT	F	2451.0
Boat Rock Rd @ New Hope Rd	2034	p.m. peak	WB	F	160.8

Table 1 shows LOS "F" in the a.m. peak and LOS "E" in the p.m. peak for the southbound left-turn movement from Boat Rock Road onto Campbellton Road in 2010. The delay increases substantially as the traffic volumes increase for 2014 and 2034. The LOS in the p.m. peak hour deteriorates to LOS "F" by 2014.

Even though the LOS doesn't fall below LOS "C" for the westbound left-turn movement from New Hope Road onto southbound Boat Rock Road, the more important issue is that the queuing of the southbound left-turn movement from Boat Rock to Campbellton blocks the New Hope Road intersection, and correspondingly creates a substantial back-up of the New Hope Road approach traffic during peak hours.

As this area grows in population and traffic, this intersection will experience increasing congestion and potential for accidents. There are two keys to improving the operation of both of these intersections. One is to signalize Campbellton Road @ Boat Rock Road so that the southbound queue can clear Boat Rock Road at regular intervals. The other is to move the New Hope Road approach to Boat Rock Road farther away from Campbellton Road so the two intersections have less interference with each other.

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Signal Warrant Analysis

A Traffic Signal Warrant Evaluation was conducted for the intersections of Campbellton Road @ Boat Rock Road and Boat Rock Road @ New Hope Road to determine if the installation of a traffic signal is warranted under the criteria presented in the *Manual of Uniform Traffic Control Devices* (MUTCD), published by the Federal Highway Administration. Two or more warrants are satisfied for the existing (2010), opening (2014) and design years (2034) for Campbellton Road @ Boat Rock Road. No signal warrant is satisfied for Boat Rock Road @ New Hope Road in any year. The 70% tables are allowed to be used, since the major street speed exceeds 40 MPH. The posted speed limit for Campbellton Road is 45 MPH. Table 2 summarizes the signal warrant analysis for Campbellton Road @ Boat Rock Road.

Table 2 - Signal Warrant Analysis Summary (based on 70% tables)
Intersection of Campbellton Road at Boat Rock Road

Warrant	Description	2010 Analysis Results	2014 Analysis Results	2034 Analysis Results
1	Eight-Hour Vehicular Volume	Not Satisfied	Not Satisfied	Satisfied
2	Four-Hour Vehicular Volume	Satisfied	Satisfied	Satisfied
3	Peak Hour	Satisfied	Satisfied	Satisfied
4	Pedestrian Volume	Not Applicable	Not Applicable	Not Applicable
5	School Crossing	Not Applicable	Not Applicable	Not Applicable
6	Coordinated Signal System	Not Applicable	Not Applicable	Not Applicable
7	Crash Experience	See Note	See Note	See Note
8	Roadway Network	Not Applicable	Not Applicable	Not Applicable
9	Intersection Near A Grade Crossing	Not Applicable	Not Applicable	Not Applicable

Note: Right-angle accidents are often susceptible to correction by a traffic signal. Table 1 indicates That warrant #7 may be satisfied in 2007 and 2008. However, police reports are needed to verify the details of the individual accidents before it can be determined if this warrant is satisfied.

Table 2 shows a minimum of two traffic signal warrants being satisfied for the existing year (2010) and proposed opening year (2014) for Campbellton Road @ Boat Rock Road. A minimum of three signal warrants are satisfied for the design year (2034). Only one warrant needs to be satisfied before the installation of a traffic signal can be considered. Signal Warrant analysis spreadsheets for Campbellton Road @ Boat Rock Road are included in Appendix B. The spreadsheets contain detailed information about each warrant, including approach volumes per hour.

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Level of Service Analysis - Alternatives 1 and 2

The original "Build" alternatives proposed the signalization of Campbellton Road @ Boat Rock Road, along with an eastbound left-turn lane along Campbellton Road. They relocated the New Hope Road approach to Boat Rock Road approximately 220 feet farther north, in order to separate the two intersections. Alternatives 1 and 2 differed at Boat Rock Road @ New Hope Road. Alternative 1 would have constructed Boat Rock Road @ Campbellton Road as a conventional intersection, either with side street stop control or as a multi-way stop. Alternative 2 would construct the intersection as a three-legged roundabout. Table 3 summarizes the LOS for both Alternatives 1 and 2 at Campbellton Road @ Boat Rock Road. Table 4 summarizes the LOS for Alternatives 1 and 2 at Boat Rock Road @ New Hope Road.

Table 3: - Level of Service Summary – Campbellton Rd @ Boat Rock Rd – Alternatives 1 and 2

Traffic Control	Year	Time Period	Level of Service	Intersection Delay (sec)
Signalized	2014	a.m. peak	B	14.4
Signalized	2034	a.m. peak	C	24.5
Signalized	2014	p.m. peak	B	16.7
Signalized	2034	p.m. peak	D	35.3

Table 4: - Level of Service Summary – Boat Rock Rd @ New Hope Rd – Alternatives 1 and 2

Traffic Control	Year	Time Period	Worst Approach (roundabout/ Side st. stop)	Level of Service	Approach Delay (roundabout/ s.s. stop) Intersection Delay (mult-way stop)
Alt 1 – Side Street Stop	2014	a.m. peak	WB	C	20.5
Alt 1 – 3-way Stop	2014	a.m. peak	-	B	10.18
Alt 2 - Roundabout	2014	a.m. peak	NB	A	6
Alt 1 – Side Street Stop	2034	a.m. peak	WB	F	226.8
Alt 1 – 3-way Stop	2034	a.m. peak	-	C	16.47
Alt 2 - Roundabout	2034	a.m. peak	NB	B	13
Alt 1 – Side Street Stop	2014	p.m. peak	WB	C	16.9
Alt 1 – 3-way Stop	2014	p.m. peak	-	B	10.38
Alt 2 - Roundabout	2014	p.m. peak	NB	A	5
Alt 1 – Side Street Stop	2014	p.m. peak	WB	F	114.5
Alt 1 – 3-way Stop	2014	p.m. peak	-	C	17.96
Alt 2 - Roundabout	2034	p.m. peak	WB	B	11

As can be seen from Tables 3 and 4, the LOS and resulting delay at both intersections would improve substantially compared to the “No-Build” Alternative. The .only scenario where level of service/delay issues would remain is for the p.m. peak for Alternative 1 on the New Hope Road approach assuming a side street stop.

Both Alternatives 1 and 2 would further separate the two intersections compared to existing conditions, and both intersections would operate better, compared to “No-Build”. However, conventional HCM level of service tools are not able to take into account the proximity of the two intersections and how each intersection affects the operation of the other. Even though 310 feet would be better separation than the current 90 feet, both intersections would remain close enough together where they could still interfere with each other.

VISSIM Queue Analysis – Alternatives 1 and 2

VISSIM simulation was used as a tool to help evaluate the operations of the adjacent intersections of Campbellton Road @ Boat Rock Road and Boat Rock Road @ Relocated New Hope Road as a system. Simulation was used for evaluation, since these two intersections are proposed to be located within 400 feet from each other. HCS will only evaluate queuing of a signalized intersection in isolation.

VISSIM Simulation had been run for the existing conditions (existing roadways and 2010 traffic). VISSIM was also run for the two alternatives at Boat Rock Road @ New Hope Road that were originally under active consideration. These included Alternative 1 (side street stop and 3-Way Stop) and Alternative 2 (roundabout) using design year traffic (2034). In the case of Alternative 1, the VISSIM simulation assumed a three-way stop for Boat Rock Road @ New Hope Road.

Animation files were derived from each simulation run and displayed at the initial Concept Team Meeting and at the second Public Information Open House. Qualitatively, the simulations for both “Build” Scenarios showed significant improvements in congestion and reduction in queuing compared to existing conditions. The animations also showed smoother operation for Alternative 2 versus Alternative 1, since the roundabout in Alternative 2 reduces delay by not forcing all traffic to stop.

The animation files display approximately 2 minutes of typical operation of each scenario run. That actual simulation that VISSIM evaluates lasts a full hour. Queuing analysis done by VISSIM considers the full hour of simulation time. For the purposes of this analysis, queue analysis was run at three critical locations for both alternatives in both the a.m. and p.m. peak hours. The four locations are listed below:

MEMORANDUM

- Southbound approach to Boat Rock Road @ Relocated New Hope Road
- Northbound approach to Boat Rock Road @ Relocated New Hope Road
- Southbound approach to Boat Rock Road @ Campbellton Road
- Westbound New Hope approach to Boat Rock Road

Table 5 (next page) summarizes both the average queue and maximum queue lengths for each scenario run. The underlined text signifies queues that could overlap into the adjacent intersection causing operational problems that would not be identified by the Level of Service analysis. There are several rows where the queue lengths are underlined, all being maximum (95th percentile) queue lengths. None of the average (50th percentile) queues would be long enough to reach the adjacent intersection.

One factor that was taken into account for each simulation run that affects queue lengths is the presence of the entrance to the CITGO station. This entrance is located approximately half way between Campbellton Road and Relocated New Hope Road and is currently full movement. The turning movement volumes using this driveway had been counted and factored into this analysis. As is the existing condition, this driveway was assumed to be full-movement in the VISSIM simulation.

The presence of occasional left-turning vehicles wanting to enter the CITGO station tends to affect some of the queue lengths, especially the maximum queue lengths in the northbound direction. This driveway could be closed to left-turn traffic if a raised median were constructed on this section of roadway. Northbound vehicles would have to access the CITGO station via the entrance along Campbellton Road, or use the roundabout at New Hope Road to change direction and access the CITGO station as a right-turn in the southbound direction.

Table 5 reveals that Alternative 2 (Roundabout) tends to have a substantially shorter queue length than Alternative 1 (3-way stop) for the southbound approach to the New Hope Road intersection during the a.m. peak hour. This makes sense since many vehicles don't have to stop when entering the roundabout, while all vehicles would have to stop when approaching the 3-way stop. This difference would result in a longer queue length for the 3-way stop. During the p.m. peak hour, the queues are predicted to be longer (especially for the average queue) for Alternative 2. This doesn't make intuitive sense, unless the queues from Campbellton @ Boat Rock are a contributing factor.

MEMORANDUM

Southbound traffic queuing through the roundabout results in operational issues with the roundabout itself within the peak hours when this condition would occur. A long southbound queue from Campbellton Road can extend beyond New Hope Road, not allowing westbound left-turns from New Hope Road anywhere to turn. It is likely that these vehicles would be stuck in the roundabout, forcing a northbound queue. An excessive queue in the northbound direction could spill into the signalized intersection of Campbellton Road @ Boat Rock Road affecting Campbellton Road traffic as well as the safe operation of the signalized intersection.

Table 5: - VISSIM Queue Analysis Summary

Alternative / Time Period	Location	Average Queue (ft)	Maximum Queue (ft)
1 – a.m. peak	SB Boat Rock @ New Hope	68	400
2 – a.m. peak	SB Boat Rock @ New Hope	6	161
1 – p.m. peak	SB Boat Rock @ New Hope	28	234
2 – p.m. peak	SB Boat Rock @ New Hope	567	742
1 – a.m. peak	NB Boat Rock @ New Hope	20	145
2 – a.m. peak	NB Boat Rock @ New Hope	8	236
1 – p.m. peak	NB Boat Rock @ New Hope	76	464
2 – p.m. peak	NB Boat Rock @ New Hope	6	253
1 – a.m. peak	SB Boat Rock @ Campbellton	47	335
2 – a.m. peak	SB Boat Rock @ Campbellton	62	405
1 – p.m. peak	SB Boat Rock @ Campbellton	268	568
2 – p.m. peak	SB Boat Rock @ Campbellton	112	349
1 – a.m. peak	WB New Hope @ Boat Rock	10	128
2 – a.m. peak	WB New Hope @ Boat Rock	3	116
1 – p.m. peak	WB New Hope @ Boat Rock	26	166
2 – p.m. peak	WB New Hope @ Boat Rock	37	296

The same issue could occur if Boat Rock Road @ New Hope Road were a 3-way stop, but probably not as severe. For one, westbound vehicles on New Hope Road would be under stop sign control, and not encouraged to flow into the intersections if Boat Rock Road were backed up. However, some vehicles would likely still try to jump the stop sign and join the southbound queue, blocking northbound traffic through the intersection. Traffic control could be changed at the conventional intersection by removing the northbound stop sign, which would give northbound Boat Rock Road traffic the right-of-way through the intersection, reducing the likelihood of a northbound queue backing up into Campbellton Road.

Queue analysis was not specifically run for the “No-Build” Alternative. However, both intersections are located within 90 feet, and there is already severe queuing with existing traffic volumes. 24 years of additional traffic growth would make the already bad situation even worse. That is the primary reason why this project is being considered in the first place.

Moving New Hope Road 220 further away from Campbellton Road would improve the safety and operation of both intersections. However, 310 feet is still a fairly close distance between these two intersections, and by the design year, there is a good possibility that queuing caused by a signal at Campbellton Road @ Boat Rock Road would still impair the operation of Boat Rock Road @ New Hope Road.

Moving New Hope Road even farther north would allow more queuing room on Boat Rock Campbellton Road but greatly increase the cost of this project. Lining relocated New Hope Road up with Stonecastle Pass Way would result in a distance of 800 feet between the two intersections, but require the total acquisition of four residential parcels with existing large homes and construction of a much longer section of relocated New Hope Road.

Due to the issues discussed in this section, it was determined that additional alternatives should be considered in meeting the purpose and need for this project.

Level of Service Analysis - Alternative 4

This alternative would create a single signalized intersection at the existing location of Campbellton Road @ Boat Rock Road. This alternative would create an intersection shaped like a “K” that would leave the Campbellton Road and Boat Rock Road approaches at their current locations while relocating the New Hope Road approach to intersect Campbellton Road adjacent to the existing Boat Rock Road approach.

Separate left-turn lanes for Boat Rock Road and New Hope Road would need to be designated and properly signed and marked on the eastbound approach along Campbellton Road. The geometry of this configuration would not allow

direct turns between Boat Rock Road and New Hope Road. A separate connector road would be required to accommodate those movements. Finally a signal with a minimum of four phases would need to be provided at this intersection. A conventional three-legged signal for Campbellton Road @ Boat Rock Road could operate with three phases.

Level of service analysis for this intersection configuration was run for the design year of 2034 using Synchro. Table 6 summarizes the results of this analysis. As can be seen, the overall intersection would operate at level of service "E" for both time periods, with at least one movement at level of service "F".

Table 6: - Level of Service Summary – Campbellton Rd @Boat Rock Rd / New Hope Rd – Alternative 4

Traffic Control	Year	Time Period	Overall LOS	LOS / Worst Approach	Intersection Delay / Worst Approach Delay (sec)
Alt 4 – Single Signalized Intersection	2034	a.m. peak	E	F / WB TH	66.8 / 156.2
Alt 4 – Single Signalized Intersection	2034	p.m. peak	E	F / EB LT to Boat Rock	74.3 / 131.0

One of the factors contributing to the poor operation of this alternative is the fact that Campbellton Road is currently a two-lane facility, and there is no currently programmed project to widen it to a four-lane facility. Adding a traffic signal with this many phases would reduce the available green time for through traffic on Campbellton Road, compared to other alternatives that would signalize this intersection. The peak hour through volumes along Campbellton Road are high enough that the introduction of the extra signal phase for the "K-intersection" becomes a critical factor in breaking down this intersection.

If Campbellton Road were a four-lane facility, this would more likely be a more viable alternative than it is under the existing circumstances. Appendix C contains the Synchro analysis worksheets for this alternative.

Level of Service Analysis - Alternative 5 (Preferred Alternative)

Alternative 5 consolidates all four approaches to the existing two intersections into a single four-legged intersection, located immediately east of the existing Campbellton Road @ Boat Rock Road intersection. The orientation of this intersection would be NE-NW-SE-SW, being that this orientation best fits the horizontal alignment of the approach roadways.

MEMORANDUM

The southwest approach would connect to the existing Campbellton Road west approach, the southeast approach to the existing Campbellton east approach, the northeast approach to the existing New Hope east approach, and the northwest approach to the existing Boat Rock north approach.

Since the heaviest traffic movements through this intersection would be the SE-SW movement (left-turn through intersection) and its inverse, a roundabout would be the optimum form of traffic control for this intersection. If this intersection were signalized, the left-turn storage requirement for westbound Campbellton Road traffic would be excessive.

Various lane configurations were studied for this alternative. It was found that a single-lane roundabout was inadequate to accommodate the Campbellton Road through volumes. It was also found that a dual-lane roundabout is not necessary to accommodate the Boat Rock Road and New Hope Road approaches. In order to determine the optimum lane configuration and overall footprint for this roundabout concept, Kittelson & Associates was hired to prepare an Operational Evaluation.

The Kittelson evaluation performed level of service analysis for various lane configuration alternatives, and recommends a partial multi-lane roundabout. It recommends dual lanes for Campbellton Road traffic though the roundabout, and single lanes for other movements. For the design year, it also recommends a second southbound approach lane for Boat Rock Road. It also includes discussion of an optional bypass lane for eastbound Campbellton Road traffic that could be studied during the preliminary design phase of this project.

Analysis was performed using both NCHRP-572 methodology and SIDRA analysis software. The complete analyses using both methodologies and all lane configuration alternatives are included in the Kittleson Report. Table 8 summarizes the overall SIDRA intersection level of service results for Alternative 5.

Table 7: SIDRA Alternative 5 Level of Service Summary–Campbellton Rd @ Boat Rock Rd/New Hope Rd

Traffic Control	Year	Time Period	Level of Service	Average Delay (sec)
Roundabout	2014	a.m. peak	B	13.7
Roundabout	2034	a.m. peak	C*	12.3*
Roundabout	2014	p.m. peak	B	10.7
Roundabout	2034	p.m. peak	B	13.2

* Level of service is better for 2034 due to addition of second approach lane for Boat Rock Rd that was not included in 2014 approach.

MEMORANDUM

This alternative has the efficiency of meeting the purpose and need for this project with a single intersection and without signalization. It also results in acceptable level of service for the design year, without the complications of queuing affecting the adjacent intersection. For these reasons, Alternative 5 was selected as the preferred alternative for this project.

List of Appendices

Appendix A – “No-Build” Level of Service Printouts

Appendix B – Signal Warrant Analysis Spreadsheets

Appendix C – Alternative 4 Synchro Traffic Analysis Worksheets

Appendix A:

“No-Build” Level of Service Printouts

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*a.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2010*

Project Description *Exist. Volumes, Exist Lane Config.*

East/West Street: *Campbellton Rd* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*257*	*468*			*247*	*133*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*257*	*468*	*0*	*0*	*247*	*133*
Percent Heavy Vehicles	*4*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration	*LT*				*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*118*		*234*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*118*	*0*	*234*
Percent Heavy Vehicles	*0*	*0*	*0*	*4*	*0*	*4*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
v (veh/h)	*257*					*118*		*234*
C (m) (veh/h)	*1168*					*152*		*787*
v/c	*0.22*					*0.78*		*0.30*
95% queue length	*0.84*					*4.86*		*1.25*
Control Delay (s/veh)	*8.9*					*82.3*		*11.5*
LOS	*A*					*F*		*B*
Approach Delay (s/veh)	--	--				*35.2*		
Approach LOS	--	--				*E*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*a.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2010*

Project Description *Exist. Volumes, Exist Lane Config.*

East/West Street: *New Hope* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*186*	*194*	*83*	*228*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*186*	*194*	*83*	*228*	*0*
Percent Heavy Vehicles	*0*	--	--	*4*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*124*	*0*	*21*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*124*	*0*	*21*
Percent Heavy Vehicles	*4*	*0*	*0*	*4*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*				
v (veh/h)		*83*		*145*				
C (m) (veh/h)		*1168*		*416*				
v/c		*0.07*		*0.35*				
95% queue length		*0.23*		*1.54*				
Control Delay (s/veh)		*8.3*		*18.2*				
LOS		*A*		*C*				
Approach Delay (s/veh)	--	--	*18.2*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*a.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2014*

Project Description *2014 Volumes, Exist Lane Config., NB Scenario*

East/West Street: *Campbellton Rd* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*289*	*527*			*278*	*138*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*289*	*527*	*0*	*0*	*278*	*138*
Percent Heavy Vehicles	*4*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration	*LT*				*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*133*		*263*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*133*	*0*	*263*
Percent Heavy Vehicles	*0*	*0*	*0*	*4*	*0*	*4*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
v (veh/h)	*289*					*133*		*263*
C (m) (veh/h)	*1132*					*117*		*756*
v/c	*0.26*					*1.14*		*0.35*
95% queue length	*1.02*					*8.13*		*1.56*
Control Delay (s/veh)	*9.3*					*195.7*		*12.3*
LOS	*A*					*F*		*B*
Approach Delay (s/veh)	--	--				*73.9*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*a.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2014*

Project Description

East/West Street: *New Hope* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*209*	*218*	*94*	*256*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*209*	*218*	*94*	*256*	*0*
Percent Heavy Vehicles	*0*	--	--	*4*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*140*	*0*	*24*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*140*	*0*	*24*
Percent Heavy Vehicles	*4*	*0*	*0*	*4*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*				
v (veh/h)		*94*		*164*				
C (m) (veh/h)		*1122*		*368*				
v/c		*0.08*		*0.45*				
95% queue length		*0.27*		*2.22*				
Control Delay (s/veh)		*8.5*		*22.4*				
LOS		*A*		*C*				
Approach Delay (s/veh)	--	--	*22.4*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*a.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2034*

Project Description *2034 Volumes, Exist Lane Config. - NB Scenario*

East/West Street: *Campbellton Rd* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*474*	*864*			*456*	*226*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*474*	*864*	*0*	*0*	*456*	*226*
Percent Heavy Vehicles	*4*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration	*LT*				*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*218*		*431*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*218*	*0*	*431*
Percent Heavy Vehicles	*0*	*0*	*0*	*4*	*0*	*4*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
v (veh/h)	*474*					*218*		*431*
C (m) (veh/h)	*901*					*21*		*600*
v/c	*0.53*					*10.38*		*0.72*
95% queue length	*3.14*					*27.59*		*5.97*
Control Delay (s/veh)	*13.3*					*4580*		*24.8*
LOS	*B*					*F*		*C*
Approach Delay (s/veh)	--	--				*1555*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*a.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2034*

Project Description *2034 Volumes, Exist Lane Config., NB Scenario*

East/West Street: *New Hope* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*343*	*357*	*154*	*419*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*343*	*357*	*154*	*419*	*0*
Percent Heavy Vehicles	*0*	--	--	*4*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*229*	*0*	*39*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*229*	*0*	*39*
Percent Heavy Vehicles	*4*	*0*	*0*	*4*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*				
v (veh/h)		*154*		*268*				
C (m) (veh/h)		*888*		*174*				
v/c		*0.17*		*1.54*				
95% queue length		*0.63*		*17.49*				
Control Delay (s/veh)		*9.9*		*317.9*				
LOS		*A*		*F*				
Approach Delay (s/veh)	--	--	*317.9*					
Approach LOS	--	--	*F*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*a.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2010*

Project Description *Exist. Volumes, Exist Lane Config.*

East/West Street: *Campbellton Rd* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*150*	*252*			*397*	*211*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*150*	*252*	*0*	*0*	*397*	*211*
Percent Heavy Vehicles	*4*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration	*LT*				*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*169*		*149*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*169*	*0*	*149*
Percent Heavy Vehicles	*0*	*0*	*0*	*4*	*0*	*4*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
v (veh/h)	*150*					*169*		*149*
C (m) (veh/h)	*961*					*242*		*648*
v/c	*0.16*					*0.70*		*0.23*
95% queue length	*0.55*					*4.61*		*0.88*
Control Delay (s/veh)	*9.4*					*48.3*		*12.2*
LOS	*A*					*E*		*B*
Approach Delay (s/veh)	--	--				*31.4*		
Approach LOS	--	--				*D*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2010*

Project Description *Exist. Volumes, Exist Lane Config.*

East/West Street: *New Hope* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*250*	*111*	*32*	*188*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*250*	*111*	*32*	*188*	*0*
Percent Heavy Vehicles	*0*	--	--	*4*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*130*	*0*	*63*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*130*	*0*	*63*
Percent Heavy Vehicles	*4*	*0*	*0*	*4*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*				
v (veh/h)		*32*		*193*				
C (m) (veh/h)		*1187*		*537*				
v/c		*0.03*		*0.36*				
95% queue length		*0.08*		*1.62*				
Control Delay (s/veh)		*8.1*		*15.4*				
LOS		*A*		*C*				
Approach Delay (s/veh)	--	--	*15.4*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*p.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2014*

Project Description *2014 Volumes, Exist Lane Config., NB Scenario*

East/West Street: *Campbellton Rd* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*169*	*284*			*447*	*237*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*169*	*284*	*0*	*0*	*447*	*237*
Percent Heavy Vehicles	*4*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration	*LT*				*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*190*		*168*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*190*	*0*	*168*
Percent Heavy Vehicles	*0*	*0*	*0*	*4*	*0*	*4*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
v (veh/h)	*169*					*190*		*168*
C (m) (veh/h)	*900*					*197*		*607*
v/c	*0.19*					*0.96*		*0.28*
95% queue length	*0.69*					*8.01*		*1.13*
Control Delay (s/veh)	*9.9*					*104.7*		*13.2*
LOS	*A*					*F*		*B*
Approach Delay (s/veh)	--	--				*61.8*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*p.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	

Project Description

East/West Street: *New Hope* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*281*	*125*	*36*	*211*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*281*	*125*	*36*	*211*	*0*
Percent Heavy Vehicles	*0*	--	--	*4*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*146*	*0*	*71*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*146*	*0*	*71*
Percent Heavy Vehicles	*4*	*0*	*0*	*4*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*				
v (veh/h)		*36*		*217*				
C (m) (veh/h)		*1142*		*493*				
v/c		*0.03*		*0.44*				
95% queue length		*0.10*		*2.22*				
Control Delay (s/veh)		*8.3*		*17.9*				
LOS		*A*		*C*				
Approach Delay (s/veh)	--	--	*17.9*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*p.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2034*

Project Description *2034 Volumes, Exist Lane Config. - NB Scenario*

East/West Street: *Campbellton Rd* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*277*	*465*			*732*	*388*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*277*	*465*	*0*	*0*	*732*	*388*
Percent Heavy Vehicles	*4*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*1*
Configuration	*LT*				*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*311*		*275*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*311*	*0*	*275*
Percent Heavy Vehicles	*0*	*0*	*0*	*4*	*0*	*4*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
v (veh/h)	*277*					*311*		*275*
C (m) (veh/h)	*616*					*51*		*418*
v/c	*0.45*					*6.10*		*0.66*
95% queue length	*2.32*					*35.76*		*4.59*
Control Delay (s/veh)	*15.5*					*2451*		*28.7*
LOS	*C*					*F*		*D*
Approach Delay (s/veh)	--	--				*1314*		
Approach LOS	--	--				*F*		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*JWD*
Agency/Co.	*Qk4*
Date Performed	*1/15/2010*
Analysis Time Period	*p.m. peak*

Site Information

Intersection	*Campbellton Rd @ Boat Rock Rd*
Jurisdiction	*Fulton Co., GA*
Analysis Year	*2010*

Project Description *2034 Volumes, Exist Lane Config., NB Scenario*

East/West Street: *New Hope* | North/South Street: *Boat Rock Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*461*	*205*	*59*	*346*	
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*461*	*205*	*59*	*346*	*0*
Percent Heavy Vehicles	*0*	--	--	*4*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*239*	*0*	*117*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*239*	*0*	*117*
Percent Heavy Vehicles	*4*	*0*	*0*	*4*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration					*LTR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LTR*				
v (veh/h)		*59*		*356*				
C (m) (veh/h)		*914*		*293*				
v/c		*0.06*		*1.22*				
95% queue length		*0.21*		*16.14*				
Control Delay (s/veh)		*9.2*		*160.8*				
LOS		*A*		*F*				
Approach Delay (s/veh)	--	--	*160.8*					
Approach LOS	--	--	*F*					

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Appendix B:

Signal Warrant Analysis Spreadsheets –

Campbellton Road @ Boat Rock Road

Campbellton Road @ Boat Rock Road - Signal Warrant Worksheet - 2010 Volumes - 70% Tables

Time Period		Campbellton Road				E-W approach	Boat Rock Rd		SB approach	Warrant 1A-70%		Warrant 1B - 70%		Warrant 2-70%		Warrant 3-70%	
		# Lanes 1	# Lanes 1	33% Ded.		Volumes Used For	1 Orig Volumes	40% RT	Volumes Used For	Threshold 350	Threshold 105	Threshold 525	Threshold 53	Threshold varies	Threshold 60 min	Threshold varies	Threshold 75 min
Beginning	Ending	Eastbound	Westbound	WB RT	WB Thru	Analysis	Southbound	Deduction	Analysis	EB & WB	SB	EB & WB	SB	EB & WB	SB	EB & WB	SB
12:00 AM	1:00 AM	66	73	24	49	115	27	11	16								
1:00 AM	2:00 AM	39	28	9	19	58	12	5	7								
2:00 AM	3:00 AM	21	34	11	23	44	7	3	4								
3:00 AM	4:00 AM	13	18	6	12	25	14	6	8								
4:00 AM	5:00 AM	16	32	11	21	37	12	5	7								
5:00 AM	6:00 AM	26	76	25	51	77	34	14	20								
6:00 AM	7:00 AM	72	145	48	97	169	113	45	68				68		68		
7:00 AM	8:00 AM	369	332	110	222	591	291	116	175	591	175	591	175	591	175	175	175
8:00 AM	9:00 AM	718	299	99	200	918	178	71	107	918	107	918	107	918	107	918	107
9:00 AM	10:00 AM	486	176	58	118	604	98	39	59	604		604	59				
10:00 AM	11:00 AM	260	204	67	137	397	104	42	62	397			61		61		
11:00 AM	12:00 PM	185	212	70	142	327	76	30	46								
12:00 PM	1:00 PM	187	223	74	149	336	125	50	75				75		75		
1:00 PM	2:00 PM	208	289	95	194	402	111	44	67	402			67		67		
2:00 PM	3:00 PM	247	342	113	229	476	168	67	101	476			101		101		101
3:00 PM	4:00 PM	363	514	170	344	707	154	62	92	707		707	92	707	92		92
4:00 PM	5:00 PM	395	609	201	408	803	199	80	119	803	119	803	119	803	119	803	119
5:00 PM	6:00 PM	389	528	174	354	743	160	64	96	743		743	96	743	96		96
6:00 PM	7:00 PM	288	391	129	262	550	118	47	71	550		550	71		71		
7:00 PM	8:00 PM	223	238	79	159	382	87	35	52	382							
8:00 PM	9:00 PM	139	186	61	125	264	59	24	35								
9:00 PM	10:00 PM	92	108	36	72	164	33	13	20								
10:00 PM	11:00 PM	65	99	33	66	131	35	14	21								
11:00 PM	12:00 AM	56	60	20	40	96	40	16	24								
		4923 Total	**5216** Total	**1721**	**3495**	**8418** Total	**2255** Total		**1353** Total	3 hours not met	3 hours not met	7 hours not met	7 hours not met	**5 hours met**	**5 hours met**	**3 hours met**	**3 hours met**

Assumptions:

Westbound approach volume deduction of 33% to remove RT lanes from analysis
South approach volume deduction of 40% to remove RT lanes from analysis
Major street speed exceeds 40 MPH, so 70% tables applicable

Warrant Summary:

Warrant 1: Not Satisfied
Warrant 2: Satisfied
Warrant 3: Satisfied
Warrants 4 - 9: Not Applicable

Campbellton Road @ Boat Rock Road - Signal Warrant Worksheet - 2014 Volumes, 70% Tables

Time Period		# Thru Lns 1	# Thru Lns 1	33% Ded.		E-W approach Volumes Used For	Boat Rock Rd 1 Orig Volumes	Boat Rock Rd 1 Orig Volumes	40% RT	SB approach Volumes Used For	Warrant 1A-100% Threshold 350	Threshold 105	Warrant 1B - 100% Threshold 525	Threshold 53	Warrant 2-100% Threshold varies	Threshold 60 min	Warrant 3-100% Threshold varies	Threshold 75 min
Beginning	Ending	EB	WB	WB RT	WB Thru	Analysis	Southbound	SB	Deduction	Analysis	EB & WB	SB	EB & WB	SB	EB & WB	SB	EB & WB	SB
12:00 AM	1:00 AM	74	82	27	55	129	27	30	12	18								
1:00 AM	2:00 AM	44	32	10	21	65	12	14	5	8								
2:00 AM	3:00 AM	24	38	13	26	49	7	8	3	5								
3:00 AM	4:00 AM	15	20	7	14	28	14	16	6	9								
4:00 AM	5:00 AM	18	36	12	24	42	12	14	5	8								
5:00 AM	6:00 AM	29	86	28	57	87	34	38	15	23								
6:00 AM	7:00 AM	81	163	54	109	190	113	127	51	76				76		76		76
7:00 AM	8:00 AM	415	374	123	250	666	291	328	131	197	666	197		197	666	197	666	197
8:00 AM	9:00 AM	808	337	111	225	1034	178	200	80	120	1034	120	1034	120	1034	120	1034	120
9:00 AM	10:00 AM	547	198	65	133	680	98	110	44	66	680		680	66		66		
10:00 AM	11:00 AM	293	230	76	154	446	104	117	47	70	446			70		70		
11:00 AM	12:00 PM	208	239	79	160	368	76	86	34	51	368							
12:00 PM	1:00 PM	210	251	83	168	379	125	141	56	84	379			84		84		84
1:00 PM	2:00 PM	234	325	107	218	452	111	125	50	75	452			75		75		75
2:00 PM	3:00 PM	278	385	127	258	536	168	189	76	113	536	113	536	113		113		113
3:00 PM	4:00 PM	409	579	191	388	796	154	173	69	104	796		796	104	796	104		104
4:00 PM	5:00 PM	445	685	226	459	904	199	224	90	134	904	134	904	134	904	134	904	134
5:00 PM	6:00 PM	438	594	196	398	836	160	180	72	108	836	108	836	108	836	108		108
6:00 PM	7:00 PM	324	440	145	295	619	118	133	53	80	619		619	80		80		80
7:00 PM	8:00 PM	251	268	88	179	430	87	98	39	59	430			59				
8:00 PM	9:00 PM	156	209	69	140	297	59	66	27	40								
9:00 PM	10:00 PM	104	122	40	81	185	33	37	15	22								
10:00 PM	11:00 PM	73	111	37	75	148	35	39	16	24								
11:00 PM	12:00 AM	63	68	22	45	108	40	45	18	27								
				1937	**3933**	**9474**	**2255**			**1523**	5 hours	5 hours	7 hours	6 hours	**5 hours**	**5 hours**	**3 hours**	**3 hours**
						Total	Total			Total	not met	not met	not met	not met	**met**	**met**	**met**	**met**

Assumptions:

Westbound approach volume deduction of 33% to remove RT lanes from analysis
South approach volume deduction of 40% to remove RT lanes from analysis
Major street speed exceeds 40 MPH, so 70% tables applicable

Warrant Summary:

Warrant 1: Not Satisfied
Warrant 2: Satisfied
Warrant 3: Satisfied
Warrants 4 - 9: Not Applicable

Campbellton Road @ Boat Rock Road - Signal Warrant Worksheet - 2034 Volumes, 70% Tables

Time Period		# Thru Lns 1	# Thru Lns 1	33% Ded.		E-W approach Volumes Used For	Boat Rock Rd 1 Orig Volumes	Boat Rock Rd 1 Orig Volumes	40% RT	SB approach Volumes Used For	Warrant 1A-100% Threshold 350	Threshold 105	Warrant 1B - 100% Threshold 525	Threshold 53	Warrant 2-100% Threshold varies	Threshold 60 min	Warrant 3-100% Threshold varies	Threshold 75 min
Beginning	Ending	EB	WB	WB RT	WB Thru	Analysis	Southbound	SB	Deduction	Analysis	EB & WB	SB	EB & WB	SB	EB & WB	SB	EB & WB	SB
12:00 AM	1:00 AM	108	120	39	80	188	27	44	18	27								
1:00 AM	2:00 AM	64	46	15	31	95	12	20	8	12								
2:00 AM	3:00 AM	34	56	18	37	72	7	11	5	7								
3:00 AM	4:00 AM	21	29	10	20	41	14	23	9	14								
4:00 AM	5:00 AM	26	52	17	35	61	12	20	8	12								
5:00 AM	6:00 AM	43	125	41	83	126	34	56	22	33								
6:00 AM	7:00 AM	118	238	78	159	277	113	185	74	111				111		111		111
7:00 AM	8:00 AM	605	544	180	365	969	291	477	191	286	969	286	969	286	969	286	969	286
8:00 AM	9:00 AM	1177	490	162	328	1505	178	292	117	175	1505	175	1505	175	1505	175	1505	175
9:00 AM	10:00 AM	796	288	95	193	990	98	161	64	96	990		990	96	990	96	990	96
10:00 AM	11:00 AM	426	334	110	224	650	104	170	68	102	650		650	102	650	102	650	102
11:00 AM	12:00 PM	303	347	115	233	536	76	125	50	75	536		536	75		75		75
12:00 PM	1:00 PM	306	365	121	245	551	125	205	82	123	551	123	551	123	551	123	551	123
1:00 PM	2:00 PM	341	474	156	317	658	111	182	73	109	658	109	658	109	658	109	658	109
2:00 PM	3:00 PM	405	560	185	375	780	168	275	110	165	780	165	780	165	780	165	780	165
3:00 PM	4:00 PM	595	842	278	564	1159	154	252	101	151	1159	151	1159	151	1159	151	1159	151
4:00 PM	5:00 PM	647	998	329	669	1316	199	326	130	196	1316	196	1316	196	1316	196	1316	196
5:00 PM	6:00 PM	637	865	286	580	1217	160	262	105	157	1217	157	1217	157	1217	157	1217	157
6:00 PM	7:00 PM	472	641	211	429	901	118	193	77	116	901	116	901	116	901	116	901	116
7:00 PM	8:00 PM	365	390	129	261	627	87	143	57	86	627		627	86	627	86		86
8:00 PM	9:00 PM	228	305	101	204	432	59	97	39	58	432			58				
9:00 PM	10:00 PM	151	177	58	119	269	33	54	22	32								
10:00 PM	11:00 PM	107	162	54	109	215	35	57	23	34								
11:00 PM	12:00 AM	92	98	32	66	158	40	66	26	39								
				2821	**5727**	**13794**	**2255**			**2217**	**9 hours**	**9 hours**	**13 hours**	**13 hours**	**12 hours**	**12 hours**	**11 hours**	**11 hours**
						Total	Total			Total	**met**	**met**	**met**	**met**	**met**	**met**	**met**	**met**

Assumptions:

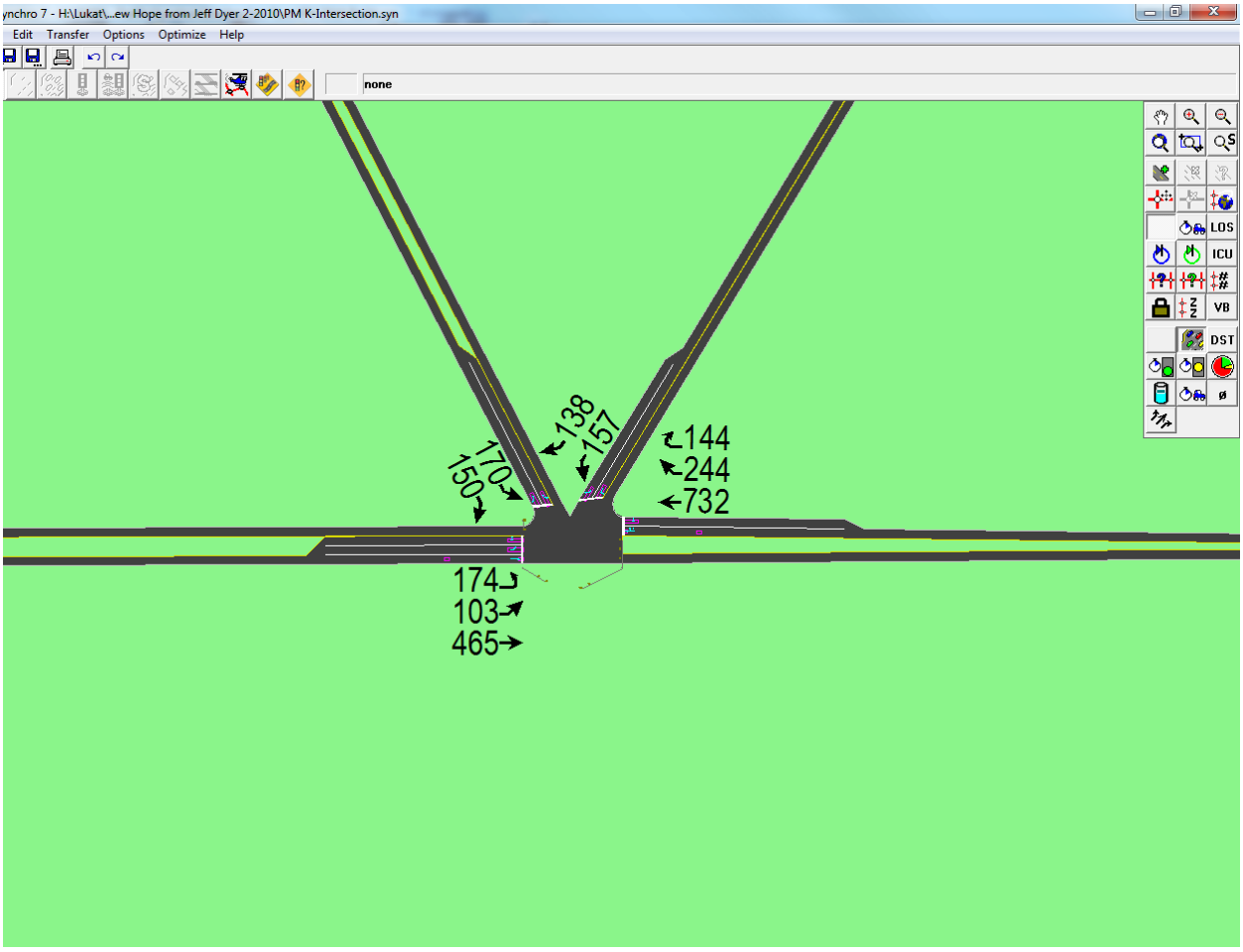
Westbound approach volume deduction of 33% to remove RT lanes from analysis
South approach volume deduction of 40% to remove RT lanes from analysis
Major street speed exceeds 40 MPH, so 70% tables applicable

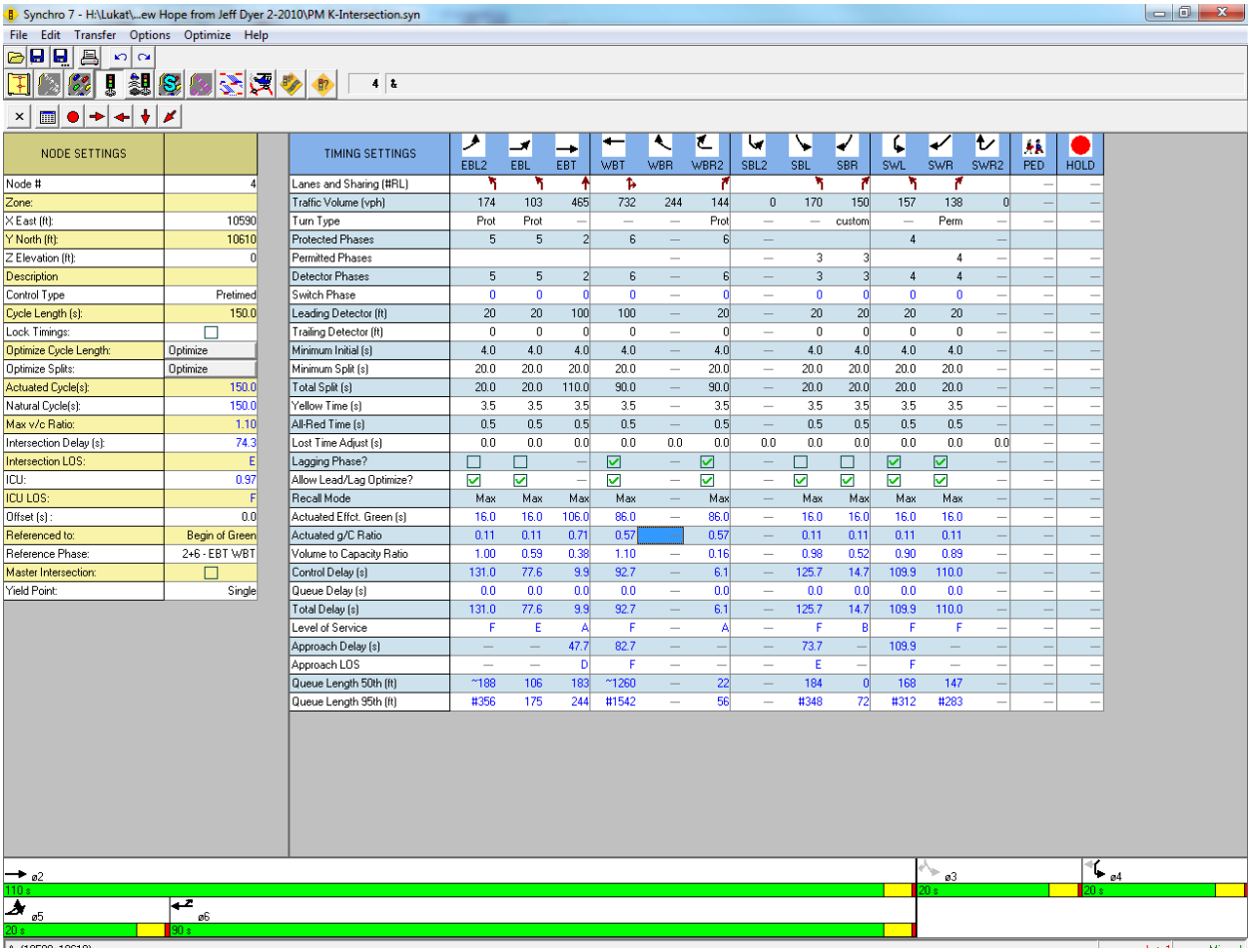
Warrant Summary:

Warrant 1: Satisfied
Warrant 2: Satisfied
Warrant 3: Satisfied
Warrants 4 - 9: Not Applicable

Appendix C:

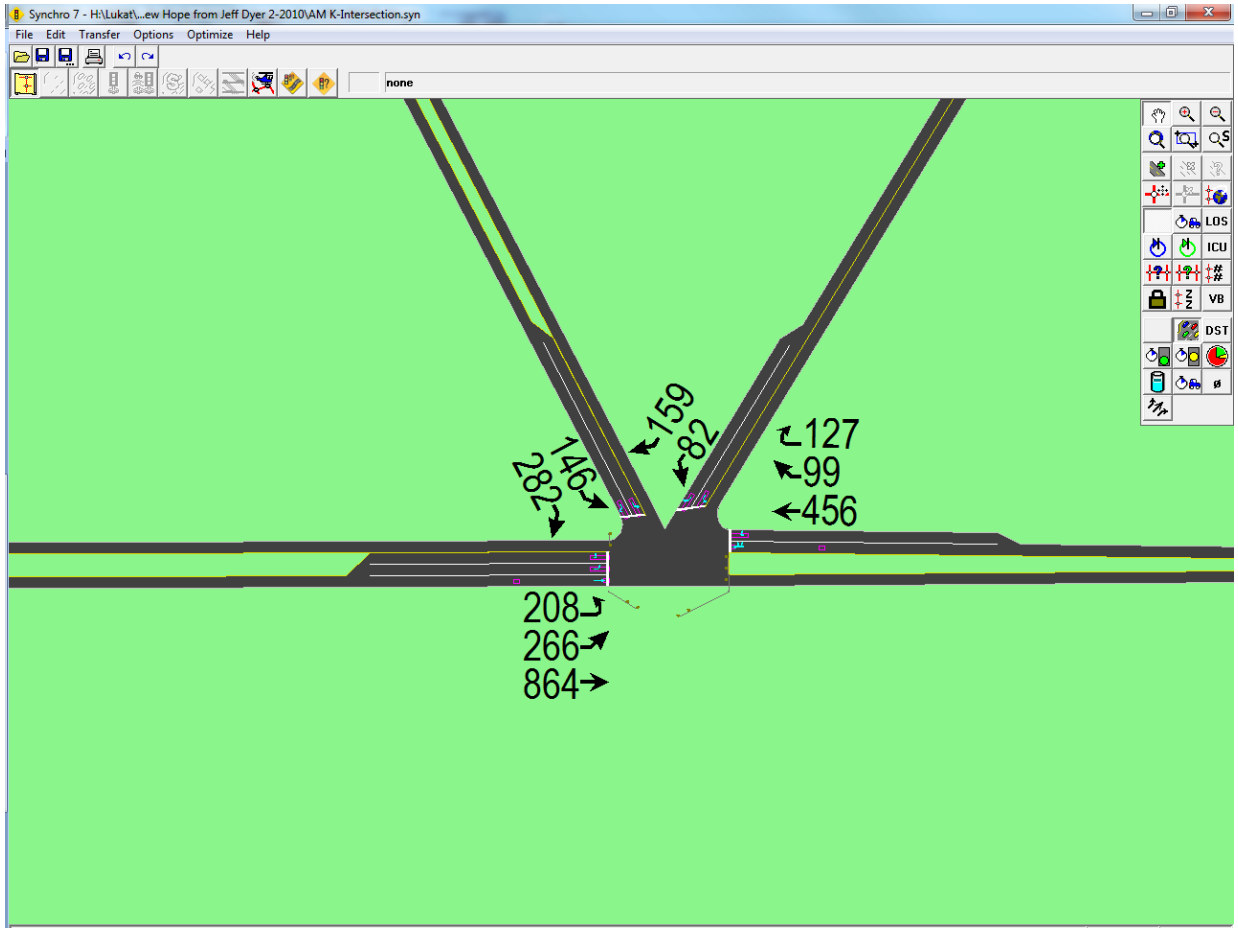
Alternate 4 Synchro Traffic Analysis Worksheets





NODE SETTINGS	
Node #	4
Zone:	
X East (ft):	10590
Y North (ft):	10610
Z Elevation (ft):	0
Description	
Control Type	Pretimed
Cycle Length (s):	150.0
Lock Timings:	☐
Optimize Cycle Length:	Optimize
Optimize Splits:	Optimize
Actuated Cycle(s):	150.0
Natural Cycle(s):	150.0
Max v/c Ratio:	1.10
Intersection Delay (s):	74.3
Intersection LOS:	E
ICU:	0.97
ICU LOS:	F
Offset (s) :	0.0
Referenced to:	Begin of Green
Reference Phase:	2+6 - EBT WBT
Master Intersection:	☐
Yield Point:	Single

TIMING SETTINGS	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL2	SBL	SBR	SWL	SWR	SWR2	PED	HOLD
Lanes and Sharing (#RL)													—	—
Traffic Volume (vph)	174	103	465	732	244	144	0	170	150	157	138	0	—	—
Turn Type	Prot	Prot	—	—	—	Prot	—	—	custom	—	Perm	—	—	—
Protected Phases	5	5	2	6	—	6	—			4		—		
Permitted Phases					—		—	3	3		4	—	—	—
Detector Phases	5	5	2	6	—	6	—	3	3	4	4	—	—	—
Switch Phase	0	0	0	0	—	0	—	0	0	0	0	—	—	—
Leading Detector (ft)	20	20	100	100	—	20	—	20	20	20	20	—	—	—
Trailing Detector (ft)	0	0	0	0	—	0	—	0	0	0	0	—	—	—
Minimum Initial (s)	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	—	—	—
Total Split (s)	20.0	20.0	110.0	90.0	—	90.0	—	20.0	20.0	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	—	—	—
All-Red Time (s)	0.5	0.5	0.5	0.5	—	0.5	—	0.5	0.5	0.5	0.5	—	—	—
Lost Time Adjust (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	—	—
Lagging Phase?	☐	☐	—	☑	—	☑	—	☐	☐	☑	☑	—	—	—
Allow Lead/Lag Optimize?	☑	☑	—	☑	—	☑	—	☑	☑	☑	☑	—	—	—
Recall Mode	Max	Max	Max	Max	—	Max	—	Max	Max	Max	Max	—	—	—
Actuated Effct. Green (s)	16.0	16.0	106.0	86.0	—	86.0	—	16.0	16.0	16.0	16.0	—	—	—
Actuated g/C Ratio	0.11	0.11	0.71	0.57		0.57	—	0.11	0.11	0.11	0.11	—	—	—
Volume to Capacity Ratio	1.00	0.59	0.38	1.10	—	0.16	—	0.98	0.52	0.90	0.89	—	—	—
Control Delay (s)	131.0	77.6	9.9	92.7	—	6.1	—	125.7	14.7	109.9	110.0	—	—	—
Queue Delay (s)	0.0	0.0	0.0	0.0	—	0.0	—	0.0	0.0	0.0	0.0	—	—	—
Total Delay (s)	131.0	77.6	9.9	92.7	—	6.1	—	125.7	14.7	109.9	110.0	—	—	—
Level of Service	F	E	A	F	—	A	—	F	B	F	F	—	—	—
Approach Delay (s)	—	—	47.7	82.7	—	—	—	73.7	—	109.9	—	—	—	—
Approach LOS	—	—	D	F	—	—	—	E	—	F	—	—	—	—
Queue Length 50th (ft)	~188	106	183	~1260	—	22	—	184	0	168	147	—	—	—
Queue Length 95th (ft)	#356	175	244	#1542	—	56	—	#348	72	#312	#283	—	—	—



Synchro 7 - H:\Lukat\...ew Hope from Jeff Dyer 2-2010\AM K-Intersection.syn

File Edit Transfer Options Optimize Help

NODE SETTINGS	
Node #	4
Zone:	
X East (ft):	10590
Y North (ft):	10610
Z Elevation (ft):	0
Description	
Control Type	Pretimed
Cycle Length (s):	90.0
Lock Timings:	☐
Optimize Cycle Length:	Optimize
Optimize Splits:	Optimize
Actuated Cycle(s):	90.0
Natural Cycle(s):	90.0
Max v/c Ratio:	1.24
Intersection Delay (s):	66.8
Intersection LOS:	E
ICU:	0.73
ICU LOS:	D
Offset (s) :	0.0
Referenced to:	Begin of Green
Reference Phase:	2+6 - EBT WBT
Master Intersection:	☐
Yield Point:	Single

TIMING SETTINGS	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL2	SBL	SBR	SWL	SWR	SWR2	PED	HOLD
Lanes and Sharing (#RL)													—	—
Traffic Volume (vph)	208	266	864	456	99	127	0	146	282	82	159	0	—	—
Turn Type	Prot	Prot	—	—	—	Prot	—	—	custom	—	Perm	—	—	—
Protected Phases	5	5	2	6	—	6	—			4		—		
Permitted Phases					—		—	3	3		4	—	—	—
Detector Phases	5	5	2	6	—	6	—	3	3	4	4	—	—	—
Switch Phase	0	0	0	0	—	0	—	0	0	0	0	—	—	—
Leading Detector (ft)	20	20	100	100	—	20	—	20	20	20	20	—	—	—
Trailing Detector (ft)	0	0	0	0	—	0	—	0	0	0	0	—	—	—
Minimum Initial (s)	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	—	—	—
Total Split (s)	20.0	20.0	50.0	30.0	—	30.0	—	20.0	20.0	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	—	—	—
All-Red Time (s)	0.5	0.5	0.5	0.5	—	0.5	—	0.5	0.5	0.5	0.5	—	—	—
Lost Time Adjust (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	—	—
Lagging Phase?	☐	☐	—	☑	—	☑	—	☐	☐	☑	☑	—	—	—
Allow Lead/Lag Optimize?	☑	☑	—	☑	—	☑	—	☑	☑	☑	☑	—	—	—
Recall Mode	Max	Max	Max	Max	—	Max	—	Max	Max	Max	Max	—	—	—
Actuated Effct. Green (s)	16.0	16.0	46.0	26.0	—	26.0	—	16.0	16.0	16.0	16.0	—	—	—
Actuated g/C Ratio	0.18	0.18	0.51	0.29	—	0.29	—	0.18	0.18	0.18	0.18	—	—	—
Volume to Capacity Ratio	0.72	0.92	0.99	1.24	—	0.24	—	0.50	0.57	0.28	0.62	—	—	—
Control Delay (s)	49.2	71.9	49.4	156.2	—	6.0	—	39.8	8.8	34.9	44.7	—	—	—
Queue Delay (s)	0.0	0.0	0.0	0.0	—	0.0	—	0.0	0.0	0.0	0.0	—	—	—
Total Delay (s)	49.2	71.9	49.4	156.2	—	6.0	—	39.8	8.8	34.9	44.7	—	—	—
Level of Service	D	E	D	F	—	A	—	D	A	C	D	—	—	—
Approach Delay (s)	—	—	53.9	131.1	—	—	—	19.4	—	41.4	—	—	—	—
Approach LOS	—	—	D	F	—	—	—	B	—	D	—	—	—	—
Queue Length 50th (ft)	122	163	500	~468	—	0	—	83	0	44	92	—	—	—
Queue Length 95th (ft)	#223	#313	#784	#688	—	42	—	145	69	88	160	—	—	—

ø2 50 s | ø3 20 s | ø4 20 s | ø5 20 s | ø6 30 s

Architecture

Engineering

Construction

MEETING MINUTES

Project:	Campbellton Road @ Boat Rock Road/New Hope Rd, STP-0186-01(038)
	P.I. # 731830
Purpose:	Initial Concept Team Meeting
Place:	GDOT District 7 / Area 3 Conference Room
Meeting Date:	Tuesday, June 15, 2010
Prepared By:	Jeff Dyer
In Attendance:	Antonio Valenzuela – Fulton County
	Ernay Robinson – GDOT Project Manager
	Larry Bowman – GDOT/OES
	Pam Hooks – GDOT / Local Gov. R/W Support
	Mike Lobdell – GDOT District 7
	Vulonda Pride Foster – GDOT / Utilities
	Michael K. Hill – GDOT
	Kaycee Mertz – GDOT
	Patrick Allen – GDOT/Traffic Safety & Design
	Bobby Plunkett – Georgia Power Co.
	John Wisenhart – Georgia Power Co.
	Arlene Jackson – AT&T
	Jeff Dyer - Qk4

The following items were discussed:

Two conceptual alternatives are under consideration for the Campbellton Road / Boat Rock Road / New Hope Road intersections and were presented by Mr. Dyer, along with an overview of the pros and cons of each. Both alternatives would signalize Campbellton Road @ Boat Rock Road and add an eastbound left-turn lane. The two alternatives differ in how they would reconstruct the Boat Rock Road / New Hope Road intersection:

- Both Alternatives would relocate the New Hope Road approach from its existing location, which is 100 feet north of the Boat Rock Road intersection with Campbellton Road to a new location which is approximately 350 feet north of Campbellton Road.

MEETING MINUTES

- Alternative 1 would construct a conventional intersection with all-way stop control, while providing a separate turning roadway for northbound right-turn traffic wanting to use New Hope Road.

- Alternative 2 would construct a single-lane urban roundabout.

Fulton County is holding a second public information meeting on June 21. After that meeting has been held, a preferred alternative will be selected.

Traffic simulation animations based on a VSSIM analysis had been prepared for the existing conditions, and both alternatives, using design year traffic. These animations were shown to the attendees.

There is a sidewalk project along Campbellton Road that is close to being let. That project has been designed by Qk4. There is also a resurfacing project that is supposed to take place in this area.

Georgia Power representatives questioned how this project would be coordinated with the upcoming sidewalk project. They do not want to have to relocate poles twice. They also suggested that enough right-of-way be purchased in order to provide room for pole placement behind sidewalks.

The project schedule was gone over and adjusted, based on the current status of the project. The management let date for this project will be adjusted from February 2013 to March 2014.

Following selection of the preferred alternative, the concept report will be updated accordingly, and then circulated through GDOT for final approval.

Dyer, Jeff

From: Dyer, Jeff
Sent: Tuesday, November 16, 2010 7:53 AM
To: Robinson, Ernay
Cc: Valenzuela, Antonio
Subject: Notes from yesterdays field meeting for Campbellton @ Boat Rock/New Hope - PI#731830

The following items were discussed.

The VISSIM analysis that was included in the previous version of the traffic study has had to be rerun due to incorrect speed profiles. That made VISSIM show the intersections operating worse than predicted by the traffic volumes and other analysis tools. The traffic study will be updated and reissued to include updated queue lengths from the updated VISSIM analysis.

At the request of GDOT, predicted queue lengths from HCS analysis will also be added to the updated traffic study for the signalized intersection of Campbellton Road @ Boat Rock Road.

Updated VISSIM animation files were provided to GDOT.

At GDOT's request the following additional analysis scenarios will be added to the updated traffic study:

1. Same scenario as Alternative 1 (conventional), but with a change of traffic control to provide a free flow for northbound traffic on Boat Rock Road as it approaches relocated New Hope Road so that this traffic can't queue into the signalized intersection at Campbellton Road. Scenario will either be a side-street stop, two-way stop (SB and WB stop control) or both.

2. Analyze a scenario that involves a signal signalized intersection along Campbellton Road where Boat Rock Road and New Hope Road approach into the same intersection, side by side, forming a "K" shaped configuration. There would be an extra signal phase needed to handle this extra intersection leg.

3. Analyze a scenario that involves a single multi-lane roundabout that includes Campbellton, New Hope, and Boat Rock Roads. This concept had been studied previously. GDOT will provide a sketch that shows this previous design.

VISSIM will used as an evaluation tool for the original scenarios included in the original report, and possibly for the modifications of Alternative 1. However, other analysis tools such as SIDRA, HCS, and/or SYNCHRO will be used for the remaining scenarios. VISSIM will not be used as an evaluation tool for the new scenarios.

It has been agreed that the traffic report will be updated and resubmitted for review before the Concept Report is updated. This way, remaining traffic issues can be resolved before the recommended concept is incorporated into the Concept Report.

Jeffrey W. Dyer, P.E., PTOE
Sr. Project Manager
Qk4
Engineering Planning
3169 Holcolmb Bridge Road, Suite 455, Norcross, GA 30071
404.417.3024 (direct) - Fx. 404.329.5901
jdyer@qk4.com

Architecture

Engineering

Construction

MEETING SUMMARY

Project:	Campbellton Road @ Boat Rock Road/New Hope Rd, STP-0186-01(038) P.I. # 731830
Purpose:	Progress / Coordination Meeting
Place:	GDOT General Office 25th Floor Conference Room
Meeting Date:	Monday, February 7, 2011, 10:00 a.m.
Prepared By:	Jeff Dyer
In Attendance:	Antonio Valenzuela – Fulton County Ernay Robinson – GDOT Project Manager Michael Haithcock – GDOT Scott Zehngraff – GDOT Daniel Pass - GDOT Tony Jones – GDOT Andy Ballerstedt – Qk4 Jeff Dyer - Qk4

Note that the attendee list may be incomplete. The following items were discussed:

The results of the traffic analysis undertaken after the November 15 field meeting were discussed. The results of these analyses had already been sent to attendees via email.

Based on those results, the "K" intersection concept alternative will not be pursued further due to issues with level of service of the signalized intersection.

A refinement of Alternate 2 (3-legged roundabout at Boat Rock @ New Hope) had been made to add a second southbound lane on Boat Rock to reduce queuing from Campbellton. Although this appeared to improve the situation, there is no evidence that it would improve it enough to alleviate potential of locking the roundabout. For this reason, this alternative has been removed from further consideration.

A single roundabout alternative was developed that combined the Campbellton Road, Boat Rock Road, and New Hope Road approaches at a single roundabout intersection. Level of service analysis revealed that a single lane roundabout design would not handle the expected traffic demands.

Initial analysis revealed that constructing the single roundabout as a multi-lane design would accommodate the expected traffic demands. A concept was displayed assumed multi-lanes on all approaches. It was discussed by

MEETING SUMMARY

GDOT that a partial multi-lane roundabout design may be feasible at this intersection and more cost-effective than what was shown.

It was suggested by GDOT that Qk4 hire a subconsultant to prepare a peer review and refine the single roundabout concept at this intersection. As part of the scope of work, both the location and the lane configuration would be refined based on more detailed analysis.

Qk4 will investigate hiring Kittleson & Associates to provide peer review for a single roundabout. If a multilane or partial multi-lane roundabout concept is found to be feasible for this intersection based the peer review, this will likely be the preferred alternative for this project.

If a roundabout is selected as the preferred alternative, it was discussed that this project would be eligible for full federal funding.

If a single roundabout is found not to be feasible, Alternative 1 with the northbound stop sign removed would be the "fallback" preferred alternative.

Once the peer review is completed, the preferred alternative will be selected. At that point Qk4 will revise the Concept Report and submit it for approval.

FILE: P. I. No 731830 **DATE:** March 3, 2010

FROM: Qk4

TO: Fulton County, Public Works Department

SUBJECT: P.I. 731830, Fulton County, Summary of Comments Received During the Public Comment Period

COMMENT TOTALS:

A total of 31 people attended the February 11, 2010, public information open house (PIOH) meeting held at the Southwest Fulton Arts Center, 915 New Hope Road, SW Atlanta, Georgia. From those attending, 22 comment forms were received at the PIOH. Two comment forms were completed by married couples, so each of their comment forms is counted as two comments. An additional four emailed comments were received during comment period following the PIOH. Two emails were from attendees who submitted a comment card, so their comments are only counted once, therefore, there are a total of 26 comments, summarized as follows:

Total Received	Opposed	In Support	Uncommitted	Conditional
26	0	23	0	3

MAJOR CONCERNS:

Some people that commented expressed a preference for one or more of the alternatives presented:

Concept One – 6
Concept Two – 3
Concept Three – 7
Concepts One and Three - 1

Other concerns are:

- Concerns related to traffic control/lights

OFFICIALS:

Angela Parker, Public Works Director

DISPOSITION OF COMMENTS:

If you have any questions about the comments, please call Matt Houser at (404)329-5900.

Attachments

DISTRIBUTION:

FILE: P. I. No. 731830 **DATE:** July 14, 2010

FROM: Qk4

TO: Fulton County, Public Works Department

SUBJECT: P.I. 731830, Fulton County, PIOH, June 21, 2010 - Summary of Comments Received During the Public Comment Period

COMMENT TOTALS:

A total of 21 people attended the June 21, 2010, public information open house (PIOH) meeting held at the Atlanta Fulton Public Library - SW Branch, 3665 Cascade Road SW Atlanta, Georgia 30331. From those attending, three comment forms were received at the PIOH. An additional four emailed comments were received during comment period following the PIOH. One email was from an attendee who submitted a comment card, so his comments are only counted once, therefore, there are a total of six comments, summarized as follows:

Total Received	Opposed	In Support	Uncommitted	Conditional
6	0	6	0	0

MAJOR CONCERNS:

None

OFFICIALS:

Angela Parker, Public Works Director

DISPOSITION OF COMMENTS:

If you have any questions about the comments, please call Matt Houser at (404)329-5900.

Attachments

DISTRIBUTION:

DISTRIBUTION:

FULTON COUNTY

Campbellton Road at Boat Rock and New Hope Roads
Second Public Meeting – June 21, 2010
Atlanta-Fulton Public Library

Comments:

Proposed to add Roundabout on Boat Rock @ New hope, shut down small existing section of current New Hope Rd & stated will add some barrier to prevent Dumping - Turning lanes from Campbellton Rd, A traffic signal will be installed w/ ample warning of approaching lites & turning lane.

I personally think: if the above do occur as stated in the comm meeting, it will be an improvement in appearance and safety to pedestrian & should prevent motor vehicle accidents I would certainly like to see some way of preventing a left turn off of Campbellton WB - Directly into Citgo. Make it so they traffic flow must go NB on Boat rock to access the conv. store. (safety issue) as well as preventing a collision

Submitted By: (Please Print) Drewitt Worthy

Complete Address: FCFD #3

Submit comments to:

Campbellton Road at Boat Rock and New Hope Roads Project

Matthew R. Houser, ASLA
Qk4
3169 Holcomb Road, Suite 455
Norcross, GA 30071
Fax: 404.329.5901
Email: mhouser@qk4.com

Antonio Valenzuela
Transportation Planning Administrator
Fulton County
Tel: 404-612-0520
Fax: 404-893-6227
Email: antonio.valenzuela@fultoncountyga.gov

Project mngr. ~~Renee~~
Erway Robinson (present)

FULTON COUNTY

Campbellton Road at Boat Rock and New Hope Roads
Second Public Meeting – June 21, 2010
Atlanta-Fulton Public Library

Comments: w the flow of traffic going SB on Boatrock turning R onto Campbellton Rd.

Submitted By: (Please Print) Dewitt Worthy

Complete Address:

Submit comments to:

Campbellton Road at Boat Rock and New Hope Roads Project

Matthew R. Houser, ASLA
Qk4
3169 Holcomb Road, Suite 455
Norcross, GA 30071
Fax: 404.329.5901
Email: mhouser@qk4.com

Antonio Valenzuela
Transportation Planning Administrator
Fulton County
Tel: 404-612-0520
Fax: 404-893-6227
Email: antonio.valenzuela@fultoncountyga.gov

FULTON COUNTY

Campbellton Road at Boat Rock and New Hope Roads

Second Public Meeting – June 21, 2010

Atlanta-Fulton Public Library

Comments: Absolutely Need Supplemental traffic light head to warn eastbound SR166 traffic

Prefer Roundabout with one way signage ~~and~~

Submitted By: (Please Print) Harvey Davis

Complete Address: 1780 Versailles Dr
Atlanta, GA 30331

Submit comments to:

Campbellton Road at Boat Rock and New Hope Roads Project

Matthew R. Houser, ASLA
Qk4
3169 Holcomb Road, Suite 455
Norcross, GA 30071
Fax: 404.329.5901
Email: mhouser@qk4.com

Antonio Valenzuela
Transportation Planning Administrator
Fulton County
Tel: 404-612-0520
Fax: 404-893-6227
Email: antonio.valenzuela@fultoncountyga.gov

FULTON COUNTY

Campbellton Road at Boat Rock and New Hope Roads

Second Public Meeting – June 21, 2010

Atlanta-Fulton Public Library

Comments:

Please assure that the closed off New Hope will not become a dumping ~~gro~~ ground. Once the road is closed - a great idea would be to add green land / park. Beautify the end caps to be a source of pride for our neighborhood.

Submitted By: (Please Print) Mary Lee McNair

Complete Address: 1620 Esprit Court
Atlanta Ga 30331

Submit comments to:

Campbellton Road at Boat Rock and New Hope Roads Project

Matthew R. Houser, ASLA
Qk4
3169 Holcomb Road, Suite 455
Norcross, GA 30071
Fax: 404.329.5901
Email: mhouser@qk4.com

Antonio Valenzuela
Transportation Planning Administrator
Fulton County
Tel: 404-612-0520
Fax: 404-893-6227
Email: antonio.valenzuela@fultoncountyga.gov

Houser, Matt

From: Sherry Finch [sherryfi@bellsouth.net]
Sent: Wednesday, June 23, 2010 11:28 AM
To: sca-steering@googlegroups.com; angela.parker@fultoncountyga.gov; antonio.valenzular@fultoncountyga.gov; Houser, Matt; erobinson@dot.ga.gov; richard.coates@fultoncountyga.gov
Subject: Cambellton/Boatrock/New Hope Roads--OPTION #2 is the best choice!

Hi,

I did not get to attend the informational meeting re: the intersection changes proposed for Boat Rock, Campbellton Rd and New Hope Rds last week, but did review the drawings and would like to express my family's preference for the Option #2, providing a roundabout instead of a 4-way stop on Boat Rock Rd where the newly aligned New Hope Rd will join.

We know the roundabout will provide a continuous flow of traffic as opposed to the stop-and-go that results from stop signs, and with the growth of new subdivisions and apartments all along our street (Boat Rock) the number of cars needing to pass that way has grown, and will keep growing, so we strongly urge the use of continuous traffic flow via roundabout as opposed to the bottle-neck that will occur with stop signs there.

We have been keenly interested in the county's traffic and connectivity planning for Sandtown since we moved here 11 years ago, attending most of the informational meetings provided by the county and the Sandtown Community Association; we were excited by the Blueprint Sandtown that the LCI study evolved many years ago, and had hoped that would have been made a reality long before now. The proposal #2 for this intersection seems most compatible with the aesthetics and the efficiencies of good traffic management techniques encompassed by the Blueprint Sandtown plans.

Thank you for taking on this project in our community, we have long desired a better and safer intersection at that location.

Thank you,

Sherry and Ken Finch

Sherry Finch

Direct: 404-788-3652

1181 Boat Rock Rd
Atlanta, Ga 30331

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Houser, Matt

From: Cheryl Flowers [flowerscc@hotmail.com]
Sent: Wednesday, June 23, 2010 10:53 AM
To: angela.parker@fultoncountyga.gov; antonio.valenzular@fultoncountyga.gov; Houser, Matt; erobinson@dot.ga.gov; richard.coates@fultoncountyga.gov; Sandtown community association
Subject: Cambellton/Boatrock/New Hope Roads

Everyone,

As one who has worked, hoped, and prayed for a new design for the intersection of Campbellton, Boar Rock and New Hope Roads for almost twelve years, I am again hopeful as you are re-visiting this project. For many years, I served as co-chair of the zoning committee for the Sandtown Community Association. I, as well as those who have participated with the planning of Campbellton Road over the years, overwhelmingly support the ROUND-ABOUT as the first option.

In 1997, when the Georgia DOT fisrt announced plans to widen Campbellton Road, many of us sought options which would enhance Campbellton Road (state road 166).
We worked collaboratively with the Ben Hill community to our east, and the Campbellton Road Coalition was formed.

As we took this undertaking seriously, we applied for, and was granted the funds to conduct an LCI study. The G-DOT, Fulton County government, national traffic planners, such as Ian Lockwood and Walter Kulash, and approximately 3,000 Sandtown residents, participated in this process. The process yeilded a design, not only for the above intersection, but for all of Campbellton Road, from I-285 to the Douglass County line.

In the October 29, 2000 Atlanta Journal-Constitution, an article entitled "A roundabout Solution", stated that traffic engineers across Georgia espoused the roundabout as a viable solution to traffic management. In fact, the G-DOT has since enstalled a roundabout on State road 166, approximately thirteen miles west of Sandtown, in Douglas County. From a small neighborhood intersection, to grand twenty lane boulevards in Europe, the roundabout appears to be an efficient, as well as asthetically beautiful option.

I ask very seriously, that you consider the wishes of the community who have spoken so passionately regarding this matter, and proceed with the installation of the roundabout in the heart of our community.

If you wish to contact me, I may be reached at 404-344-2781 or 404-401-8163.

Regards,
Cheryl Flowers

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Houser, Matt

From: Valenzuela, Antonio [Antonio.Valenzuela@fultoncountyga.gov]
Sent: Wednesday, June 23, 2010 9:15 AM
To: Dyer, Jeff
Cc: Houser, Matt; Morgan, LaNiece
Subject: FW: T244 - Campbellton Road at Boat Rock Road and New Hope Road Intersection Improvements

Please keep this email as one more support for the roundabout.

Thank you,

Antonio M. Valenzuela
Transportation Planning Administrator
Public Works Dept., Transportation Planning
Tel: (404) 612-0520
Fax: (404) 730-6325
antonio.valenzuela@fultoncountyga.gov

From: Davis, John A [mailto:John.A.Davis@delta.com]
Sent: Wednesday, June 23, 2010 7:44 AM
To: Parker, Angela; Valenzuela, Antonio; 'emcclinton@dot.ga.gov'; Coates, Richard; 'erobinson@dot.ga.gov'
Cc: 'Davis, Debbie S.'; 'Cheryl Flowers'
Subject: T244 - Campbellton Road at Boat Rock Road and New Hope Road Intersection Improvements

All:

I have been a longstanding Sandtown resident for over 10 years and sending this email in support of the proposed changes for the intersection of Campbellton Road, Boat Rock and New Hope. Specifically, I support the project for a roundabout at this intersection.

I reside in Enon Pines and I live within view through the trees of this intersection. My home is on Enon Mill which is about 500 feet from this part of Campbellton Road. My reasoning for supporting the roundabout is as follows:

- The Blueprint Sandtown was a master plan for the community that was funded from an LCI grant. Part of the plan included traffic calming of Campbellton Road. We have long been a supporter of roundabouts as a measure of calming the traffic on Campbellton Road.
- I have participated in several community studies and feel that a light alternative at this intersection is not the best tool for long term growth of our community. This part of Campbellton is residential and continual movement of traffic minimizes environmental pollution and noise during a 24 hour period.
- The State DOT although initially hesitant and reluctant to support the community have found benefits in other areas of the state and concluded the Sandtown community could benefit from this solution as well.
- aesthetically a roundabout gives a community uniqueness and a separate distinction from other areas. And Sandtown has desired this type of charm and character for close to 20 years.
- A roundabout would create a safer area by reducing traffic speeding and signaling a need to exercise greater caution. And this is needed given the proximity of an elementary and middle school close by.

I want to thank all of you who have worked hard on this project and urge your

favorable decision on the implementation of the roundabout.

If you wish to talk with me further, please feel free to call me at 678-637-0804.

Thanks!

John A. Davis, Esq.

Blueprint Sandtown summarized the history of the Sandtown Community's creation of a land use master plan for the Sandtown Community Village that would impact the traffic flow of Campbellton Road. The land use master plan for the community includes an analysis of educational needs, development of a live/work/play village that would incorporate elements of a walkable residential development, parks and traffic calming of Campbellton Road.

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Houser, Matt

From: Smith, Vance [vsmith@dot.ga.gov]
Sent: Tuesday, June 22, 2010 10:08 PM
To: 'harveydavis@bellsouth.net'; 'angela.parker@fultoncountyga.gov'; Robinson, Ernay; McClinton, Emory
Cc: Houser, Matt; 'antonio.valenzuela@fultoncountyga.gov'; 'Richard.Coates@fultoncountyga.gov'
Subject: Re: T244 - Campbellton Road at Boat Rock Road and New Hope Road Intersection Improvements

Mr. Davis,

Thanks for your comments and we appreciate the partnership, which improves transportation for all our citizens.
Again thanks,

Vance

From: Harvey Davis <harveydavis@bellsouth.net>
To: Angela Parker <angela.parker@fultoncountyga.gov>; Robinson, Ernay; McClinton, Emory; Smith, Vance
Cc: mhouser@qk4.com <mhouser@qk4.com>; antonio.valenzuela@fultoncountyga.gov <antonio.valenzuela@fultoncountyga.gov>; Richard Coates <Richard.Coates@fultoncountyga.gov>
Sent: Tue Jun 22 21:07:52 2010
Subject: RE: T244 - Campbellton Road at Boat Rock Road and New Hope Road Intersection Improvements

Angela Parker

Director of Fulton County Public Works

141 Pryor St., Suite 6001
Atlanta, GA 30303

June 22, 2010

Ms. Parker,

I am very pleased to see the continued collaborative partnership between Fulton County and GDOT to solve the longstanding intersection upgrade needs at SR166/Boat Rock and New Hope. While either solution would have an enormous impact on our life safety needs, I strongly prefer the **roundabout solution** for efficiency, throughput and aesthetics. It is also consistent on a smaller scale with Blueprint Sandtown's planning.

Some ten years ago now, the community as part of the Sandtown LCI and Blueprint Sandtown endorsed the following land use objectives:

- Better school options (new middle and high schools) **ACHIEVED**
- Walkable community **IN PROGRESS** (Sandtown Pedestrian Network)
- Recreation facilities (**IN PROGRESS** revitalization of Sandtown Park and Gym),
- Shopping opportunities (Camp Creek and Campbellton and **MORE TO COME**)
- Reduced neighborhood truck traffic. (A roundabound at Boat Rock and New Hope **WILL ACHIEVE** this on the truck restricted arterial roads)
- Standards for the manner in which buildings and roads should be designed. (**ACHIEVED - THE SANDTOWN OVERLAY DISTRICT**)

This roundabout implementation would be one of the final key components of proven world class design, that I am encouraged to see GDOT embraces statewide - as evidenced in numerous successful projects including the one at SR166 and SR5. We will also need a supplemental traffic light for eastbound traffic coming around the curve as there is on Camp Creek near Welcome All.

Thank you all, for your teams continued efforts and commitment to making this key safety improvement a reality, for the Sandtown Community and those who travel through it.

Harvey Davis

1780 Versailles Drive SW
Atlanta, GA 30331

(678) 390-0097

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Department of Public Works
141 Pryor Street S. W., Suite 6001
Atlanta, Georgia 30303
Telephone: 404-612-8102
Fax: 404-730-6325

FULTON COUNTY

Angela Parker
Director

April 26, 2011

Brent A. Story, P.E.
Georgia Department of Transportation
One Georgia Center
600 West Peachtree Street, NW
Atlanta, Georgia 30308

RE: Lighting required for roundabout intersection project
GDOT Project STP00-0186-01(038) P. I. No. 73180 Fulton County
SR 166/Campbellton Road at Boat Rock Road and New Hope Road

Dear Mr. Story:

The above-referenced project is now in the Concept stage according the Georgia Department of Transportation (GDOT) Plan Development Process. For this project, roundabout lighting is both a necessary design component and requirement. The warranting conditions for lighting, based on the illuminating Engineering Society of North America (IESNA) and American Association of State Highway and Transportation Officials (AASHTO) guidelines would be met.

At this time, the GDOT is requesting a written commitment from the County. Fulton County is willing to share in the costs of the lighting by funding the Energy, Operation and Maintenance of the installed Lighting system along county roads. The GDOT's responsibility shall be the design and construction costs, including all materials.

Sincerely yours,

Angela Parker

Cc: Scott A. MacLean

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
225 E Robinson Street, Suite 450, Orlando, FL 32801 P 407.540.0555 F 407.540.0550

MEMORANDUM

Date: March 3, 2011 Project #: 11614

To: Jeffrey W. Dyer, QK4
3169 Holcolmb Bridge Road, Suite 455
Norcross, Georgia 30071

From: Justin Bansen and Alek Pochowski

Project: Campbellton Road/Boat Rock Road/New Hope Road Roundabout

Subject: Roundabout Operational Evaluation

Kittelson & Associates, Inc. (KAI) performed a traffic operations analysis to identify expected performance for a proposed roundabout at the intersections of Campbellton Road (SR154/166)/Boat Rock Road and Boat Rock Road/New Hope Road in Fulton County, Georgia. KAI performed the analysis using provided opening year 2014 and design year 2034 traffic volumes. The purpose of the analysis is to identify the roundabout lane numbers and arrangements that would be required to provide adequate operational performance through the 2034 design year. Figure 1 displays the existing intersection. The proposed roundabout would combine the intersections of Campbellton Road (SR154/166)/Boat Rock Road and Boat Rock Road/New Hope Road, as shown in a conceptual roundabout design provided by QK4 in Figure 2.

The proposed roundabout intersections have been evaluated using two operational analysis procedures – the operational model from *NCHRP Report 572 – Roundabouts in the United States* (Reference 1) and the SIDRA Intersection analysis software. The capacity data from NCHRP Report 572 represents the only model available that is based upon U.S. specific roundabout performance data, and it is the basis for the revised roundabout operational procedure in the forthcoming *2010 Highway Capacity Manual*. The NCHRP Report 572 analysis was performed using the Georgia Department of Transportation Roundabout Analysis Tool. SIDRA Intersection is an Australian analysis tool that predicts capacity based upon Australian experience. The analysis in this report uses an adjustment factor (called an environmental factor) of 1.2, to better replicate predicted capacities in the U.S., as recommended by the developers of SIDRA.

The results of both models are provided to offer an expected range of potential performance. The NCHRP Report 572 model may be conservative for future conditions; the SIDRA model may be more optimistic than what can be expected in the United States. Therefore, the expected operations are likely to fall within the ranges reported in this memorandum. For planning purposes, a volume-to-capacity (v/c) ratio of 0.85 or less is targeted for each approach leg. However, higher v/c ratios may be acceptable for future conditions depending upon the corresponding delay and queue prediction.

Figure 1. Existing Campbellton Road (SR154/166)/Boat Rock Road and Boat Rock Road /New Hope Road Intersections

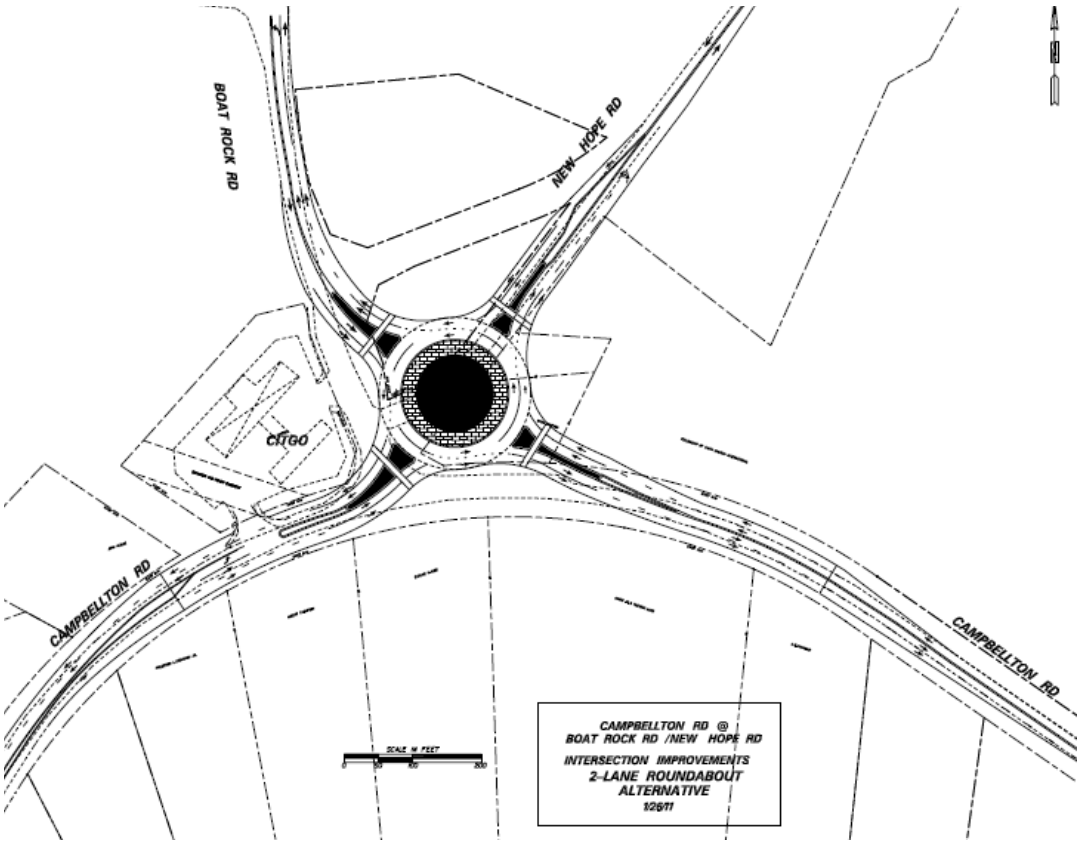

Figure 2. Conceptual Roundabout (Source: QK4)

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OPENING YEAR 2014 ROUNDABOUT OPERATIONS

KAI performed an initial evaluation of a single-lane roundabout configuration for the forecast year 2014 traffic volumes. The analysis identified that a single-lane roundabout is expected to provide acceptable operations for the opening year 2014; however, the eastbound Campbellton Road approach will require an additional right-turn bypass lane to be provided as illustrated in Figure 3. Results of the operational analysis are provided in Tables 1 and 2.

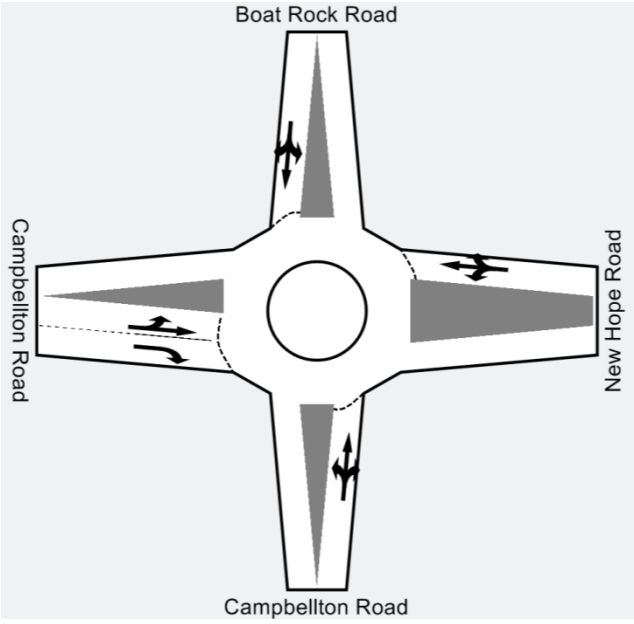


Figure 3. 2014 Roundabout Configuration

Table 1. Year 2014 Weekday A.M Peak Period Roundabout Operations

Approach	Southbound (Boat Rock Road)	Westbound (New Hope Road)	Northbound (Campbellton Road)	Eastbound (Campbellton Road)
NCHRP 572 Operational Model				
V/C ratio	0.61	0.31	***0.85***	0.62
Control Delay, sec/pcu	14.9	9.1	25.6	9.6
95th % Queue (ft)	106	33	264	120
SIDRA Intersection				
V/C ratio	0.58	0.30	0.77	0.51
Control Delay, sec/pcu	15.5	12.2	20.0	8.9
95th % Queue (ft)	149	56	292	120

Table 2. Year 2014 Weekday P.M Peak Period Roundabout Operations

Approach	Southbound (Boat Rock Road)	Westbound (New Hope Road)	Northbound (Campbellton Road)	Eastbound (Campbellton Road)
NCHRP 572 Operational Model				
V/C ratio	0.42	0.47	***0.87***	0.36
Control Delay, sec/pcu	11.0	13.8	23.3	6.1
95th % Queue (ft)	53	64	296	43
SIDRA Intersection				
V/C ratio	0.39	0.46	0.75	0.28
Control Delay, sec/pcu	12.3	17.3	14.4	9.4
95th % Queue (ft)	77	103	279	51

As summarized in Table 1 and Table 2, the northbound entry is close to the target threshold v/c ratio of 0.85 in the weekday a.m. and p.m. peak period based upon the NCHRP Report 572 operational model. The results of the Sidra Version 4 analysis show the single-lane roundabout configuration (shown in Figure 3) to operate acceptably under year 2014 traffic conditions with a maximum v/c ratio of 0.77 on the south approach.

YEAR 2034 ROUNDABOUT OPERATIONS

For the forecast year 2034 traffic conditions, KAI identified that a single-lane roundabout will not provide acceptable operations. A partial multilane configuration was evaluated that included two lanes entering, circulating, and exiting along Campbellton Road. Single-lane entries and exits were maintained on Boat Rock Road and New Hope Road as illustrated in Figure 4. Table 3 and Table 4 summarize the results of the analysis.

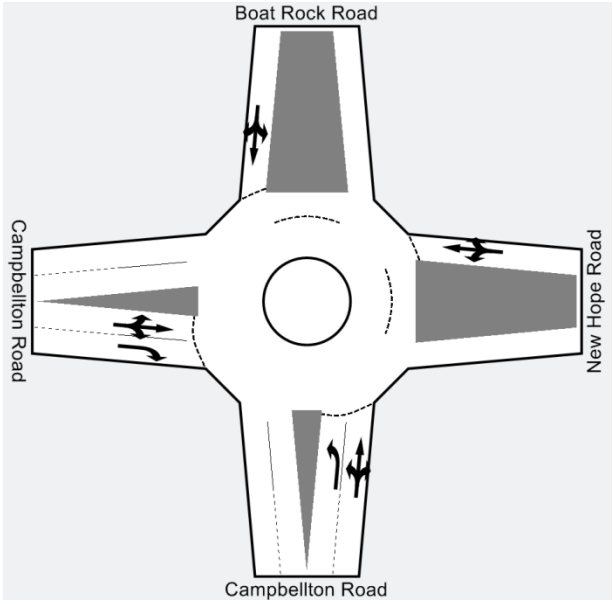


Figure 4 Year 2034 Roundabout Configuration

Table 3. Year 2034 Weekday A.M Peak Period Roundabout Operations

Approach	Southbound (Boat Rock Road)	Westbound (New Hope Road)	Northbound (Campbellton Road)	Eastbound (Campbellton Road)
NCHRP 572 Operational Model				
V/C ratio	***0.91***	0.47	0.73	***0.94***
Control Delay, sec/pcu	37.2	10.9	21.5	33.8
95th % Queue (ft)	306	63	166	385
SIDRA Intersection				
V/C ratio	***0.94***	0.47	0.50	0.72
Control Delay, sec/pcu	27.0	11.7	15.7	11.8
95th % Queue (ft)	394	78	132	268

Table 4. Year 2034 Weekday P.M Peak Period Roundabout Operations

Approach	Southbound (Boat Rock Road)	Westbound (New Hope Road)	Northbound (Campbellton Road)	Eastbound (Campbellton Road)
NCHRP 572 Operational Model				
V/C ratio	0.75	***0.87***	***0.88***	0.62
Control Delay, sec/pcu	25.9	43.8	27.7	12.5
95th % Queue (ft)	169	229	298	117
SIDRA Intersection				
V/C ratio	0.78	0.82	0.60	0.41
Control Delay, sec/pcu	21.1	23.3	13.1	9.8
95th % Queue (ft)	200	195	165	85

The NCHRP Report 572 operational model predicts that the eastbound Campbellton Road entry will operate with a v/c ratio of 0.94 during the weekday a.m. peak hour. However, the results of the Sidra Intersection analysis show the same eastbound entry to operate with a v/c ratio of 0.72 during the weekday a.m. peak period. Similarly, the NCHRP Report 572 operational model predicts that the north leg (southbound Boat Rock Road) entry will operate with a v/c ratio of 0.91 during the weekday a.m. peak hour. However, the results of the Sidra Intersection analysis show the north leg of the roundabout to operate with a v/c ratio of 0.94 during the weekday a.m. peak period. In both cases, the actual performance is expected to fall within the identified range.

Alternative Eastbound Entry Configuration

For the forecast year 2034 traffic conditions, KAI evaluated an alternative configuration for the eastbound entry. The eastbound Campbellton Road entry was reconfigured to operate with a single shared left/through lane entering the roundabout and with a continuous right-turn bypass lane as illustrated in Figure 5. Table 5 summarizes the results of the analysis in comparison to the configuration illustrated in Figure 4.

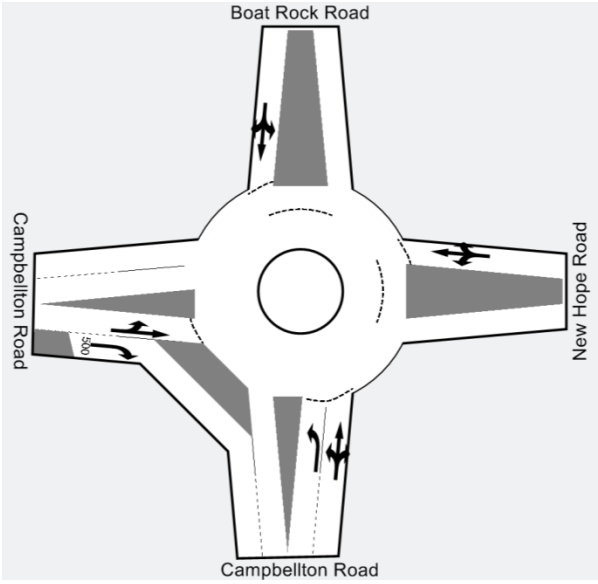


Figure 5 Year 2034 Roundabout Configuration with Continuous bypass on Eastbound Approach

Table 5. Year 2034 Weekday Eastbound Approach – Comparison of Alternatives

	2034 AM		2034 PM	
	Dual EB Right Turns (Figure 4)	Single EB Entry Lane w/ Continuous Right-Turn Bypass (Figure 5)[1]	Dual EB Right Turns (Figure 4)	Single EB Entry Lane w/ Continuous Right-Turn Bypass (Figure 5)[1]
NCHRP 572 Operational Model				
V/C ratio	***0.94***	0.70	0.62	0.41
Control Delay, sec/pcu	33.8	14.6	12.5	7.9
95th % Queue (ft)	385	155	117	54
SIDRA Intersection				
V/C ratio	0.72	0.62	0.41	0.37
Control Delay, sec/pcu	11.8	12.3	9.8	12.5
95th % Queue (ft)	268	178	85	69

[1]Results reported reflect the left-through lane entering the roundabout. SIDRA Intersection estimates the v/c ratio for the continuous bypass lane to be 0.77 in the a.m. peak hour and 0.41 in the p.m. peak hour.

The configuration shown in Figure 5 was found to provide improved capacity for the eastbound approach during both peak periods. For the a.m. peak hour, SIDRA Intersection results indicate that either lane configuration option will provide adequate operations. However, the NCHRP 572 model suggests that the configuration with dual eastbound rights (Left/Through/Right Lane and Right-turn Only Lane) will operate near capacity during the 2034 a.m. peak hour. In the 2034 p.m. peak hour, both lane configuration options are estimated to operate acceptably.

While the use of a continuous right-turn bypass provides a slight advantage in terms of capacity, there are other geometric considerations to be taken into account as part of the lane configuration determination. Given that Campbellton Road is a two-lane roadway upstream and downstream of the intersection, the continuous right-turn bypass lane will need to be added on the eastbound entry and

then terminated on the southbound exit. This will require vehicles on the continuous bypass lane to merge with vehicles exiting the roundabout to transition back to a single lane. In order to avoid a capacity constraint on the southbound exit, the continuous bypass lane needs to be carried far enough downstream to allow adequate distance for merging with vehicles exiting the roundabout.

Another consideration is the ultimate cross-section along Campbellton Road. If Campbellton Road is eventually widened to four-lanes, the use of the configuration shown in Figure 5 (with a continuous right-turn bypass lane) would interrupt lane continuity for the two primary lanes traveling eastbound along Campbellton Road and would essentially result in a "drop" lane on the eastbound approach that may violate driver expectancy. With the dual-right turn configuration on the eastbound approach, as shown in Figure 4, the two basic through lanes would be maintained along Campbellton Road which better maintains lane continuity and avoids unnecessary lane changes upstream of the roundabout.

The use of a continuous bypass is less desirable for pedestrians due to the additional conflict points and the fact that vehicles traveling on the bypass are moving free-flow. In addition the continuous bypass lane may also create additional challenges for serving residential access on the south side of Campbellton Road in the vicinity of the intersection.

Based upon the considerations identified above, either configuration shown in Figure 4 or 5 is expected to provide adequate operations, with the use of a continuous bypass lane providing a slightly higher eastbound approach capacity. The configuration selected should consider the ultimate cross-section along Campbellton Road as well other geometric issues such as driveway access and pedestrians.

Alternative Southbound Entry Configuration

For the forecast year 2034 traffic conditions, the analysis results from both NCHRP Report 572 and SIDRA intersection showed that the southbound Boat Rock Road entry would be operating close to capacity during the 2034 a.m. peak hour. Although the results show acceptable delay, queues of 300 to 400 feet were estimated for a single-lane entry. KAI evaluated the results of providing an additional yield controlled right-turn only lane. This configuration is illustrated in Figure 6. Table 6 summarizes the results of the analysis in comparison to the configuration shown in Figure 4.

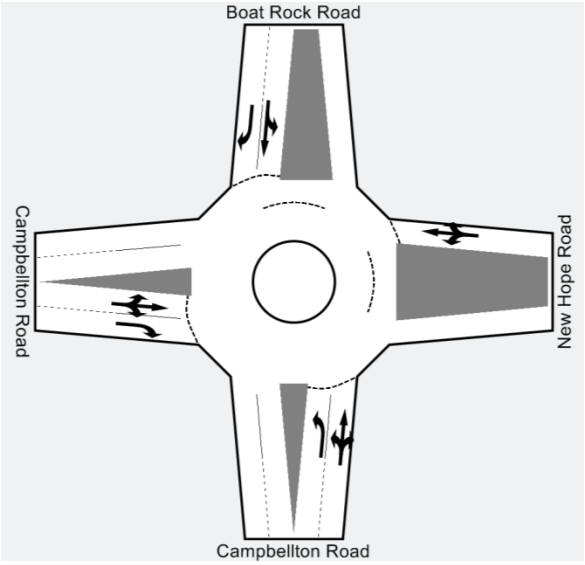


Figure 6 Year 2034 Roundabout Configuration with Continuous bypass on Eastbound Approach

Table 6. Year 2034 Weekday Southbound Approach – Comparison of Alternatives

	2034 AM		2034 PM	
	Single-Lane SB Entry (Figure 4)	**One SB Entry Lane plus Right-Turn Only Lane (Figure 5)**	**Single-Lane SB Entry (Figure 4)**	**One SB Entry Lane plus Right-Turn Only Lane (Figure 5)**
NCHRP 572 Operational Model				
V/C ratio	***0.91***	0.45	0.75	0.43
Control Delay, sec/pcu	37.2	9.4	25.9	12.5
95th % Queue (ft)	306	61	169	56
SIDRA Intersection				
V/C ratio	***0.94***	0.39	0.78	0.35
Control Delay, sec/pcu	27.0	10.2	21.1	11.0
95th % Queue (ft)	394	65	200	59

Based upon the results in Table 6, the addition of a second lane on the southbound approach is expected to significantly improve operational performance for the 2034 design year. In order to maintain reasonable queues on this minor street approach for the 2034 horizon year, consideration could be given to designing a second southbound entry lane. However, we recommend that the construction of the second southbound lane be deferred until the actual traffic conditions dictate the need for additional capacity on this approach, which is expected to be near or after the 2034 design year.

SENSITIVITY/DESIGN-LIFE ANALYSIS

KAI performed a sensitivity analysis to review the how long a single-lane roundabout (as illustrated in Figure 3) might be expected to provide acceptable operations. In some situations, a smaller opening year configuration will provide acceptable operations for 10 years or longer, in which case consideration may be given to phasing in construction of a more complex multilane roundabout configuration. The intent of this analysis was to review whether the ultimate configuration (shown in Figure 4) should be constructed for opening day, or whether a phased implementation should be considered for the study intersection.

For the single-lane configuration (shown if Figure 3), the results of the sensitivity/design-life analysis show that the northbound entry will have approximately two years of design life beyond the 2014 opening year. To mitigate, a second northbound entry lane is required. One option would be to provide an exclusive northbound left-turn lane and a shared through/right-turn lane. This would also require the construction of a second lane on the portion of the circulatory roadway adjacent to the east leg (westbound entry). This configuration is expected to last approximately seven years. A second option would be to use the configuration shown in Figure 4, which provides a left-turn only lane and a shared left-turn/through/right-turn lane and requires a second circulating lane adjacent to the east leg (westbound entry) and north leg (southbound entry). This configuration is anticipated to provide acceptable operations on the northbound entry through the 2034 design year.

For the eastbound entry, the configuration shown in Figure 3 is anticipated to have a life of approximately eight years. At that point the entry configuration would need to be changed to a shared left-turn/through/right-turn lane and an exclusive right-turn only lane. This would also require the construction of a second exit lane on the southbound exit as shown in Figure 4.

Based upon the results of the analysis, the single-lane configuration is not anticipated to provide sufficient design-life to justify a phased implementation. The south leg and portions of the circulatory roadway would require expansion to two lanes by approximately 2016. Additional changes to the eastbound entry and southbound exit would be required prior to 2022. Therefore, the configuration identified in Figure 4 is recommended for opening year construction. The configuration shown in Figure 6 is recommended for design purposes to also allow for expansion of the southbound approach to two lanes in the future, if needed.

RECOMMENDATIONS

Based on the results of the analysis, a partial multilane roundabout is estimated to provide acceptable vehicle operations through the design year 2034. KAI recommends the proposed roundabout be designed for the multilane configuration shown in Figure 6. The configuration shown in Figure 4 is recommended for construction in the 2014 opening year. The opening year configuration is the same as the ultimate configuration with the exception of one right-turn only lane on the southbound Boat Rock Road approach. This additional southbound right-turn only lane is not anticipated to be needed until near the design year 2034 (or later).

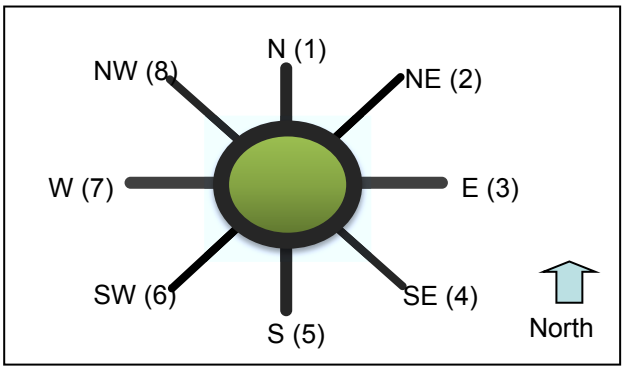
Consideration could also be given to an alternative configuration that would use a continuous right-turn bypass lane in lieu of dual right-turns on the eastbound approach. This configuration is shown in Figure 5. The continuous bypass lane is expected to provide higher capacity for the design year; however, it may offer disadvantages in terms of lane continuity, pedestrians, and driveway connections. Further review of these key issues should be undertaken as part of the design process if the County is interested in exploring this alternative configuration.

REFERENCES

1. Rodegerdts, L., M Blogg, E. Wemple, E. Myers, M. Kyte, M. Dixon, G. List, A. Flannery, R. Troutbeck, W. Brilon, N. Wu, B. Persaud, C. Lyon, D. Harkey, D. Carter. *Roundabouts in the United States.* National Cooperative Highway Research Program Report 572. Transportation Research Board, National Academies of Science, Washington, D.C., 2007.

Appendix A
2014 AM & PM
(See Figure 3)

General & Site Information	
Analyst:	ALP
Agency/Company:	Kittelson & Associates, Inc.
Date:	2/17/2011
Project Name or PI#:	11614
Year, Peak Hour:	2014 AM
County/District:	Fulton
Intersection:	Campellton Road (SR 154/166)/Boat Rock



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
	N (1), vph			16		58		122	
Exit	NE (2), vph								
Legs	E (3), vph	68				80		167	
(TO)	SE (4), vph								
	S (5), vph	85		48					
	SW (6), vph								
	W (7), vph	168		95		416			
	NW (8), vph								
Output	Total Vehicles	321	0	159	0	554	0	288	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96%	100%	98%	100%	94%	100%	94%	100%
% SU/ Bus	0%	0%	0%	0%	0%	0%	0%	0%
% Trucks/ Combin.	4%	0%	2%	0%	6%	0%	6%	0%
% Bicycle	0%	0%	0%	0%	0%	0%	0%	0%
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{HV}	0.962	1.000	0.980	1.000	0.943	1.000	0.943	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	18	0	67	0	140	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	77	0	0	0	92	0	192	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	96	0	53	0	0	0	0	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	190	0	105	0	479	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	363	0	176	0	638	0	332	0
Conflicting flow, pcu/h	637	0	687	0	409	0	226	0

Results: Approach Measures of Effectiveness								
NCHRP-572 Model	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**
Entry Capacity, pcu/h	597	NA	569	NA	751	NA	901	NA
V/C ratio	**0.61**		**0.31**		**0.85**		**0.37**	
Control Delay, sec/pcu	**14.9**		**9.1**		**25.6**		**6.3**	
LOS	B		A		D		A	
95th % Queue (ft)	**106**		**33**		**264**		**45**	

Notes:

Unit Legend:
vph = vehicles per hour
PHF = peak hour factor
F_{HV} = heavy vehicle factor
pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)						
Bypass Characteristics	**Bypass #1**	**Bypass #2**	**Bypass #3**	**Bypass #4**	**Bypass #5**	**Bypass #6**
Select Entry Leg from Bypass (FROM)	**W (7)**					
Select Exit Leg for Bypass (TO)	**S (5)**					
Volumes						
Right Turn Volume removed from Entry Leg	**527**					
Volume Characteristics (for entry leg)						
PHF	0.92					
F_{HV}	0.94					
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow	607					
Conflicting Flow	149					
Bypass Lane Results (NCHRP-572 Model)						
Entry Capacity at bypass mergepoint, pcu/hr	973					
V/C ratio	**0.62**					
Control Delay, sec/pcu	**9.6**					
LOS	A					
95th % Queue (ft)	**120**					

LANE SUMMARY

Site: 2014 AM

Campellton Road (SR 154/166)/Boat Rock Road/New Hope Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Campbellton Road																
Lane 1	452	63	87	602	6.0	779	0.773	100	20.0	LOS C	11.1	291.7	1600	–	0.0	0.0
Approach	452	63	87	602	6.0		0.773		20.0	LOS C	11.1	291.7				
East: New Hope Road																
Lane 1	52	103	17	173	2.0	579	0.299	100	12.2	LOS B	2.2	56.0	1600	–	0.0	0.0
Approach	52	103	17	173	2.0		0.299		12.2	LOS B	2.2	56.0				
North: Boat Rock Road																
Lane 1	74	92	183	349	4.0	602	0.580	100	15.5	LOS C	5.8	148.7	1600	–	0.0	0.0
Approach	74	92	183	349	4.0		0.580		15.5	LOS C	5.8	148.7				
West: Campbellton Road																
Lane 1	133	182	0	314	6.0	911	0.345	100	9.8	LOS A	2.5	65.9	1600	–	0.0	0.0
Lane 2	0	0	573	573	6.0	1126	0.509	100	8.5	LOS A	4.6	119.9	1600	–	0.0	0.0
Approach	133	182	573	887	6.0		0.509		8.9	LOS A	4.6	119.9				
Intersection				2011	5.3		0.776		13.7	LOS B	11.1	291.7				

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all lanes. LOS Method: Delay (HCM).
Level of Service (Worst Lane): LOS C. LOS Method for individual lanes: Delay (HCM).
Approach LOS values are based on the worst delay for any lane.
Roundabout LOS Method: Same as Sign Control.
Roundabout Capacity Model: SIDRA Standard.

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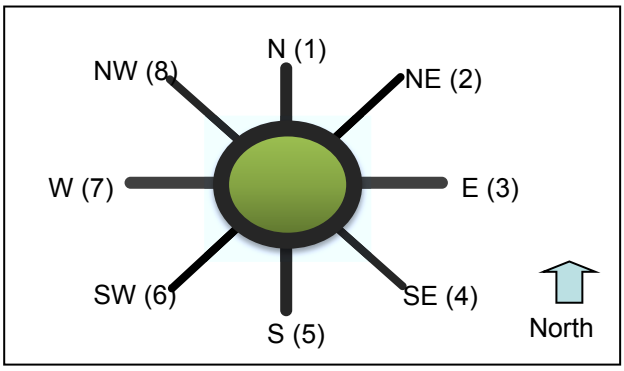
General & Site Information	
Analyst:	ALP
Agency/Company:	Kittelson & Associates, Inc.
Date:	2/17/2011
Project Name or PI#:	11614
Year, Peak Hour:	2014 PM
County/District:	Fulton
Intersection:	Campellton Road (SR 154/166)/Boat Rock



Volumes		Entry Legs (FROM)							
		N (1)	NE (2)	E (3)	SE (4)	S (5)	SW (6)	W (7)	NW (8)
	N (1), vph			37		163		116	
Exit	NE (2), vph								
Legs	E (3), vph	19				74		53	
(TO)	SE (4), vph								
	S (5), vph	99		91					
	SW (6), vph								
	W (7), vph	87		81		447			
	NW (8), vph								
Output	Total Vehicles	205	0	209	0	684	0	169	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96%	100%	98%	100%	94%	100%	94%	100%
% SU/ Bus	0%	0%	0%	0%	0%	0%	0%	0%
% Trucks/ Combin.	4%	0%	2%	0%	6%	0%	6%	0%
% Bicycle	0%	0%	0%	0%	0%	0%	0%	0%
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{HV}	0.962	1.000	0.980	1.000	0.943	1.000	0.943	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to Leg # N (1), pcu/h	0	0	41	0	187	0	134	0
NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	21	0	0	0	86	0	61	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	112	0	101	0	0	0	0	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	99	0	89	0	515	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Entry flow, pcu/h	232	0	232	0	788	0	195	0
Conflicting flow, pcu/h	706	0	836	0	216	0	234	0

Results: Approach Measures of Effectiveness

NCHRP-572 Model	N	NE	E	SE	S	SW	W	NW
Entry Capacity, pcu/h	558	NA	490	NA	910	NA	894	NA
V/C ratio	**0.42**		**0.47**		**0.87**		**0.22**	
Control Delay, sec/pcu	**11.0**		**13.8**		**23.3**		**5.1**	
LOS	B		B		C		A	
95th % Queue (ft)	**53**		**64**		**296**		**22**	

Notes:

Unit Legend:
vph = vehicles per hour
PHF = peak hour factor
F_{HV} = heavy vehicle factor
pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)

Bypass Characteristics	Bypass #1	Bypass #2	Bypass #3	Bypass #4	Bypass #5	Bypass #6
Select Entry Leg from Bypass (FROM)	**W (7)**					
Select Exit Leg for Bypass (TO)	**S (5)**					
Volumes						
Right Turn Volume removed from Entry Leg	**284**					
Volume Characteristics (for entry leg)						
PHF	0.92					
F_{HV}	0.94					
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow	327					
Conflicting Flow	213					
Bypass Lane Results (NCHRP-572 Model)						
Entry Capacity at bypass mergepoint, pcu/hr	913					
V/C ratio	**0.36**					
Control Delay, sec/pcu	**6.1**					
LOS	A					
95th % Queue (ft)	**43**					

LANE SUMMARY

Site: 2014 PM

Campellton Road (SR 154/166)/Boat Rock Road/New Hope Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Campbellton Road																
Lane 1	486	177	80	743	6.0	989	0.752	100	14.4	LOS B	10.7	279.4	1600	–	0.0	0.0
Approach	486	177	80	743	6.0		0.752		14.4	LOS B	10.7	279.4				
East: New Hope Road																
Lane 1	99	88	40	227	2.0	490	0.464	100	17.3	LOS C	4.1	103.3	1600	–	0.0	0.0
Approach	99	88	40	227	2.0		0.464		17.3	LOS C	4.1	103.3				
North: Boat Rock Road																
Lane 1	21	108	95	223	4.0	573	0.389	100	12.3	LOS B	3.0	77.0	1600	–	0.0	0.0
Approach	21	108	95	223	4.0		0.389		12.3	LOS B	3.0	77.0				
West: Campbellton Road																
Lane 1	126	58	0	184	6.0	930	0.198	100	11.5	LOS B	1.2	32.3	1600	–	0.0	0.0
Lane 2	0	0	309	309	6.0	1093	0.283	100	8.2	LOS A	2.0	51.1	1600	–	0.0	0.0
Approach	126	58	309	492	6.0		0.283		9.4	LOS B	2.0	51.1				
Intersection				1686	5.2		0.752		13.1	LOS B	10.7	279.4				

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all lanes. LOS Method: Delay (HCM).
Level of Service (Worst Lane): LOS C. LOS Method for individual lanes: Delay (HCM).
Approach LOS values are based on the worst delay for any lane.
Roundabout LOS Method: Same as Sign Control.
Roundabout Capacity Model: SIDRA Standard.

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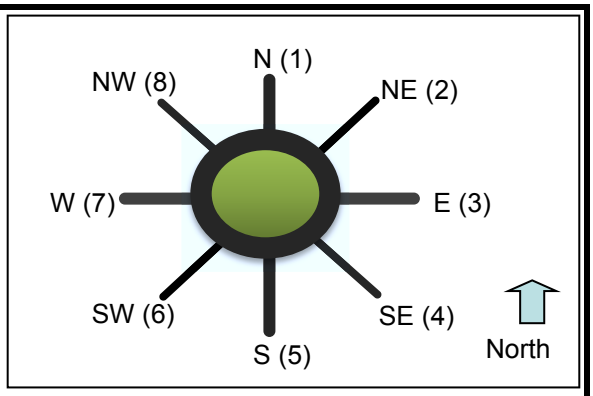
Appendix B
2034 AM & PM
(See Figure 4)

General & Site Information

Analyst:	ALP
Agency/Company:	Kittelson & Associates, Inc.
Date:	2/17/2011
Project Name or PI#:	11614
Year, Peak Hour:	2034 AM
County/District:	Fulton
Intersection:	Campellton Road (SR 154/166)/Boat Rock



Volumes

Entry Legs (FROM)

Legs (TO)	N1 (1)	N2 (1)			E1 (3)	E2 (3)		
N (1), vph						26		
E (3), vph		111						
.								
S (5), v		139				79		
W (7), vph		276				155		
Entry Volume, vph	0	526	0	0	0	260	0	0
	S1 (5)	S2 (5)			W1 (7)	W2 (7)		
N (1), vph		95			200			
E (3), vph		131			274			
S (5), vph					144			
W (7), vph	368	88						
Entry Volume, vph	368	314	0	0	618	0	0	0

Critical Lane Volumes

	N	NE	E	SE	S	SW	W	NW
N (1), vph	0	0	26	0	0	0	200	0
NE (2), vph	0	0	0	0	0	0	0	0
E (3), vph	111	0	0	0	0	0	274	0
SE (4), vph	0	0	0	0	0	0	0	0
S (5), vph	139	0	79	0	0	0	144	0
SW (6), vph	0	0	0	0	0	0	0	0
W (7), vph	276	0	155	0	368	0	0	0
NW (8), vph	0	0	0	0	0	0	0	0
Entry Volume, vph	526	0	260	0	368	0	618	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96%	100%	98%	100%	94%	100%	94%	100%
% S.U./ Bus	0%	0%	0%	0%	0%	0%	0%	0%
% Trucks/ Combin.	4%	0%	2%	0%	6%	0%	6%	0%
% Bicycles	0%	0%	0%	0%	0%	0%	0%	0%
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{hv}	0.962	1.000	0.980	1.000	0.943	1.000	0.943	1.000

Entry/Conflicting Flows		N	NE	E	SE	S	SW	W	NW
Flow to	N (1), pcu/h	0	0	29	0	110	0	231	0
Leg #	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	125	0	0	0	150	0	315	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	158	0	87	0	0	0	166	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	312	0	172	0	525	0	0	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Conflicting flow, pcu/h	785	0	866	0	672	0	370	0
	Number of Conflicting Lanes	2		2		1		1	

Results: Approach Measures of Effectiveness								
NCHRP-572 Model	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**
Crit. Entry Capacity pcu/h	652	NA	616	NA	577	NA	780	NA
Crit. Lane Entry Flow pcu/h	595	0	288	0	424	0	712	0
V/C ratio	**0.91**		**0.47**		**0.73**		**0.91**	
Control Delay, sec/pcu	**37.2**		**10.9**		**21.5**		**32.7**	
LOS	E		B		C		D	
95th % Queue (ft)	**306**		**63**		**166**		**334**	

Notes:

Unit Legend:
vph = vehicles per hour
PHF = peak hour factor
F_{HV} = heavy vehicle factor
pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)						
Bypass Characteristics	**Bypass #1**	**Bypass #2**	**Bypass #3**	**Bypass #4**	**Bypass #5**	**Bypass #6**
Select Entry Leg from Bypass (FROM)	**W (7)**					
Select Exit Leg for Bypass (TO)	**S (5)**					
Volumes						
Entry Leg: Insert Right Turn Volume	720					
Exit Leg:	245					
Volume Characteristics						
PHF (Entry Leg)	0.92					
F_{HV} (Entry Leg)	0.94					
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow	830					
Conflicting Exit Flow	245					
Number of Conflicting Exit Lanes	1					
Bypass Lane Results (NCHRP-572 Method)						
Entry Capacity at bypass merge point, pcu/hr	884					
V/C ratio	0.94					
Control Delay, sec/pcu	33.8					
LOS	D					
95th % Queue (ft)	**385**					

LANE SUMMARY

Site: 2034 AM

Campellton Road (SR 154/166)/Boat Rock Road/New Hope Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Campbellton Road																
Lane 1	341	0	0	341	6.0	679	0.503	100	18.6	LOS C	4.8	125.1	1600	–	0.0	0.0
Lane 2	155	103	142	400	6.0	796	0.503	100	13.2	LOS B	5.0	131.8	1600	–	0.0	0.0
Approach	496	103	142	741	6.0		0.503		15.7	LOS C	5.0	131.8				
East: New Hope Road																
Lane 1	86	168	28	283	2.0	601	0.470	100	11.7	LOS B	3.1	77.9	1600	–	0.0	0.0
Approach	86	168	28	283	2.0		0.470		11.7	LOS B	3.1	77.9				
North: Boat Rock Road																
Lane 1	121	151	300	572	4.0	612	0.935	100	27.0	LOS D	15.3	394.2	1600	–	0.0	0.0
Approach	121	151	300	572	4.0		0.935		27.0	LOS D	15.3	394.2				
West: Campbellton Road																
Lane 1	217	298	166	681	6.0	941	0.724	100	12.9	LOS B	10.0	261.1	1600	–	0.0	0.0
Lane 2	0	0	773	773	6.0	1068	0.724	100	10.9	LOS B	10.2	267.7	1600	–	0.0	0.0
Approach	217	298	939	1454	6.0		0.724		11.8	LOS B	10.2	267.7				
Intersection				3050	5.3		0.935		15.6	LOS C	15.3	394.2				

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all lanes. LOS Method: Delay (HCM).
Level of Service (Worst Lane): LOS D. LOS Method for individual lanes: Delay (HCM).
Approach LOS values are based on the worst delay for any lane.
Roundabout LOS Method: Same as Sign Control.
Roundabout Capacity Model: SIDRA Standard.

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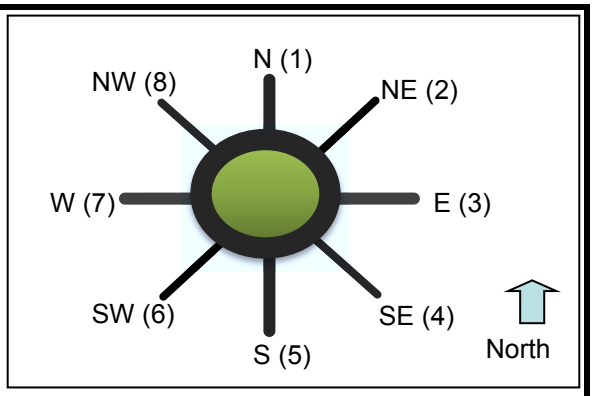
General & Site Information

Analyst:	ALP
Agency/Company:	Kittelson & Associates, Inc.
Date:	2/17/2011
Project Name or PI#:	11614
Year, Peak Hour:	2034 PM
County/District:	Fulton
Intersection:	Campellton Road (SR 154/166)/Boat Rock



Volumes

Entry Legs (FROM)

Legs (TO)	N1 (1)	N2 (1)			E1 (3)	E2 (3)		
N (1), vph						61		
E (3), vph		31						
.								
S (5), v		162				149		
W (7), vph		143				132		
Entry Volume, vph	0	336	0	0	0	342	0	0
	S1 (5)	S2 (5)			W1 (7)	W2 (7)		
N (1), vph		266			190			
E (3), vph		122			87			
S (5), vph					65			
W (7), vph	605	127						
Entry Volume, vph	605	515	0	0	342	0	0	0

Critical Lane Volumes

	N	NE	E	SE	S	SW	W	NW
N (1), vph	0	0	61	0	0	0	190	0
NE (2), vph	0	0	0	0	0	0	0	0
E (3), vph	31	0	0	0	0	0	87	0
SE (4), vph	0	0	0	0	0	0	0	0
S (5), vph	162	0	149	0	0	0	65	0
SW (6), vph	0	0	0	0	0	0	0	0
W (7), vph	143	0	132	0	605	0	0	0
NW (8), vph	0	0	0	0	0	0	0	0
Entry Volume, vph	336	0	342	0	605	0	342	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96%	100%	98%	100%	94%	100%	94%	100%
% S.U./ Bus	0%	0%	0%	0%	0%	0%	0%	0%
% Trucks/ Combin.	4%	0%	2%	0%	6%	0%	6%	0%
% Bicycles	0%	0%	0%	0%	0%	0%	0%	0%
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{hv}	0.962	1.000	0.980	1.000	0.943	1.000	0.943	1.000

Entry/Conflicting Flows		N	NE	E	SE	S	SW	W	NW
Flow to	N (1), pcu/h	0	0	68	0	306	0	218	0
Leg #	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	35	0	0	0	141	0	101	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	183	0	165	0	0	0	75	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	162	0	146	0	843	0	0	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Conflicting flow, pcu/h	1155	0	1368	0	354	0	383	0
	Number of Conflicting Lanes	2		2		1		1	

Results: Approach Measures of Effectiveness								
NCHRP-572 Model	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**
Crit. Entry Capacity pcu/h	503	NA	434	NA	793	NA	770	NA
Crit. Lane Entry Flow pcu/h	380	0	379	0	697	0	394	0
V/C ratio	**0.75**		**0.87**		**0.88**		**0.51**	
Control Delay, sec/pcu	**25.9**		**43.8**		**27.7**		**9.5**	
LOS	D		E		D		A	
95th % Queue (ft)	**169**		**229**		**298**		**78**	

Notes:

Unit Legend:
vph = vehicles per hour
PHF = peak hour factor
F_{HV} = heavy vehicle factor
pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)						
Bypass Characteristics	**Bypass #1**	**Bypass #2**	**Bypass #3**	**Bypass #4**	**Bypass #5**	**Bypass #6**
Select Entry Leg from Bypass (FROM)	**W (7)**					
Select Exit Leg for Bypass (TO)	**S (5)**					
Volumes						
Entry Leg: Insert Right Turn Volume	400					
Exit Leg:	423					
Volume Characteristics						
PHF (Entry Leg)	0.92					
F_{HV} (Entry Leg)	0.94					
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow	461					
Conflicting Exit Flow	423					
Number of Conflicting Exit Lanes	1					
Bypass Lane Results (NCHRP-572 Method)						
Entry Capacity at bypass merge point, pcu/hr	740					
V/C ratio	0.62					
Control Delay, sec/pcu	12.5					
LOS	B					
95th % Queue (ft)	**117**					

LANE SUMMARY

Site: 2034 PM

Campellton Road (SR 154/166)/Boat Rock Road/New Hope Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Campbellton Road																
Lane 1	576	0	0	576	6.0	963	0.598	100	16.0	LOS C	6.2	162.8	1600	–	0.0	0.0
Lane 2	220	289	133	641	6.0	1072	0.598	100	10.5	LOS B	6.3	164.5	1600	–	0.0	0.0
Approach	796	289	133	1217	6.0		0.598		13.1	LOS C	6.3	164.5				
East: New Hope Road																
Lane 1	162	143	66	372	2.0	452	0.822	100	23.3	LOS C	7.7	195.3	1600	–	0.0	0.0
Approach	162	143	66	372	2.0		0.822		23.3	LOS C	7.7	195.3				
North: Boat Rock Road																
Lane 1	34	176	155	365	4.0	469	0.778	100	21.1	LOS C	7.7	199.7	1600	–	0.0	0.0
Approach	34	176	155	365	4.0		0.778		21.1	LOS C	7.7	199.7				
West: Campbellton Road																
Lane 1	207	95	82	383	6.0	935	0.410	100	11.5	LOS B	3.2	82.7	1600	–	0.0	0.0
Lane 2	0	0	423	423	6.0	1034	0.410	100	8.4	LOS A	3.2	85.1	1600	–	0.0	0.0
Approach	207	95	505	807	6.0		0.410		9.8	LOS B	3.2	85.1				
Intersection				2761	5.2		0.825		14.6	LOS B	7.7	199.7				

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all lanes. LOS Method: Delay (HCM).
Level of Service (Worst Lane): LOS C. LOS Method for individual lanes: Delay (HCM).
Approach LOS values are based on the worst delay for any lane.
Roundabout LOS Method: Same as Sign Control.
Roundabout Capacity Model: SIDRA Standard.

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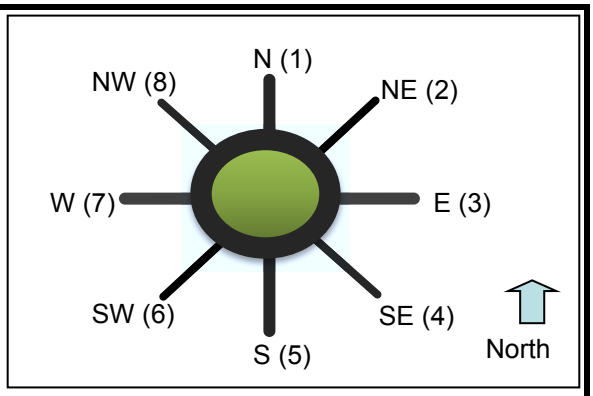
Appendix C
2034 AM & PM
with Continuous EB
Right Turn Lane
(See Figure 5)

General & Site Information

Analyst:	ALP
Agency/Company:	Kittelson & Associates, Inc.
Date:	2/17/2011
Project Name or PI#:	11614
Year, Peak Hour:	2034 AM
County/District:	Fulton
Intersection:	Campellton Road (SR 154/166)/Boat Rock



Volumes

Entry Legs (FROM)

Legs (TO)	N1 (1)	N2 (1)			E1 (3)	E2 (3)		
N (1), vph						26		
E (3), vph		111						
.								
S (5), v		139				79		
W (7), vph		276				155		
Entry Volume, vph	0	526	0	0	0	260	0	0
	S1 (5)	S2 (5)			W1 (7)	W2 (7)		
N (1), vph		95			200			
E (3), vph		131			274			
S (5), vph								
W (7), vph	368	88						
Entry Volume, vph	368	314	0	0	474	0	0	0

Critical Lane Volumes

	N	NE	E	SE	S	SW	W	NW
N (1), vph	0	0	26	0	0	0	200	0
NE (2), vph	0	0	0	0	0	0	0	0
E (3), vph	111	0	0	0	0	0	274	0
SE (4), vph	0	0	0	0	0	0	0	0
S (5), vph	139	0	79	0	0	0	0	0
SW (6), vph	0	0	0	0	0	0	0	0
W (7), vph	276	0	155	0	368	0	0	0
NW (8), vph	0	0	0	0	0	0	0	0
Entry Volume, vph	526	0	260	0	368	0	474	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96%	100%	98%	100%	94%	100%	94%	100%
% S.U./ Bus	0%	0%	0%	0%	0%	0%	0%	0%
% Trucks/ Combin.	4%	0%	2%	0%	6%	0%	6%	0%
% Bicycles	0%	0%	0%	0%	0%	0%	0%	0%
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{hv}	0.962	1.000	0.980	1.000	0.943	1.000	0.943	1.000

Entry/Conflicting Flows		N	NE	E	SE	S	SW	W	NW
Flow to	N (1), pcu/h	0	0	29	0	110	0	231	0
Leg #	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	125	0	0	0	150	0	315	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	158	0	87	0	0	0	0	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	312	0	172	0	525	0	0	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Conflicting flow, pcu/h	785	0	866	0	672	0	370	0
	Number of Conflicting Lanes	2		2		1		1	

Results: Approach Measures of Effectiveness								
NCHRP-572 Model	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**
Crit. Entry Capacity pcu/h	652	NA	616	NA	577	NA	780	NA
Crit. Lane Entry Flow pcu/h	595	0	288	0	424	0	546	0
V/C ratio	**0.91**		**0.47**		**0.73**		**0.70**	
Control Delay, sec/pcu	**37.2**		**10.9**		**21.5**		**14.6**	
LOS	E		B		C		B	
95th % Queue (ft)	**306**		**63**		**166**		**155**	

Notes:

Unit Legend:

vph = vehicles per hour

PHF = peak hour factor

F_{HV} = heavy vehicle factor

pcu = passenger car unit

LANE SUMMARY

Site: 2034 AM EBRT Bypass

Campellton Road (SR 154/166)/Boat Rock Road/New Hope Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Campbellton Road																
Lane 1	344	0	0	344	6.0	681	0.504	100	18.7	LOS C	4.8	124.5	1600	–	0.0	0.0
Lane 2	152	103	142	398	6.0	788	0.504	100	13.4	LOS B	5.0	130.5	1600	–	0.0	0.0
Approach	496	103	142	741	6.0		0.504		15.9	LOS C	5.0	130.5				
East: New Hope Road																
Lane 1	86	168	28	283	2.0	602	0.469	100	11.7	LOS B	3.1	77.7	1600	–	0.0	0.0
Approach	86	168	28	283	2.0		0.469		11.7	LOS B	3.1	77.7				
North: Boat Rock Road																
Lane 1	121	151	300	572	4.0	613	0.933	100	26.9	LOS D	15.2	393.0	1600	–	0.0	0.0
Approach	121	151	300	572	4.0		0.933		26.9	LOS D	15.2	393.0				
West: Campbellton Road																
Lane 1	217	298	0	515	6.0	828	0.622	100	12.3	LOS B	6.8	177.8	1600	–	0.0	0.0
Lane 2	0	0	939	939	6.0	1224	0.768	100	6.0	NA[9]	NA[9]	NA[9]	500	Turn Bay	0.0	0.0
Approach	217	298	939	1454	6.0		0.768		8.2	LOS B	6.8	177.8				
Intersection				3050	5.3		0.935		13.9	LOS B	15.2	393.0				

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all lanes. LOS Method: Delay (HCM).
Level of Service (Worst Lane): LOS D. LOS Method for individual lanes: Delay (HCM).
Approach LOS values are based on the worst delay for any lane.
Roundabout LOS Method: Same as Sign Control.
Roundabout Capacity Model: SIDRA Standard.

9 Continuous lane

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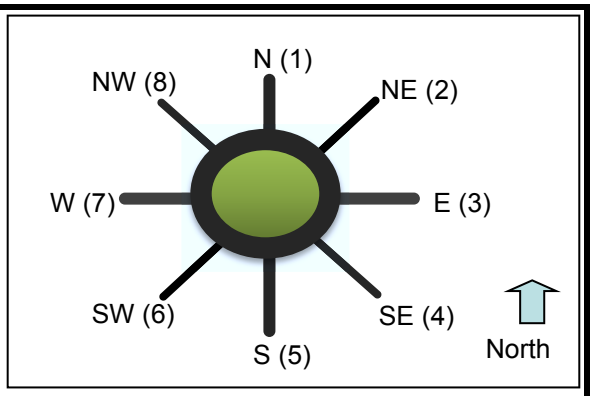
General & Site Information

Analyst:	ALP
Agency/Company:	Kittelson & Associates, Inc.
Date:	2/17/2011
Project Name or PI#:	11614
Year, Peak Hour:	2034 PM
County/District:	Fulton
Intersection:	Campellton Road (SR 154/166)/Boat Rock



Volumes

Entry Legs (FROM)

Legs (TO)	N1 (1)	N2 (1)			E1 (3)	E2 (3)		
N (1), vph						61		
E (3), vph		31						
.								
S (5), v		162				149		
W (7), vph		143				132		
Entry Volume, vph	0	336	0	0	0	342	0	0
	S1 (5)	S2 (5)			W1 (7)	W2 (7)		
N (1), vph		266			190			
E (3), vph		122			87			
S (5), vph								
W (7), vph	605	127						
Entry Volume, vph	605	515	0	0	277	0	0	0

Critical Lane Volumes

	N	NE	E	SE	S	SW	W	NW
N (1), vph	0	0	61	0	0	0	190	0
NE (2), vph	0	0	0	0	0	0	0	0
E (3), vph	31	0	0	0	0	0	87	0
SE (4), vph	0	0	0	0	0	0	0	0
S (5), vph	162	0	149	0	0	0	0	0
SW (6), vph	0	0	0	0	0	0	0	0
W (7), vph	143	0	132	0	605	0	0	0
NW (8), vph	0	0	0	0	0	0	0	0
Entry Volume, vph	336	0	342	0	605	0	277	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96%	100%	98%	100%	94%	100%	94%	100%
% S.U./ Bus	0%	0%	0%	0%	0%	0%	0%	0%
% Trucks/ Combin.	4%	0%	2%	0%	6%	0%	6%	0%
% Bicycles	0%	0%	0%	0%	0%	0%	0%	0%
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{hv}	0.962	1.000	0.980	1.000	0.943	1.000	0.943	1.000

Entry/Conflicting Flows		N	NE	E	SE	S	SW	W	NW
Flow to	N (1), pcu/h	0	0	68	0	306	0	218	0
Leg #	NE (2), pcu/h	0	0	0	0	0	0	0	0
	E (3), pcu/h	35	0	0	0	141	0	101	0
	SE (4), pcu/h	0	0	0	0	0	0	0	0
	S (5), pcu/h	183	0	165	0	0	0	0	0
	SW (6), pcu/h	0	0	0	0	0	0	0	0
	W (7), pcu/h	162	0	146	0	843	0	0	0
	NW (8), pcu/h	0	0	0	0	0	0	0	0
	Conflicting flow, pcu/h	1155	0	1368	0	354	0	383	0
	Number of Conflicting Lanes	2		2		1		1	

Results: Approach Measures of Effectiveness								
NCHRP-572 Model	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**
Crit. Entry Capacity pcu/h	503	NA	434	NA	793	NA	770	NA
Crit. Lane Entry Flow pcu/h	380	0	379	0	697	0	319	0
V/C ratio	**0.75**		**0.87**		**0.88**		**0.41**	
Control Delay, sec/pcu	**25.9**		**43.8**		**27.7**		**7.9**	
LOS	D		E		D		A	
95th % Queue (ft)	**169**		**229**		**298**		**54**	

Notes:

Unit Legend:

vph = vehicles per hour

PHF = peak hour factor

F_{HV} = heavy vehicle factor

pcu = passenger car unit

LANE SUMMARY

Site: 2034 PM EBRT Bypass

Campellton Road (SR 154/166)/Boat Rock Road/New Hope Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Campbellton Road																
Lane 1	576	0	0	576	6.0	964	0.598	100	16.0	LOS C	6.2	162.3	1600	–	0.0	0.0
Lane 2	220	289	133	641	6.0	1073	0.598	100	10.5	LOS B	6.3	164.0	1600	–	0.0	0.0
Approach	796	289	133	1217	6.0		0.598		13.1	LOS C	6.3	164.0				
East: New Hope Road																
Lane 1	162	143	66	372	2.0	452	0.822	100	23.3	LOS C	7.7	195.0	1600	–	0.0	0.0
Approach	162	143	66	372	2.0		0.822		23.3	LOS C	7.7	195.0				
North: Boat Rock Road																
Lane 1	34	176	155	365	4.0	470	0.778	100	21.1	LOS C	7.7	199.5	1600	–	0.0	0.0
Approach	34	176	155	365	4.0		0.778		21.1	LOS C	7.7	199.5				
West: Campbellton Road																
Lane 1	207	95	0	301	6.0	826	0.365	100	12.5	LOS B	2.6	68.7	1600	–	0.0	0.0
Lane 2	0	0	505	505	6.0	1224	0.413	100	5.7	NA[9]	NA[9]	NA[9]	500	Turn Bay	0.0	0.0
Approach	207	95	505	807	6.0		0.413		8.3	LOS B	2.6	68.7				
Intersection				2761	5.2		0.822		14.1	LOS B	7.7	199.5				

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all lanes. LOS Method: Delay (HCM).
Level of Service (Worst Lane): LOS C. LOS Method for individual lanes: Delay (HCM).
Approach LOS values are based on the worst delay for any lane.
Roundabout LOS Method: Same as Sign Control.
Roundabout Capacity Model: SIDRA Standard.

9 Continuous lane

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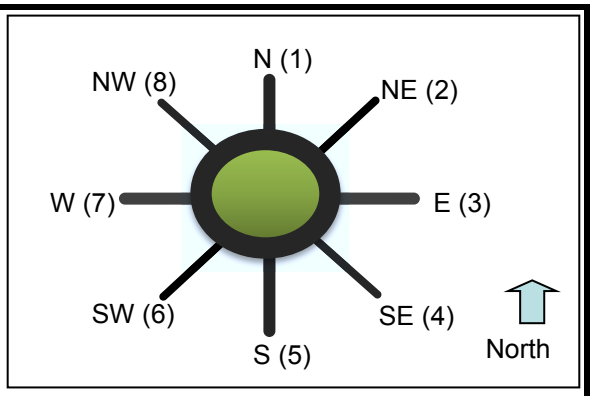
Appendix D
2034 AM & PM
with Additional SB
Right-Turn Lane
(See Figure 6)

General & Site Information

Analyst:	ALP
Agency/Company:	Kittelson & Associates, Inc.
Date:	2/17/2011
Project Name or PI#:	11614
Year, Peak Hour:	2034 AM
County/District:	Fulton
Intersection:	Campellton Road (SR 154/166)/Boat Rock



Volumes

Entry Legs (FROM)

Legs (TO)	N1 (1)	N2 (1)			E1 (3)	E2 (3)		
N (1), vph						26		
E (3), vph		111						
.								
S (5), v		139				79		
W (7), vph						155		
Entry Volume, vph	0	250	0	0	0	260	0	0
	S1 (5)	S2 (5)			W1 (7)	W2 (7)		
N (1), vph		95			200			
E (3), vph		131			274			
S (5), vph					144			
W (7), vph	368	88						
Entry Volume, vph	368	314	0	0	618	0	0	0

Critical Lane Volumes

	N	NE	E	SE	S	SW	W	NW
N (1), vph	0	0	26	0	0	0	200	0
NE (2), vph	0	0	0	0	0	0	0	0
E (3), vph	111	0	0	0	0	0	274	0
SE (4), vph	0	0	0	0	0	0	0	0
S (5), vph	139	0	79	0	0	0	144	0
SW (6), vph	0	0	0	0	0	0	0	0
W (7), vph	0	0	155	0	368	0	0	0
NW (8), vph	0	0	0	0	0	0	0	0
Entry Volume, vph	250	0	260	0	368	0	618	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96%	100%	98%	100%	94%	100%	94%	100%
% S.U./ Bus	0%	0%	0%	0%	0%	0%	0%	0%
% Trucks/ Combin.	4%	0%	2%	0%	6%	0%	6%	0%
% Bicycles	0%	0%	0%	0%	0%	0%	0%	0%
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{hv}	0.962	1.000	0.980	1.000	0.943	1.000	0.943	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to N (1), pcu/h	0	0	29	0	110	0	231	0
Leg # NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	125	0	0	0	150	0	315	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	158	0	87	0	0	0	166	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	0	0	172	0	525	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Conflicting flow, pcu/h	785	0	866	0	672	0	370	0
Number of Conflicting Lanes	2		2		1		1	

Results: Approach Measures of Effectiveness								
NCHRP-572 Model	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**
Crit. Entry Capacity pcu/h	652	NA	616	NA	577	NA	780	NA
Crit. Lane Entry Flow pcu/h	283	0	288	0	424	0	712	0
V/C ratio	**0.43**		**0.47**		**0.73**		**0.91**	
Control Delay, sec/pcu	**9.7**		**10.9**		**21.5**		**32.7**	
LOS	A		B		C		D	
95th % Queue (ft)	**57**		**63**		**166**		**334**	

Notes:

Unit Legend:
vph = vehicles per hour
PHF = peak hour factor
F_{HV} = heavy vehicle factor
pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)						
Bypass Characteristics	**Bypass #1**	**Bypass #2**	**Bypass #3**	**Bypass #4**	**Bypass #5**	**Bypass #6**
Select Entry Leg from Bypass (FROM)	**W (7)**	**N (1)**				
Select Exit Leg for Bypass (TO)	**S (5)**	**W (7)**				
Volumes						
Entry Leg: Insert Right Turn Volume	720	276				
Exit Leg:	245	698				
Volume Characteristics						
PHF (Entry Leg)	0.92	0.92				
F_{HV} (Entry Leg)	0.94	0.96				
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow	830	312				
Conflicting Exit Flow	245	698				
Number of Conflicting Exit Lanes	1	2				
Bypass Lane Results (NCHRP-572 Method)						
Entry Capacity at bypass merge point, pcu/hr	884	693				
V/C ratio	0.94	0.45				
Control Delay, sec/pcu	33.8	9.4				
LOS	D	A				
95th % Queue (ft)	**385**	**61**				

LANE SUMMARY

Site: 2034 AM with 2 SB Lanes

Campellton Road (SR 154/166)/Boat Rock Road/New Hope Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Campbellton Road																
Lane 1	341	0	0	341	6.0	684	0.498	100	18.5	LOS C	4.7	122.9	1600	–	0.0	0.0
Lane 2	155	103	142	400	6.0	803	0.498	100	13.2	LOS B	4.9	129.3	1600	–	0.0	0.0
Approach	496	103	142	741	6.0		0.498		15.6	LOS C	4.9	129.3				
East: New Hope Road																
Lane 1	86	168	28	283	2.0	602	0.469	100	11.7	LOS B	3.1	77.7	1600	–	0.0	0.0
Approach	86	168	28	283	2.0		0.469		11.7	LOS B	3.1	77.7				
North: Boat Rock Road																
Lane 1	121	151	0	272	4.0	719	0.378	100	11.3	LOS B	2.4	61.2	1600	–	0.0	0.0
Lane 2	0	0	300	300	4.0	769	0.390	100	9.2	LOS A	2.5	65.3	1600	–	0.0	0.0
Approach	121	151	300	572	4.0		0.390		10.2	LOS B	2.5	65.3				
West: Campbellton Road																
Lane 1	217	298	166	681	6.0	963	0.707	100	12.6	LOS B	9.2	242.1	1600	–	0.0	0.0
Lane 2	0	0	773	773	6.0	1093	0.707	100	10.6	LOS B	9.4	247.1	1600	–	0.0	0.0
Approach	217	298	939	1454	6.0		0.707		11.6	LOS B	9.4	247.1				
Intersection				3050	5.3		0.708		12.3	LOS B	9.4	247.1				

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all lanes. LOS Method: Delay (HCM).
Level of Service (Worst Lane): LOS C. LOS Method for individual lanes: Delay (HCM).
Approach LOS values are based on the worst delay for any lane.
Roundabout LOS Method: Same as Sign Control.
Roundabout Capacity Model: SIDRA Standard.

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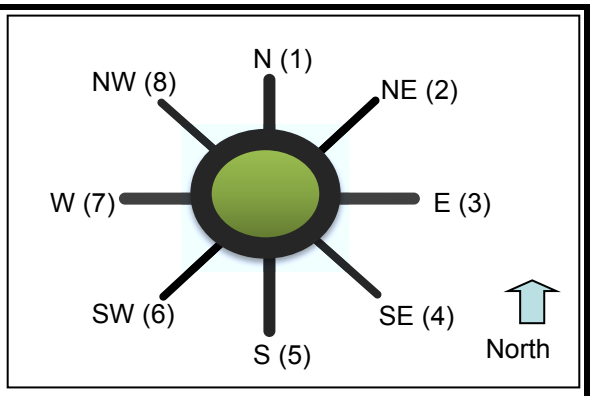
General & Site Information

Analyst:	ALP
Agency/Company:	Kittelson & Associates, Inc.
Date:	2/17/2011
Project Name or PI#:	11614
Year, Peak Hour:	2034 PM
County/District:	Fulton
Intersection:	Campellton Road (SR 154/166)/Boat Rock



Volumes

Entry Legs (FROM)

Legs (TO)	N1 (1)	N2 (1)			E1 (3)	E2 (3)		
N (1), vph						61		
E (3), vph		31						
.								
S (5), v		162				149		
W (7), vph						132		
Entry Volume, vph	0	193	0	0	0	342	0	0
	S1 (5)	S2 (5)			W1 (7)	W2 (7)		
N (1), vph		266			190			
E (3), vph		122			87			
S (5), vph					65			
W (7), vph	605	127						
Entry Volume, vph	605	515	0	0	342	0	0	0

Critical Lane Volumes

	N	NE	E	SE	S	SW	W	NW
N (1), vph	0	0	61	0	0	0	190	0
NE (2), vph	0	0	0	0	0	0	0	0
E (3), vph	31	0	0	0	0	0	87	0
SE (4), vph	0	0	0	0	0	0	0	0
S (5), vph	162	0	149	0	0	0	65	0
SW (6), vph	0	0	0	0	0	0	0	0
W (7), vph	0	0	132	0	605	0	0	0
NW (8), vph	0	0	0	0	0	0	0	0
Entry Volume, vph	193	0	342	0	605	0	342	0

Volume Characteristics	N	NE	E	SE	S	SW	W	NW
% Cars	96%	100%	98%	100%	94%	100%	94%	100%
% S.U./ Bus	0%	0%	0%	0%	0%	0%	0%	0%
% Trucks/ Combin.	4%	0%	2%	0%	6%	0%	6%	0%
% Bicycles	0%	0%	0%	0%	0%	0%	0%	0%
PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
F_{hv}	0.962	1.000	0.980	1.000	0.943	1.000	0.943	1.000

Entry/Conflicting Flows	N	NE	E	SE	S	SW	W	NW
Flow to N (1), pcu/h	0	0	68	0	306	0	218	0
Leg # NE (2), pcu/h	0	0	0	0	0	0	0	0
E (3), pcu/h	35	0	0	0	141	0	101	0
SE (4), pcu/h	0	0	0	0	0	0	0	0
S (5), pcu/h	183	0	165	0	0	0	75	0
SW (6), pcu/h	0	0	0	0	0	0	0	0
W (7), pcu/h	0	0	146	0	843	0	0	0
NW (8), pcu/h	0	0	0	0	0	0	0	0
Conflicting flow, pcu/h	1155	0	1368	0	354	0	383	0
Number of Conflicting Lanes	2		2		1		1	

Results: Approach Measures of Effectiveness								
NCHRP-572 Model	**N**	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**
Crit. Entry Capacity pcu/h	503	NA	434	NA	793	NA	770	NA
Crit. Lane Entry Flow pcu/h	218	0	379	0	697	0	394	0
V/C ratio	**0.43**		**0.87**		**0.88**		**0.51**	
Control Delay, sec/pcu	**12.5**		**43.8**		**27.7**		**9.5**	
LOS	B		E		D		A	
95th % Queue (ft)	**56**		**229**		**298**		**78**	

Notes:

Unit Legend:
vph = vehicles per hour
PHF = peak hour factor
F_{HV} = heavy vehicle factor
pcu = passenger car unit

Bypass Lane Merge Point Analysis (if applicable)						
Bypass Characteristics	**Bypass #1**	**Bypass #2**	**Bypass #3**	**Bypass #4**	**Bypass #5**	**Bypass #6**
Select Entry Leg from Bypass (FROM)	**W (7)**	**N (1)**				
Select Exit Leg for Bypass (TO)	**S (5)**	**W (7)**				
Volumes						
Entry Leg: Insert Right Turn Volume	400	143				
Exit Leg:	423	990				
Volume Characteristics						
PHF (Entry Leg)	0.92	0.92				
F_{HV} (Entry Leg)	0.94	0.96				
NOTE: Volume Characteristics for Exit Leg are already taken into account						
Entry/Conflicting Flows						
Entry Flow	461	162				
Conflicting Exit Flow	423	990				
Number of Conflicting Exit Lanes	1	2				
Bypass Lane Results (NCHRP-572 Method)						
Entry Capacity at bypass merge point, pcu/hr	740	565				
V/C ratio	0.62	0.29				
Control Delay, sec/pcu	12.5	8.9				
LOS	B	A				
95th % Queue (ft)	**117**	**31**				

LANE SUMMARY

Site: 2034 PM with 2 SB Lanes

Campellton Road (SR 154/166)/Boat Rock Road/New Hope Road
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Campbellton Road																
Lane 1	576	0	0	576	6.0	964	0.598	100	16.0	LOS C	6.2	162.3	1600	–	0.0	0.0
Lane 2	220	289	133	641	6.0	1073	0.598	100	10.5	LOS B	6.3	164.0	1600	–	0.0	0.0
Approach	796	289	133	1217	6.0		0.598		13.1	LOS C	6.3	164.0				
East: New Hope Road																
Lane 1	162	143	66	372	2.0	452	0.822	100	23.3	LOS C	7.7	195.0	1600	–	0.0	0.0
Approach	162	143	66	372	2.0		0.822		23.3	LOS C	7.7	195.0				
North: Boat Rock Road																
Lane 1	34	176	0	210	4.0	603	0.348	100	10.7	LOS B	2.3	59.3	1600	–	0.0	0.0
Lane 2	0	0	155	155	4.0	519	0.300	100	11.3	LOS B	1.8	46.1	1600	–	0.0	0.0
Approach	34	176	155	365	4.0		0.348		11.0	LOS B	2.3	59.3				
West: Campbellton Road																
Lane 1	207	95	82	383	6.0	942	0.407	100	11.5	LOS B	3.1	80.8	1600	–	0.0	0.0
Lane 2	0	0	423	423	6.0	1041	0.407	100	8.4	LOS A	3.2	83.0	1600	–	0.0	0.0
Approach	207	95	505	807	6.0		0.407		9.8	LOS B	3.2	83.0				
Intersection				2761	5.2		0.822		13.2	LOS B	7.7	195.0				

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all lanes. LOS Method: Delay (HCM).
Level of Service (Worst Lane): LOS C. LOS Method for individual lanes: Delay (HCM).
Approach LOS values are based on the worst delay for any lane.
Roundabout LOS Method: Same as Sign Control.
Roundabout Capacity Model: SIDRA Standard.

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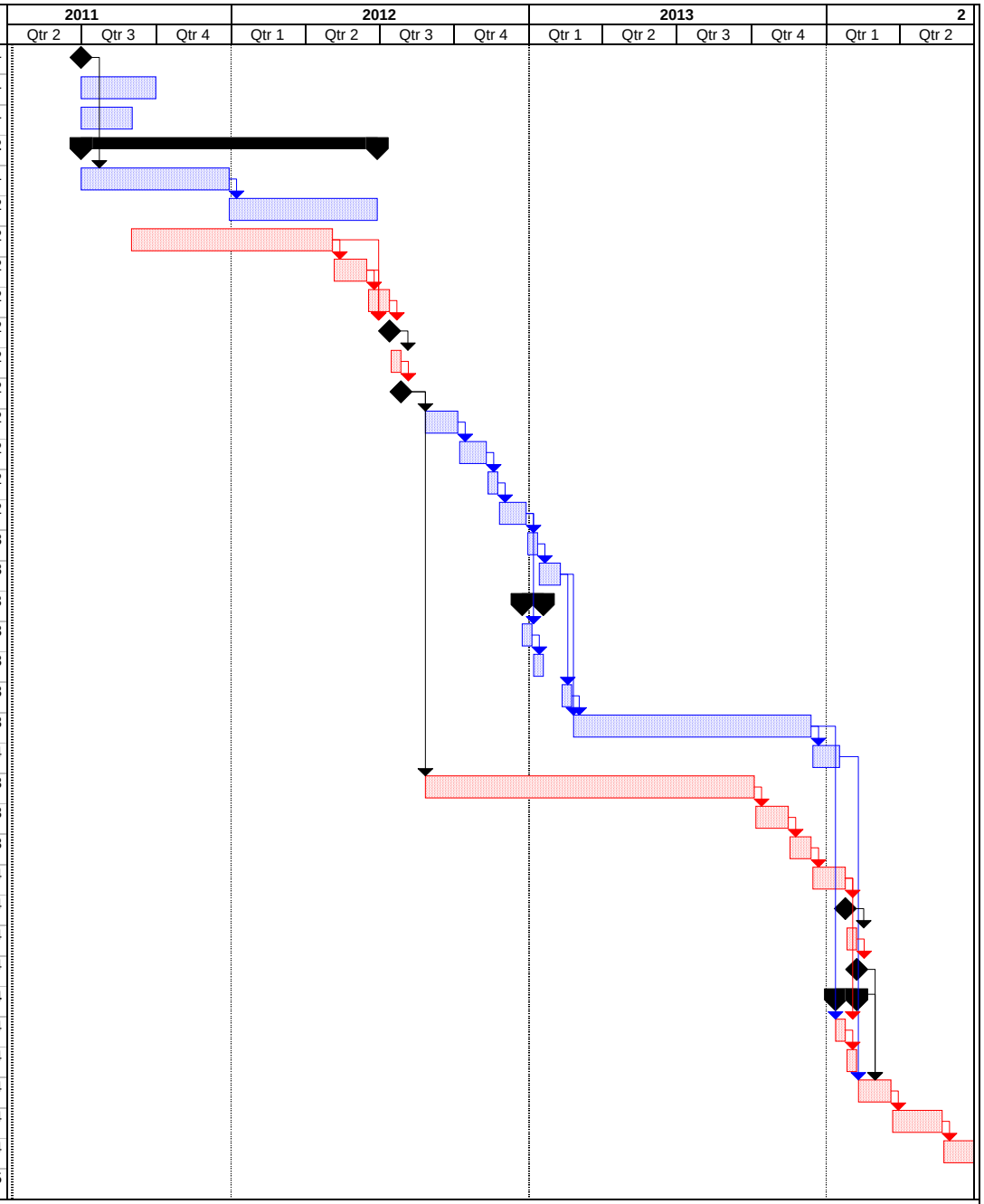
ID	Task Name	Duration	Start	Finish
1	Notice To Proceed	0 days	7/1/11	7/1/11
2	Database Preparation	66 days?	7/1/11	9/30/11
3	Concept Validation	45 days?	7/1/11	9/1/11
4	**Environmental Document Preparation**	**260 days**	**7/1/11**	**6/28/12**
5	Prepare Environmental Studies & Report	26 wks	7/1/11	12/29/11
6	Categorical Exclusion Review & Approval	26 wks	12/30/11	6/28/12
7	Preliminary Plan Preparation	35.4 wks	9/1/11	5/4/12
8	GDOT Prelim. Plan Review	6 wks	5/7/12	6/15/12
9	Revise Prelim. Plans	4 wks	6/18/12	7/13/12
10	Submit Plans to Utility Cos.	0 days	7/13/12	7/13/12
11	Review Prelim Plans & Schedule PFPR	2 wks	7/16/12	7/27/12
12	Preliminary Field Plan Review	0 days	7/27/12	7/27/12
13	Prepare R/W Plans	6 wks	8/27/12	10/5/12
14	GDOT Review R/W Plans	5 wks	10/8/12	11/9/12
15	Revise R/W Plans	2 wks	11/12/12	11/23/12
16	R/W Office R/W Plan Review	5 wks	11/26/12	12/28/12
17	Revise R/W Plans	2 wks	12/31/12	1/11/13
18	Review/Approve R/W Plans	4 wks	1/14/13	2/8/13
19	**Environmental Re-evaluation**	**20 days**	**12/24/12**	**1/18/13**
20	Prepare Environmental Re-evaluation	2 wks	12/24/12	1/4/13
21	GDOT review & approve	2 wks	1/7/13	1/18/13
22	GDOT & County R/W Agreement	2 wks	2/11/13	2/22/13
23	R/W Acquisition	42 wks	2/25/13	12/13/13
24	GDOT Certifies R/W	5 wks	12/16/13	1/17/14
25	Final Plan Preparation	58 wks	8/27/12	10/4/13
26	GDOT Review	6 wks	10/7/13	11/15/13
27	Revise Final Plans	4 wks	11/18/13	12/13/13
28	Schedule Field Plan Review	6 wks	12/16/13	1/24/14
29	Final Field Plan Review	0 days	1/24/14	1/24/14
30	Revise Final Plans	2 wks	1/27/14	2/7/14
31	Submit Final Package	0 days	2/7/14	2/7/14
32	**Environmental Re-evaluation**	**20 days**	**1/13/14**	**2/7/14**
33	Prepare Environmental Re-evaluation	2 wks	1/13/14	1/24/14
34	GDOT Review & Approve	2 wks	1/27/14	2/7/14
35	GDOT Authorizes County to Bid Project	6 wks	2/10/14	3/21/14
36	Bidding Process	9 wks	3/24/14	5/23/14
37	GDOT & County Execute Construction Agreement	10 wks	5/26/14	8/1/14
38	Construction	26 wks	8/4/14	1/30/15



PI # 731830 STP00-0186-01(038)01
Critical Path Schedule
Qk4

Task		Summary		Rolled Up Progress		Rolled Up Split	
Critical Task		Rolled Up Task		External Tasks		External Milestone	
Progress		Rolled Up Critical Task		Project Summary		Deadline	
Milestone		Rolled Up Milestone		Split			

Benefit Cost Analysis Work Sheet
CONGESTION Projects

STP00-0186-01(038)

731830

Fulton

Campbellton Road @ Boat RockRoad / New Hope Road Intersection Improvement

Congestion Benefit = Tb + CMb + Fb

Person Time Savings Benefit (Tb)

*Db (hrs)	0.04
ADT	18,500
Tb ($s)	$25,437,500.00

Commercial or Truck Time Savings Benefit (CMb)

Db (hrs)	0.04
% Truck Traffic	0.04
ADT	18,500
CMb	$5,376,100.00

Fuel Savings Benefit (Fb)

ADT	18,500
Fb ($s)	$8,864,583.33

Total Congestion Benefit	**$39,678,183.33**
Total Project Cost	**$3,961,238.57**
B/C Ratio	**10.02**

Date 4/27/2011

P.I. Number **731830** County **Fulton**

Project Number **STP-186-1(38)**

Special Provision, Section 109-Measurement and Payment

FUEL PRICE ADJUSTMENT *(ENGLISH 125% MAX)*

ENTER FPL DIESEL	4.25
ENTER FPM DIESEL	9.563

ENTER FPL UNLEADED	4
ENTER FPM UNLEADED	9

http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx

INCREASE ADJUSTMENT
125.00%

INCREASE ADJUSTMENT
125.00%

ROADWAY ITEMS	QUANTITY	DIESEL FACTOR	GALLONS DIESEL	UNLEADED FACTOR	GALLONS UNLEADED	REMARKS
Excavations paid as specified by Sections 205 **(CUBIC YARD)**		0.29		0.15		
Excavations paid as specified by Sections 206 **(CUBIC YARD)**		0.29		0.15		
GAB paid as specified by the ton under Section 310 **(TON)**	2198.000	0.29	637.42	0.24	527.52	
Hot Mix Asphalt paid as specified by the ton under Sections 400 **(TON)**		2.90		0.71		
Hot Mix Asphalt paid as specified by the ton under Sections 402 **(TON)**	2127.000	2.90	6168.30	0.71	1510.17	
PCC Pavement paid as specified by the square yard under Section 430 **(SY)**		0.25		0.20		

BRIDGE ITEMS	Quantity	Unit Price	QF/1000	Diesel Factor	Gallons Diesel	Unleaded Factor	Gallons Unleaded	REMARKS
Bridge Excavation (CY) Section 211				8.00		1.50		
Class __Concrete (CY) Section 500				8.00		1.50		
Class __Concrete (CY) Section 500				8.00		1.50		
Class __Concrete (CY) Section 500				8.00		1.50		
Superstru Con Class__(CY) Section 500				8.00		1.50		
Superstru Con Class__(CY) Section 500				8.00		1.50		
Superstru Con Class__(CY) Section 500				8.00		1.50		
Concrete Handrail (LF) Section 500				8.00		1.50		
Concrete Barrier (LF) Section 500				8.00		1.50		

BRIDGE ITEMS	Quantity	Unit Price	QF/1000	Diesel Factor	Gallons Diesel	Unleaded Factor	Gallons Unleaded	REMARKS

Stru Steel Plan Quantity (LB) Section 501				8.00		1.50		
Stru Steel Plan Quantity (LB) Section 501				8.00		1.50		
PSC Beams_____ (LF) Section 507				8.00		1.50		
PSC Beams_____ (LF) Section 507				8.00		1.50		
PSC Beams_____ (LF) Section 507				8.00		1.50		
Stru Reinf Plan Quantity(LB) Section 511				8.00		1.50		
Stru Reinf Plan Quantity(LB) Section 511				8.00		1.50		
Bar Reinf Steel (LB) Section 511				8.00		1.50		
Piling___inch (LF) Section 520				8.00		1.50		
Piling___inch (LF) Section 520				8.00		1.50		
Piling___inch (LF) Section 520				8.00		1.50		
Piling___inch (LF) Section 520				8.00		1.50		
Piling___inch (LF) Section 520				8.00		1.50		
Piling___inch (LF) Section 520				8.00		1.50		
Drilled Caisson,___ (LF) Section 524				8.00		1.50		
Drilled Caisson,___ (LF) Section 524				8.00		1.50		
Drilled Caisson,___ (LF) Section 524				8.00		1.50		
Pile Encasement,___(LF) Section 547				8.00		1.50		
Pile Encasement,___(LF) Section 547				8.00		1.50		

SUM QF DIESEL=	**6805.72**	**SUM QF UNLEADED=**	**2037.69**

DIESEL PRICE ADJUSTMENT($)	**$33,262.96**
UNLEADED PRICE ADJUSTMENT($)	**$9,373.37**

ASPHALT CEMENT PRICE ADJUSTMENT
(BITUMINOUS TACK COAT 125% MAX)

APPLICABLE TO CONTRACTS/PROJECTS CONTAINING THE 413 SPECIFICATION, SECTION 413.5.01 ADJUSTMENTS
ASPHALT PRICE ADJUSTMENT FOR BITUMINOUS TACK COAT

http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx

ENTER APL 389 **ENTER APM** 875.25

125.00%	INCREASE ADJUSTMENT

L.I.N.	TYPE	TACK (GALLONS)	TACK (TONS)	REMARKS
413-1000	PG 58-22	200	0.8590	

TMT = 0.8590

PRICE ADJUSTMENT($)	$400.99

400 / 402 ASPHALT CEMENT PRICE ADJUSTMENT 125% MAX

ENTER APL 389 **ENTER APM** 875.25

http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx

125.00%	INCREASE ADJUSTMENT

L.I.N. / Spec Number	MIX TYPE	HMA	JMF AC%	AC	REMARKS
402-1811	4.75 mm	70	5.00	3.50	
402-3141	12.5 mm SP	1235	5.00	61.75	
402-3190	19 mm SP	1100	5.00	55.00	
402-3121	9.5 mm SP TP2	2198	5.00	109.90	
			5.00		
			5.00		
			5.00		
			5.00		
			5.00		
			5.00		
			5.00		
			5.00		
			5.00		
			5.00		
			5.00		
			TMT =	230.15	

PRICE ADJUSTMENT($)	$107,434.02

ASPHALT CEMENT PRICE ADJUSTMENT FOR BITUMINOUS TACK COAT(Surface Treatment 125% MAX)

APPLICABLE TO CONTRACTS CONTAINING THE 413 SPEC. SECTION 413.5.01 ADJUSTMENTS ASPHALT PRICE ADJUSTMENT FOR BITUMINOUS TACK COAT

http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx

ENTER APL 389 ENTER APM 875.25

125.00%	INCREASE ADJUSTMENT

Use this side for Asphalt Emulsion Only

L.I.N.	TYPE	ASPHALT EMULSION (GALLONS)
TMT =		
REMARKS:		

Use this side for Asphalt Cement Only

L.I.N.	TYPE	TACK (GALLONS)
TMT =		
REMARKS:		

MONTHLY PRICE ADJUSTMENT($)	

ADJUSTMENT SUMMARY

FUEL PRICE ADJUSTMENT *(ENGLISH 125% MAX)*

DIESEL PRICE ADJUSTMENT($)	$33,262.96
UNLEADED PRICE ADJUSTMENT($)	$9,373.37
ASPHALT CEMENT PRICE ADJUSTMENT (BITUMINOUS TACK COAT 125% MAX)	$400.99
400 / 402 ASPHALT CEMENT PRICE ADJUSTMENT 125% MAX	$107,434.02
ASPHALT CEMENT PRICE ADJUSTMENT FOR BITUMINOUS TACK COAT(Surface Treatment 125% MAX)	

REMARKS:	

TOTAL ADJUSTMENTS	$150,471.34

DWM 10/08