ORIGINAL TO GENERAL FILES

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

OFFICE OF DESIGN POLICY & SUPPORT
INTERDEPARTMENTAL CORRESPONDENCE

FILE P.I. # 332180-
NH000-0022-01(023)
Coweta County
GDOT District 3 - Thomaston
Roundabout: SR 16 @ SR 54

OFFICE Design Policy & Support

DATE 4/23/2015

FROM for Brent Story, State Design Policy Engineer

TO SEE DISTRIBUTION

SUBJECT **APPROVED REVISED CONCEPT REPORT**

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

Attachment

DISTRIBUTION:

Glenn Bowman, Director of Engineering
Joe Carpenter, Director of P3/Program Delivery
Genetha Rice-Singleton, Assistant Director of P3/Program Delivery
Albert Shelby, State Program Delivery Engineer
Bobby Hilliard, Program Control Administrator
Cindy VanDyke, State Transportation Planning Administrator
Hiral Patel, State Environmental Administrator
Ben Rabun, State Bridge Engineer
Andrew Heath, State Traffic Engineer
Angela Robinson, Financial Management Administrator
Lisa Myers, State Project Review Engineer
Charles "Chuck" Hasty, State Materials Engineer
Mike Bolden, State Utilities Engineer
Richard Cobb, Statewide Location Bureau Chief
Andy Casey, State Roadway Design Engineer
Attn: Jason Mobley, District Design Engineer
Michael Presley, District Engineer
Dan Pass, District Preconstruction Engineer
Kerry Gore, District Utilities Engineer
Kevin VanHouten, Project Manager
BOARD MEMBER - 3rd Congressional District

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
REVISED PROJECT CONCEPT REPORT

Project Type: Intersection Improvement
GDOT District: 3
Federal Route Number: N/A
P.I. Number: 332180
County: Coweta
State Route Number: 16, 54
Project Number: NH000-0022-01(023)

Project NH000-0022-01(023) will improve the operations of the existing all way stop controlled intersection by replacing it with a modern roundabout. The existing bridge over Central of Georgia Railroad north of the intersection will be replaced with a wider structure to accommodate approaches to the roundabout.

Submitted for approval:

for Thomas Howell — District Engineer – District 3 — DATE 2-6-15

Albert Shelby BVS — State Program Delivery Engineer — DATE 2/25/2015

KEBD — GDOT Project Manager — DATE 2-6-15

Recommended for approval:

HIRAL PATEL*/EKP — State Environmental Administrator — DATE 2/27/2015

ANDREW HEATH*/EKP — State Traffic Engineer — DATE 3/2/2015

LISA MYERS*/EKP — Project Review Engineer — DATE 3/2/2015

FOR YOLONDA PRIDE-FOSTER*/EKP — State Utilities Engineer — DATE 3/9/2015

BEN RABUN*/EKP — State Bridge Engineer — DATE 2/27/2015

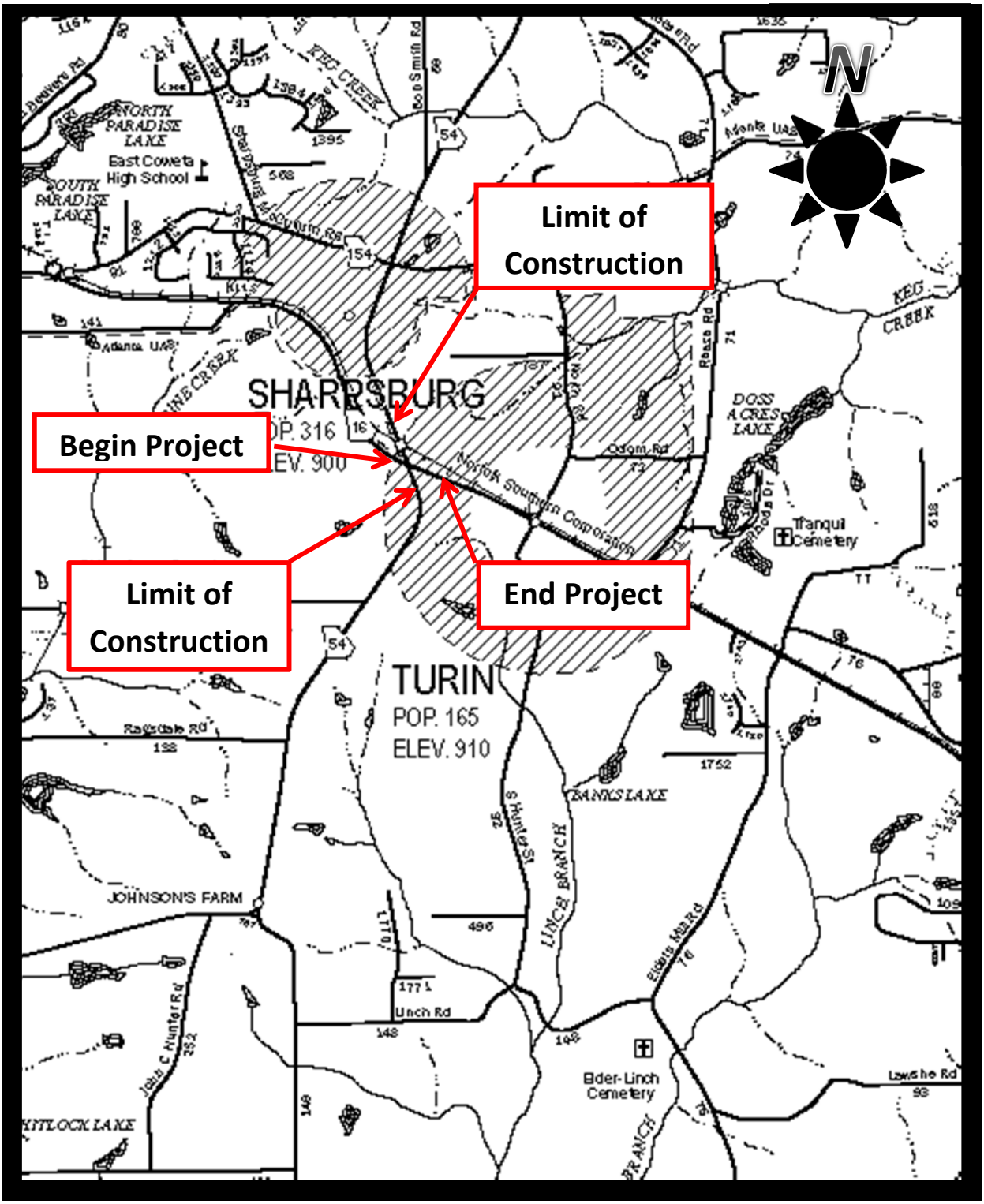
☒ MPO Area: This project is consistent with the MPO adopted Regional Transportation Plan (RTP)/Long Range Transportation Plan (LRTP).

☐ Rural Area: This project is consistent with the goals outlined in the Statewide Transportation Plan (SWTP) and/or is included in the State Transportation Improvement

CINDY VAN DYKE*/EKP — State Transportation Planning Administrator — Date 3/5/2015

* - RECOMMENDATION ON FILE

PROJECT LOCATION MAP



PLANNING AND BACKGROUND

Project Justification Statement:

Coweta County, in the area around the proposed intersection improvement, has experienced population growth due to development moving easterly in the county. To the west, SR 16 provides a connection to I-85 and Newnan. To the east, it also provides a connection to I-75 and Griffin. SR 54 provides a connection to SR 34 and Peachtree City to the north.

The purpose of this project is to improve the operational efficiency of the existing intersection of SR 16 and SR 54 while reducing the frequency and severity of crashes at the intersection. Nationally, intersection crashes account for forty percent of all reported crashes.

SR 16 is an Urban Minor Arterial with a posted speed limit of 55 mph. The 2018 ADT is 14, 400 vpd, and the 2038 ADT is 22, 500 vpd. SR 54 is an Urban Minor Arterial with a posted speed limit of 55 mph. The 2018 ADT is 9,600 vpd, and the 2038 ADT is 15,000. Both roads are currently operating at an LOS of F. Both roads are projected to operate at a LOS of F is the intersection is not improved.

From 2008 to 2012, there were eleven, predominantly rear-end crashes at this intersection, indicating heavy congestion and/or significant turning movements. This intersection has been a four way stop since 1996. The proposed improvements will reduce congestion and crash severity at this intersection.

Due to the geometry of the proposed intersection, replacement of the bridge on SR 54 over Central of Georgia (Norfolk Southern) Railroad is recommended.

Existing conditions:

This project is located on S.R. 16 at the intersection with S.R. 54 in the City of Turin and Coweta County. The existing pavement width on S.R. 16 is twenty eight feet. That includes two twelve foot travel lanes, two foot paved shoulders, and six foot grass shoulders. The existing paved width of S.R. 54 twenty three feet. This includes two eleven foot lanes, six inch paved shoulders, and five and one half foot grass shoulders. There is an existing 156 foot by 38 foot bridge crossing Central of Georgia Railroad on S.R. 54 just north of the intersection. No utilities are attached to the bridge. There is a Georgia Power transmission line on the south side of S.R. 16.

Other projects in the area: M004859 – Resurfacing on SR 16 from SR 14 to Spalding County line

This project is scheduled to let in June 2015. The resurfacing of SR 16 in the area of the intersection will not have an effect on the design of that roadway.

MPO: Atlanta Regional Commission (ARC) **TIP No.:** CW-011

Regional Commission: Three Rivers Regional Commission (TRRC) **RC Project ID:** CW-011

Congressional District(s): 3

Federal Oversight: ☐ PoDI ☒ Exempt ☐ State Funded ☐ Other

Projected Traffic: ADT (see attached traffic assignments)

S.R. 16
Current Year (2013): 13,100 Open Year (2018): 14,400 Design Year (2038): 22,500

S.R. 54
Current Year (2013): 8,700 Open Year (2018): 9,600 Design Year (2038): 15,000

Traffic Projections Performed by: GDOT Office of Planning

Functional Classification:

S.R. 16
Urban Minor Arterial

S.R. 54
Urban Minor Arterial

Complete Streets - Bicycle, Pedestrian, and/or Transit Standard Warrants:
Warrants met: ☒ None ☐ Bicycle ☐ Pedestrian ☐ Transit

This intersection is within three miles of East Coweta High School. Neither state route is on a bike route. There is no evidence of pedestrian or bicycle traffic at this intersection. Sidewalks will be provided to allow pedestrians to navigate the intersection. No bicycle accommodations will we added to this intersection. This was discussed in the original kickoff peer review meeting, but not covered in the notes.

Is this a 3R (Resurfacing, Restoration, & Rehabilitation) Project? ☒ No ☐ Yes

Pavement Evaluation and Recommendations

Preliminary Pavement Evaluation Summary Report Required? ☒ No ☐ Yes
Preliminary Pavement Type Selection Report Required? ☒ No ☐ Yes
Feasible Pavement Alternatives: ☒ HMA ☐ PCC ☐ HMA & PCC

DESIGN AND STRUCTURAL

Description of the proposed project: This project will replace the existing stop-controlled intersection of SR16 and SR54 with a modern roundabout. The project will replace the existing bridge over Norfolk Southern Railroad north of the intersection with a wider structure to accommodate approaches to the roundabout. The project is located in the city of Turin, GA. The proposed length is approximately 0.3 miles on SR 16, and 0.5 miles on SR 54.

Major Structures:

Bridges:

Structure	Existing	Proposed
077-0018-0	Bridge Length = 156 ft Deck Width = 38 ft Total Lane Width =28 ft Shoulder Width = 10 ft Suff. Rating = 73.27	Bridge Length = 156 ft Deck Width = 52 ft Total Lane Width = 36 ft Shoulder Width = 16 ft

Proposed bridge width was selected based on guidance from the GDOT Bridge Design Manual Chapter 2.9.1.

Retaining Walls:

Structure	Existing	Proposed
MSE WALL	N/A	Wall Length = 700 max Max. Height = 20 ft Will be patterned to resemble natural stone

Major Interchanges/Intersections: SR 16 at SR 54.

Lighting required: ☐ No ☒ Yes

The lighting agreement between Coweta County and GDOT was signed on February 3, 2015. Please see the attached lighting agreement.

Off-site Detours Anticipated: ☒ No ☐ Yes ☐ Undetermined

Transportation Management Plan [TMP] Required: ☐ No ☒ Yes

If Yes: Project classified as: ☒ Non-Significant ☐ Significant

TMP Components Anticipated: ☒ TTC ☐ TO ☐ PI

Mainline Design Features: State Route 16 - Urban Minor Arterial[1,2,3]

Feature	Existing	Standard	Proposed
	SR16	SR 16	SR 16
Typical Section			
- Number of Lanes	2		2
- Lane Width(s)	12'	12'	12'
- Median Width & Type	N/A	N/A	N/A
- Outside Shoulder or Border Area Width	6'	≥10'	~~10'~~ 12.5' EKA
- Outside Shoulder Slope	6%	6%	6%
- Inside Shoulder Width	N/A	N/A	N/A
- Sidewalks	No	Yes	Yes
- Auxiliary Lanes	1		N/A
- Bike Lanes	No	No	No
Posted Speed	55 mph		45 mph
Design Speed	50 mph	30-60 mph	45 mph
Min Horizontal Curve Radius	1920'	711'	≥711'
Maximum Superelevation Rate	N/A	4%	4%
Maximum Grade	4%	≤7%	≤7%
Access Control	By Permit		By Permit
Design Vehicle	Unknown	WB-67	WB-67
Pavement Type	Asphalt	Asphalt	Asphalt

[1]The design speed is being lowered to 45 mph from 55 mph because the intersection is within the city limits of Turin, both roadways have nearby 45 mph zones, and the existing topography lends towards a lower speed than 55 mph.

[2]All existing information was obtained from field survey and old plans.

[3]SR 16 is on the GDOT oversized truck route network.

Side Road Design Features: State Route 54 - Urban Minor Arterial[12]

Feature	Existing	Standard		Proposed	
	SR 54	SR 54		SR 54	
		North Leg	South Leg	North Leg	South Leg
Typical Section					
- Number of Lanes	2			2	1
- Lane Width(s)	11'	12'	12'	12'	12'
- Median Width & Type	N/A	N/A	N/A	N/A	N/A
- Outside Shoulder or Border Area Width	6'	≥ 10'	≥ 10'	~~10'~~ 12.5'	~~10'~~ 12.5' EXP
- Outside Shoulder Slope	6%	6%	6%	6%	6%
- Inside Shoulder Width	N/A	N/A	N/A	N/A	N/A
- Sidewalks	No	Yes	Yes	Yes	YES
- Auxiliary Lanes	1			N/A	N/A
- Bike Lanes	No	No	No	No	No
Posted Speed	55 mph			45 mph	55 mph
Design Speed	50 mph	30-60 mph		45 mph	55 mph
Min Horizontal Curve Radius	1200'	711'	1190'	≥711'	≥ 1190'
Maximum Superelevation Rate	N/A	4%	4%	4%	4%
Maximum Grade	4.5%	≤6%	≤7%	≤7%	≤6%
Access Control	By Permit			By Permit	
Design Vehicle	Unknown	WB-67		WB-67	
Pavement Type	Asphalt	Asphalt		Asphalt	

[1]The design speed is being lowered to 45 mph from 55 mph because the intersection is within the city limits of Turin, both roadways have nearby 45 mph zones, and the existing topography lends towards a lower speed than 55 mph.

[2]All existing information was obtained from field survey and old plans.

Design Exceptions to FHWA/AASHTO controlling criteria anticipated:

FHWA/AASHTO Controlling Criteria	No	Undetermined	Yes	Appvl Date (if applicable)
1. Design Speed	☒	☐	☐	
2. Lane Width	☒	☐	☐	
3. Shoulder Width	☒	☐	☐	
4. Bridge Width	☒	☐	☐	
5. Horizontal Alignment	☒	☐	☐	
6. Superelevation	☒	☐	☐	
7. Vertical Alignment	☒	☐	☐	
8. Grade	☒	☐	☐	
9. Stopping Sight Distance	☒	☐	☐	
10. Cross Slope	☒	☐	☐	
11. Vertical Clearance	☒	☐	☐	
12. Lateral Offset to Obstruction	☒	☐	☐	
13. Bridge Structural Capacity	☒	☐	☐	

Design Variances to GDOT Standard Criteria anticipated:

GDOT Standard Criteria	Reviewing Office	No	Undeter--mined	Yes	Appvl. Date (if applicable)
1. Access Control/Median Openings	DP&S	☒	☐	☐	
2. Intersection Sight Distance	DP&S	☒	☐	☐	
3. Intersection Skew Angle	DP&S	☒	☐	☐	
4. Lateral Offset to Obstruction	DP&S	☒	☐	☐	
5. Rumble Strips	DP&S	☒	☐	☐	
6. Safety Edge	DP&S	☒	☐	☐	
7. Median Usage	DP&S	☒	☐	☐	
8. Roundabout Illumination Levels	DP&S	☒	☐	☐	
9. Complete Streets	DP&S	☒	☐	☐	
10. ADA & PROWAG	DP&S	☒	☐	☐	
11. GDOT Construction Standards	DP&S	☒	☐	☐	
12. GDOT Drainage Manual	DP&S	☒	☐	☐	
13. GDOT Bridge & Structural Manual	Bridges	☒	☐	☐	

VE Study anticipated: ☒ No ☐ Yes ☐ Completed – Date:

UTILITY AND PROPERTY

Temporary State Route needed: No

Railroad Involvement: The bridge replacement will span the right-of-way of Central of Georgia Railroad (Norfolk Southern Railroad). Currently there is only one track in this area. Future expansion would include one additional track located to the geographic southwest of the existing track. The tracks will be spaced fourteen feet center to center. Coordination will be done during preliminary design. Please see cost estimate attachment.

Utility Involvements:

SUE Required: ☐ No ☒ Yes ☐ Undetermined

Public Interest Determination Policy and Procedure recommended (Utilities)? ☒ No ☐ Yes

Right-of-Way (ROW): **SR 16 -** Existing width: 100 ft Proposed width: 150 ft
SR 54 - Existing width: 80-150 ft Proposed width: 110-180 ft

Required Right-of-Way anticipated: ☐ None ☒ Yes ☐ Undetermined
Easements anticipated: ☐ None ☒ Temporary ☒ Permanent ☒ Utility ☐ Other

Anticipated total number of impacted parcels:	11
Displacements anticipated: Businesses:	0
Residences:	0
Other:	0
Total Displacements:	0

Location and Design approval: ☐ Not Required ☒ Required

ROUNDABOUTS

EKP

Roundabout Lighting Agreement/Commitment Letter received: ☐ No ☒ Yes
The lighting agreement was signed on February 3, 2015. Please see attached lighting agreement..

Roundabout Planning Level Assessment: N/A

Roundabout Feasibility Study:

From the study's findings, a multi-lane roundabout is the most feasible choice for the intersection of SR 16 and SR 54. A multi-lane roundabout is expected to provide adequate capacity in the design, and open years based on the projected traffic volumes. Please see attached study.

Roundabout Peer Review Required: ☐ No ☒ Yes ☒ Completed – Date: 3/17/2014

Please see attached meeting minutes.

CONTEXT SENSITIVE SOLUTIONS

Issues of Concern: None

Context Sensitive Solutions Proposed: None

ENVIRONMENTAL & PERMITS

Anticipated Environmental Document:

GEPA: ☐ **NEPA:** ☒ CE ☐ EA/FONSI ☐ EIS

MS4 Permit Compliance – Is the project located in a MS4 area? ☐ No ☒ Yes

A preliminary MS4 analysis (attached) suggests that channel protection is the most critical storm water criterion for both project outfalls. Detention ponds appear to be the most appropriate BMP due to the two point-source outfalls. Micro pool extended detention ponds that provide the channel protection volume (CPv) will also provide the water quality volume (WQv) and keep the 25—year and 100-year storms below pre-developed flow rates. Constructing and maintaining the micro pools may prove infeasible due to the proximity to the power transmission facility, protected species habitat, and the railroad (see concept layout). In this case, other BMP's, including grass channels, enhanced swales, and infiltration trenches, will be considered in the preliminary design phase, but their increased impacts to environmental resources will have to be considered as well.

Environmental Permits/Variances/Commitments/Coordination anticipated:

Permit/ Variance/ Commitment/ Coordination Anticipated	No	Yes	Remarks
1. U.S. Coast Guard Permit	☒	☐	
2. Forest Service/Corps Land	☒	☐	
3. CWA Section 404 Permit	☐	☒	
4. Tennessee Valley Authority Permit	☒	☐	
5. Buffer Variance	☐	☒	Retention pond within buffer likely not eligible for a variance.
6. Coastal Zone Management Coordination	☒	☐	
7. NPDES	☐	☒	
8. FEMA	☒	☐	
9. Cemetery Permit	☒	☐	
10. Other Permits	☒	☐	
11. Other Commitments	☐	☒	Decorative wall patterning
12. Other Coordination	☐	☒	SHPO

Is a PAR required? ☒ No ☐ Yes ☐ Completed – Date:

Environmental Comments and Information:

NEPA/GEPA: A Categorical Exclusion is anticipated.

Ecology: Approximately 42 linear feet and less than 0.01 acre of wetland may be impacted by the project. Habitat suitable for protected species was present in a stream located within the project footprint. Impacts to the stream should be avoided or minimized. There are no Biota Impaired streams, or culverts that require fish passage.

History: There are four recognized eligible historic resources within the project limits.

1. Central of Georgia Railroad (Norfolk Southern) Right-of-Way – Minimal Impacts
2. Johnson Farm – Adverse Impacts
3. Turin Water Tower – No Impacts
4. Brown House – Adverse Impacts

Archeology: Artifacts identified during fieldwork, further research needed for eligibility recommendations.

Air Quality:

Is the project located in a PM 2.5 Non-attainment area? ☐ No ☒ Yes

Is the project located in an Ozone Non-attainment area? ☐ No ☒ Yes

Carbon Monoxide hotspot analysis: ☐ Required ☒ Not Required ☐ TBD

Noise Effects: Noise modeling may be required for any alignment shifts.

Public Involvement: A PIOH was held on September 2, 2014. Please see attached synopsis.

Major stakeholders: Travelling Public**,** City of Turin, City of Sharpsburg, and Coweta County

CONSTRUCTION

Issues potentially affecting constructability/construction schedule: All roadways are to remain open during construction. The bridge and the roundabout will have to be constructed using staged construction.

Early Completion Incentives recommended for consideration: No

COORDINATION, ACTIVITIES, RESPONSIBILITIES, AND COSTS

Initial Concept Meeting: N/A

Concept Meeting: Held on May 27, 2014. Please see attached meeting minutes.

Project Activity	Party Responsible for Performing Task(s)
Concept Development	GDOT – District 3 Design
Design	GDOT – District 3 Design
Right-of-Way Acquisition	Coweta County
Utility Coordination (Pre Let)	GDOT
Utility Relocation (Construction)	Utility Companies
Letting to Contract	GDOT – Office of Bidding Administration
Construction Supervision	GDOT – District 3 Construction
Providing Material Pits	Contractor
Providing Detours	N/A
Environmental Studies, Documents, & Permits	GDOT – Office of Environmental Services
Environmental Mitigation	GDOT – Office of Environmental Services
Construction Inspection & Materials Testing	GDOT – District 3 Construction & Office of Materials

Project Cost Estimate Summary and Funding Responsibilities:

	Breakdown of P.E	Right of Way	Reimbursable Utility	Reimbursable Railroad	Construction*	Total Cost
Funded By	GDOT	Coweta County	GDOT	GDOT	GDOT	
Amount	$256,845.80	$580,000.00	$625,600.00	$144,000.00	$4,569,495.12	$6,175,940.92
Date of Estimate	10/8/1996	5/19/2014	4/29/2014	5/1/2014	4/30/2014	

*Construction Cost includes: Construction, Construction Contingency, Engineering and Inspection, and Liquid AC Cost Adjustment.
All lump sum items were derived from similar costs on similar projects. Bridge lump sum quantities were based on a 8112 sf. bridge.

ALTERNATIVES DISCUSSION

Preferred Alternative: Multi-Lane Roundabout with Bridge Replacement			$6,175,940.92 (EAP)
Estimated Property Impacts:	**11 Parcels**	**Estimated Total Cost:**	**~~$ 5,636,405.20~~**
Estimated ROW Cost:	**$ 580,000.00**	**Estimated CST Time:**	**18-24 Months**
Rationale: A hybrid multi-lane roundabout would more than adequately address the current and future operational needs of this intersection. It will improve capacity at the build and design years. The projected LOS for the Design year is C.			

No-Build Alternative: Four way stop sign controlled and bridge remains in place.			
Estimated Property Impacts:	**NONE**	**Estimated Total Cost:**	**$0.00**
Estimated ROW Cost:	**$0.00**	**Estimated CST Time:**	**0 months**
Rationale: Existing stop signed controlled intersection already has severe delays. Those delays will only increase if the intersection is left as is.			

Alternative 1: Signal and Bridge Replacement			
Estimated Property Impacts:	**12 Parcels**	**Estimated Total Cost:**	**$ 5,988,573.26**
Estimated ROW Cost:	**$ 775,500.00**	**Estimated CST Time:**	**18-24 months**
Rationale: A signal will address the severe delays at this intersection. To construct the signal the intersection would need to be shifted to the SE to construct the new intersection at the minimum intersection skew angle of seventy degrees. Shifting the intersection would dramatically increase right-of-way costs. This option would also require the removal of a historic farm house in the SW quadrant of the intersection.			

Alternative 2: Single-Lane Roundabout on existing intersection location with Bridge Replacement			
Estimated Property Impacts:	**4 Parcels**	**Estimated Total Cost:**	**$5,129,457.55**
Estimated ROW Cost:	**$377,000.00**	**Estimated CST Time:**	**18-24 months**
Rationale: A single lane roundabout will improve the functionality and capacity of this intersection for the open year. Because of the projected growth in the area a single lane roundabout will not be expected to operate efficiently in the design year.			

Other Alternatives – These alternatives were not analyzed as in depth as the others above.			
Estimated Property Impacts:	**N/A**	**Estimated Total Cost:**	**N/A**
Estimated ROW Cost:	**N/A**	**Estimated CST Time:**	**N/A**

Alternative 3: Single-Lane Roundabout offset to the north of the existing intersection with bridge replacement. This option will have the same design year operational issues as alternative 2. There will also be issues with the grade coming to the intersection from the bridge.

Alternative 4: Construct bridge on new alignment to the west of the existing bridge. Two three-way roundabouts will be built. One at the existing intersection location. The second location would be west of the existing location were the new bridge alignment intersects SR 16. This option was ultimately rejected due to the grade of the railroad. There could be difficulty in getting the proper clearance over the railroad with the new bridge.

Alternative 5: This alternative would construct a new multi-lane roundabout on top of the existing intersection. This option would not require replacement of the bridge. This option would severely damage the historic property in the SW corner of the intersection. There would also be issues with the grade coming off the bridge as you approach the intersection. Because of these issues this option was not chosen.

ADDITIONAL COMMENTS:

LIST OF ATTACHMENTS/SUPPORTING DATA

1. Concept Layouts
2. Typical sections
3. Detailed Cost Estimates:
    a. Construction including Engineering and Inspection
    b. Completed Fuel & Asphalt Price Adjustment forms
    c. Right-of-Way
    d. Utilities
    e. Rail Road
4. Crash summaries
5. Traffic diagrams
6. Feasibility Study
7. S I & A Report(s)
8. MS4 Analysis
9. Minutes of Concept meetings
10. Minutes from Peer Review Meetings
11. PIOH Synopsis/Comment Responses
12. Lighting Agreement

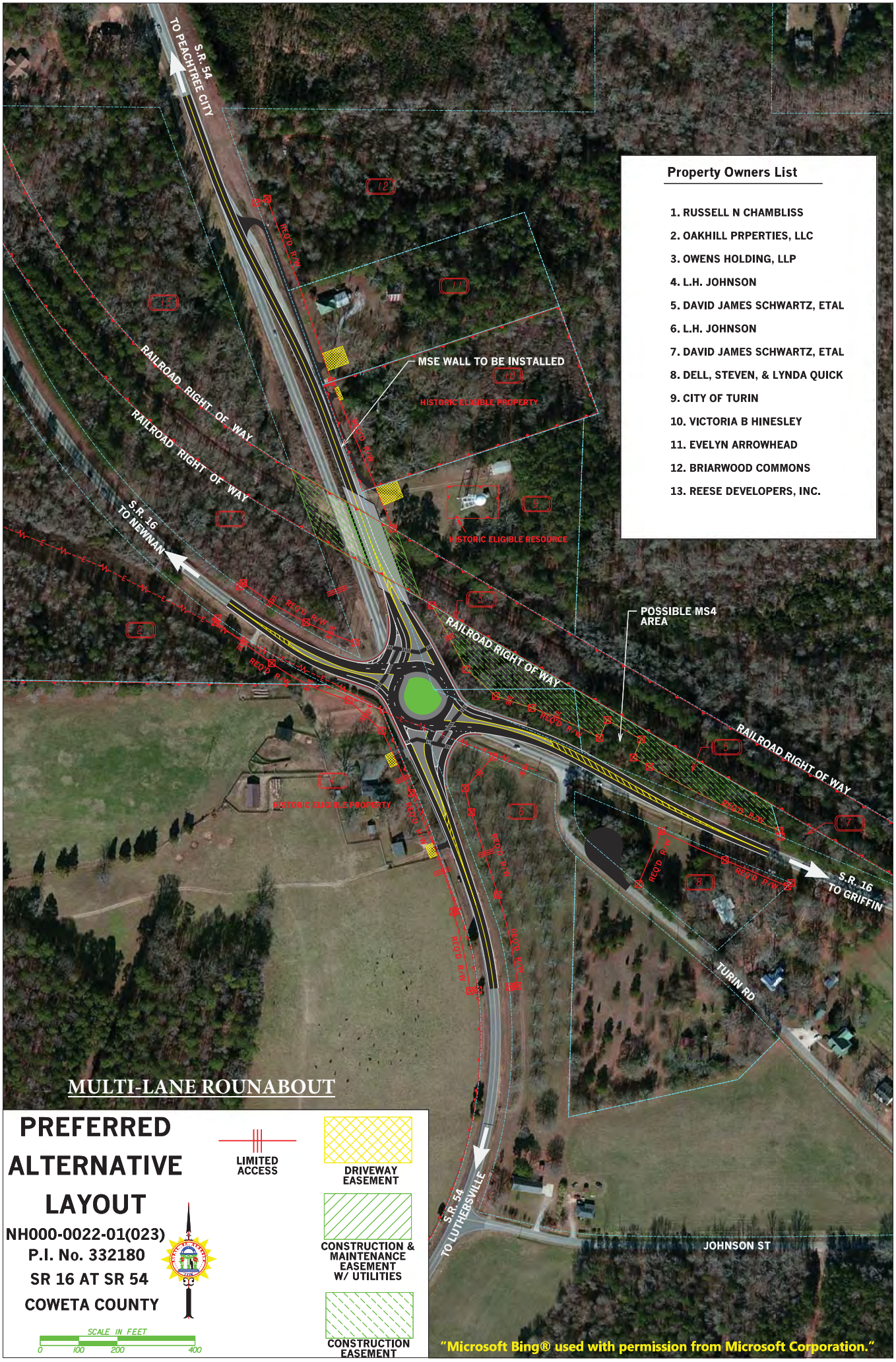
APPROVALS

Concur:

Director of Engineering — DATE 4/13/2015

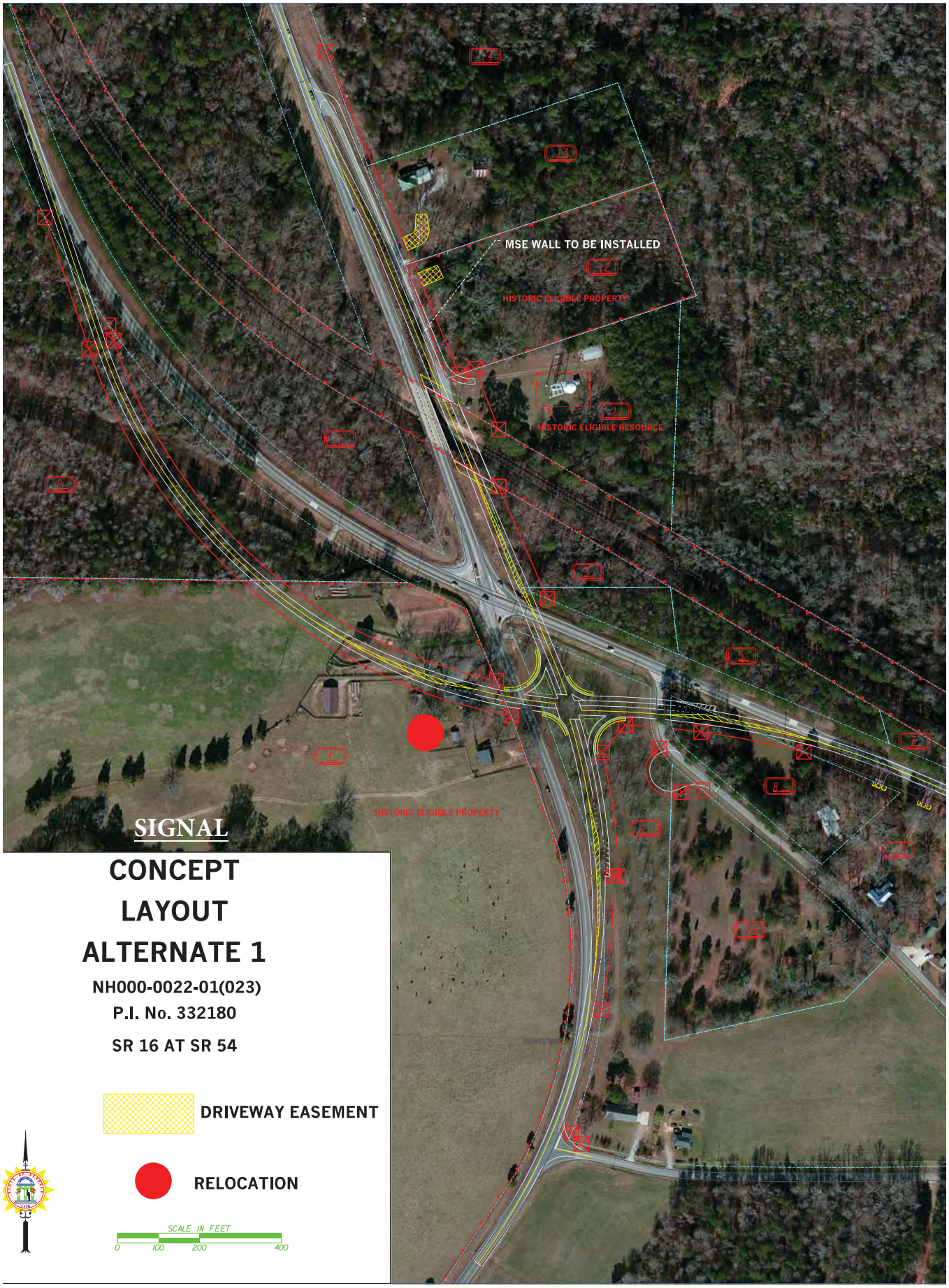
Approve:

Chief Engineer — DATE 4.20.15



Property Owners List

1. RUSSELL N CHAMBLISS
2. OAKHILL PRPERTIES, LLC
3. OWENS HOLDING, LLP
4. L.H. JOHNSON
5. DAVID JAMES SCHWARTZ, ETAL
6. L.H. JOHNSON
7. DAVID JAMES SCHWARTZ, ETAL
8. DELL, STEVEN, & LYNDA QUICK
9. CITY OF TURIN
10. VICTORIA B HINESLEY
11. EVELYN ARROWHEAD
12. BRIARWOOD COMMONS
13. REESE DEVELOPERS, INC.



CONCEPT LAYOUT ALTERNATE 1

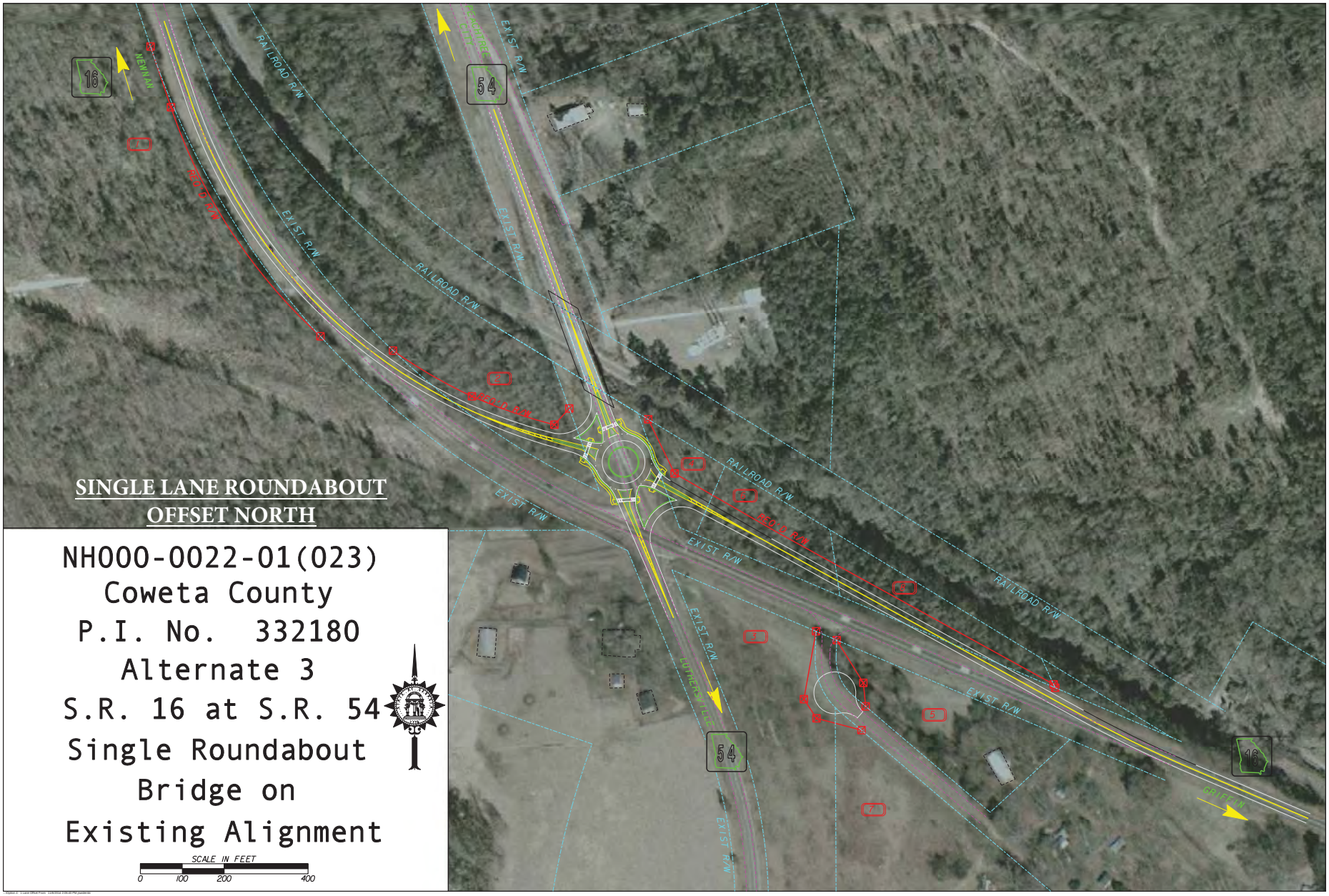
NH000-0022-01(023)

P.I. No. 332180

SR 16 AT SR 54

SINGLE LANE ROUNDABOUT

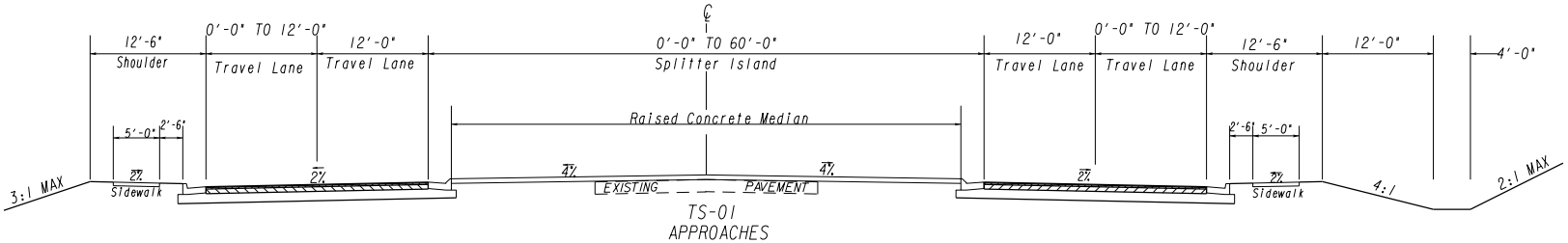
NH000-0022-01(023)
Coweta County
P.I. No. 332180
S.R. 16 at S.R. 54
Alternative 2
Single Roundabout
Bridge on Existing Alignment


SINGLE LANE ROUNDABOUT
OFFSET NORTH
NH000-0022-01(023)
Coweta County
P.I. No. 332180
Alternate 3
S.R. 16 at S.R. 54
Single Roundabout
Bridge on
Existing Alignment
SCALE IN FEET
0
100
200
400
16
54
NEWNAN
LUTHERS FLT
RAILROAD R/W
EXIST R/W
REQ'D R/W
GA FLT

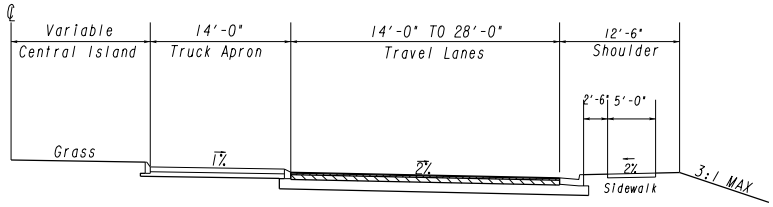
NH000-0022-01(023)
Coweta County
P.I. No. 332180
S.R. 16 at S.R. 54
Alternate 4
Split Roundabouts
Bridge on New Alignment

SCALE IN FEET
0 100 200 400

"Microsoft Bing® used with permission from Microsoft Corporation."
S.R. 16
TO NEWNAN
TO PEACHTREE CITY
S.R. 54
HISTORIC ELIGIBLE PROPERTY
S.R. 16
TO GRIFFIN
S.R. 54
TO LUTHERSVILLE
TURIN RD
MULTI-LANE ROUNDABOUT
NO BRIDGE REPLACEMENT
CONCEPT LAYOUT
NH000-0022-01(023)
P.I. No. 332180
SR 16 AT SR 54
ALTERNATE 5
COWETA COUNTY
SCALE IN FEET
0
50
100
200



TS-01
APPROACHES



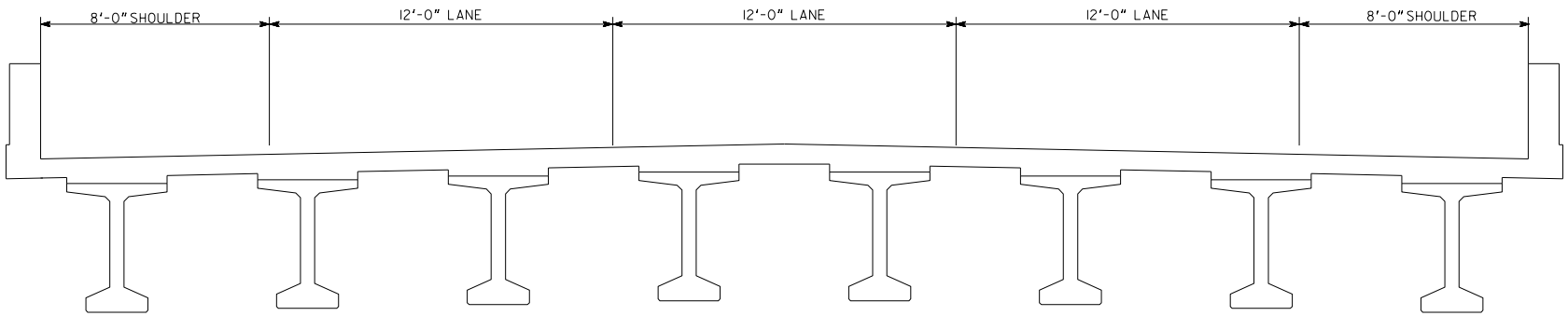
TS-02
ROUNDABOUT

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE:

TYPICAL SECTIONS

DRAWING No. 05-



The bridge will be constructed at a constant 54 ft wide. The striped roadway on the bridge will be 36 ft wide on the south end of the bridge, and it will taper down to 24 ft wide on the north end.

JOB NO.: *332180* **DATE** *March 18, 2015*

SPEC YE *01*

DESCRIPTION: *SR 16 @ SR 54*

ITEMS FOR JOB 332180

0010 - ROADWAY

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0005	150-1000	1.000	LS	$175,000.00000	TRAFFIC CONTROL - NH000-0022-01(023)	$175,000.00
0010	153-1300	1.000	EA	$100,000.00000	FIELD ENGINEERS OFFICE TP 3	$100,000.00
0030	210-0100	1.000	LS	$500,000.00000	GRADING COMPLETE - NH000-0022-01(023)	$500,000.00
0035	310-1101	5900.000	TN	$20.00000	GR AGGR BASE CRS, INCL MATL	$118,000.00
0040	318-3000	1000.000	TN	$18.00000	AGGR SURF CRS	$18,000.00
0045	402-1812	2000.000	TN	$79.00000	RECYL AC LEVELING,INC BM&HL	$158,000.00
0505	402-3103	1200.000	TN	$80.00000	REC AC 9.5 MM SP,TPII,GP2, INCL BM & H L	$96,000.00
0050	402-3121	3400.000	TN	$75.00000	RECYL AC 25MM SP,GP1/2,BM&HL	$255,000.00
0060	402-3190	960.000	TN	$82.00000	RECYL AC 19 MM SP,GP 1 OR 2 ,INC BM&HL	$78,720.00
0065	413-1000	890.000	GL	$3.00000	BITUM TACK COAT	$2,670.00
0070	429-1000	8.000	EA	$700.00000	RUMBLE STRIPS	$5,600.00
0075	430-0200	540.000	SY	$95.00000	PLN PC CONC PVMT/CL1C/ 10" TK	$51,300.00
0080	432-5010	540.000	SY	$10.00000	MILL ASPH CONC PVMT,VARB DEPTH	$5,400.00
0520	433-1000	430.000	SY	$165.00000	REINF CONC APPROACH SLAB	$70,950.00
0090	441-0104	550.000	SY	$28.00000	CONC SIDEWALK, 4 IN	$15,400.00
0095	441-0108	100.000	SY	$50.00000	CONC SIDEWALK, 8 IN	$5,000.00
0120	441-0748	1900.000	SY	$31.00000	CONC MEDIAN, 6 IN	$58,900.00
0545	441-3999	230.000	LF	$23.78377	CONCRETE V GUTTER	$5,470.27
0100	441-4030	110.000	SY	$45.00000	CONC VALLEY GUTTER, 8 IN	$4,950.00
0515	441-5008	310.000	LF	$12.00000	CONC HEADER CURB, 6 IN, TP 7	$3,720.00
0510	441-5025	400.000	LF	$14.00000	CONC HEADER CURB, 4", TP 9	$5,600.00
0525	441-6222	1100.000	LF	$14.88948	CONC CURB & GUTTER/ 8"X30"TP2	$16,378.43
0125	446-1100	3000.000	LF	$3.00000	PVMT REF FAB STRIPS, TP2,18 INCH WIDTH	$9,000.00
0130	500-0100	2100.000	SY	$4.00000	GROOVED CONCRETE	$8,400.00
0550	500-3200	30.000	CY	$366.67585	CL B CONC	$11,000.28
0135	550-1180	448.000	LF	$38.00000	STM DR PIPE 18",H 1-10	$17,024.00
0140	550-2180	96.000	LF	$27.00000	SIDE DR PIPE 18",H 1-10	$2,592.00
0145	550-4118	8.000	EA	$300.00000	FLARED END SECT 18 IN, SIDE DR	$2,400.00
0150	550-4218	4.000	EA	$500.00000	FLARED END SECT 18 IN, ST DR	$2,000.00
0155	620-0100	300.000	LF	$28.00000	TEMP BARRIER, METHOD NO. 1	$8,400.00
0160	632-0003	4.000	EA	$6,500.00000	CHANGEABLE MESS SIGN,PORT,TP 3	$26,000.00
0165	634-1200	40.000	EA	$115.00000	RIGHT OF WAY MARKERS	$4,600.00
0170	641-1100	120.000	LF	$60.00000	GUARDRAIL, TP T	$7,200.00
0175	641-1200	800.000	LF	$18.00000	GUARDRAIL, TP W	$14,400.00
0180	641-5001	2.000	EA	$600.00000	GUARDRAIL ANCHORAGE, TP 1	$1,200.00
0185	641-5012	2.000	EA	$1,900.00000	GUARDRAIL ANCHORAGE, TP 12	$3,800.00
0190	643-8200	5000.000	LF	$2.00000	BARRIER FENCE (ORANGE), 4 FT	$10,000.00
0195	668-1100	12.000	EA	$2,200.00000	CATCH BASIN, GP 1	$26,400.00
0200	999-5200	200.000	SF	$16.00000	DETECTABLE WARNING SURFACE	$3,200.00
					SUBTOTAL FOR ROADWAY:	**$1,907,674.98**

0020 - EROSION CONTROL

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0205	163-0232	3.000	AC	$300.00000	TEMPORARY GRASSING	$900.00
0210	163-0240	27.000	TN	$250.00000	MULCH	$6,750.00
0215	163-0300	10.000	EA	$1,200.00000	CONSTRUCTION EXIT	$12,000.00
0225	163-0520	500.000	LF	$15.00000	CONSTR AND REMOVE TEMP PIPE SLOPE DRAIN	$7,500.00
0015	163-0527	45.000	EA	$275.00000	CNST/REM RIP RAP CKDM,STN P RIPRAP/SN BG	$12,375.00

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0020	163-0528	1000.000	LF	$3.00000	CONSTR AND REM FAB CK DAM -TP C SLT FN	$3,000.00
0535	163-0539	1.000	EA	$1,300.00000	CONST AND REM RETROFIT-SL BD DM/W STN FL	$1,300.00
0230	163-0541	7.000	EA	$500.00000	CONSTR & REM ROCK FILTER DAMS	$3,500.00
0235	163-0550	12.000	EA	$200.00000	CONS & REM INLET SEDIMENT TRAP	$2,400.00
0240	165-0030	5000.000	LF	$1.00000	MAINT OF TEMP SILT FENCE, TP C	$5,000.00
0025	165-0041	1500.000	LF	$2.50000	MAINT OF CHECK DAMS - ALL TYPES	$3,750.00
0540	165-0096	1.000	EA	$1,300.00000	MAINT OF RETROFIT-SLOT BD DAM/W ST FLT	$1,300.00
0250	165-0101	10.000	EA	$700.00000	MAINT OF CONST EXIT	$7,000.00
0530	165-0105	12.000	EA	$75.00000	MAINT OF INLET SEDIMENT TRAP	$900.00
0255	165-0110	7.000	EA	$125.00000	MAINT OF ROCK FILTER DAM	$875.00
0260	167-1000	3.000	EA	$500.00000	WATER QUALITY MONITORING AND SAMPLING	$1,500.00
0265	167-1500	18.000	MO	$500.00000	WATER QUALITY INSPECTIONS	$9,000.00
0270	171-0030	10000.000	LF	$2.50000	TEMPORARY SILT FENCE, TYPE C	$25,000.00
0275	603-2182	500.000	SY	$41.00000	STN DUMPED RIP RAP, TP 3, 24"	$20,500.00
0280	603-7000	500.000	SY	$4.00000	PLASTIC FILTER FABRIC	$2,000.00
0285	700-6910	6.000	AC	$1,000.00000	PERMANENT GRASSING	$6,000.00
0290	700-7000	18.000	TN	$85.00000	AGRICULTURAL LIME	$1,530.00
0295	700-8000	5.000	TN	$450.00000	FERTILIZER MIXED GRADE	$2,250.00
0300	700-8100	300.000	LB	$2.30000	FERTILIZER NITROGEN CONTENT	$690.00
0305	716-1000	1000.000	SY	$1.50000	EROSION CONTROL MATS,WATERWAYS	$1,500.00
0310	716-2000	1000.000	SY	$1.24000	EROSION CONTROL MATS, SLOPES	$1,240.00
					SUBTOTAL FOR EROSION CONTROL:	**$139,760.00**

0030 - STRUCTURAL

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0400	211-0200	250.000	CY	$45.00000	BR EXCAV, GRADE SEPARATION	$11,250.00
0405	540-1101	1.000	LS	$100,000.00000	REM OF EX BR, STA NO - NH000-0022-01(023)	$100,000.00
0410	543-9000	1.000	LS	$1,000,000.00000	CONSTR OF BRIDGE COMPLETE - NH000-0022-01(023)	$1,000,000.00
0555	627-1000	3600.000	SF	$63.81478	MSE WALL FACE, 0 - 10 FT HT, WALL NO - NH000-0022-01(023)	$229,733.21
0560	627-1010	5400.000	SF	$53.62615	MSE WALL FACE, 10 - 20 FT HT, WALL NO - NH000-0022-01(023)	$289,581.21
					SUBTOTAL FOR STRUCTURAL:	**$1,630,564.42**

0040 - SIGNAL SIGNING AND MARKI

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0315	500-3104	10.000	CY	$845.00000	CL A CONC, SIGNS	$8,450.00
0320	636-1020	140.000	SF	$17.00000	HWY SGN,TP1MAT,REFL SH TP3	$2,380.00
0325	636-1033	160.000	SF	$22.00000	HWY SIGNS, TP1MAT,REFL SH TP 9	$3,520.00
0330	636-1072	510.000	SF	$22.00000	HWY SIGNS,ALUM EXTRD PNLS, RS TP 3	$11,220.00
0335	636-2070	460.000	LF	$8.00000	GALV STEEL POSTS, TP 7	$3,680.00
0340	636-2090	170.000	LF	$9.00000	GALV STEEL POSTS, TP 9	$1,530.00
0345	636-3000	2800.000	LB	$5.00000	GALV STEEL STR SHAPE POST	$14,000.00
0350	636-9094	120.000	LF	$85.00000	P-IN-PL,SIGNS,STL H,HP 12 X 53	$10,200.00
0355	653-1804	5000.000	LF	$2.25000	THERM SOLID TRAF STRIPE, 8",WH	$11,250.00
0360	653-2501	1.000	LM	$1,600.00000	THERMO SOLID TRAF ST, 5 IN, WH	$1,600.00
0365	653-2502	1.000	LM	$1,600.00000	THERMO SOLID TRAF ST, 5 IN YE	$1,600.00
0370	653-3501	700.000	GLF	$1.00000	THERMO SKIP TRAF ST, 5 IN, WHI	$700.00
0375	653-6004	40.000	SY	$10.00000	THERM TRAF STRIPING, WHITE	$400.00
0380	653-6006	2000.000	SY	$3.25000	THERM TRAF STRIPING, YELLOW	$6,500.00
0385	654-1001	200.000	EA	$3.00000	RAISED PVMT MARKERS TP 1	$600.00
0390	657-1085	900.000	LF	$6.00000	PRF PL SD PVT MKG,8",B/W,TP PB	$5,400.00
0395	657-6085	1200.000	LF	$6.00000	PRF PL SD PVMT MKG,8",B/Y,TPPB	$7,200.00
					SUBTOTAL FOR SIGNAL SIGNING AND MARKING:	**$90,230.00**

0050 - LIGHTING

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0415	500-3101	21.000	CY	$850.00000	CLASS A CONCRETE	$17,850.00
0420	511-1000	4200.000	LB	$1.00000	BAR REINF STEEL	$4,200.00
0425	615-1200	300.000	LF	$15.00000	DIRECTIONAL BORE - 2 IN	$4,500.00
0430	681-4277	17.000	EA	$6,500.00000	LT STD, 25' MH, 6' ARM	$110,500.00
0435	681-4300	4.000	EA	$6,500.00000	LT STD, 30' MH, 6' ARM	$26,000.00
0440	681-6295	5.000	EA	$750.00000	LUMINAIRE, TP 3, 40 W, LED	$3,750.00
0445	681-6310	2.000	EA	$840.00000	LUMINAIRE,TP 3, 90 W, LED	$1,680.00
0450	681-6315	3.000	EA	$1,080.00000	LUMINAIRE,TP 3, 105 W, LED	$3,240.00
0455	681-6316	2.000	EA	$1,050.00000	LUMINAIRE,TP 3, 130 W, LED	$2,100.00
0460	681-6410	9.000	EA	$1,000.00000	LUMINAIRE,TP 4, 105 W, LED	$9,000.00
0465	682-1504	11000.000	LF	$0.90000	CABLE, TP RHH/RHW, AWG NO 10	$9,900.00
0470	682-6219	2600.000	LF	$6.00000	CONDUIT, NONMETL, TP 2, 1 IN	$15,600.00
0475	682-9000	1.000	LS	$8,500.00000	MAIN SVC PICK UP POINT	$8,500.00
					SUBTOTAL FOR LIGHTING:	**$216,820.00**

0060 - LANDSCAPING

Line Number	ITEM	QUANTITY	UNITS	PRICE	DESCRIPTION	AMOUNT
0480	700-9300	1800.000	SY	$5.50000	SOD	$9,900.00
0485	702-0212	3.000	EA	$650.00000	CRATAEGUS VIRIDIS - NH000-0022-01(023)	$1,950.00
0490	702-0470	430.000	EA	$21.00000	ILEX VOMITORIA NANA - NH000-0022-01(023)	$9,030.00
0495	702-9005	1400.000	LB	$1.50000	SPRING APPLICATION FERTILIZER	$2,100.00
0500	702-9025	8600.000	SY	$2.55000	LANDSCAPE MULCH	$21,930.00
					SUBTOTAL FOR LANDSCAPING:	**$44,910.00**

TOTALS FOR JOB 332180

ITEMS COST:	**$4,029,959.40**
CONTINGENCY 5 PERCENT:	**$201,497.97**
ENGINEERING AND INSPECTION	**$201,497.97**
FUEL &ASPH ADJ.	**$136,539.78**
ESTIMATED COST WITH CONTINGENCY AND E&I:	**$4,569,495.12**

PROJ. NO.		CALL NO.	9/29/2009
P.I. NO.	332180		
DATE	7/22/2014		

INDEX (TYPE)	**DATE**	**INDEX**
REG. UNLEADED	Jul-14	$ 3.586
DIESEL		$ 3.867
LIQUID AC		$596

Link to Fuel and AC Index:
http://www.dot.ga.gov/doingbusiness/Materials/Pages/asphaltcementindex.aspx

LIQUID AC ADJUSTMENTS

PA=[((APM-APL)/APL)]xTMTxAPL

Asphalt

Price Adjustment (PA)				**135172.8**	**$ 135,172.80**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	953.60	
Monthly Asphalt Cement Price month project let (APL)			$	596.00	
Total Monthly Tonnage of asphalt cement (TMT)				378	

ASPHALT	**Tons**	**%AC**	**AC ton**
Leveling	2000	5.0%	100
12.5 OGFC		5.0%	0
12.5 mm		5.0%	0
9.5 mm SP	1200	5.0%	60
25 mm SP	3400	5.0%	170
19 mm SP	960	5.0%	48
	7560		**378**

BITUMINOUS TACK COAT

Price Adjustment (PA)			**$**	**1,366.98**	**$ 1,366.98**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	953.60	
Monthly Asphalt Cement Price month project let (APL)			$	596.00	
Total Monthly Tonnage of asphalt cement (TMT)				3.822639821	

Bitum Tack Gals	gals/ton	tons
890	232.8234	3.82263982

BITUMINOUS TACK COAT (surface treatment)

Price Adjustment (PA)				**0**	**$ -**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	953.60	
Monthly Asphalt Cement Price month project let (APL)			$	596.00	
Total Monthly Tonnage of asphalt cement (TMT)				0	

Bitum Tack	SY	Gals/SY	Gals	gals/ton	tons
Single Surf. Trmt.		0.20	0	232.8234	0
Double Surf.Trmt.		0.44	0	232.8234	0
Triple Surf. Trmt		0.71	0	232.8234	0
					0

TOTAL LIQUID AC ADJUSTMENT **$ 136,539.78**

GEORGIA DEPARTMENT OF TRANSPORTATION
PRELIMINARY ROW COST ESTIMATE SUMMARY

Date: 5/19/2014 Project: NH000-0022-01(023)
Revised: County: Coweta
PI: 332180
Description: Roundabout Intersection SR 154 & SR 16
Project Termini: Roundabout Intersection SR 154 & SR 16
Existing ROW: Varies
Parcels: 11 Required ROW: Varies

Land and Improvements		$315,360.00
Proximity Damage	*$5,000.00*	
Consequential Damage	*$0.00*	
Cost to Cures	*$5,000.00*	
Trade Fixtures	*$0.00*	
Improvements	*$25,000.00*	
Valuation Services		$42,500.00
Legal Services		$82,425.00
Relocation		$22,000.00
Demolition		$0.00
Administrative		$117,000.00
TOTAL ESTIMATED COSTS		$579,285.00
TOTAL ESTIMATED COSTS (ROUNDED)		***$580,000.00***

Preparation Credits	Hours	Signature

Prepared By: Lashone Alexander CG#: 286999 05/19/2014 (DATE)
Approved By: Lashone Alexander CG#: 286999 05/19/2014 (DATE)

NOTE: No Market Appreciation is included in this Preliminary Cost Estimate

allsop

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE **NH000-0022-01(023) Coweta County, P.I. # 332180**
Intersection Improvement at SR 16 and SR 54 - Roundabout

OFFICE Thomaston

DATE April 29, 2014

FROM Kerry Gore, District Utilities Engineer

TO Kevin VanHouten, Project Manager

SUBJECT **PRELIMINARY UTILITY COST (ESTIMATE)**

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

FACILITY OWNER	NON-REIMBURSABLE	REIMBURSABLE
Coweta County Water & Sewer	$202,000.00	
Atlanta Gas Light	$420,000.00	
BellSouth	$60,000.00	$120,000.00
Charter Communications	$68,060.00	
City of Turin	$50,000.00	
Coweta-Fayette EMC	$21,400.00	$10,600.00
Georgia Power Co. - Dist.		$120,000.00
Georgia Power Co.-Trans.		$375,000.00
TOTALS	**$821,460.00**	**$625,600.00**

Total Preliminary Utility Cost Estimate is **$1,447,060.00**.

If you have any questions, please contact Gene McKissick at 706-646-7604.

KG/BGM

cc: Mike Bolden, State Utilities Engineer *(via: e-mail)*

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: PI # 332180, Coweta County **OFFICE:** State Utilities Office

FROM: Michael J. Bolden, State Utility Engineer **DATE:** May 1, 2014

TO: Albert V. Shelby, III, State Program Delivery Engineer
Attn: Kevin B. VanHouten, Project Manager

SUBJECT: **REVISED PRELIMINARY RAILROAD COST FOR SURFACE WORK (CONCEPT ESTIMATE)**

A review of railroads located within the project limits on the above referenced project has been conducted based on the proposed concept report provided. Listed below is a breakdown of the estimated railroad costs:

FACILITY OWNER	NON-REIMBURSABLE	REIMBURSABLE
NS - Central of GA Railroad Company		
PE for bridge over railroad	**$0.00**	**$41,900.00**
CE for bridge over railroad	**$0.00**	**$102,100.00**
Total Reimbursement Cost:	**$0.00**	**$144,000.00**

Total railroad surface work reimbursable cost for the above project is estimated to be:
$144,000.00.

Please note that this amount does not include other reimbursable utility costs that may be associated with this project. Please keep the railroad costs separate from other utilities in your designer's cost estimate.

If you have any questions, please contact Marcela Coll, (404)631-1372, mcoll@dot.ga.gov or Jill Franks, (404) 631-1370, jfranks@dot.ga.gov.

MJB:JLF:mgc

cc: Jun Birnkammer, State Utilities Preconstruction Engineer
Angela Robinson, State Financial Management Administrator
Kerry Gore, District 3 Utilities Engineer

Crash Data

S.R. 16 at S.R. 54 Crash Summary						
		Type		Severity		
Year	Total Crashes	Rear End	Left Turns	Property Damage Only	Injury	Fatality
2008	1	0	1	0	1	0
2009	1	1	0	0	1	0
2010	3	2	1	3	0	0
2011	3	2	1	3	0	0
2012	3	2	1	2	1	0
Total	11	7	4	8	3	0

Intersection was primarily a stop sign controlled intersection during this time period.

Traffic Projections/Forecasting Summary Sheet

NH000-0022-00(023)

P.I. # 332180

COWETA COUNTY

Year Counts Were Taken: 2013

Growth Factors

Build

Growth for Build

Existing Year to Base Year:

Mainline (SR0016) 1.95%

Base Year to Design Year:

Mainline (SR0016) 2.26%

Mainline (SR0016)

K = 8.2%

Mainline (SR0016)

D = 55% thru 58%

No Build

Growth for No Build

Existing Year to Base Year:

Mainline (SR0016) 1.95%

Base Year to Design Year:

Mainline (SR0016) 2.26%

Mainline (SR0016)

K = 8.0%

Mainline (SR0016)

D = 55% thru 58%

Assumptions

- Reviewed GDOT AADT Historical Traffic Growth Trends for the past 25 Years, 20 Years, 15 Years, 10 Years, and 5 Years for the following:
    a. 4 Traffic Counter Location within the scope of this project.
- Reviewed Coweta County Comprehensive Land Use Plan.

RESEARCHED BY: ANDRE WASHINGTON
DATE: APRIL 2013

- Reviewed Georgia Residential Population Projections Based on The 2000 Census Count and The 2010 Census Count.
- Reviewed 2040 Travel Demand MPO Model for Atlanta, Georgia

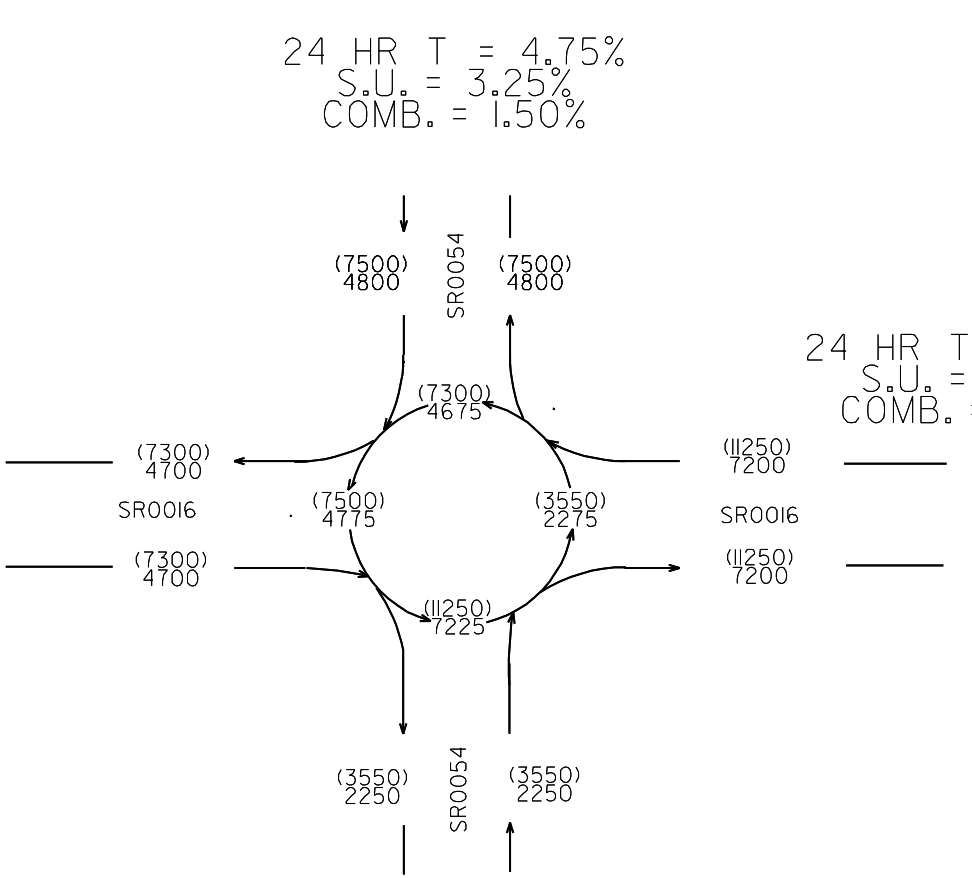
RESEARCHED BY: ANDRE WASHINGTON
DATE: APRIL 2013

COWETA COUNTY
BUILD

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

24 HR T = 4.75%
S.U. = 3.25%
COMB. = 1.50%

24 HR T = 8.00%
S.U. = 5.25%
COMB. = 2.75%



NH000-0022-01(023)
P.I.# 332180
COWETA
COUNTY

SR 16 @ SR 54

2038 ADT = (000)
2018 ADT = 000

AMW
04/13

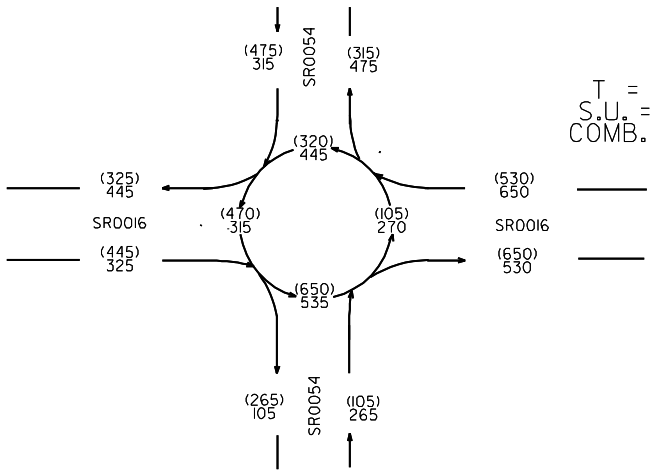
COWETA COUNTY
BUILD

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

N

T = 4.75%
S.U. = 3.75%
COMB. = 1.00%

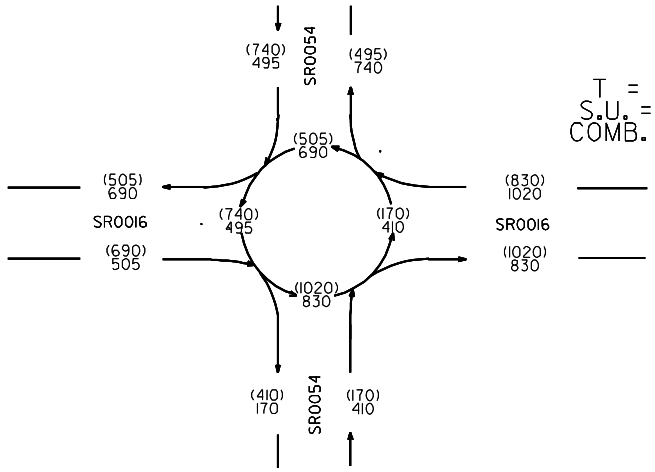
T = 3.50%
S.U. = 2.50%
COMB. = 1.00%



2018 PM DHV = (000)
2018 AM DHV = 000

T = 4.75%
S.U. = 3.75%
COMB. = 1.00%

T = 3.50%
S.U. = 2.50%
COMB. = 1.00%



2038 PM DHV = (000)
2038 AM DHV = 000

NH000-0022-01(023)
P.I.# 332180
COWETA
COUNTY

SR 16 @ SR 54

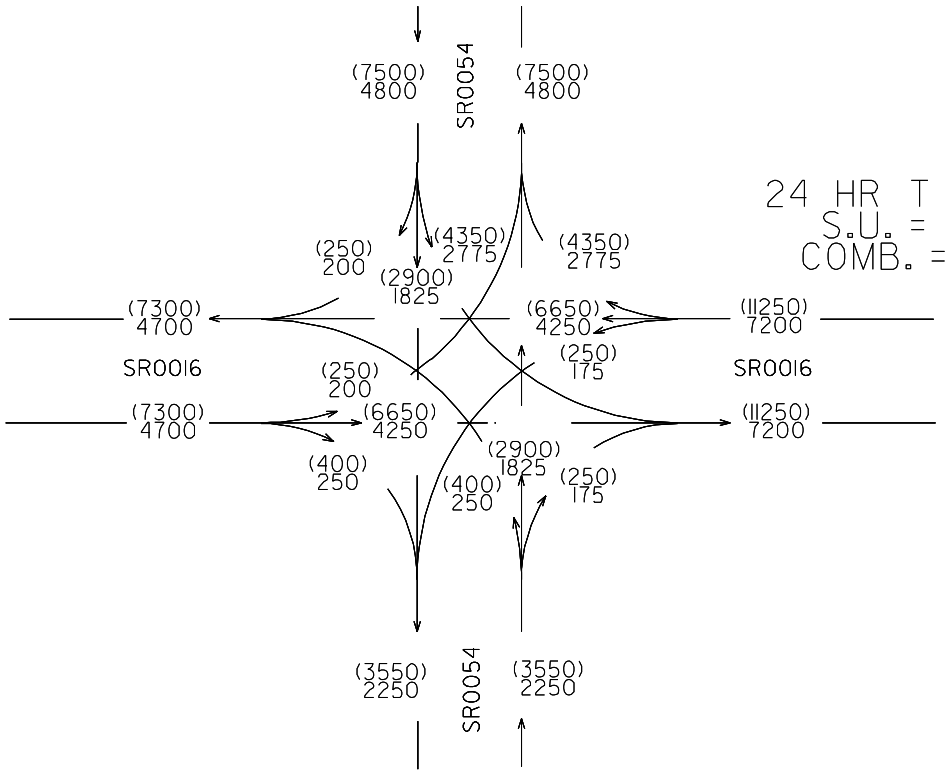
AMW
04/13

COWETA COUNTY
NO BUILD

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF PLANNING

24 HR T = 4.75%
S.U. = 3.25%
COMB. = 1.50%

24 HR T = 8.00%
S.U. = 5.25%
COMB. = 2.75%



NH000-0022-01(023)
P.I.# 332180
COWETA
COUNTY

SR 16 @ SR 54

2038 ADT = (000)
2018 ADT = 000

AMW
04/13

COWETA COUNTY
NO BUILD

GEORGIA DEPARTMENT OF TRANSPORTATION
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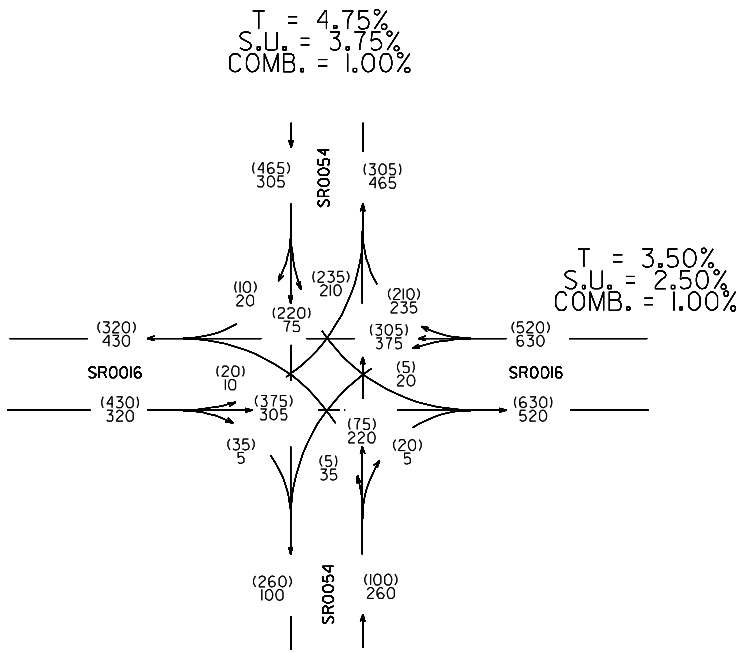

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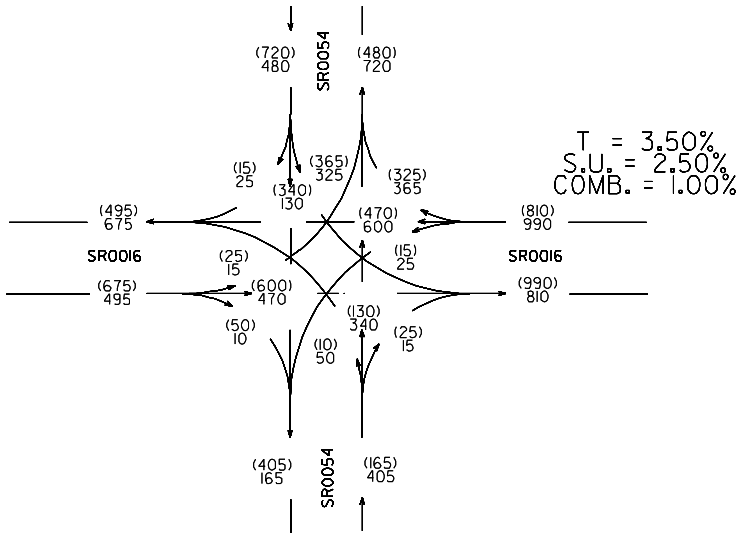
2018 AM DHV = 000



2038 PM DHV = (000)
2038 AM DHV = 000

NH000-0022-01(023)
P.I.# 332180
COWETA
COUNTY

SR 16 @ SR 54

AMW
04/13

SHEET 1 OF 1

COWETA COUNTY

GEORGIA DEPARTMENT OF TRANSPORTATION
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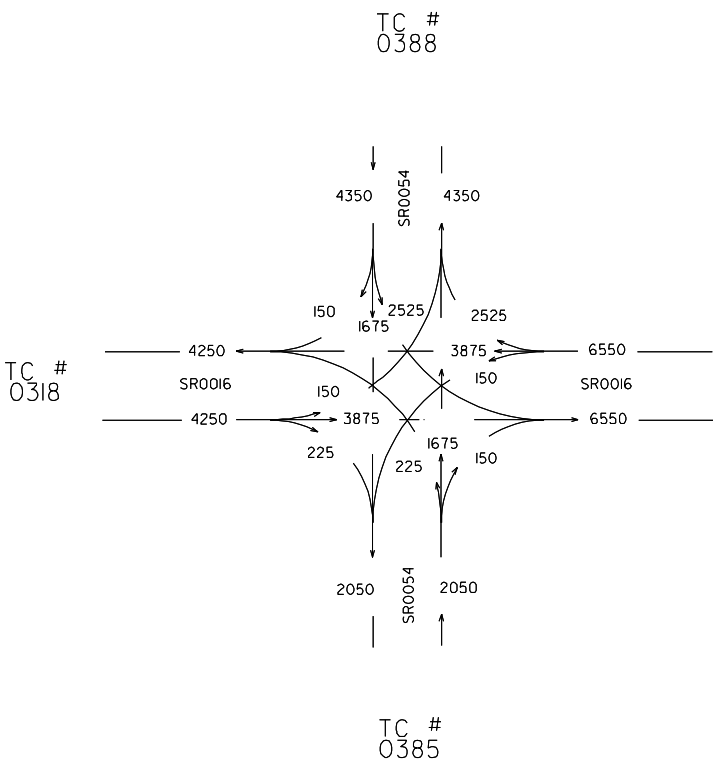
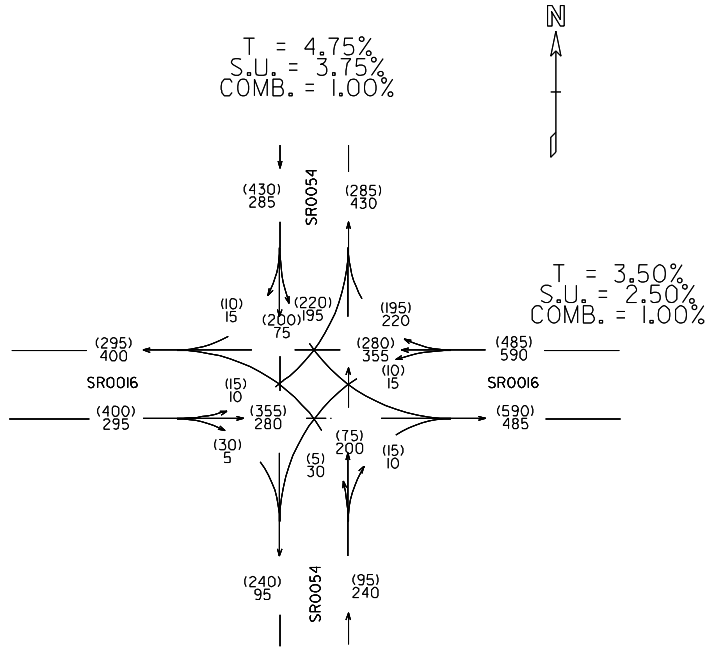


2013 EXISTING TRAFFIC



2013 PM DHV = (000)
2013 AM DHV = 000

NH000-0022-01(023)
P.I.# 332180
COWETA COUNTY

SR 16 @ SR 54

AMW
04/13

Roundabout Feasibility Study

NH000-0022-01(023)

P.I. No. 332180

Coweta County

S.R. 16 at S.R. 54

Prepared By:

Georgia Department of Transportation

District Three Design

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Section 1: Project Background

Project NH000-022-01(023)is located in eastern Coweta County in the City of Turin on S.R. 16 at the intersection with S.R. 54. S.R. 16 is the East/West route, and S.R. 54 is the North/South route. All four approaches are stop controlled. S.R 16 is posted at 55 mph, and S.R. 54 is posted at 55 mph. There are no current pedestrian facilities, and no pedestrians are recorded in the count data provided. Existing residential land uses are present on the western side of the southern approach on S.R. 54.Please see the intersection below in Figure No. 1.

Figure No. 1.1 – Intersection of S.R. 16 and S.R. 54

Section 2: Safety Assessment

The updated crash data for the years 2008 through 2012 has been collected. The intersection was stop sign controlled during this period. The crash data shows eleven total crashes. Of those eleven crashes three (27%) were injury crashes, and eight (73%) were non-injury crashes. There were no fatality crashes. Seven (64%) of the crashes were rear end crashes. Of those six were crashes involving west bound right turns on S.R. 16 to north bound S.R. 54. The remaining rear end collision involved both vehicles traveling east bound on S.R. 16. The remaining four (36%) of the crashes were angle crashes. The predominant cause of these crashes was failure to yield to oncoming traffic. The predominant crash type is the rear end crashes cause by the S.R. 16 east bound right turning vehicle being impacted by the vehicle directly behind it. This is consistent with the right turn drivers misjudging the timing of the vehicle in front of them turning right. With three injury crashes in three years, alternate selection is not driven by the need to improve safety.

Table No. 2.1 – Crash Summary

S.R. 16 at S.R. 54 Crash Summary						
		Type		Severity		
Year	Total Crashes	Rear End	Left Turns	Property Damage Only	Injury	Fatality
2008	1	0	1	0	1	0
2009	1	1	0	0	1	0
2010	3	2	1	3	0	0
2011	3	2	1	3	0	0
2012	3	2	1	2	1	0
Total	11	7	4	8	3	0

Section 3: Construction Alternates

Four viable intersection improvement alternatives have been identified to improve the existing operational and safety performance of the intersection. These options include:

- Preferred Alternate – Modern Multi Lane Roundabout
- Alternate 1 – Signalized
- Alternate 2 – Single Lane Roundabout
- No Build – Stop Sign Controlled

Based on these sketch alternative intersection improvement and control alternatives a traffic engineering assessment and evaluation has been performed. The goal of this assessment was to determine a preferred alternative.

Figure No. 3.1 – Modern Multi Lane Roundabout

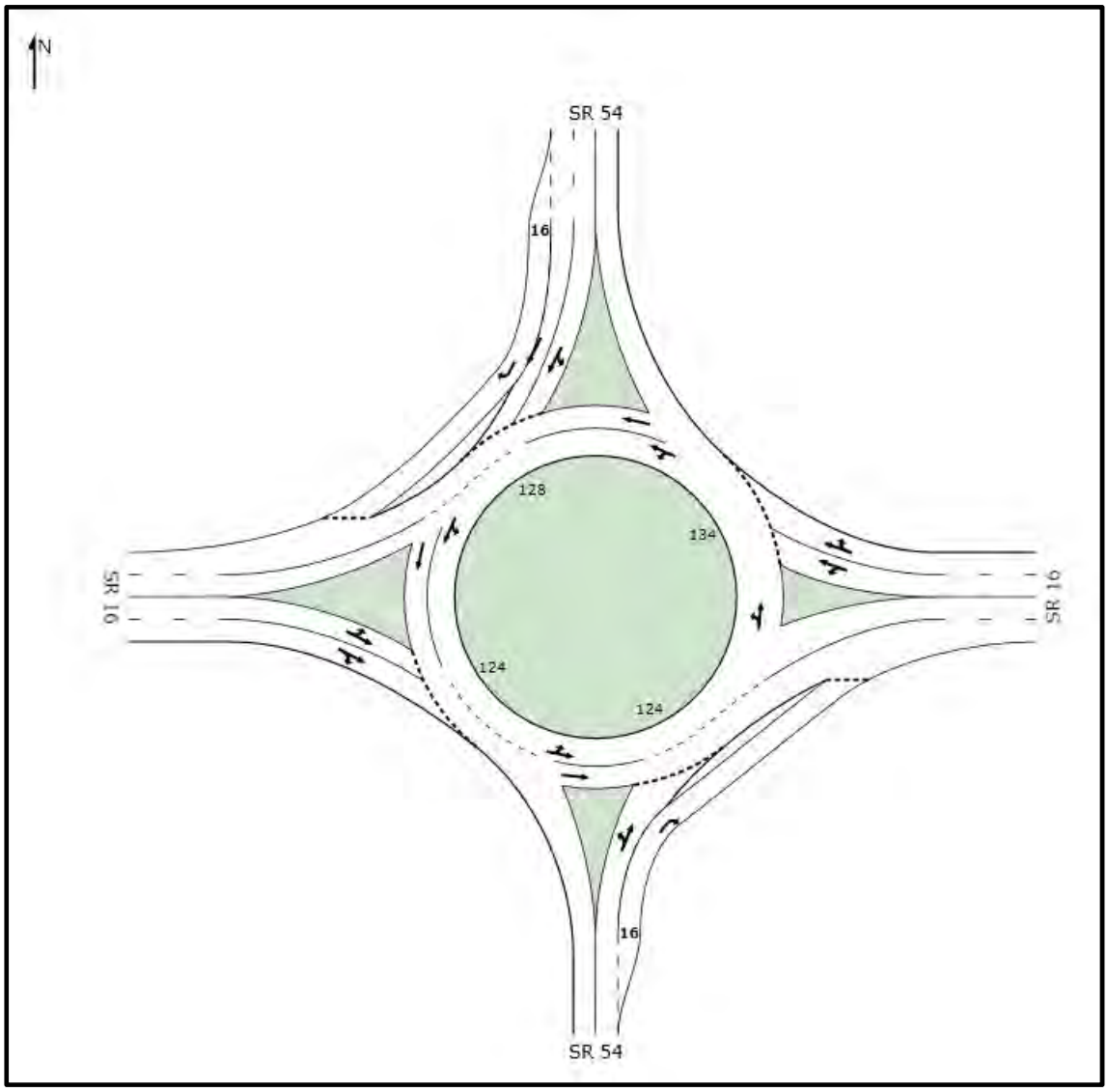


Figure No. 3.2 – Signalized Intersection

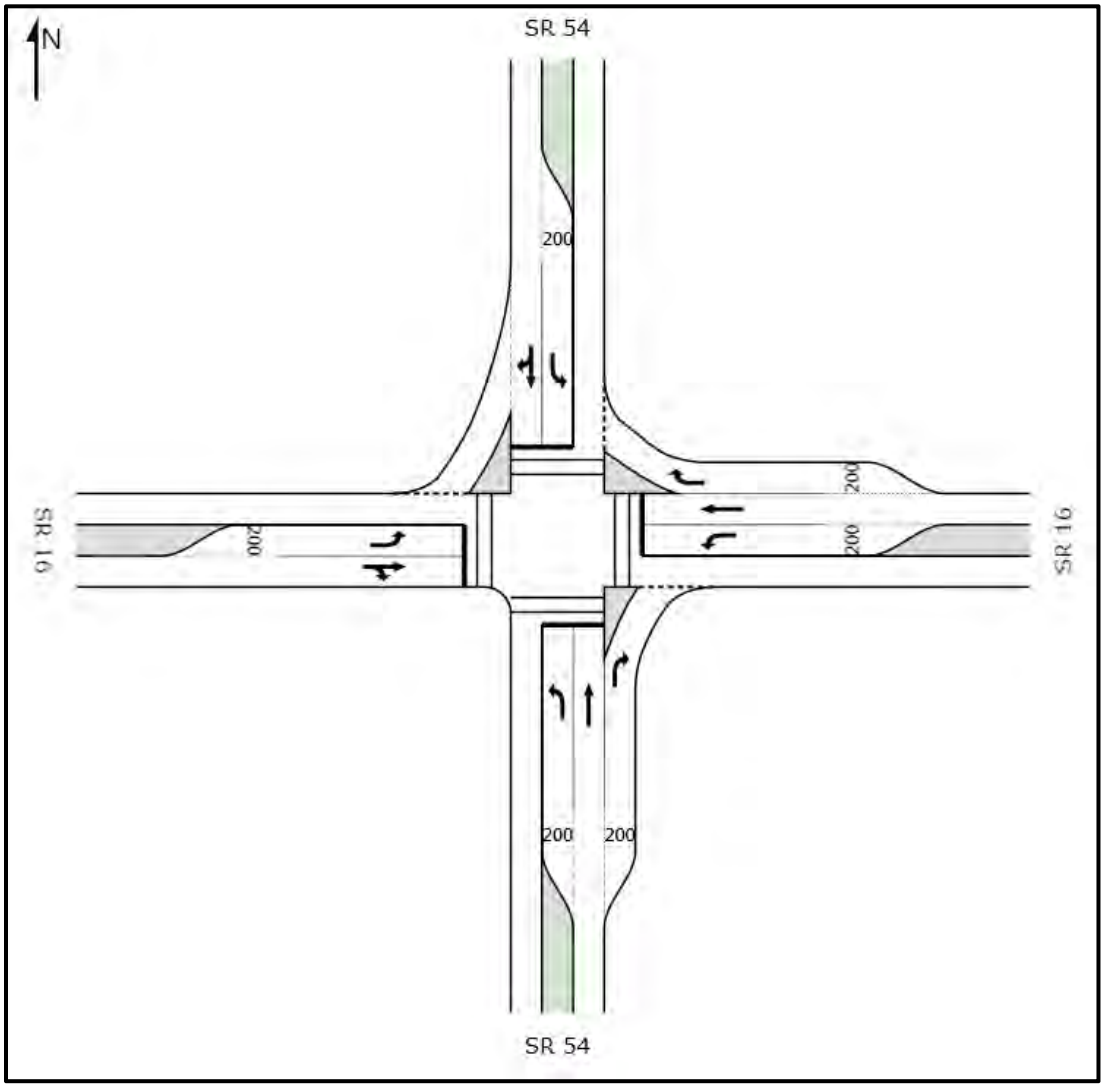
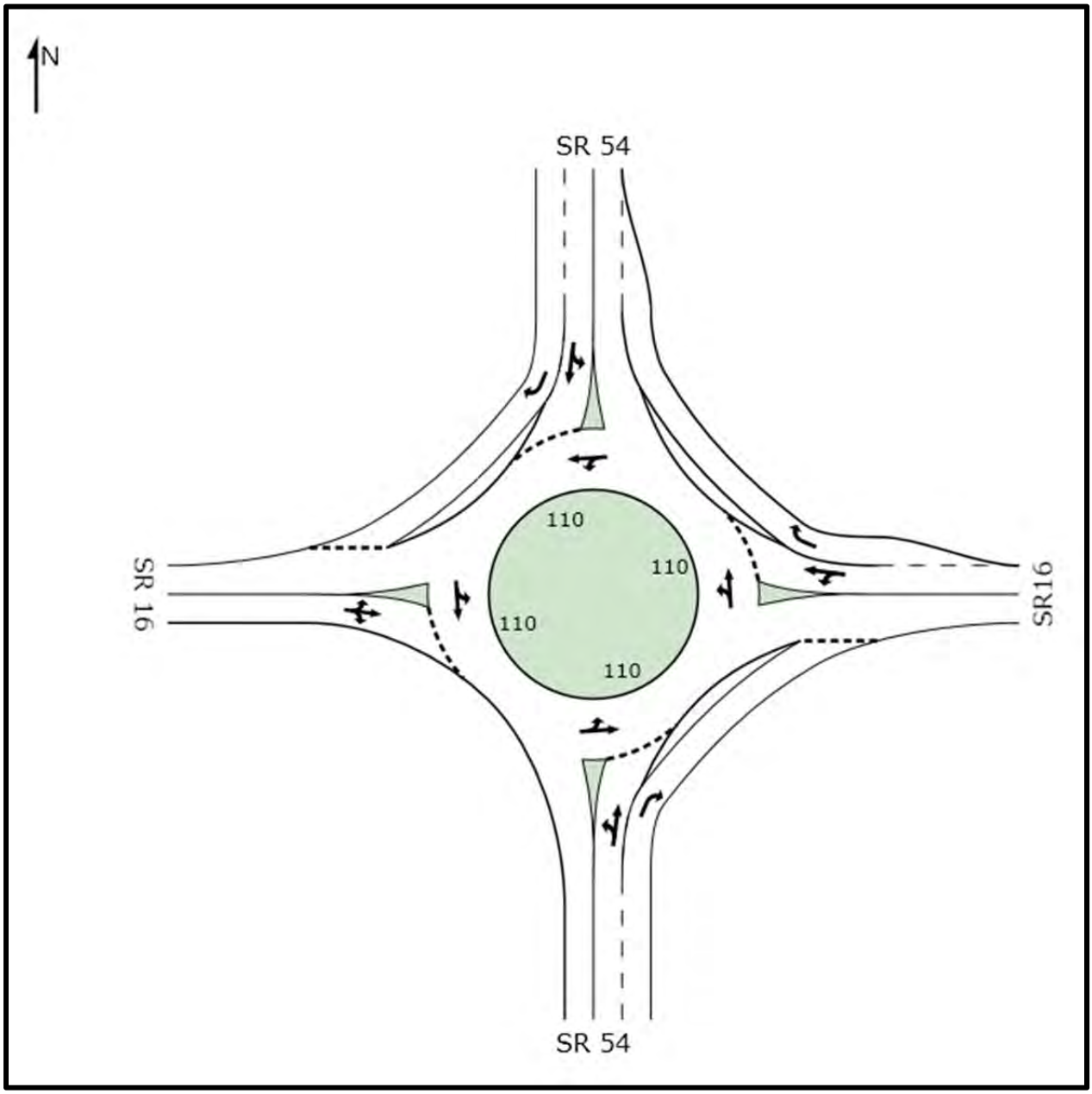


Figure No. 3.2 – Modern Single Lane Roundabout



Section 4: Operational Analysis

We have evaluated the proposed Alternatives based on the following traffic projections shown below in figure 4.1.

Figure No. 4.1a-Traffic Peak Hour Counts

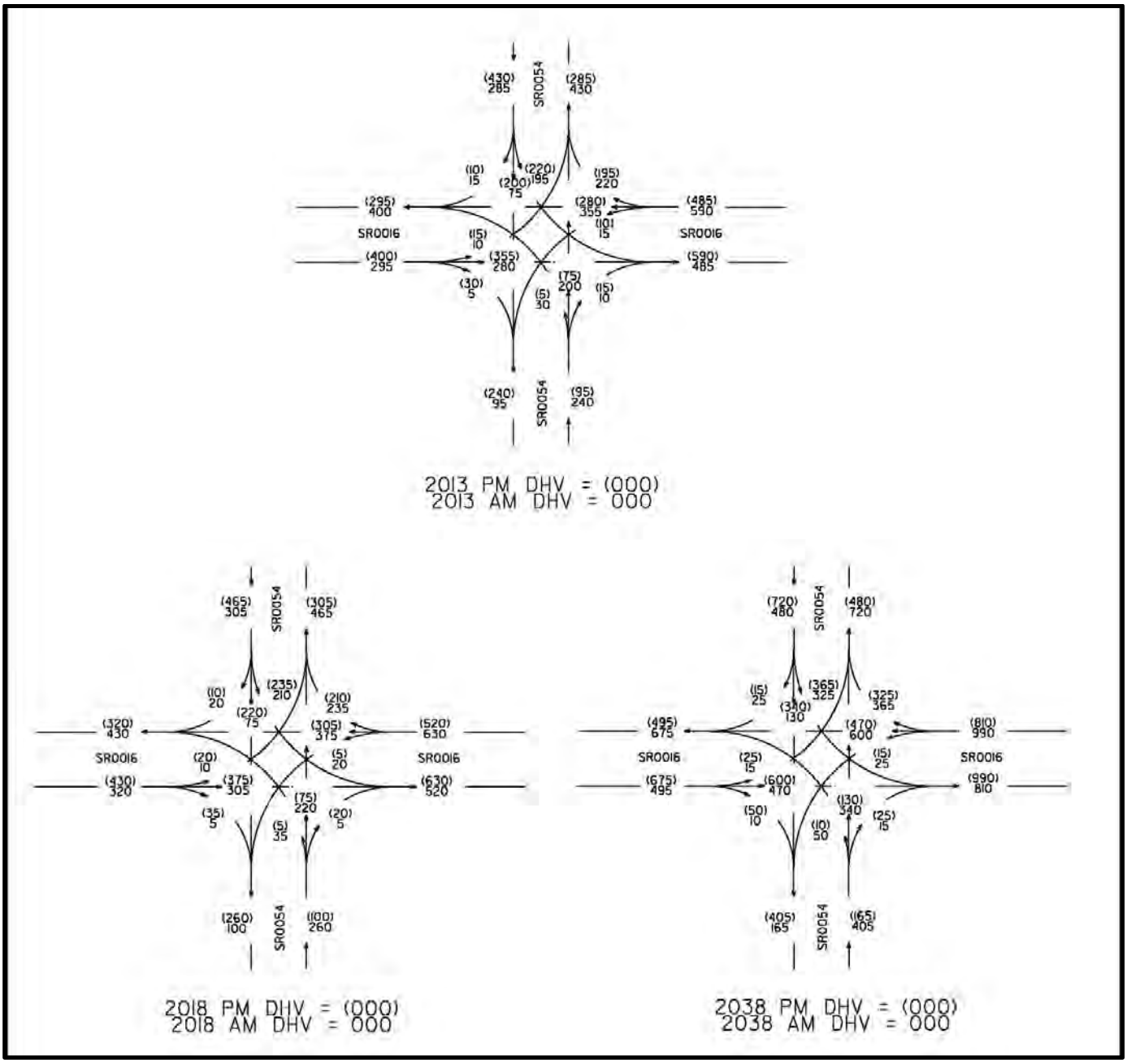
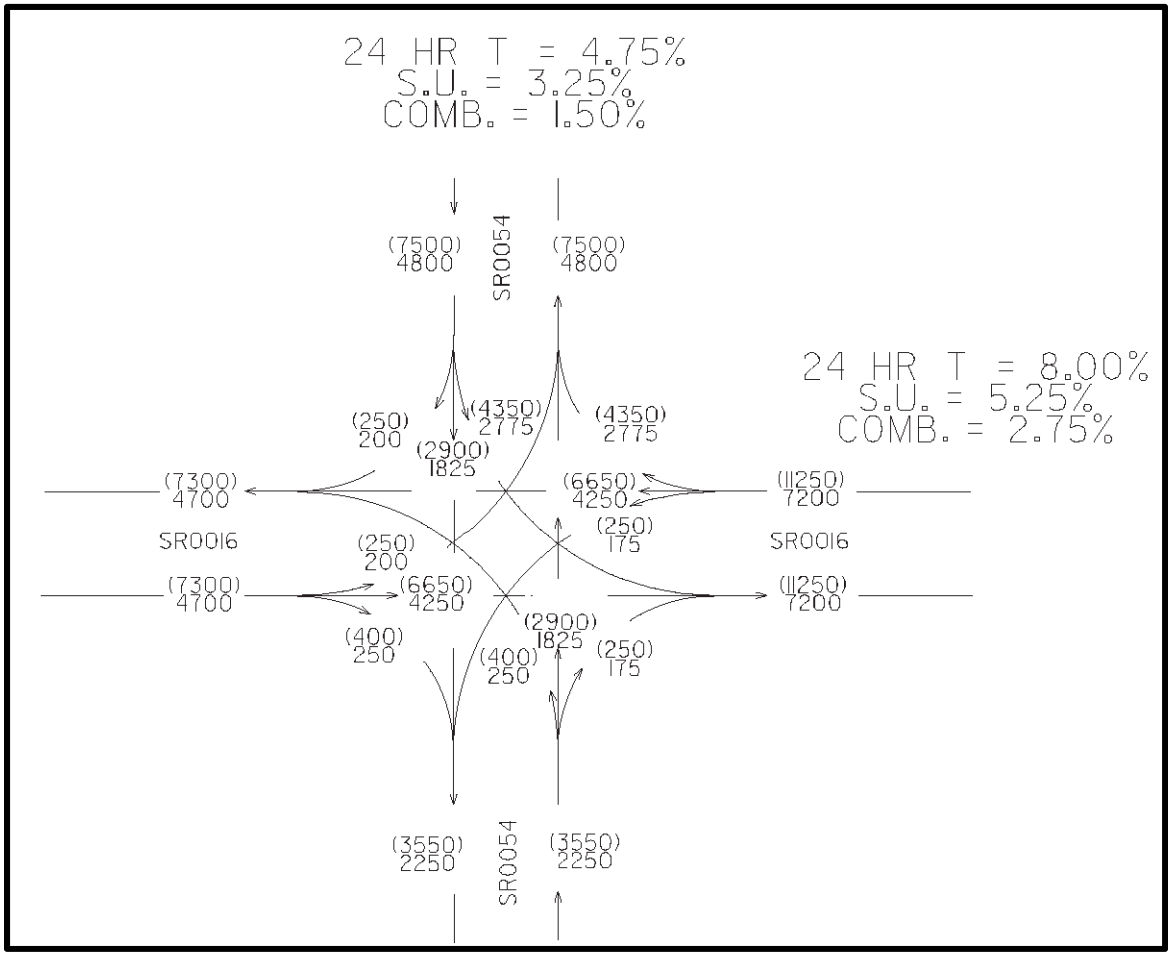


Figure 4.1b – ADT Diagram



Four Way Stop Control

The delay at this intersection is expected to continue to degrade under the existing four way stop sign controlled intersection. Crashes are expected to correspondingly increase. Therefore the existing four way stop controlled intersection should not be considered a viable option, and is not included in any further analysis. Please see appendix A for the capacity analysis of the four way stop.

Table 4.1 Stop Sign Controlled Operational Analysis

Period	Intersection LOS	Intersection Delay (s/veh)
2018 AM	F	54.37
2018 PM	F	189.01
2038 AM	F	1870.00
2038 PM	F	1499.00

Please see Appendix D for expanded analysis.

Modern Multi Lane Roundabout

Based on the peak hour flows for the opening and design years a capacity analysis has been conducted on a multi-lane roundabout using HCS 2010. The target LOS of D was used in the analysis. Please see Table 4.7 for a summary of the analysis.

Using the HCS 2010 analysis method in both the AM and the PM time periods the roundabout operated at a LOS of A for the open year of 2018. The results of the analysis of the roundabout for the design year of 2038 resulted the intersection meeting or exceeding a LOS of C. Using the HCS 2010 model a multi-lane roundabout would operate efficiently well past the twenty year design life.

Table 4.6 – Multi-Lane Roundabout Capacity Analysis

Period	Intersection LOS	Intersection Delay (s/veh)
2018 AM	A	8.82
2018 PM	A	7.44
2038 AM	C	20.49
2038 PM	B	13.58

Please see Appendix A for expanded analysis.

Signalized Intersection

Based on the long range 2038 traffic volumes a signalized intersection may be warranted in the long range future. Warrant No. 1 has been evaluated using the 80% volume threshold values and the 100% volume thresholds. Signal warrant is met for both the 80% and the 100% threshold on the 2038 long range traffic.

Table 4.2 – Signal Warrant No. 1 MUTCD 2009 – 8th Highest Hourly Volume

Signal Warrant #1 MUTCD 2009					
Roadway	**Actual Volume**	**Req'd for 100%**	**Threshold Met**	**Req'd for 80%**	**Threshold Met**
Major (SR 16)	1260	500	Y	600	Y
Minor (SR 54)	420	150	Y	60	Y

Actual Volume = 2038 ADT x 5.6%

SR 16 2038 ADT=22500

SR 54 ADT=7500

The signalized option was analyzed using the HCS 2010 software package. Please see Figure 3.1 for a representation of the geometry used in the analysis. Table 4.3 shows how the intersection operates for the open and design years. Please see appendix B for the complete analysis.

Table 4.3 – Signalized Controlled Intersection Operational Analysis

Period	Intersection LOS	Intersection Delay (s/veh)
2018 AM	C	23.60
2018 PM	C	22.00
2038 AM	C	30.70
2038 PM	C	28.10

Please see Appendix B for expanded analysis.

Modern Single Lane Roundabout

Based on the peak hour flows for the opening and design years a capacity analysis has been conducted on a single lane roundabout using HCS 2010. The target LOS of D was used in the analysis. Please see Table 4.4 for a summary of the analysis.

Using the HCS 2010 analysis method the level of service (LOS) for both the AM and PM time periods was B. The analysis for the design year of 2038 yielded a LOS of E in the AM period for the year 2038, and a LOS of F for the PM period.. According to the HCS 2010 analysis the single lane roundabout would not operate efficiently in the design year of 2038.

According to the GDOT Design Manual Chapter 8.3.11 if the capacity analysis demonstrates that a single lane roundabout is adequate for at least 10 years after the opening year, a single lane roundabout should be constructed. As shown in Table No. 4.4 the roundabout operates at a LOS of E during the PM analysis period using the HCM 2010 analysis method. Using the Sidra analysis method the intersection operates at a LOS of C or better for all analysis periods. Please See Appendix C for a full analysis.

Table No. 4.4 – Single Lane Roundabout Capacity Analysis

Period	Intersection LOS	Intersection Delay (s/veh)
2018 AM	B	11.40
2018 PM	B	14.46
2038 AM	E	48.54
2038 PM	F	126.35

Please see Appendix C for expanded analysis

Table 4.5 – Future Intersection LOS

Intersection Level of Service				
	Year 5		Year 10	
Period	HCM 2010	Sidra	HCM 2010	Sidra
AM	B	A	C	B
PM	C	B	E	C

Section 5: Cost Comparison

A cost comparison has been performed for the four options presented in this study. Please see Table 5.1 for a breakdown of the Construction and R/W costs for each option discussed in this report.

Table 5.1 – Construction Alternative Cost Comparison

Construction Option	Total Cost
Pref. Alt. - Multi Lane Roundabout	$5,636,405.20
Alt. 1 - Signal	$5,988,573.26
Alt. 3 - Single Lane Roundabout	$5,129,457.55
No Build - Stop Sign	$0.00

As shown in Table 5.1 the most economical option to construct would be the single lane roundabout.

Section 6: Alternative Selection

According to NCHRP Report 672 a roundabout will always provide a higher capacity and lower delays than an all way stop control (AWSC) operating with the same traffic volumes. A roundabout that operates within its capacity will generally produce lower delays than a signalized intersection operation with the same traffic volumes.

NCHRP Report 672 also states that roundabouts offer significant benefits for improving safety particularly for reducing serious injury and fatal crashes. Roundabouts have crash reductions of approximately 35.4% for all crashes, and 75.8% for injury crashes when an intersection was converted from a signal or stop control to a roundabout.

A large part of the operational benefit of a roundabout to an AWSC intersection is obtained during the off peak periods. The restrictive stop control applies to the intersection for the entire 24 hours each day. A roundabout frees the intersection from those restrictions. This intersection has a large percentage of left turns, and therefore the delay would be reduced for this intersection.

The capacity analysis demonstrated that a single lane roundabout at the subject intersection would not operate at a capacity level necessary for the 20 year traffic projections. A single lane roundabout also has the lowest estimated construction cost.

A two lane roundabout capacity analysis demonstrated that a two lane roundabout would operate very efficiently at the 20 year traffic numbers and beyond. A two lane roundabout at this location would require a large amount of right of way, and has the highest construction costs of all the alternatives analyzed.

A hybrid type roundabout intersection offers the capacity of a two lane roundabout, but with a reduced construction cost. This type of intersection will work well with the higher left turn volumes from the northern approach on S.R. 54 onto S.R. 16.

Section 7: Conceptual Roundabout Design

Conceptual Layout

Please see the concept layout of the roundabout at the intersection of S.R. 16 at S.R. 54. The intersection has been shifted to the east to improve the existing skew, and to minimize impacts to local residential parcels. The roundabout will have one twenty foot lane between the east and north approaches. It will transition from one lane to two lanes between the north and the west approach. The roundabout will have two twenty foot lanes between the west and south approaches. It will transition back to one lane between the south and east approaches. This configuration was chosen to accommodate the left turn traffic from the north approach to the east approach. A free flow right turn bypass lane will be constructed from the east approach to the north approach. This will accommodate the excess right turn traffic approaching from the east. Simple right turn bypass lanes will be added between the north and west approaches as well as the between the south and east approaches because of intersection skew angle.

This roundabout is also being constructed in conjunction with a new bridge on S.R. 54 over Norfolk Southern Railroad. The existing bridge will be removed and replaced with a new bridge wide enough to accommodate the required lanes for the north approach.

Figure 7.1a Concept Layout – Intersection View

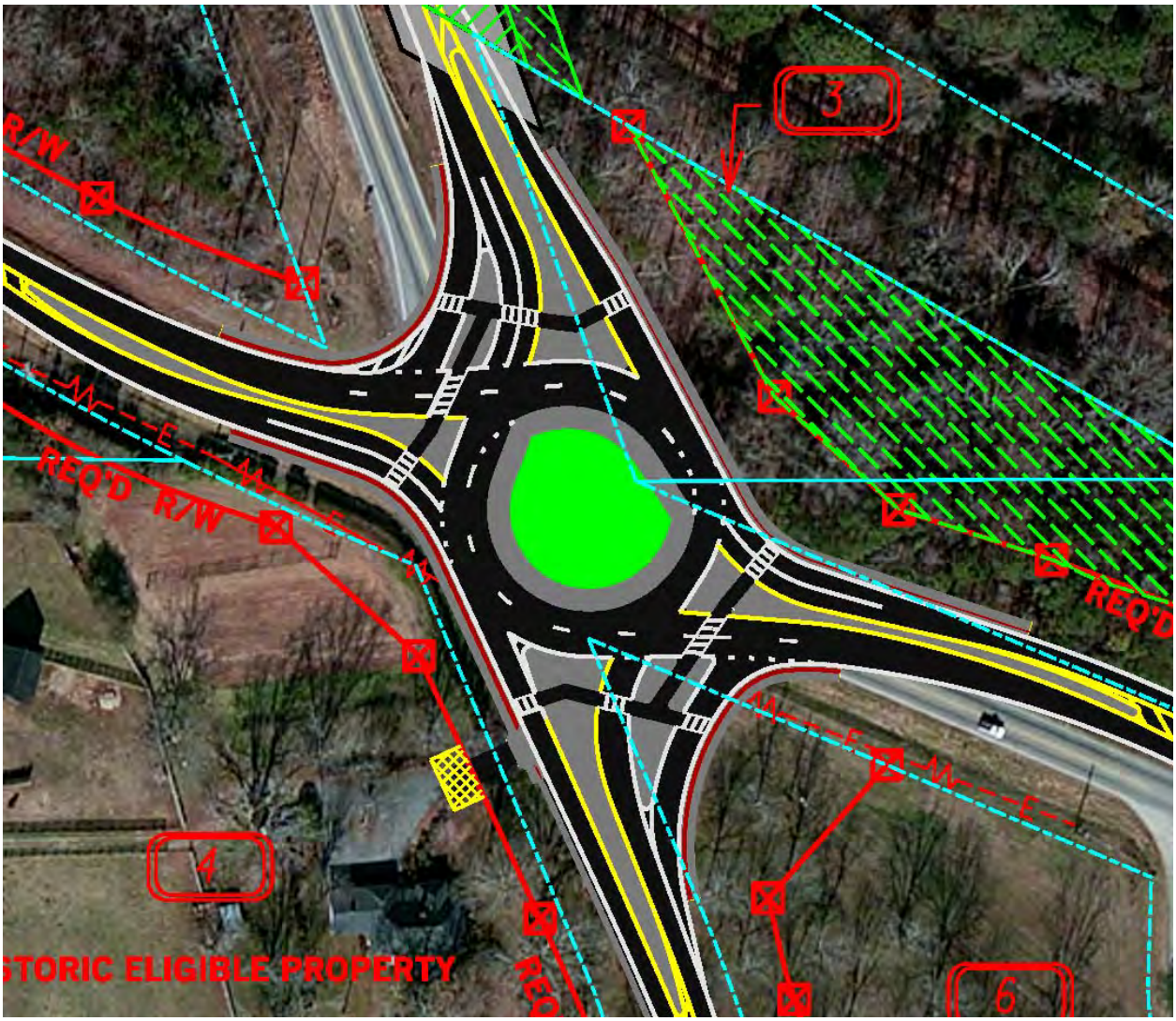
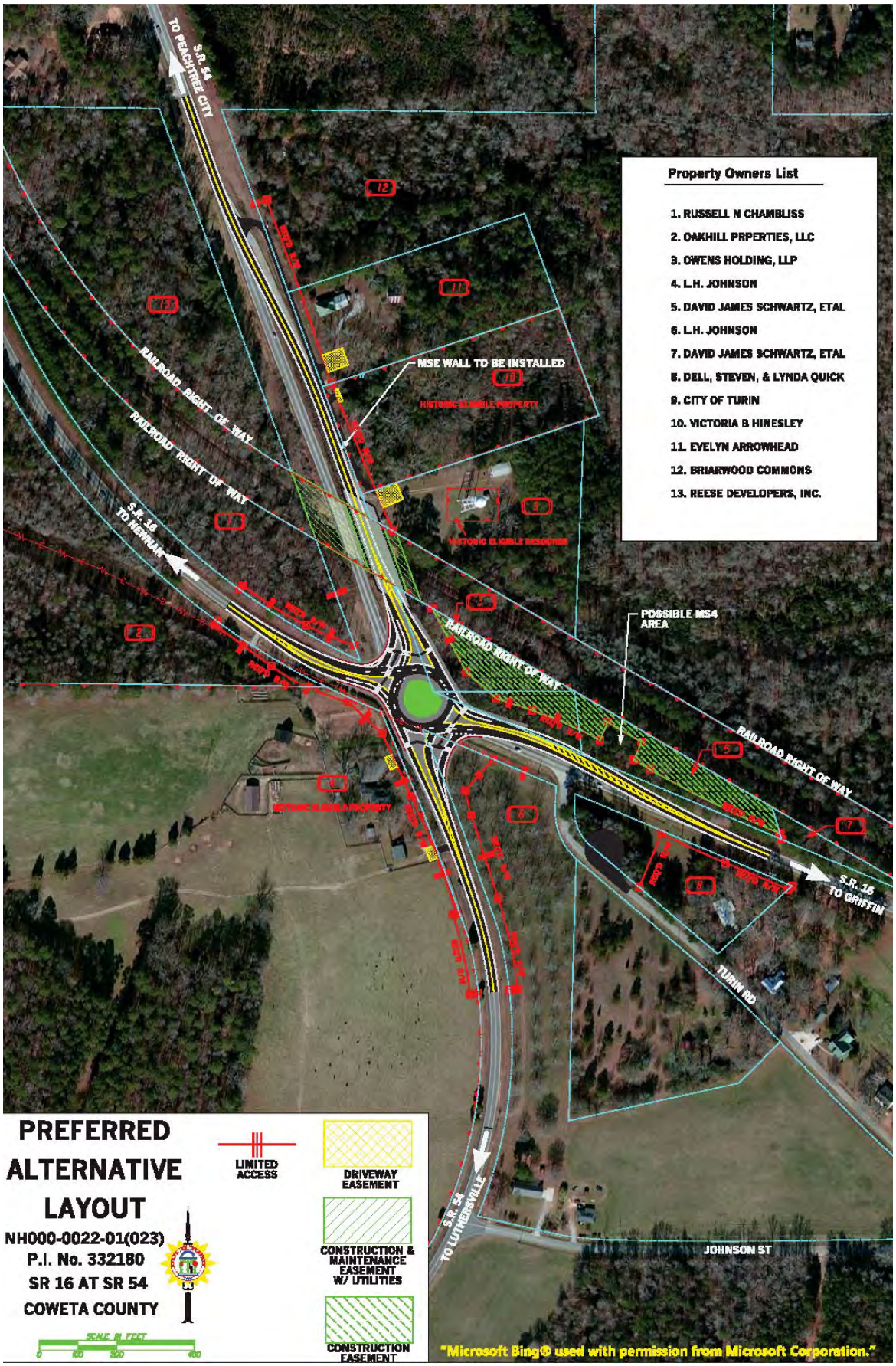


Figure 7.1a Concept Layout – Project View



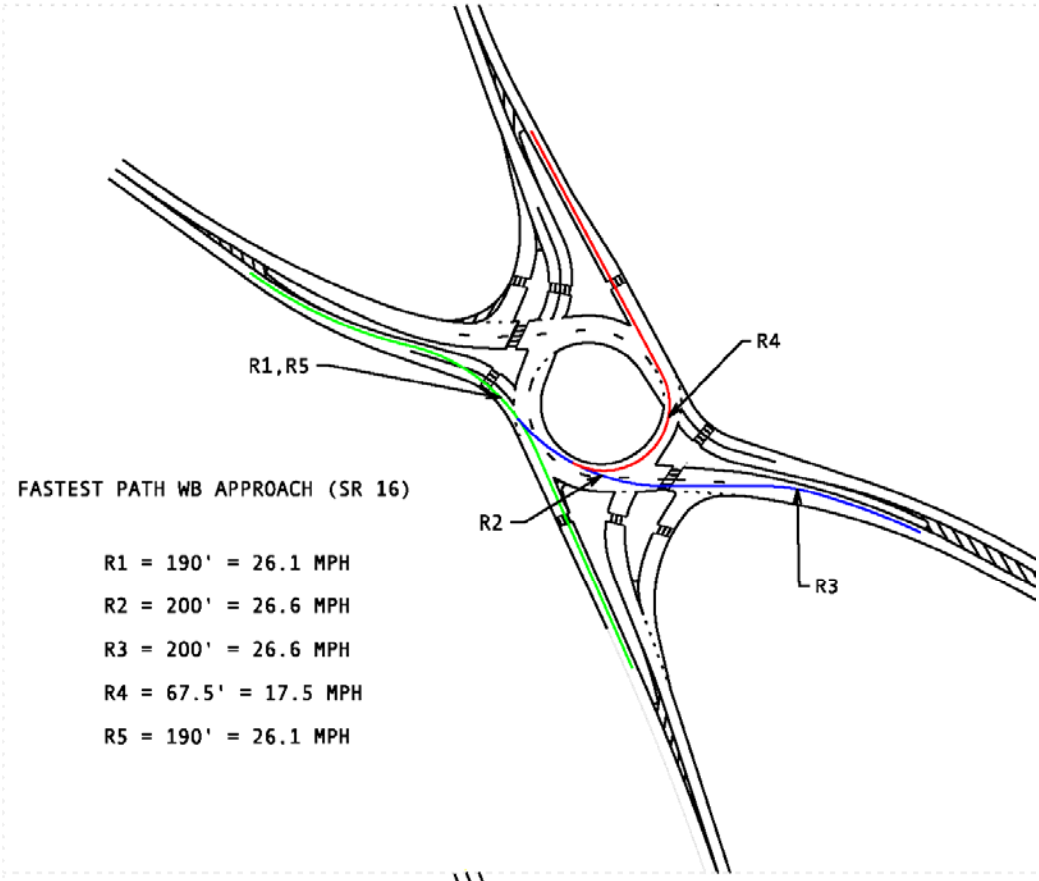
Stopping Sight Distance

The stopping sight distance needed for the design speed of 45 mph is 360 ft. Because of the minimum clearance requirements above the railroad tracks, and the proximity of the intersection to the bridge, the north approach may have sight distance issues. Further investigation into this issue can be done during preliminary design.

Fastest Path

According to the NCHRP Report 672 the fastest path allowed by the geometry determines the negotiation speed for each movement into, through, and exiting the roundabout. According to the report the recommended maximum theoretical design speed for a multi-lane roundabout should be 25-35 mph. As you can see in figure 7.2 the speeds for all five critical path radii have been calculated. All of the calculated speeds meet the recommended values. Please note that the R3 value could not be calculated for the two approaches on SR 54. There is no deflection exiting the roundabout so the R3 radius is zero.

Figure 7.2a – Fastest Path Diagram – SR 16



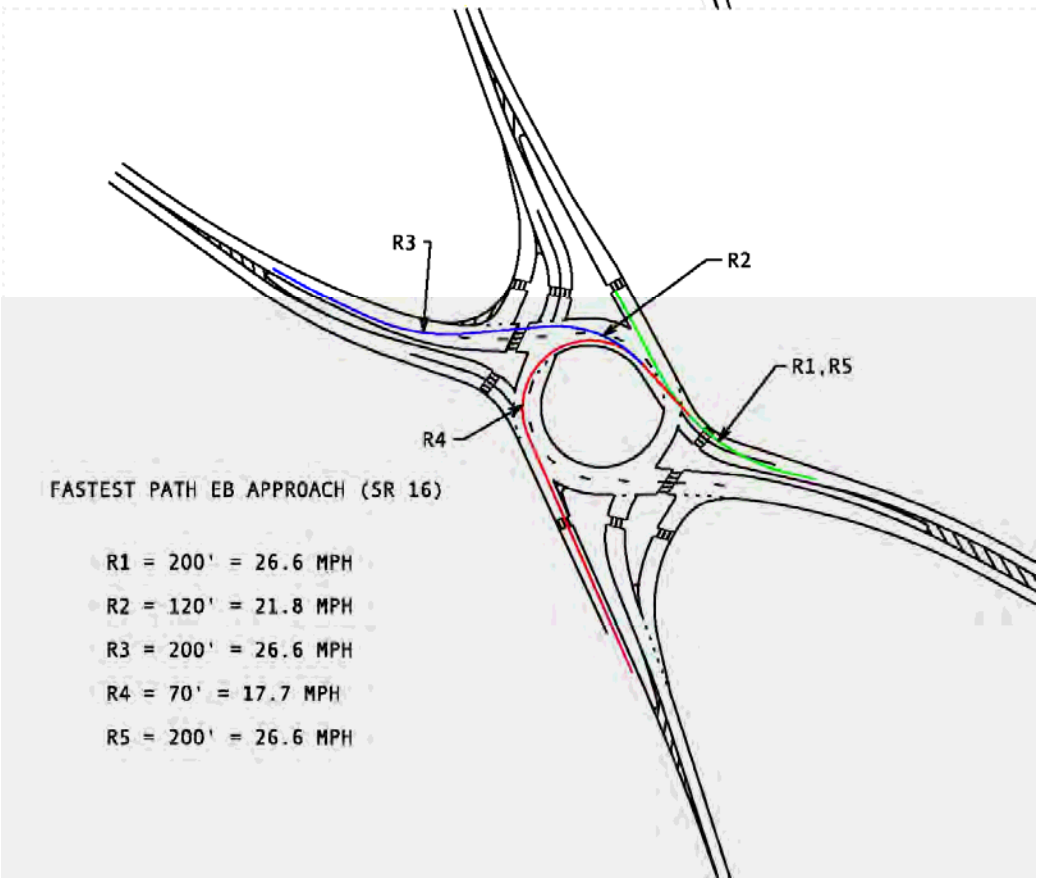
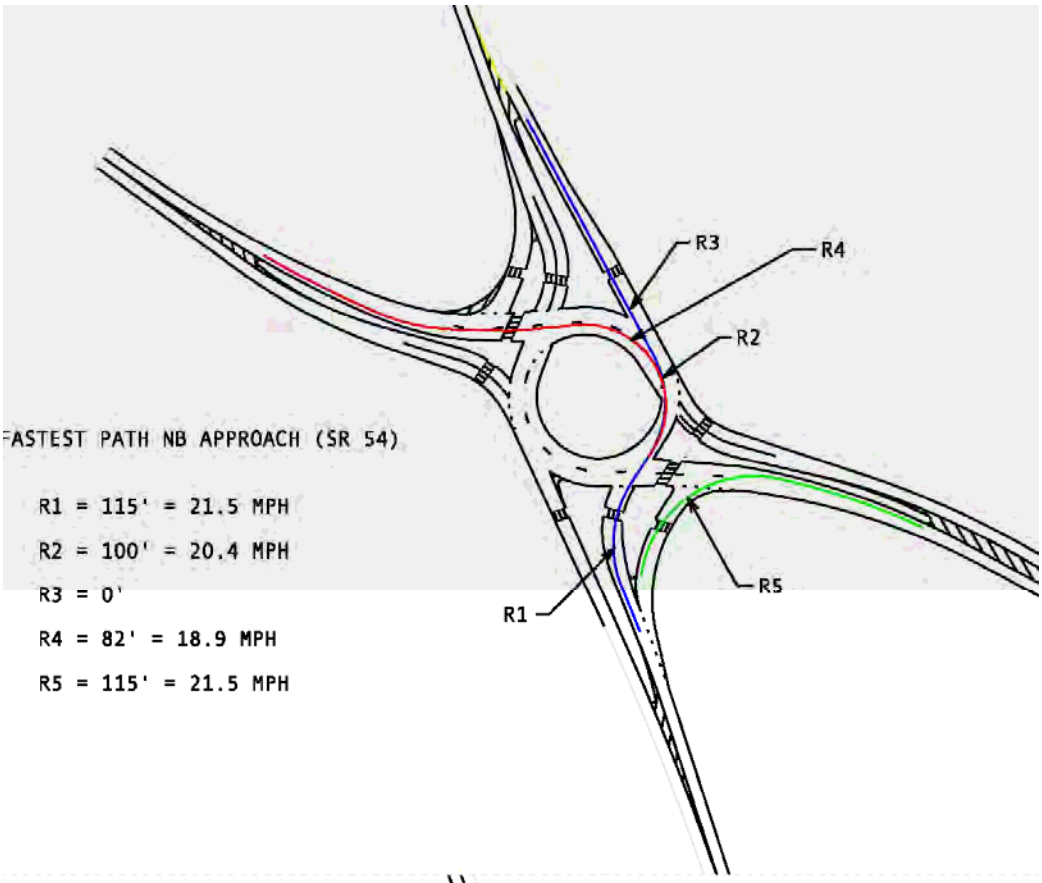
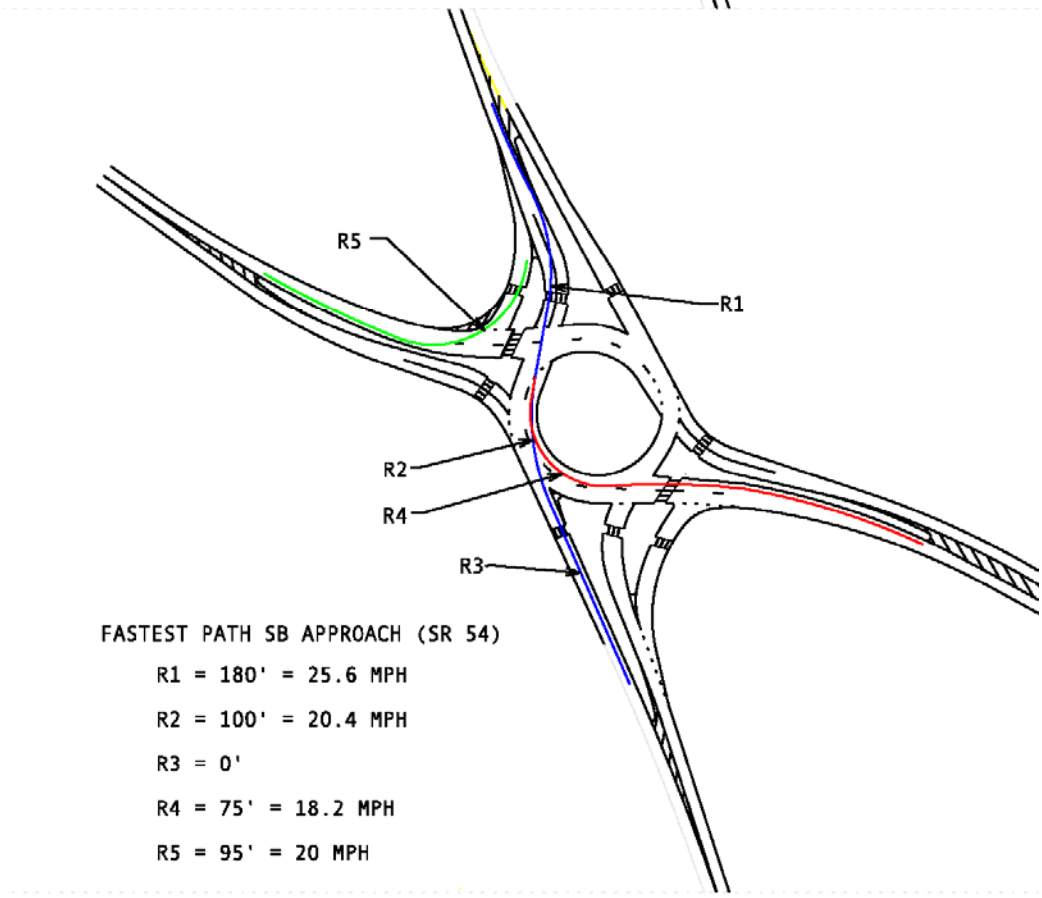


Figure 7.2b – Fastest Path Diagram – SR 54





`Section 8 – Recommendations

Based upon or analysis of the safety performance and the traffic operations at this intersection, we conclude that a hybrid roundabout is the most appropriate solution to the safety and operational performance at this intersection.

Below are issues with the design that will need to be addressed prior to moving forward to preliminary design:

- A detailed topographic and property survey should be obtained before preliminary design can begin.

- Coweta County has requested that the design impacts to the parcel on the southwest corner of the existing intersection be limited.

- The design should attempt to minimize impacts to the environmental features.

Appendices

Appendix A – Multi Lane Roundabout Operational Analysis

Appendix B – Signal Controlled Operational Analysis

Appendix C – Single Lane Roundabout Operational Analysis

Appendix D – Multi-Lane Hybrid Roundabout Operational Analysis

Appendix A – Multi Lane Roundabout Operational Analysis

ROUNDABOUT REPORT

General Information		Site Information	
Analyst	JMS	Intersection	SR 16 at SR 54
Agency or Co.	GDOT	E/W Street Name	SR 16
Date Performed	10/16/2014	N/S Street Name	
Time Period	AM	Analysis Year	2018
		Project ID	332180

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	2	0		0	2	0		0	1	0		0	2	0	
Volume (V), veh/h	10	305	5	0	20	375	235	0	35	220	0	0	210	75	0	0
Heavy Veh. Adj. (f_{HV}), %	4	4	4	3	4	4	4	3	5	5	5	3	5	5	5	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	4.2929	4.1129	5.1929	5.1929	5.1929	5.1929	4.2929	4.1129	5.1929	4.2929	4.1129	5.1929
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	349			302			596			487		
Exiting Flow (V_{ex}), pc/h	585			464			528			115		
Entry Flow (V_e), pc/h	170	192		335	378			291	0	240	86	0
Entry Volume veh/h	163	185		322	363			277	0	229	82	0

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h	870	885		835	835			745	630	784	804	711
Capacity (c), veh/h	837	851		803	803			710	606	747	766	684
v/c Ratio (X)	0.20	0.22		0.40	0.45			0.39	0.00	0.31	0.11	0.00

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	6.3	6.5		9.5	10.4			10.2	5.9	8.5	5.8	5.3
Lane LOS	A	A		A	B			B		A	A	
Lane 95% Queue	0.7	0.8		1.9	2.4			1.9	0.0	1.3	0.4	0.0
Approach Delay, s/veh	6.41			9.96			10.23			7.76		
Approach LOS, s/veh	A			A			B			A		
Intersection Delay, s/veh	8.82											
Intersection LOS	A											

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ROUNDABOUT REPORT

General Information		Site Information	
Analyst	*JMS*	Intersection	*SR 16 at SR 54*
Agency or Co.	*GDOT*	E/W Street Name	*SR 16*
Date Performed	*10/16/2014*	N/S Street Name	
Time Period	*PM*	Analysis Year	*2018*
		Project ID	*332180*

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	*0*	*2*	*0*		*0*	*2*	*0*		*0*	*1*	*0*		*0*	*2*	*0*	
Volume (V), veh/h	*20*	*375*	*35*	*0*	*5*	*305*	*210*	*0*	*5*	*75*	*0*	*0*	*210*	*220*	*0*	*0*
Heavy Veh. Adj. (f_{HV}), %	*4*	*4*	*4*	*3*	*4*	*4*	*4*	*3*	*5*	*5*	*5*	*3*	*5*	*5*	*5*	*3*
Peak Hour Factor (PHF)	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*
No. of Pedestrians Crossing Entry	*0*				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	*4.2929*	*4.1129*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*
Follow-Up Headway (sec)	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	*497*			*115*			*687*			*357*		
Exiting Flow (V_{ex}), pc/h	*664*			*351*			*346*			*297*		
Entry Flow (V_e), pc/h	*229*	*258*		*276*	*312*			*92*	*0*	*231*	*260*	*0*
Entry Volume veh/h	*220*	*248*		*265*	*300*			*88*	*0*	*220*	*248*	*0*

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h	*778*	*798*		*1007*	*1007*			*699*	*582*	*865*	*880*	*796*
Capacity (c), veh/h	*748*	*767*		*968*	*968*			*666*	*560*	*824*	*838*	*765*
v/c Ratio (X)	*0.29*	*0.32*		*0.27*	*0.31*			*0.13*	*0.00*	*0.27*	*0.30*	*0.00*

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	*8.3*	*8.5*		*6.5*	*6.9*			*6.9*	*6.4*	*7.3*	*7.6*	*4.7*
Lane LOS	*A*	*A*		*A*	*A*			*A*		*A*	*A*	
Lane 95% Queue	*1.2*	*1.4*		*1.1*	*1.3*			*0.5*	*0.0*	*1.1*	*1.2*	*0.0*
Approach Delay, s/veh	*8.42*			*6.72*			*6.88*			*7.43*		
Approach LOS, s/veh	*A*			*A*			*A*			*A*		
Intersection Delay, s/veh	*7.44*											
Intersection LOS	*A*											

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ROUNDABOUT REPORT

General Information		Site Information	
Analyst	*JMS*	Intersection	*SR 16 at SR 54*
Agency or Co.	*GDOT*	E/W Street Name	*SR 16*
Date Performed	*10/16/2014*	N/S Street Name	
Time Period	*AM*	Analysis Year	*2038*
		Project ID	*332180*

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	*0*	*2*	*0*		*0*	*2*	*0*		*0*	*1*	*0*		*0*	*2*	*0*	
Volume (V), veh/h	*15*	*470*	*10*	*0*	*25*	*600*	*365*	*0*	*50*	*340*	*0*	*0*	*325*	*130*	*0*	*0*
Heavy Veh. Adj. (f_{HV}), %	*4*	*4*	*4*	*3*	*4*	*4*	*4*	*3*	*5*	*5*	*5*	*3*	*5*	*5*	*5*	*3*
Peak Hour Factor (PHF)	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*
No. of Pedestrians Crossing Entry	*0*				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	*4.2929*	*4.1129*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*
Follow-Up Headway (sec)	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	*547*			*462*			*919*			*763*		
Exiting Flow (V_{ex}), pc/h	*902*			*735*			*818*			*187*		
Entry Flow (V_e), pc/h	*263*	*296*		*526*	*593*			*445*	*0*	*371*	*148*	*0*
Entry Volume veh/h	*253*	*285*		*506*	*570*			*424*	*0*	*353*	*141*	*0*

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h	*750*	*771*		*712*	*712*			*594*	*459*	*638*	*662*	*542*
Capacity (c), veh/h	*721*	*741*		*685*	*685*			*566*	*441*	*608*	*630*	*521*
v/c Ratio (X)	*0.35*	*0.38*		*0.74*	*0.83*			*0.75*	*0.00*	*0.58*	*0.22*	*0.00*

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	*9.4*	*9.8*		*22.3*	*29.9*			*26.6*	*8.2*	*16.7*	*8.5*	*6.9*
Lane LOS	*A*	*A*		*C*	*D*			*D*		*C*	*A*	
Lane 95% Queue	*1.6*	*1.8*		*6.6*	*9.1*			*6.5*	*0.0*	*3.7*	*0.9*	*0.0*
Approach Delay, s/veh	*9.61*			*26.33*			*26.64*			*14.36*		
Approach LOS, s/veh	*A*			*D*			*D*			*B*		
Intersection Delay, s/veh	*20.49*											
Intersection LOS	*C*											

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ROUNDABOUT REPORT

General Information		Site Information	
Analyst	*JMS*	Intersection	*SR 16 at SR 54*
Agency or Co.	*GDOT*	E/W Street Name	*SR 16*
Date Performed	*10/16/2014*	N/S Street Name	
Time Period	*PM*	Analysis Year	*2038*
		Project ID	*332180*

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	*0*	*2*	*0*		*0*	*2*	*0*		*0*	*1*	*0*		*0*	*2*	*0*	
Volume (V), veh/h	*25*	*600*	*50*	*0*	*15*	*470*	*325*	*0*	*10*	*130*	*0*	*0*	*365*	*340*	*0*	*0*
Heavy Veh. Adj. (f_{HV}), %	*4*	*4*	*4*	*3*	*4*	*4*	*4*	*3*	*5*	*5*	*5*	*3*	*5*	*5*	*5*	*3*
Peak Hour Factor (PHF)	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*
No. of Pedestrians Crossing Entry	*0*				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	*4.2929*	*4.1129*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*4.2929*	*4.1129*	*5.1929*	*4.2929*	*4.1129*	*5.1929*
Follow-Up Headway (sec)	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	*822*			*187*			*1123*			*559*		
Exiting Flow (V_{ex}), pc/h	*1095*			*542*			*543*			*462*		
Entry Flow (V_e), pc/h	*359*	*404*		*430*	*485*			*159*	*0*	*417*	*388*	*0*
Entry Volume veh/h	*345*	*388*		*413*	*466*			*151*	*0*	*397*	*370*	*0*

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h	*610*	*636*		*937*	*937*			*515*	*378*	*743*	*764*	*657*
Capacity (c), veh/h	*587*	*612*		*901*	*901*			*490*	*363*	*708*	*728*	*632*
v/c Ratio (X)	*0.59*	*0.63*		*0.46*	*0.52*			*0.31*	*0.00*	*0.56*	*0.51*	*0.00*

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	*17.4*	*18.7*		*9.6*	*10.8*			*12.1*	*9.9*	*14.2*	*12.5*	*5.7*
Lane LOS	*C*	*C*		*A*	*B*			*B*		*B*	*B*	
Lane 95% Queue	*3.8*	*4.5*		*2.4*	*3.0*			*1.3*	*0.0*	*3.5*	*2.9*	*0.0*
Approach Delay, s/veh	*18.12*			*10.25*			*12.14*			*13.36*		
Approach LOS, s/veh	*C*			*B*			*B*			*B*		
Intersection Delay, s/veh	*13.58*											
Intersection LOS	*B*											

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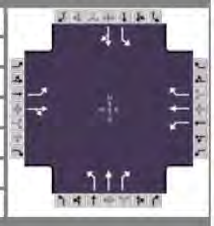
Appendix B – Signalized Intersection Operational Analysis

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	9/18/2014	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Intersection	SR 16 at SR 54	Analysis Year	2014	Analysis Period	1> 7:00
File Name	Signal - 2018 AM.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	305	5	20	375	235	35	220	5	210	75	20

Signal Information												
Cycle, s	79.4	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	20.4	16.0	25.0	0.0	0.0	0.0		
Uncoordinated	Yes	Simult. Gap E/W	Off	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	Off	Red	2.0	2.0	2.0	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		6.0		5.0		5.3	1.0	4.0
Phase Duration, s		26.4		26.4		31.0	22.0	53.0
Change Period, *(Y+Rc)*, s		6.0		6.0		6.0	6.0	6.0
Max Allow Headway *(MAH)*, s		2.9		3.0		2.9	2.9	2.9
Queue Clearance Time *(g_s)*, s		19.8		18.9		10.3	7.5	4.0
Green Extension Time *(g_e)*, s		0.5		1.2		0.2	0.2	0.2
Phase Call Probability		1.00		1.00		1.00	1.00	1.00
Max Out Probability		0.00		0.00		0.46	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	11	337		22	408	255	38	239	5	228	103	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	955	1822		1019	1827	1548	1249	1810	1533	1723	1743	
Queue Service Time *(g_s)*, s	0.9	13.4		1.6	16.9	11.7	1.7	8.3	0.2	5.5	2.0	
Cycle Queue Clearance Time *(g_c)*, s	17.8	13.4		15.0	16.9	11.7	1.7	8.3	0.2	5.5	2.0	
Capacity *(c)*, veh/h	131	467		180	468	397	484	570	483	671	1033	
Volume-to-Capacity Ratio *(X)*	0.083	0.722		0.121	0.871	0.644	0.079	0.419	0.011	0.340	0.100	
Available Capacity *(c_a)*, veh/h	573	1309		651	1313	1112	484	570	483	671	1033	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.2	5.2		0.4	6.7	3.9	0.4	3.1	0.1	1.6	0.5	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay *(d_1)*, s/veh	36.8	26.9		33.8	28.2	26.3	19.2	21.4	18.7	10.4	7.0	
Incremental Delay *(d_2)*, s/veh	0.1	0.8		0.1	2.0	0.7	0.0	0.2	0.0	0.1	0.0	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay *(d)*, s/veh	36.9	27.7		33.9	30.2	26.9	19.2	21.6	18.7	10.5	7.0	
Level of Service (LOS)	D	C		C	C	C	B	C	B	B	A	
Approach Delay, s/veh / LOS	28.0	C		29.1	C		21.2	C		9.4	A	
Intersection Delay, s/veh / LOS	23.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.3	B	2.4	B	2.2	B
Bicycle LOS Score / LOS	1.1	A	1.6	A	1.0	A	1.0	A

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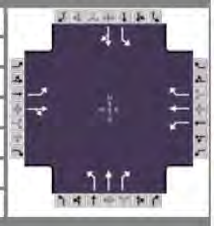
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	9/18/2014	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Intersection	SR 16 at SR 54	Analysis Year	2014	Analysis Period	1> 7:00
File Name	Signal - 2018 PM.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	20	375	35	5	305	210	5	75	20	235	220	10

Signal Information												
Cycle, s	81.9	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	22.9	16.0	25.0	0.0	0.0	0.0		
Uncoordinated	Yes	Simult. Gap E/W	Off	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	Off	Red	2.0	2.0	2.0	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		6.0		5.0		5.3	1.0	4.0
Phase Duration, s		28.9		28.9		31.0	22.0	53.0
Change Period, *(Y+Rc)*, s		6.0		6.0		6.0	6.0	6.0
Max Allow Headway *(MAH)*, s		2.9		3.0		2.9	2.9	2.9
Queue Clearance Time *(g_s)*, s		21.4		22.0		4.7	8.8	7.6
Green Extension Time *(g_e)*, s		0.8		1.0		0.1	0.3	0.4
Phase Call Probability		1.00		1.00		1.00	1.00	1.00
Max Out Probability		0.00		0.00		0.00	0.02	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	22	446		5	332	228	5	82	22	255	250	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	1024	1799		922	1827	1548	1093	1810	1533	1723	1795	
Queue Service Time *(g_s)*, s	1.6	19.4		0.5	13.1	10.2	0.3	2.7	0.8	6.8	5.6	
Cycle Queue Clearance Time *(g_c)*, s	14.7	19.4		20.0	13.1	10.2	0.3	2.7	0.8	6.8	5.6	
Capacity *(c)*, veh/h	210	503		126	511	433	422	552	468	772	1030	
Volume-to-Capacity Ratio *(X)*	0.104	0.886		0.043	0.649	0.527	0.013	0.148	0.046	0.331	0.243	
Available Capacity *(c_a)*, veh/h	636	1252		510	1271	1077	422	552	468	772	1030	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.4	7.6		0.1	5.1	3.4	0.1	1.0	0.3	2.1	1.7	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay *(d_1)*, s/veh	32.5	28.2		37.8	26.0	24.9	19.9	20.7	20.1	11.0	8.6	
Incremental Delay *(d_2)*, s/veh	0.1	2.1		0.1	0.5	0.4	0.0	0.0	0.0	0.1	0.0	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay *(d)*, s/veh	32.5	30.4		37.9	26.5	25.3	19.9	20.7	20.1	11.1	8.7	
Level of Service (LOS)	C	C		D	C	C	B	C	C	B	A	
Approach Delay, s/veh / LOS	30.5	C		26.1	C		20.6	C		9.9	A	
Intersection Delay, s/veh / LOS	22.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.3	B	2.4	B	2.2	B
Bicycle LOS Score / LOS	1.3	A	1.4	A	0.7	A	1.3	A

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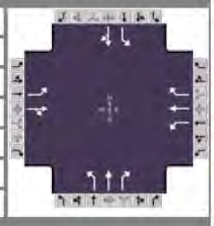
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	9/18/2014	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Intersection	SR 16 at SR 54	Analysis Year	2014	Analysis Period	1> 7:00
File Name	Signal - 2038 AM.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	15	470	10	25	600	365	50	340	15	325	130	25

Signal Information												
Cycle, s	96.7	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	37.7	16.0	25.0	0.0	0.0	0.0		
Uncoordinated	Yes	Simult. Gap E/W	Off	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	Off	Red	2.0	2.0	2.0	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		6.0		5.0		5.3	1.0	4.0
Phase Duration, s		43.7		43.7		31.0	22.0	53.0
Change Period, *(Y+Rc)*, s		6.0		6.0		6.0	6.0	6.0
Max Allow Headway *(MAH)*, s		2.9		3.0		2.9	2.9	2.9
Queue Clearance Time *(g_s)*, s		36.8		34.8		20.4	15.9	7.3
Green Extension Time *(g_e)*, s		0.9		2.1		0.0	0.0	0.3
Phase Call Probability		1.00		1.00		1.00	1.00	1.00
Max Out Probability		0.00		0.00		1.00	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	16	522		27	652	397	54	370	16	353	168	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	762	1820		860	1827	1548	1177	1810	1533	1723	1758	
Queue Service Time *(g_s)*, s	2.0	23.7		2.7	32.8	20.3	3.5	18.4	0.8	13.9	5.3	
Cycle Queue Clearance Time *(g_c)*, s	34.8	23.7		26.5	32.8	20.3	3.5	18.4	0.8	13.9	5.3	
Capacity *(c)*, veh/h	113	710		199	713	604	379	468	396	426	854	
Volume-to-Capacity Ratio *(X)*	0.144	0.735		0.137	0.915	0.657	0.144	0.790	0.041	0.828	0.197	
Available Capacity *(c_a)*, veh/h	265	1073		370	1077	912	379	468	396	426	854	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.4	9.2		0.5	13.8	6.7	0.9	8.5	0.3	6.3	1.8	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay *(d_1)*, s/veh	44.5	25.2		36.6	28.0	24.2	27.9	33.4	26.9	21.9	14.1	
Incremental Delay *(d_2)*, s/veh	0.2	0.6		0.1	6.4	0.5	0.1	8.2	0.0	12.1	0.0	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay *(d)*, s/veh	44.7	25.8		36.7	34.4	24.6	27.9	41.6	26.9	34.0	14.2	
Level of Service (LOS)	D	C		D	C	C	C	D	C	C	B	
Approach Delay, s/veh / LOS	26.4	C		30.9	C		39.4	D		27.6	C	
Intersection Delay, s/veh / LOS	30.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.3	B	2.4	B	2.3	B
Bicycle LOS Score / LOS	1.4	A	2.3	B	1.2	A	1.3	A

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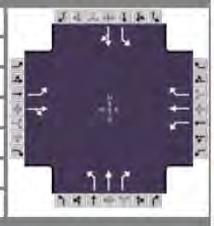
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	9/18/2014	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Intersection	SR 16 at SR 54	Analysis Year	2014	Analysis Period	1> 7:00
File Name	Signal - 2038 PM.xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	25	600	50	15	470	325	10	130	25	365	340	15

Signal Information												
Cycle, s	102.9	Reference Phase	2									
Offset, s	0	Reference Point	End	Green	43.9	16.0	25.0	0.0	0.0	0.0		
Uncoordinated	Yes	Simult. Gap E/W	Off	Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	Off	Red	2.0	2.0	2.0	0.0	0.0	0.0		

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8	7	4
Case Number		6.0		5.0		5.3	1.0	4.0
Phase Duration, s		49.9		49.9		31.0	22.0	53.0
Change Period, *(Y+Rc)*, s		6.0		6.0		6.0	6.0	6.0
Max Allow Headway *(MAH)*, s		2.9		3.0		3.0	2.9	2.9
Queue Clearance Time *(g_s)*, s		40.1		42.3		8.6	18.0	17.3
Green Extension Time *(g_e)*, s		1.3		1.6		0.1	0.0	0.6
Phase Call Probability		1.00		1.00		1.00	1.00	1.00
Max Out Probability		0.00		0.01		0.06	1.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate *(v)*, veh/h	27	707		16	511	353	11	141	27	397	386	
Adjusted Saturation Flow Rate *(s)*, veh/h/ln	868	1802		724	1827	1548	965	1810	1533	1723	1796	
Queue Service Time *(g_s)*, s	2.6	38.1		2.2	22.9	17.4	0.9	6.6	1.4	16.0	15.3	
Cycle Queue Clearance Time *(g_c)*, s	25.5	38.1		40.3	22.9	17.4	0.9	6.6	1.4	16.0	15.3	
Capacity *(c)*, veh/h	247	769		111	780	661	304	440	372	554	820	
Volume-to-Capacity Ratio *(X)*	0.110	0.919		0.146	0.655	0.535	0.036	0.321	0.073	0.717	0.470	
Available Capacity *(c_a)*, veh/h	358	998		203	1012	857	304	440	372	554	820	
Back of Queue *(Q)*, veh/ln (50th percentile)	0.5	16.4		0.4	8.9	5.7	0.2	2.7	0.5	7.1	5.7	
Overflow Queue *(Q_3)*, veh/ln	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Storage Ratio *(RQ)* (50th percentile)	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Uniform Delay *(d_1)*, s/veh	33.6	27.8		46.8	23.5	21.9	29.8	32.0	30.0	24.0	19.3	
Incremental Delay *(d_2)*, s/veh	0.1	9.7		0.2	0.4	0.3	0.0	0.2	0.0	3.8	0.2	
Initial Queue Delay *(d_3)*, s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay *(d)*, s/veh	33.7	37.5		47.0	23.9	22.2	29.8	32.1	30.1	27.9	19.5	
Level of Service (LOS)	C	D		D	C	C	C	C	C	C	B	
Approach Delay, s/veh / LOS	37.4	D		23.6	C		31.7	C		23.7	C	
Intersection Delay, s/veh / LOS	28.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.3	B	2.4	B	2.3	B
Bicycle LOS Score / LOS	1.7	A	1.9	A	0.8	A	1.8	A

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Appendix C - Single Lane Roundabout Operational Analysis

ROUNDABOUT REPORT

General Information		Site Information	
Analyst	*JMS*	Intersection	*SR 16 at SR 54*
Agency or Co.	*GDOT*	E/W Street Name	*SR 16*
Date Performed	*10/16/2014*	N/S Street Name	
Time Period	*AM*	Analysis Year	*2018*
		Project ID	*332180*

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	*0*	*1*	*0*		*0*	*1*	*1*		*0*	*1*	*1*		*0*	*1*	*1*	
Volume (V), veh/h	*10*	*305*	*5*	*0*	*20*	*375*	*235*	*0*	*35*	*220*	*5*	*0*	*210*	*75*	*20*	*0*
Heavy Veh. Adj. (f_{HV}), %	*4*	*4*	*4*	*3*	*4*	*4*	*4*	*3*	*5*	*5*	*5*	*3*	*5*	*5*	*5*	*3*
Peak Hour Factor (PHF)	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*
No. of Pedestrians Crossing Entry	*0*				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*
Follow-Up Headway (sec)	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	*349*			*302*			*596*			*487*		
Exiting Flow (V_{ex}), pc/h	*585*			*464*			*262*			*115*		
Entry Flow (V_e), pc/h		*362*		*447*	*0*	*266*	*291*	*0*	*6*	*326*	*0*	*23*
Entry Volume veh/h		*348*		*430*	*0*	*256*	*277*	*0*	*6*	*310*	*0*	*22*

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h		*797*		*835*	*835*	*870*	*623*	*623*	*630*	*694*	*694*	*711*
Capacity (c), veh/h		*766*		*803*	*803*	*837*	*593*	*593*	*606*	*661*	*661*	*684*
v/c Ratio (X)		*0.45*		*0.54*	*0.00*	*0.31*	*0.47*	*0.00*	*0.01*	*0.47*	*0.00*	*0.03*

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		*10.8*		*12.2*	*4.5*	*7.7*	*13.6*	*6.1*	*6.0*	*12.5*	*5.4*	*5.6*
Lane LOS		*B*		*B*	*A*		*B*	*A*		*B*	*A*	
Lane 95% Queue		*2.4*		*3.2*	*0.0*	*1.3*	*2.5*	*0.0*	*0.0*	*2.5*	*0.0*	*0.1*
Approach Delay, s/veh	*10.83*			*10.53*			*13.46*			*12.07*		
Approach LOS, s/veh	*B*			*B*			*B*			*B*		
Intersection Delay, s/veh	*11.40*											
Intersection LOS	*B*											

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ROUNDABOUT REPORT

General Information		Site Information	
Analyst	*JMS*	Intersection	*SR 16 at SR 54*
Agency or Co.	*GDOT*	E/W Street Name	*SR 16*
Date Performed	*10/16/2014*	N/S Street Name	
Time Period	*PM*	Analysis Year	*2018*
		Project ID	*332180*

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	*0*	*1*	*0*		*0*	*1*	*1*		*0*	*1*	*1*		*0*	*1*	*1*	
Volume (V), veh/h	*20*	*375*	*35*	*0*	*5*	*305*	*210*	*0*	*5*	*75*	*20*	*0*	*235*	*220*	*10*	*0*
Heavy Veh. Adj. (f_{HV}), %	*4*	*4*	*4*	*3*	*4*	*4*	*4*	*3*	*5*	*5*	*5*	*3*	*5*	*5*	*5*	*3*
Peak Hour Factor (PHF)	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*	*0.92*	*0.92*	*0.92*	*1.00*
No. of Pedestrians Crossing Entry	*0*				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*	*5.1929*
Follow-Up Headway (sec)	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*	*3.1858*

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	*525*			*115*			*715*			*357*		
Exiting Flow (V_{ex}), pc/h	*692*			*351*			*109*			*297*		
Entry Flow (V_e), pc/h		*487*		*351*	*0*	*237*	*92*	*0*	*23*	*519*	*0*	*11*
Entry Volume veh/h		*468*		*338*	*0*	*228*	*88*	*0*	*22*	*494*	*0*	*10*

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h		*668*		*1007*	*1007*	*1013*	*553*	*553*	*566*	*791*	*791*	*796*
Capacity (*c*), veh/h		*642*		*968*	*968*	*974*	*527*	*527*	*544*	*753*	*753*	*765*
v/c Ratio (X)		*0.73*		*0.35*	*0.00*	*0.23*	*0.17*	*0.00*	*0.04*	*0.66*	*0.00*	*0.01*

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		*22.9*		*7.4*	*3.7*	*6.0*	*9.0*	*6.8*	*7.1*	*16.7*	*4.8*	*4.8*
Lane LOS		*C*		*A*	*A*		*A*	*A*		*C*	*A*	
Lane 95% Queue		*6.3*		*1.6*	*0.0*	*0.9*	*0.6*	*0.0*	*0.1*	*5.0*	*0.0*	*0.0*
Approach Delay, s/veh	*22.85*			*6.86*			*8.64*			*16.48*		
Approach LOS, s/veh	*C*			*A*			*A*			*C*		
Intersection Delay, s/veh	*14.46*											
Intersection LOS	*B*											

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ROUNDABOUT REPORT

General Information		Site Information	
Analyst	JMS	Intersection	SR 16 at SR 54
Agency or Co.	GDOT	E/W Street Name	SR 16
Date Performed	10/16/2014	N/S Street Name	
Time Period	AM	Analysis Year	2038
		Project ID	332180

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	0		0	1	1		0	1	1		0	1	1	
Volume (V), veh/h	15	470	10	0	25	600	365	0	50	340	15	0	325	130	25	0
Heavy Veh. Adj. (f_{HV}), %	4	4	4	3	4	4	4	3	5	5	5	3	5	5	5	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	547			462			919			763		
Exiting Flow (V_{ex}), pc/h	902			735			405			187		
Entry Flow (V_e), pc/h		559		706	0	413	445	0	17	519	0	29
Entry Volume veh/h		538		679	0	397	424	0	16	494	0	28

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h		654		712	712	754	451	451	459	527	527	542
Capacity (c), veh/h		629		685	685	725	430	430	441	502	502	521
v/c Ratio (X)		0.85		0.99	0.00	0.55	0.99	0.00	0.04	0.98	0.00	0.05

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		34.5		56.6	5.3	13.6	71.1	8.4	8.7	65.1	7.2	7.6
Lane LOS		D		F	A		F	A		F	A	
Lane 95% Queue		9.6		15.6	0.0	3.4	12.2	0.0	0.1	13.1	0.0	0.2
Approach Delay, s/veh	34.47			40.74			68.81			62.03		
Approach LOS, s/veh	D			E			F			F		
Intersection Delay, s/veh	48.54											
Intersection LOS	E											

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ROUNDABOUT REPORT

General Information		Site Information	
Analyst	JMS	Intersection	SR 16 at SR 54
Agency or Co.	GDOT	E/W Street Name	SR 16
Date Performed	10/16/2014	N/S Street Name	
Time Period	PM	Analysis Year	2038
		Project ID	332180

Project Description:

Volume Adjustment and Site Characteristics

	EB				WB				NB				SB			
	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	U
Number of Lanes(N)	0	1	0		0	1	1		0	1	1		0	1	1	
Volume (V), veh/h	25	600	50	0	15	470	325	0	10	130	25	0	365	340	15	0
Heavy Veh. Adj. (f_{HV}), %	4	4	4	3	4	4	4	3	5	5	5	3	5	5	5	3
Peak Hour Factor (PHF)	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00	0.92	0.92	0.92	1.00
No. of Pedestrians Crossing Entry	0				0				0				0			

Critical and Follow-Up Headway Adjustment

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (sec)	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929	5.1929
Follow-Up Headway (sec)	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858	3.1858

Flow Computations

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Circulating Flow (V_c), pc/h	822			187			1123			559		
Exiting Flow (V_{ex}), pc/h	1095			542			176			462		
Entry Flow (V_e), pc/h		763		548	0	367	159	0	29	805	0	17
Entry Volume veh/h		734		527	0	353	151	0	28	767	0	16

Capacity and v/c Ratios

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Capacity (c_{PCE}), pc/h		497		937	937	948	368	368	378	646	646	657
Capacity (c), veh/h		478		901	901	912	350	350	363	615	615	632
v/c Ratio (X)		1.53		0.58	0.00	0.39	0.43	0.00	0.08	1.25	0.00	0.03

Delay and Level of Service

	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		273.2		12.4	4.0	8.4	20.1	10.3	11.1	146.1	5.9	6.0
Lane LOS		F		B	A		C	B		F	A	
Lane 95% Queue		39.0		3.9	0.0	1.8	2.1	0.0	0.2	28.9	0.0	0.1
Approach Delay, s/veh	273.17			10.77			18.67			143.24		
Approach LOS, s/veh	F			B			C			F		
Intersection Delay, s/veh	126.35											
Intersection LOS	F											

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Appendix D – Stop Sign Control Operational Analysis

ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	JMS	Intersection	SR 16 AT SR 54
Agency/Co.	GDOT	Jurisdiction	COWETA COUNTY
Date Performed	9/4/2014	Analysis Year	2018
Analysis Time Period	AM		
Project ID 332180			
East/West Street: SR 16		North/South Street: SR 54	

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	10	305	5	20	375	235
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	35	220	5	210	75	20
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LT	R	LTR		LT	R
PHF	0.92		0.92	0.92	0.92		0.92	0.92
Flow Rate (veh/h)	346		428	255	282		309	21
% Heavy Vehicles	4		4	4	5		5	5
No. Lanes	1		2		1		2	
Geometry Group	4b		5		4b		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.0	0.0	0.1		0.7	0.0
Prop. Right-Turns	0.0		0.0	1.0	0.0		0.0	1.0
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	0.0
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.5	0.5
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		0.1	-0.6	0.1		0.5	-0.6

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	3.20
x, initial	0.31		0.38	0.23	0.25		0.27	0.02
hd, final value (s)	9.34		8.94	8.18	9.75		9.71	8.60
x, final value	0.90		1.06	0.58	0.76		0.83	0.05
Move-up time, m (s)	2.3		2.3		2.3		2.3	
Service Time, t_s (s)	7.0		6.6	5.9	7.5		7.4	6.3

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	381		428	440	358		364	271
Delay (s/veh)	54.69		92.61	21.56	37.92		46.03	11.75
LOS	F		F	C	E		E	B
Approach: Delay (s/veh)	54.69		66.09		37.92		43.85	
LOS	F		F		E		E	
Intersection Delay (s/veh)	54.37							
Intersection LOS	F							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	JMS	Intersection	SR 16 AT SR 54
Agency/Co.	GDOT	Jurisdiction	COWETA COUNTY
Date Performed	9/4/2014	Analysis Year	2018
Analysis Time Period	PM		

Project ID 332180

East/West Street: SR 16 | North/South Street: SR 54

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	20	375	35	5	305	210
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	5	75	20	235	220	10
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LT	R	LTR		LT	R
PHF	0.92		0.92	0.92	0.92		0.92	0.92
Flow Rate (veh/h)	466		336	228	107		494	10
% Heavy Vehicles	4		4	4	5		5	5
No. Lanes	1		2		1		2	
Geometry Group	4b		5		4b		5	
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.0	0.0	0.0		0.5	0.0
Prop. Right-Turns	0.1		0.0	1.0	0.2		0.0	1.0
Prop. Heavy Vehicle	0.0		0.0	0.0	0.0		0.0	0.0
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.5	0.5
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		0.1	-0.6	-0.0		0.3	-0.6

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	3.20
x, initial	0.41		0.30	0.20	0.10		0.44	0.01
hd, final value (s)	8.28		8.44	7.71	10.01		8.59	7.60
x, final value	1.07		0.79	0.49	0.30		1.18	0.02
Move-up time, m (s)	2.3		2.3		2.3		2.3	
Service Time, t_s (s)	6.0		6.1	5.4	7.7		6.3	5.3

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	466		426	466	352		494	260
Delay (s/veh)	217.75		40.24	17.70	16.93		383.04	10.47
LOS	F		E	C	C		F	B
Approach: Delay (s/veh)	217.75		31.13		16.93		375.65	
LOS	F		D		C		F	
Intersection Delay (s/veh)	189.01							
Intersection LOS	F							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	JMS	Intersection	SR 16 AT SR 54
Agency/Co.	GDOT	Jurisdiction	COWETA COUNTY
Date Performed	9/4/2014	Analysis Year	2038
Analysis Time Period	AM		

Project ID 332180

East/West Street: SR 16 | North/South Street: SR 54

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	25	470	10	25	600	365
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	50	340	15	325	130	25
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.92		0.92		0.92		0.92	
Flow Rate (veh/h)	547		1075		439		521	
% Heavy Vehicles	4		4		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.0		0.1		0.7	
Prop. Right-Turns	0.0		0.4		0.0		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		-0.1		0.1		0.2	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.49		0.96		0.39		0.46	
hd, final value (s)	9.88		9.66		9.91		10.01	
x, final value	1.50		2.88		1.21		1.45	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	7.9		7.7		7.9		8.0	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	547		1075		439		521	
Delay (s/veh)	944.94		3418		438.02		852.65	
LOS	F		F		F		F	
Approach: Delay (s/veh)	944.94		3418		438.02		852.65	
LOS	F		F		F		F	
Intersection Delay (s/veh)	1870							
Intersection LOS	F							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	JMS	Intersection	SR 16 AT SR 54
Agency/Co.	GDOT	Jurisdiction	COWETA COUNTY
Date Performed	9/4/2014	Analysis Year	2038
Analysis Time Period	PM		

Project ID 332180

East/West Street: SR 16 | North/South Street: SR 54

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	25	600	50	15	470	325
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	10	130	25	365	340	15
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.92		0.92		0.92		0.92	
Flow Rate (veh/h)	733		879		178		781	
% Heavy Vehicles	4		4		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	1.00							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.0		0.0		0.1		0.5	
Prop. Right-Turns	0.1		0.4		0.2		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.0		-0.2		0.0		0.2	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.65		0.78		0.16		0.69	
hd, final value (s)	8.46		8.25		9.82		8.61	
x, final value	1.72		2.01		0.49		1.87	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	6.5		6.3		7.8		6.6	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	733		879		367		781	
Delay (s/veh)	1332		1854		21.99		1592	
LOS	F		F		C		F	
Approach: Delay (s/veh)	1332		1854		21.99		1592	
LOS	F		F		C		F	
Intersection Delay (s/veh)	1499							
Intersection LOS	F							

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Processed Date:4/15/2014

Parameters: Bridge Serial Num

Bridge Inventory Data Listing

Structure ID:077-0018-0 **Coweta** **SUFF. RATING:** 73.38

Location & Geography

Structure ID:	077-0018-0
200 Brdge Information:	06
*6A Feature Int:	N. S. RAILROAD (718848B)
*6B Critical Bridge:	0
*7A Route No Carried:	SR00054
*7B Facility Carried:	SR 54
9 Location:	.75 MI NW OF TURIN
2 Dot District:	3
207 Year Photo:	2013
*91 Inspection Frequency:	24 Date: 07/30/2013
92A Fract Crit Insp Freq:	0 Date: 02/01/1901
92B Underwater Insp Freq:	0 Date: 02/01/1901
92C Other Spc. Insp Freq:	0 Date: 02/01/1901
* 4 Place Code:	00000
*5 Inventory Route(O/U):	1
Type:	3
Designation:	1
Number:	00054
Direction:	0
*16 Latitude:	33 - 19.8588 HMMS Prefix:SR
*17 Longtitude:	84 - 38.7148 HMMS Suffix:00
	MP: 10.58
98 Border Bridge:	000 % Shared:00
99 ID Number:	000000000000000
*100 STRAHNET:	0
12 Base Highway Network:	1
13A LRS Inventory Route:	771005400
13B Sub Inventory Route:	0
*101 Parallel Structure:	N
*102 Direction of Traffic:	2
*264 Road Inventory Mile Post:	010.24
*208 Inspection Area:	03 Initials: WBP
Engineer's Initials:	JTB
* Location ID No:	077-00054D-010.58E

*104 Highway System:	0
*26 Functional Classification:	06
*204 Federal Route Type:	S No: 00101
105 Federal Lands Highway:	0
*110 Truck Route:	0
206 School Bus Route:	1
217 Benchmark Elevation:	0000.00
218 Datum:	0
*19 Bypass Length:	02
*20 Toll:	3
*21 Maintanance:	01
*22 Owner:	01
*31 Design Load:	4
37 Historical Significance:	5
205 Congressional District:	03
27 Year Constructed:	1955
106 Year Reconsrtucted:	0000
33 Bridge Median	0
34 Skew:	50
35 Structure Flared:	0
38 Navigation Control:	N
213 Special Steel Design:	0
267 Type of Paint:	5
*42 Type of Service On:	5
Type of Service Under:	2
214 Movable Bridge:	0
203 Type Bridge:	E - N - M - O
259 Pile Encasement	3
*43 Structure Type Main:	3 02
45 No.Spans Main:	003
44 Structure Type Appr:	0 00
46 No Spans Appr:	0000
226 Bridge Curve Horz	0 Vert: 1.00
111 Pier Protection	0
107 Deck Structure Type:	1
108 Wearing Structure Type:	1
Membrane Type:	0
Deck Protection:	0

Signs & Attachments

225 Expansion Joint Type:	02
242 Deck Drains:	0
243 Parapet Location:	0
Height:	0.00
Width:	0.00
238 Curb Height:	1
Curb Material:	1
239 Handrail	1 1
*240 Median Barrier Rail:	0
241 Bridge Median Height:	0
* Bridge Median Width:	0
230 Guardrail Loc. Dir. Rear:	3
Fwrd:	3
Oppo. Dir. Rear:	0
Oppo. Fwrd:	0
244 Aproach Slab	3
224 Retaining Wall:	0
233Posted Speed Limit:	55
236 Warning Sign:	0.00
234 Delineator:	1.00
235 Hazard Boards:	1
237 Utilities Gas:	00
Water:	00
Electric:	00
Telephone:	00
Sewer:	00
247 Lighting Street:	0
Navigation:	0
Aerial:	0
*248 County Continuity No.:	00

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Bridge Inventory Data Listing

Structure ID:077-0018-0

Programming Data

201 Project No:	BA (2) 1901-A (3)
202 Plans Available:	4
249 Prop Proj No:	00000000000000000000000000
250 Approval Status:	0000
251 PI Number:	0000000
252 Contract Date:	02/01/1901
260 Seismic No:	00000
75 Type Work:	34 1
94 Bridge Imp: Cost:	$610
95 Roadway Imp. Cost:	$61
96 Total Imp Cost:	$914
76 Imp Length:	001476
97 Imp Year:	2013
114 Furure ADT:	012015 Year:2032

Hydralic Data

215Waterway Data:	
High Water Elev:	0000.0 Year:1900
Flood Elev:	0000.0 Freq:00
Avg Streambed Elev:	0000.0
Drainage Area:	00000
Area of Opening:	000000
113 Scour Critical	N
216 Water Depth:	00.0 Br.Height:00.0
222 Slope Protection:	0
221Spur Dikes Rear	0 Fwd:0
219 Fender System	0
220 Dolphin:	0
223 Culvert Cover:	000
Type:	0
No. Barrels:	0
Width:	0.00 Height:0.00
Length:	0 Apron:0
*265 U/W Insp. Area	0 Diver:ZZZ
*Location ID No:	077-00054D-010.58E

Measurements:

*29 ADT	008010 Year:2012
109 %Trucks:	1
* 28 Lanes On:	02 Under:00
210 No. Tracks On:	00 Under:01
* 48 Max. Span Length	0052
* 49 Structure Length:	156
51 Br. Rwdy. Width	27.80
52 Deck Width:	39.50
* 47 Tot. Horiz. Cl:	28
50 Curb / Sidewalk Width	5.00 / 5.00
32 Approach Rdwy. Width	023
*229 Shoulder Width:	
Rear Lt:	6.00 Type:8 Rt:6.00
Fwd. Lt:	6.00 Type:8 Rt:6.00
Pavement Width:	
Rear:	23.00 Type: 2
	23.00 Type: 2
Intersaction Rear:	1 Fwd: 0
36Safety Features Br. Rail:	2
Transition:	2
App. G. Rail:	2
App. Rail End:	2
53 Minimum Cl. Over:	99' 99 "
Under: R	22' 11"
*228 Minimum Vertical Cl	
Act. Odm Dir::	99' 99"
Oppo. Dir:	99' 99"
Posted Odm. Dir:	00' 00"
Oppo. Dir:	00' 00"
55 Lateral Undercl. Rt:	R 11.00
56 Lateral Undercl. Lt:	0.00
*10 Max Min Vert Cl:	99' 99" Dir:0
39 Nav Vert Cl:	000 Horiz:0000
116 Nav Vert Cl Closed:	000
245 Deck Thickness Main	7.00
Deck Thick Approach:	0.00
246 Overlay Thickness:	0.00
212 Year Last Painted:	Sup:2001 Sub:2001

65 Inventory Rating Mathod:	1
63 Operating Rating Method:	1
66 Inventory Type:	2 Rating: 52
64 Operating Type:	2 Rating: 87
231Calculated Loads:	
H-Modified:	21 0
HS-Modified:	30 0
Type 3:	33 0
Type 3s2:	40 0
Timber:	37 0
Piggyback:	40 0
261 H Inventory Rating:	41
262 H Operating Rating	68
67 Structural Evaluation:	6
58 Deck Condition:	5
59 Superstructure Condition:	7
* 227 Collision Damage:	0
60A Substructure Condition:	6
60B Scour Condition:	N
60C Underwater Condition	N
71 Waterway Adequacy:	N
61 Channel Protection Cond.:	N
68 Deck Geometry:	2
69 UnderClr. Horz/Vert:	4
72 Appr. Alignment:	8
62 Culvert:	N

Posting Data

70 Bridge Posting Required	5
41 Struct Open, Posted, CL:	A
* 103 Temporary Structure:	0
232 Posted Loads	
H-Modified:	00
HS-Modified:	00
Type 3:	00
Type 3s2:	00
Timber:	00
Piggyback	00
253 Notification Date:	02/01/1901
258 Fed Notify Date:	02/01/1901

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Municipal Separate Storm Sewer System (MS4) Evaluation Form

P.I. No.:	**332180**
County:	**Coweta**
Description:	**SR16 @ SR54**

	Yes	**No**
1. Does the project lie in a Phase I or Phase II MS4 County/Municipality?	x	
2. Does the project lie on a State Route facility?	x	
3. Does Project disturb less than 1 acre?		x
4. Does the project discharge water soley as sheet flow?		x
5. Does the area of impervious surface decrease or remain unchanged?		x
6. Was the environmental document approved prior to June 30, 2012?		x
7. Were the R/W plans approved prior to June 30, 2012?		x

Channel protection is the most critical stormwater criterion for both project outfalls. Micro pool extended detention ponds that provide the channel protection volume (CPv) will also provide the water quality volume (WQv) and keep the 25—year and 100-year storms below pre-developed flow rates. Constructing and maintaining the micro pools may prove infeasible due to the proximity to the power transmission facility, protected species habitat, and the railroad (see concept layout). Other BMP's, including grass channels, enhanced swales, and infiltration trenches, will be considered in the preliminary design phase, but their increased impacts to environmental resources will have to be considered as well.

Description	Symbol	Storm	Outfall 1 Pre-developed	Outfall 1 Post-developed	Outfall 2 Pre-developed	Outfall 2 Post-developed
Water Quality Volume (acre-feet)	**WQ_V**			**0.41**		**0.24**
Volumetric Runoff Coefficient	R_V			0.17		0.34
Percent Impervious Cover (percent)	I		8.84	13.81	15.00	32.49
Area (acres)	A		23.4462	23.4462	7.0079	7.0079
Impervious Area (acres)			2.0737	3.2384	1.0515	2.2772
Hydrologic Soils Group (from Web Soil Survey)			B	B	B	B
Cover Description	*CN*					
Impervious Area (percent)	98		9%	14%	15%	32%
Open Space, Good Condition (percent)	61		29%	26%	77%	64%
Wood or Forest Land, Good Cover (percent)	66		62.14%	60.57%	7.62%	3.10%
Composite Curve Number	CN		67	69	67	73
Rainfall Distribution (Type I, IA, II, or III)			II	II	II	II
Time of Concentration (minutes)	T_c		10	10	10	10
Time of Concentration (hours)	T_c		0.17	0.17	0.17	0.17
24-Hour Rainfall (inches)	P	(1-Year)	3	3	3	3
		(25-Year)	6	6	6	6
		(100-Year)	8	8	8	8
Initial Abstraction (inches)	I_a		0.985	0.899	0.985	0.74
I_a/P	I_a/P	(1-Year)	0.33	0.30	0.33	0.25
		(25-Year)	0.16	0.15	0.16	0.12
		(100-Year)	0.12	0.11	0.12	0.09
Unit Peak Discharge (csm/in)	q_u	(1-Year)	710	760	710	790
		(25-Year)	830	835	830	845
		(100-Year)	845	850	845	865
Pond and Swamp Adjustment	F_P		1	1	1	1
Potential Maximum Retention after Runoff Begins (inches)	S		4.84	4.46	4.94	3.67
Runoff (inches)	Q	(1-Year)	0.60	0.68	0.58	0.87
		(25-Year)	2.56	2.73	2.52	3.11
		(100-Year)	4.16	4.37	4.11	4.83
Area (square miles)	A_m		0.04	0.04	0.01	0.01
Peak Discharge (cfs)	q_p	(1-Year)	15.62	18.82	4.53	7.49
		(25-Year)	77.97	83.37	22.94	28.74
		(100-Year)	128.92	135.94	38.06	45.75
Detention Time (usually 24 hours)	T		24	24	24	24
Ratio of Peak Outflow to Peak Inflow	q_o/q_i	(1-Year)	0.02	0.02	0.02	0.02
		(25-Year)	0.02	0.02	0.02	0.02
		(100-Year)	0.02	0.02	0.02	0.02
Ratio of Required Storage Volume to Runoff Volume	V_S/V_R	(1-Year)	0.65	0.65	0.65	0.65
		(25-Year)	0.65	0.65	0.65	0.65
		(100-Year)	0.65	0.65	0.65	0.65
Runoff (inches)	$V_R = Q$	(1-Year)	0.60	0.68	0.58	0.87
		(25-Year)	2.56	2.73	2.52	3.11
		(100-Year)	4.16	4.37	4.11	4.83
Channel Protection Storage (acre-feet)	**$Cp_v = V_S$**	**(1-Year)**	**0.77**	**0.86**	**0.22**	**0.33**
Overbank Flood Protection (acre-feet)	**Q_{P25}**	**(25-Year)**	**3.28**	**3.48**	**0.96**	**1.19**
Extreme Flood Protection (acre-feet)	**Q_f**	**(100-Year)**	**5.32**	**5.58**	**1.57**	**1.85**

Concept Team Meeting Minutes
NH000-0022-01(023)
P.I. No. 332180
May 28, 2014

- Kevin VanHouten opened the meeting and handled introductions. He turned the meeting over to Jason Mobley.
- Jason briefly gave an overview of how the report would be presented.
- Jason turned the meeting over to Jeff Swiderski to present the various alternatives.
- Alternatives:
    - Alt. 1 – Upgrade intersection from a stop controlled intersection to a signal controlled intersection. This alternative was not preferred because of the extended phase that would be required to accommodate the high traffic volumes in the left turn movement from the north approach to the east approach.
    - Alt. 2 – Upgrade the existing stop controlled intersection with a single lane roundabout on existing alignment. This alternate would require replacing the bridge over the railroad. This option would also require the possible use of a lengthy offsite detour. A single lane roundabout will not be able to handle the required capacity. This option could have impacts to the historic property in the SW quadrant. Skew of existing intersection would cause issues with the right turn movements.
    - Alt 3 - Upgrade the existing stop controlled intersection with a single lane roundabout. The roundabout would be constructed north of the existing intersection. SR 16 would be realigned to avoid the historic property in the SE quadrant. It would utilize the existing alignment on SR 54. A single lane roundabout will not be able to handle the required capacity. This option could have impacts to the historic property in the SW quadrant. Skew of existing intersection would cause issues with the right turn movements.
    - Alt. 4 – This alternate would replace the existing four way stop sign controlled intersection with two three lane roundabouts. These roundabouts would be on the existing alignment of SR 16. One would be located to the west, and one to the east, of the original intersection. This alternative would realign SR 54. The bridge would be replaced on new alignment. Traffic would be able to remain on the existing alignment during construction. There most likely will be issues with the clearance required by the railroad.

- Preferred Alternative – Upgrade the existing intersection with a hybrid multi-lane roundabout. This roundabout would be able to resolve the capacity issues. The bridge will be replaced to the east of the existing bridge. There will be impacts to the historic resources. These will be minimalized during preliminary design.

- Jason Mobley then reviewed the current concept report.
  - There could possibly be a design exception for vertical alignment required because of issues created by trying to meet the clearance required by the railroad.
  - Scott Zehngraff asked if lowering the design speed on the approaches would help solve the issues with the vertical alignment. Dan Pass mentioned it would help. Lowering the speed limit on both routes from 55 mph to 45 mph was also discussed.
  - Jill Franks said that the railroad has not been asked if the current single line would be expanded to two tracks. She would do so when we have an approved option. Dan Pass instructed Jill to ask now that we have decided to replace the bridge.
  - Gene McKissick Discussed possible utility conflicts to include a water line under the roadway, and an electric transmission line running along the south side of SR 16.
  - Gene McKissick stated PID not recommended. Tod Handley said Turin and Coweta Water were pursuing request for utility aid.
  - Michael Presley asked who they should get a lighting commitment/agreement from. Tod Handley said City of Turin.
  - Commissioner Poole expressed concern about too much lighting around houses. Dan stated design would keep “light trespass” to minimum.
  - Aaron Caldwell spoke about the four historic resources, and the stream/wetland/protected species habitat found west of the project on SR 16. He requested we avoid this area due to the animal habitat.
  - Jason discussed ms4 – two outfalls – detention ponds considered – Aaron Caldwell stated that north/western outfall may impact crayfish habitat – Jason stated we would avoid habitat but still attempt to add water quality measures.
  - Right of way should be shown funded by Coweta County.

- Kevin VanHouten opened he floor to questions and comments.
    - Ben Rabun gave his concurrence for the proposed bridge involvement.
    - Zehngraff suggested we make sure our proposed bridge would accommodate roadway needs beyond 20 year mark since bridges are designed for longer lifespan.
    - Zehngraff suggested we get visualization group to help with the PIOH presentation.
    - Add a permanent easement for the bridge on the railroad R/W .
    - Two water lines will need to be relocated.
    - Eddie Whitlock asked when R/W funding will be needed. Kevin answered April 2016.
    - Question was asked as to when construction could start. Answer was May 2017.
    - The locals (Commissioner Paul Pool) asked if we have accommodated trucks in our design. Dan answered that we will design the roundabout for a WB-67. We will include a truck apron. We will also verify a truck and a car can ride side by side around the roundabout.
    - Aaron Caldwell asked if design would accommodate wide/heavy vehicles. Dan stated we would design for OSOW.
    - In the case of a truck with an oversized load it was determined that a car would not try to drive beside the oversized truck.
    - Jill Franks asked that the railroad name be changed to Central of Georgia Railroad Company.
    - Coweta County water asked if they would be able to attach the water lines to the bridge. It was mentioned that is a possibility.

- Post Meeting Comments:
    - Lanier Boatright indicated the regional Commission was Three Rivers.
    - Scoot Zehngraff suggested we shorten the NB leg of SR 54.
    - Scott also suggested we show only the minimum R/W we need, and show the rest as easement.
    - Scott commented that we should request 100% federal funding.
    - Scott requested “accident” be changed to “crash” throughout the report.

Comments Provided by Keith Posey via email:

- Cover Page – Try keeping this to one page.
- Complete Streets (page 5) – Check the appropriate box(es).
- Design Features Tables (page 6):
    - Lane Width, Standard – 12 feet minimum for an Arterial, over 2000 vpd, 55mph design speed. AASHTO Green Book, Ch. 7
    - Outside Shoulder, Standard – 8 feet minimum, Arterial, over 2000 vpd. AASHTO Green Book, Ch. 7. Recommend stating the shoulder type here (rural), since the FC is stated above as Urban Arterial.
    - Design Speed, Standard – While the functional classification may be Urban, the typical section being proposed is rural and thus the design speed range mentioned in the AASHTO Green Book is 40-75 mph.
    - Minimum Horizontal Curve Radius, Maximum Superelevation Rate, Maximum Grade – Proposed vs Standard. Is there is a 5% grade proposed on the project? Is there is a curve with an 8% radius on the project? What are the actual values of what is being proposed?
    - Is the asterisk after the Standard heading in the tables a typo?
- Design Exceptions for bridge (page 7) – a couple of observations: 1) if the bridge is being replaced, why can't the vertical alignment be designed at 55 mph? 2) Roundabout approaches for higher speed roadways can use a lower design speed than the rest of the roadway – isn't the bridge in the approach zone where traffic needs to slow? Would a Design Exception be needed?
- Railroad Involvement (page 8) – recommend mentioning railroad coordination will be done during preliminary design.
- Management may ask that a Roundabout Lighting Agreement/Commitment Letter be completed/attached before approving the concept report.
- Roundabout Peer Review (page 9) – Mark as completed and include the date of the Peer Review here.
- MS4 Discussion (page 9) – the discussion mentions Micro pool extension detention ponds as a solution then says they may not be feasible. What would then be the preferred solution?
- Eligible History Resources discussion (page 9) – Has a determination been made as to how the project impacts these resources? Traffic Ops may require that this be determined before recommending (recent case).
- No Archeology comment (page 9).
- Air quality – Carbon Monoxide has not been checked yes/no (page 9).
- No Noise Effects comment(page 9).
- Other Coordinate to Date (page 10) - Briefly explain why FAA Coordination is needed
- Project Cost Estimate Summary & Funding Responsibilities table (page 11) – are not Locals (Coweta County) funding ROW? A right of way cost estimate will be needed.
- Alternatives Discussion (page 12) - A brief explanation (1-2 sentences) should be given as to why Alternatives 3 & 4 were each ruled out.
- Could a LOS/Delay summary for existing DHV and no-build/build for opening year and design year DHV be attached (or included with the Roundabout Feasibility study)?

MEETING SIGN-IN SHEET

Project:	PI# 332180 Coweta / SR 16 @ SR 54	**Meeting Date:**	05-28-2014
Facilitator:	Kevin VanHouten / OPD	**Place/Room:**	D3 / Auditorium A

Name	Company	Phone	E-Mail
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MEETING SIGN-IN SHEET

Project:	PI# 332180 Coweta / SR 16 @ SR 54	**Meeting Date:**	05-28-2014
Facilitator:	Kevin VanHouten / OPD	**Place/Room:**	D3 / Auditorium A

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Ben Rabun			
Jason Mobley	GDOT - D3 DESIGN	706-646-7571	jmoblaye dot.ga.gov
Jeff Swiderski	GDOT-D3 DESIGN	706-646-7578	jswiderski@dot.ga.gov

Minutes

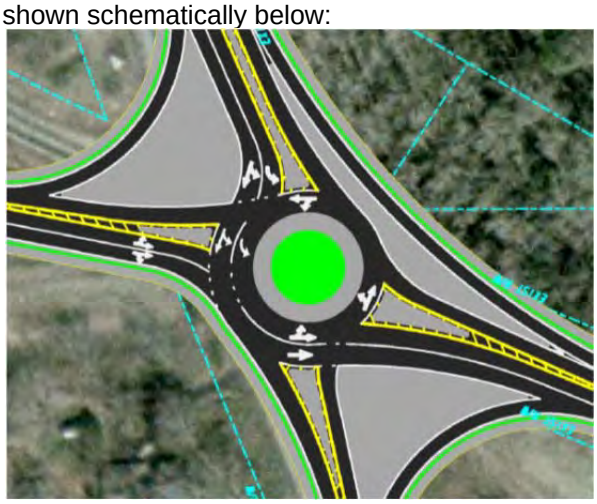
17 February 2014

Project	PI 332180, SR 16 at SR 54, Coweta County	From	Mark Lenters
Subject	Kick-off meeting	Tel	608-216-2059
Venue/Date/Time	GDOT District 3 115 Transportation Boulevard, Thomaston, GA 30286; 1:00 pm	Job No	861/6508/**
Attendees	Derrick Cameron, Project Manager, GDOT Jeff Swiderski, Design Engineer III, GDOT Jason W. Mobley, District 3 Design Engineer, GDOT Aaron Caldwell, Planner, Gresham Smith and Partners Tommy Crochet, McGee Partners Daniel Pass, District 3 Preconstruction Engineer, GDOT		

Minutes	Action
1. Meeting Purposes: • Develop a consensus among team members as to the project context and constraints • Review roles and responsibilities • Review current design issues and provide comments on the next iteration of layout effort.	**All**
2. Project Overview • Jeff Swiderski introduced the project team to the project, giving an overview the needs and several major constraints. The rail overpass bridge is to be replaced with the placement of a roundabout at the intersection. • Project NH000-022-01(023)is located in eastern Coweta County in the City of Turin on S.R. 16 at the intersection with S.R. 54. S.R. 16 is the East/West route, and S.R. 54 is the North/South route. All four approaches are stop controlled. • There are no current pedestrian facilities, and no pedestrians are recorded in the count data provided. • Existing residential land uses are present on the western side of the southern approach on S.R. 54. • The need for improvements at the intersection is congestion and safety related, as previously established in a feasibility study and concept report. • High School traffic travels through the intersection; accommodation of pedestrians and bicycles in necessary. • The bridge alignment accounts of traffic management to maintain two lanes open during construction. Tommy Crochet gave preliminary comments on the traffic staging implications on the bride cross-section and promotes a detailed review of the bridge width, median width and staging requirements. It is thought that one, possibly two lanes of width could be reduced from the general arrangement of the bridge. • Aaron Caldwell reviewed the environmental constraints with a brief description of each resource and its boundaries including stream and wetland resource (MS4). Elevation differences are a further constraint on the proposed grading limits. • The design context is predominantly rural with 45 mph posted speed limits on SR 54 (Old Georgia 16): 55 mph on SR 54, south of the intersection; 55 mph on SR 16 northwest of the intersection; and, 45 mph on SR 16, southeast of the intersection.	**McGee Partners**

GHD Inc.
5325 Wall Street Suite 2305 Madison WI 53718 USA
T 1 608 249 4545 **F** 1 608 249 4402 **E** madison@ghd.com **W** www.ghd.com

- The composition of traffic is mostly commuters with a minor amount of goods movement. The High School drop-off traffic is concentrated in the morning and afternoon peak hours. Mark Lenters visited the site after the meeting and observed the peaking conditions around 4 pm in the afternoon, noting queues of 10 to 15 vehicles on the SR 16 northwest approach and the SR 54 north approach in the peak period.
- The lane configuration was established from analysis of the approach demands. GHD reviewed the Feasibility Report and agrees with the proposed lane configuration based on an independent analysis by GHD using the Arcady analysis software. The agreed upon lane configuration for the initial build condition is shown schematically below:



- The length of additional lanes, flaring from one to two for the two multilane approaches will be confirmed by GHD in order to evaluate the length of bridge widening and the associated grading limits.
- The percent trucks is less than 3% combination vehicles and less than 3% Single unit trucks. The design vehicle is a WB-65.
- Visibility of the intersection is poor from the northwest, and north legs based on the approach speeds, bridge profile, roadway curve and profile constraints. This makes it critically important to design the roundabout approach features to optimize performance related to a driver's maintaining a safe speed and path. The driver must translate changes in alignment; grade and traffic into control actions needed to gradually reduce approach speed. Information handling for high speed approaches to roundabouts is often complex and demanding; drivers need more processing time to make decisions and respond to information inputs. This also places greater importance on importance on the traffic information system for directional way-finding.

3. Review of Roles and Responsibilities

- Mark Lenters outlined the Incremental Review process which involves regular and short phone call web-meetings to view the designer's progress and ask the kinds of questions to lead the designer to explore the optimization of the roundabout layout given the documented constraints. The designer is to record the action items of each call or contact then start with those items in subsequent calls, in order that the actions can be tracked no matter how much time transpires between calls.
- During the development of the design Mark will provide comments and redline mark-ups for design elements listed on the GDOT Roundabout Design Checklist for concept and preliminary design development.

4. Comments on initial layout (Circle size, circle placement and alignment of arms).	
• Generally, the circle size of 180-ft. in diameter (two lane sides) is acceptable given the skew angle of the intersection.	**GDOT**
• The flared entries, one to two lanes should be sized to consider the staging of traffic for the bridge approach and the capacity needs for the northwest approach, SR 16.	↕
• Approach median splitter islands need to be lengthened for the Northwest, south and southeast approaches to account for the approach curvature and profile considerations.	
• The two lane approaches need truck gores added to the entries.	**GDOT**
• Obtain upfront environmental resources constraints and suggested mitigation ahead of time	**GSP**
• Profile constraints need to be confirmed including sight distance over the bridge. Consult with Jim Simpson.	**GDOT**
• The right turn by-pass lanes should intersect the downstream exit legs at 70° or higher to promote yielding of right turning drivers and reasonable sight to the left.	
• A spiral of the central island curb is required on the north side of the circle in order to place the westbound left turning vehicle in the outer lane to exit southbound; otherwise the left turner gets trapped on the inside left turn-only lane.	**GDOT**
• Confirm right turn lane requirements, westbound to northbound	**GHD Inc.**
• Dan Pass asked if the bridge width be adjusted because queuing predictions reduce length of storage and run-outs. A shared use path (8-ft.) is also to be considered.	**McGee Partners**
• GHD will discuss the changes needed with Jeff and Jason in a web-conference call to be scheduled in the next week or two.	**GHD Inc.**
• Derrick Cameron wishes to have the design concept finalized in the next month.	**All**

End of Minutes
Mark Lenters
Service Group Manager

Peer Review Meeting – Coweta 332180 – March 4, 2014

- Attendees

  - Dan Pass, GDOT D3 Preconstruction
  - Jason Mobley, GDOT D3 Design
  - Jeff Swiderski, GDOT D3 Design
  - Scott Parker, GDOT D3 Traffic Operations
  - Mark Lenters, GHD
  - Tommy Crochet, McGee Partners (via telephone)

- Discussions

  - Tommy Crochet proposed reduced bridge dimensions that would still accommodate staging.
  - Tommy suggested possibly shifting the bridge to the west. Jeff Swiderski stated the bridge had been shifted to the east to lessen the intersection skew. Mark Lenters stated that a smaller circle might work and would help with the skew issue. Jeff stated the clearance over the railroad might become an issue if the alignment was shifted to the west. Dan Pass suggested obtaining the "as-builts" and coordinating with the railroad through the Office of Utilities. Mark stated the western alignment should still be considered and that the bridge width could be reduced either way, allowing the alignment to shift.
  - Dan stated that avoiding permanent structures on the historic resources would reduce the environmental coordination.
  - Mark stated that the existing flashing signal should be included in the proposed design as well.
  - Dan suggested talking with the oversize permit unit and looking in GEOTRAQS to determine if the intersection was part of an over-sized, over-weight (OSOW) route.
  - To save time, Dan suggested sending the Concept Meeting invitation and following up with an updated layout after receiving the first iteration of the layout.
  - Mark asked if the bridge had to be replaced. Jason Mobley stated the bridge could probably remain if it was not impacted, but he would confirm.

- Action Items

  - GHD/McGee
    - Provide an updated bridge sketch for discussion and coordination with the Office of Bridge Design.
    - Provide an updated layout being in continual communication with GDOT Design.
  - GDOT
    - Obtain railroad requirements with regard to clearance and additional tracks. Obtain rail elevations and coordinate with bridge to determine if bridge will need to be raised. Obtain "as-builts" of existing bridge.
    - Check to see if intersection is on OSOW route.
    - Check to see if replacing bridge is required.

Peer Review Meeting – Coweta 332180 – March 13, 2014

- Attendees
  - Dan Pass, GDOT D3 Preconstruction
  - Jason Mobley, GDOT D3 Design
  - Jeff Swiderski, GDOT D3 Design
  - Mark Lenters, GHD
  - Jed Munroe, GHD

- Discussions
  - Dan Pass briefed everyone on some recent conclusions
    -
    - An off-site detour is not an option.
    - There is no future 4-lane project.
    - The railroad will only be an issue if the bridge is replaced.
    - SR16 is an OSOW route, but there have only been 4 permitted vehicles in the last 6 years, and it is a through movement at the intersection, so accommodation is easily achieved.
    - The vertical curvature (K-value) on SR54 north of the intersection only meets a 50mph design speed.
    - This is not a safety project.
  - Dan also stated he had been in contact with Ben Rabun, the State Bridge Engineer, but he was still unsure of whether the bridge replacement was required. Dan stated that he would follow up with Ben.
  - Jed Munroe presented two layout options
    - The first option saved the existing bridge but had significant impacts to the historic property in the SW quadrant. Jason Mobley stated that Coweta County specifically wanted us to minimize impacts to that parcel.
    - The second option required a bridge replacement on new alignment but minimized impacts to the SW quadrant parcel.
  - Mark Lenters highlighted some key enhancements from the previous layout such as spirals and entry path adjustments.
  - Jason asked about constructability. After discussion, it was concluded that there may be multiple stages but that the project was constructible.
  - Dan asked how GHD was doing on budget, recognizing that we had requested a re-layout which was not part of the scope. Mark stated he would know better next week. Dan stated he wanted to discuss with the project manager so that there were no surprises.

- Action Items
  - GHD
    - Provide the layout next week with minor clean-up and adjustments for cross walk locations.
    - Provide both options for alternative discussion purposes.
    - Provide preliminary analysis of capacity, truck turning, and speed control
  - GDOT
    - Coordinate with Ken Werho in Traffic Operations for constructability concerns.
    - Complete layout and advance to Concept Meeting

Keith Golden, P.E., Commissioner

GEORGIA DEPARTMENT OF TRANSPORTATION

One Georgia Center, 600 West Peachtree Street, NW
Atlanta, Georgia 30308
Telephone: (404) 631-1000

January 21, 2015

«AddressBlock»

Re: Responses to Open House Comments for PI#(s): 332180, Coweta County, SR 16 at SR 54
Project Number: NH000-0022-01(023)

«GreetingLine»

Thank you for your comments concerning the proposed project referenced above. We appreciate your participation and all of the input that was received as a result of the *September 2, 2014 Public Information Open House*. Every written comment received and verbal comment given to the court reporter will be made part of the project's official record.

A total of **60** people attended the open house. Of the **27** respondents who formally commented, **4** were in **support** of the project, **21** were **opposed**, **0** were **uncommitted**, and **2** expressed **conditional support**.

The attendees of the open house and those persons sending in comments within the comment period raised the following questions and concerns. The Georgia Department of Transportation (GDOT) has prepared this one response letter that addresses all comments received so that everyone can be aware of the concerns raised and the responses given. Please find the comments summarized below (in *italics*) followed by our response.

- "*We do not want a roundabout.*"

  Your comment has been noted. The Department has undertaken feasibility and other studies to examine alternatives for improving the intersection and found that, given current and projected conditions, a roundabout is the most practicable solution to improve the intersection.

- "*Tractor trailers, buses, and other large vehicles will have trouble navigating the roundabout.*"

  The roundabout has been sized to allow tractor trailers and buses to navigate the intersection safely and easily. This includes a "truck apron" for use by tractor trailers. Provisions will also be made for oversize trucks and low boy trailers.

- "*The construction costs are too high.*"

  The current design meets safety and service standards at a reasonable cost. That being said, as design progresses opportunities to reduce cost will be explored. The construction cost for this project also includes replacement of the bridge located just north of the intersection on SR 54. This bridge was constructed in 1955 and needs to be replaced.

- "*The proposed intersection improvements will make it unsafe for pedestrians.*"

  Due to lower speeds within the intersection, roundabouts have been shown to increase pedestrian safety compared to signalized intersections. The roundabout also simplifies the task of crossing the street by providing a splitter island at each crossing; pausing in the splitter island allows the pedestrian to consider one direction of motor vehicle traffic at a time.

- "*A roundabout will increase the number of accidents at the intersection and is not safe for inexperienced drivers.*"

  Compared to other types of intersections, roundabouts have demonstrated substantial safety and other benefits for motorists. Roundabouts are known to improve safety and typically reduce fatalities, injuries, and crashes at intersections where they have been implemented. Slower speeds at roundabouts are generally safer for pedestrians crossing at designated crosswalks.

- "*We want a signalized intersection.*"

  Several alternatives for this intersection have been considered, including a signal and multiple roundabout configurations. Our studies show that a signal can reduce delays to an acceptable level, but an increase in the number of crashes would be expected. These studies also show that a roundabout can provide much greater reductions in delay, and a safer intersection. The signal alternative would also require reconstruction of SR 16 in the vicinity of the intersection which would require removal of the historic Johnson farmhouse.

- *"Will access to and from the Johnson Farm property will be restricted to right in/right out?*"

  While inbound access will be restricted to right turns, the roundabout will provide for northbound vehicles to efficiently U-turn to enter the property. It will be possible for vehicles to turn left (northbound) from the property. The department will meet with the property owner to discuss access to their property.

- "*The noise and light levels at the Johnson Farm will be a nuisance.*"

  Noise analysis will be conducted and mitigation measures, such as a landscaped visual/noise barrier, may be implemented to reduce noise levels and light trespass.

- *"Is it possible to include a right turn lane prior to reaching the roundabout onto Hwy 54 north to Peachtree City and Hwy 154 to the I-85 interstate?"*

  Traffic models have shown that traffic does not warrant a turn lane for that movement at this intersection. The intersection of SR 154 and I-85 is not included within the boundaries of this project.

- "*Roundabouts improve traffic flow.*"

  An engineering study was prepared for this project which shows a significant improvement in traffic flow. This confirms research and experience which suggest that roundabouts are very effective at improving traffic flow in situations similar to those at the intersection of SR 54 and SR 16.

- *"The new roundabout will require the taking of too much property at the Johnson Farm."*

  The Department is investigating the addition of short walls in front of the Johnson Farm to reduce the amount of property required.

- *"The new roundabout will not improve traffic flow."*

  An engineering study was prepared for this project which shows a significant improvement in traffic flow. This confirms research and experience which suggest that roundabouts are very effective at improving traffic flow in situations similar to those at the intersection of SR 54 and SR 16.

- "*A new bridge(s) is not needed.*"

  Alternatives were studied that would keep the existing bridge in place, but the impacts to the Johnson Farm were far greater and closure of the intersection would be required during construction. The age and condition of the bridge was also considered, and the decision was made to replace the bridge.

- "*Several properties currently not considered eligible for listing on the National Register should be considered eligible.*"

  The proposed project was field surveyed by a qualified historian for historic properties in compliance with Section 106 of the National Historic Preservation Act of 1966 and amendments thereto. The survey boundary and methodology were established using the *GDOT/Federal Highway Administration (FHWA) Cultural Resources Survey Guidelines*. These guidelines were established as a result of past interaction with the State Historic Preservation Officer (SHPO) and his staff and were agreed upon by the FHWA and the SHPO. The SHPO concurred with the survey findings on April 3, 2014.

- "*The maintenance costs are too high.*"

  Maintenance of landscaping and lighting are typically the responsibility of the local government. Landscaping maintenance cost may be reduced by utilizing a paved concrete median instead of a landscaped median. The Department will decide on the median type with input from the local jurisdiction.

- "*Who is responsible for the cost of replacing the Turin Water Department's pipes impacted by the proposed project?*"

  Typically, utility relocations located within existing highway right of way are the responsibility of the utility owners. The cost of relocating utilities located outside of existing highway right of way may be the responsibility of the Department. In hardship cases, utility owners may apply for relocation expense assistance from the Department.

- "*This project is needed.*"

  Thank you for your comment. A need to improve the intersection has been identified, and the Department is moving forward to address it.

- *"Since motorists have difficulty with [the existing 4-way stop], many will not be able to negotiate the proposed roundabout with its numerous entrances and exits, with other vehicles weaving through at the same time."*

  Research has shown that after an initial introduction period, motorists quickly become adept at navigating roundabouts. The roundabout will feature signage (i.e., yield signs, directional arrows) indicating how motorists should travel through the intersection.

- "*The proposed alignment was chosen to avoid impacting pecan trees and an old house.*"

  The Department has made efforts to avoiding impacts to the pecan trees; however, this is not the primary reason for designing the proposed alignment. Maintaining continuity with the existing alignment and avoiding adverse impacts to properties eligible for listing on the National Register of Historic Places, the Turin Water Tower, Johnson Farm, and Brown House, was the reason that this alignment was proposed. The proposed project is federally funded, which requires the Department and FHWA to comply with the National Historic Preservation Act, Department of Transportation Act, and other laws. Avoiding adverse impacts to eligible properties is required. The extent of impact to the Johnson Farm is undetermined at this time, but should the State Historic Preservation Officer determine that the proposed project would have an "adverse impact," an alternatives analysis will be conducted to determine if the proposed alignment is the least adverse.

- "*The Brown House should not be considered savable.*"

  Professional architectural historians and the State Historic Preservation Officer have evaluated the Brown House and determined that it meets the criteria to be eligible for listing on the National Register of Historic Places. Whether the property is "saved" or restored is the jurisdiction of the property owner.

- *"The high traffic volumes will create congestion in the roundabout."*

  Traffic models that were run during the development of this project indicate that the roundabout will actually reduce congestion at the intersection.

Again, thank you for your comments. A brochure discussing roundabouts is available for download at http://www.dot.ga.gov/travelingingeorgia/trafficcontrol/roundabouts/Documents/Brochure/RoundaboutProof_Final.pdf. Should you have further questions, comments or concerns, please call the project manager, Kevin VanHouten, at 706-646-7557 or the environmental analyst, Bobby Dollar, at 404-631-1920.

Sincerely,

Hiral Patel, P.E.
State Environmental Administrator

HP/IH/ac

cc: Kevin VanHouten, GDOT Project Manager (via email)
PDF for Project File; Hardcopy to General Files

AGREEMENT

BETWEEN

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

AND

COWETA COUNTY

This Agreement is made and entered into this 3rd day of February, 2015, by and between the DEPARTMENT OF TRANSPORTATION, an agency of the State of Georgia, hereinafter called the **DEPARTMENT**, and COWETA COUNTY, GEORGIA acting by and through its Board of Commissioners, hereinafter called the **COUNTY**.

WHEREAS, the COUNTY has represented to the DEPARTMENT a desire to obtain roundabout lighting at the SR 16 @ SR 54 intersection in Coweta County, said lighting to be installed under GDOT P.I. No. 332180; and

WHEREAS, the COUNTY has represented to the DEPARTMENT a desire to participate in: 1) Providing the Energy and 2) the Operation and Maintenance of said lighting systems at the aforesaid location, and the DEPARTMENT has relied upon such representation; and

WHEREAS, the DEPARTMENT has indicated a willingness to fund the materials and installation for the said lighting system at the aforesaid locations, with funds of the DEPARTMENT, funds apportioned to the DEPARTMENT by the Federal Highway Administration under Title 23, United States Code, Section 104, or a combination of funds from any of the above sources.

NOW, THEREFORE, in consideration of the mutual promises made and of the benefits to flow from one to the other, the DEPARTMENT and the COUNTY hereby agree each with the other as follows:

1. The DEPARTMENT or its assigns shall cause the installation of all materials and equipment necessary for roundabout lighting at the SR 16 @ SR 54 intersection in Coweta County, said lighting to be installed under GDOT P.I. No. 332180, as shown on Attachment "A" attached hereto and made a part hereof.

2. Upon completion of installation of said lighting system, and acceptance by the DEPARTMENT, the COUNTY shall assume full responsibility for the operation, the repair and the maintenance of the entire lighting system, including but not limited to repairs of any damages, replacement of lamps, ballasts, luminaires, lighting structures, associated equipment, conduit, wiring and service equipment, and the requirements of the Georgia Utility Facility Protection Act. The COUNTY further agrees to provide and pay for all the energy required for the operation of said lighting systems.

3. The DEPARTMENT shall retain ownership of all materials and various components of the entire lighting system. The COUNTY, in its operation and maintenance of the lighting system, shall not in any way alter the type or location of any of the various components which make up the entire lighting system without prior written approval from the DEPARTMENT.

4. This Agreement is considered as continuing for a period of fifty (50) years from the date of execution of this Agreement. The DEPARTMENT reserves the right to terminate this Agreement, at any time for just cause, upon thirty (30) days written notice to the COUNTY.

5. It is understood by the COUNTY that the DEPARTMENT has relied upon the COUNTY'S representation of providing for the energy, maintenance, and operation of the lighting represented by this Agreement; therefore, if the COUNTY elects to de-energize or fails to properly maintain or to repair the lighting system during the term of this Agreement, the COUNTY shall reimburse the DEPARTMENT the materials cost for the lighting system. If the COUNTY elects to de-energize or fails to properly maintain any individual unit within the lighting system, the COUNTY shall reimburse the DEPARTMENT for the material cost for the individual unit which will include all costs for the pole, luminaires, foundations, and associated wiring. The DEPARTMENT will provide the COUNTY with a statement of material costs upon completion of the installation.

The covenants herein contained shall, except as otherwise provided accrue to the benefit of and be binding upon the successors and assigns of the parties hereto.

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement the day and year first above written.

RECOMMENDED:

COWETA COUNTY

BY: _____
Chairman, Board of Commissioners

(SEAL)

DEPARTMENT OF TRANSPORTATION

BY _____
Commissioner

(SEAL)

_____
WITNESS

_____
Notary Public

FRANCES J. TABOR
NOTARY
EXPIRES
GEORGIA
Dec. 10, 2018
PUBLIC
COWETA COUNTY

This Agreement approved by the Board of Commissioners at a meeting held at

37 Perry St

this 6 day of January, 2015.

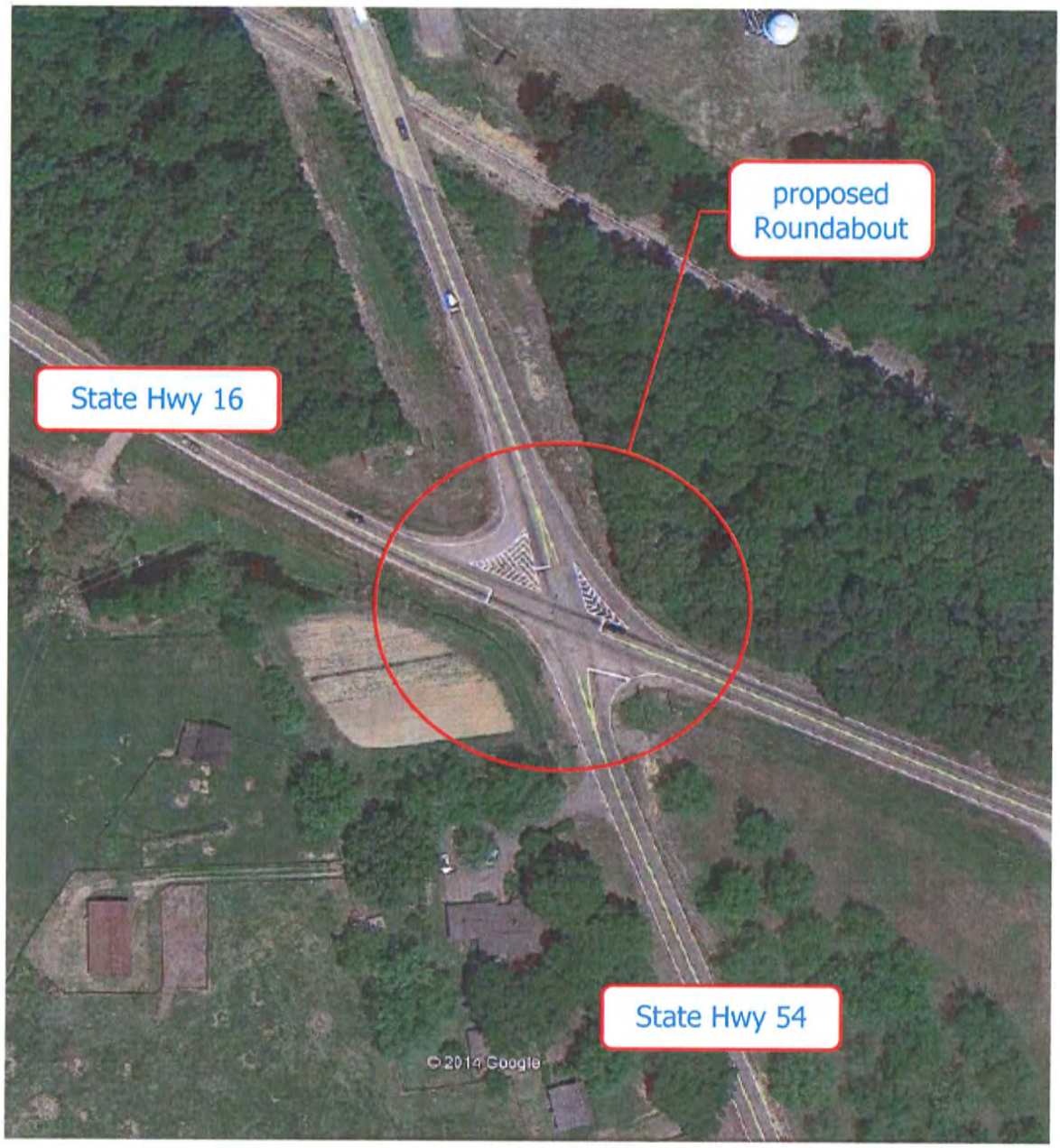
ATTEST:

_____
Treasurer

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

_____
Commission Clerk

Attachment "A"



Location Map
SR 16 @ SR 54
P.I. No. 332180
Coweta County