

DRAFT FEASIBILITY STUDY

Improve Interchange at SR 1009 (Main Street) And I-85

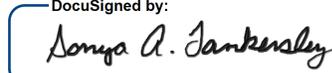
Randolph County

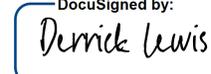
Division 8

FS-1008A (U-5770)



Prepared by the
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6/16/2016

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Randolph County

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I. General Description

This feasibility study describes the interchange improvements of SR 1009 (Main Street in Archdale, North Carolina. The route was formerly SR 1993 (US 311). The project is located in the city limits of Archdale. The project has been programmed in the STIP as U-5770. The project location is shown on Figure 1.

The existing geometry of the road is a five-lane facility with four traffic signals located within approximately 1650 feet. The current posted speed on the project is 35 mph. As part of this study, three alternatives were investigated. The alternatives investigated are described below:

- ❖ Alternate 1: Modify the existing SR 1009 (Main Street) approaches without improvements to the I-85 interchange. This alternative includes upgrading the five-lane facility to a four-lane divided narrow median curb and gutter facility from west of Pinecrest Drive to east of Rand Boulevard, a distance of 0.806 mile. This concept does not include bridge improvements at the I-85 interchange but does include intersection improvements where appropriate.
- ❖ Alternate 2: Upgrade the existing I-85 / SR 1009 (Main Street) interchange into a partial clover configuration. This alternative includes the conversion of the five-lane facility to a four-lane divided narrow median curb and gutter facility from west of Pinecrest Drive to east of Rand Boulevard, a distance of 0.806 mile.
- ❖ Alternate 3: Upgrade the existing I-85 / SR 1009 (Main Street) interchange into a diverging diamond configuration. This alternative includes the conversion of the five-lane facility to a four-lane divided narrow median curb and gutter facility from west of Pinecrest Drive to east of Rand Boulevard, a distance of 0.806 mile.

This is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including cost, and to identify potential problems that may require consideration in the planning and design phases.

Once a candidate project is identified for funding in the TIP, the Feasibility Study is followed by a rigorous planning and design process that meets the requirements of the

National Environmental Policy Act (NEPA), where either an Environmental Impact Statement (EIS) or an Environmental Assessment (EA) is done.

II. Background

The city is experiencing traffic congestion during peak hour on this stretch of road due to the spacing of the traffic signals. The purpose of this project is to improve the traffic safety and operations along SR 1009 (Main Street) in Archdale, North Carolina.

SR 1009 (Main Street) is designated a Minor Arterial according to NCDOT Functional Classification. Minor arterials provide service to travelers with trips of moderate length and at a lower level of mobility. SR 1009 (Main Street) provides service to urban residential and business streets access to interstate, US and NC routes. SR 1009 (Main Street) varies from a two-lane facility in rural areas to a five-lane facility in urban areas of North Carolina.

There are several State Transportation Improvement Program (STIP) projects within the proposed study area of FS-1008A / U-5770.

- I-5738: Pavement Rehabilitation on I-85 from South of SR 1009 (Main Street) to north of SR 1912 (Lunar Drive) in Archdale.
- I-5721: Pavement Rehabilitation on I-85 from Randolph County line to SR 1113 (Kivett Drive) in Greensboro.
- U-3400: Widening of SR 1577 / SR 1004 (Archdale Road) to multi-lanes from SR 1567 (Robbins Country Road) to SR 1009 (Main Street) in Archdale

There is one bridge in the project study area. Please see Table 3 for detailed bridge information.

III. Traffic and Safety

Currently there are four existing traffic signals located within a 1650 feet section of SR 1009 (Main Street).

The 2012 Average Daily Traffic (ADT) at the existing I-85 and SR 1009 (Main Street) interchange is 50,700 vpd on I-85 north, 27,000 vpd on SR 1009 (Main Street) east, 54,200 vpd on I-85 south, and 28,900 vpd on SR 1009 (Main Street), west. For the design year 2035 under the build scenario, the traffic volume at the interchange I-85 and SR 1009 (Main Street) is estimated to be 74,000 vpd on I-85 north, 25,700 vpd on SR 1009 (Main Street) east, 80,200 vpd on I-85 south, and 20,700 vpd on SR 1009 (Main Street) west. Truck traffic on I-85 is estimated to make up approximately 24 percent of the daily traffic. Truck traffic on SR 1009 (Main Street) is estimated to make up

approximately 4 percent of the daily traffic. Future I-74 is expected to have a major impact upon traffic volumes along SR 1009 (Main Street).

The existing segment of SR 1009 (Main Street) which includes the existing signaled intersections of Ashland Street and Balfour Drive to Aldridge Road and Renola Drive, operates at a level of service (LOS) D or better in the AM peak hour and LOS C in the PM peak hour under 2015 traffic volumes. If no improvements are made in the 2035 design year, it is projected that same signals will operate at a LOS D in both AM and PM peak hour.

The following table displays the level of service results for the alternates investigated.

Table 1: Existing Facility Level of Service

Alternate	LOS AM / PM Peak Hour			
	Ashland Street / Balfour Drive	I-85		Aldridge Road / Renola Drive
		West	East	
2015	C/C	C/C	C/C	C/C
2035*	C/D	C/C	C/B	D/D

*Volumes along SR 1009 (Main Street) are expected to decrease due to future improvements along I-74.

Table 2: 2035 Build Level of Service

Alternate	LOS AM / PM Peak Hour					Recommendation
	Post Office	Ashland Street / Balfour Drive	I-85		Dellwood Street / Renola Drive	
			West	East		
Modified Existing Facility (<i>SR 1009 approaches with no Interchange modification</i>)	C/D	No Signal	C/C	D/C	No Signal	Discarded
Partial Clover Alternate 2	C/D	No Signal	B/B	D/C	No Signal	Retained
Diverging Diamond Alternate 3	C/D	No Signal	D/C	C/D	No Signal	Retained

The partial clover and diverging diamond alternates were fully evaluated during this study while the modified existing facility configuration was discarded. The modified existing facility did not improve the traffic operations at the interchange. The traffic congestion issues included queue lengths that exceeded the length of the bridge. It is recommended that Alternate 1 not be considered for later planning and design phases. Depending on the conditions and traffic in the future, additional interchange configurations maybe considered during later planning and design phases.

To gather all crash data pertaining to the study area, one strip analysis was requested for this project. The strip analysis covered SR 1009 (Main Street) from SR 3182 (Comanche Road/Tarheel Drive) to NC 62 (Liberty Road/Trindale Road). Between 2009 and 2014, 382 total accidents were reported along this route. The total crash rate for this section of SR 1009 (Main Street) is 572.18 crashes per 100 million vehicle miles (crashes/100 MVM) traveled compared to the statewide crash rate of 389.82 crashes/100MVM for urban US Routes. There were 0 fatal crashes, 138 non-fatal injury crashes, and 244 property damage only crashes. The most prevalent types of crashes were Angle (41.36%), Rear End, Slow or Stop (30.63%), Sideswipe – Same Direction (10.47%), Left Turn – Same Roadways (3.93%), and Left Turn – Different Roadways (3.40%). The severity index for crashes on the corridor is 4.03. The average severity index for an urban facility is 3.89. The current total crash rate is significantly higher than the Statewide Rate and Critical Rate for urban secondary 4+ lane routes with a continuous left turn lane. The four lane divided improvements would be anticipated to improve the safety along the facility by controlling indiscriminate left turn movements associated with the five lane section.

IV. Description of Alternatives

The scope of the project is to improve SR 1009 (Main Street) to accommodate the increased traffic volume expected in 2035. Three alternates were investigated. The project involves converting the existing 5-lane facility into a 4-lane divided facility with median. See Table 1 for the estimated project cost for each alternative.

Alternate 1 – Modified Existing Facility (SR 1009 approaches with no Interchange modification) includes the following proposed improvements:

- Widen SR 1009 (Main Street) to a four-lane divided facility with curb and gutter with five foot sidewalks on 150 to 200 feet of right of way from just west of Pinecrest Drive to just east of Rand Boulevard.
- Within the I-85 interchange, no improvements to SR 1009 are provided and the existing 6-lane bridge is retained.
- Convert entrance to post office to a three-lane facility with 12 foot lanes and two foot paved shoulders on 80 feet of right of way.
- Extend York Place to meet the converted post office entrance. There will be 12 foot lanes and two foot paved shoulders on 80 feet of right of way.

- Install a new signal at the Post Office at SR 1009 (Main Street). The existing signals at the ramps will be coordinated with the new signal. Extend York Place to connect with entrance road to the Post Office.
- Realign Renola Drive to tie in across from Delwood Street. Close the existing connection at Renola Drive and SR 1009 (Main Street).
- Close the western most entrance to Food Lion.

With this proposed cross-section, it is anticipated that there will be two (2) residences and four (4) businesses relocated due to this project. The total cost of this alternative, including right of way, utility relocation, and construction is estimated to be \$18,400,000.

Right-of-way.....	\$12,000,000
Utility Relocation.....	\$500,000
<u>Construction.....</u>	<u>\$5,900,000</u>
<u>Total Cost</u>	<u>\$18,400,000</u>

Alternate 2 – Partial Clover:

- Convert SR 1009 (Main Street) from a five-lane section to a four-lane divided narrow median facility with curb and gutter, 4 foot to 24 foot variable width median and five foot sidewalks on 150 to 200 feet of right of way just west of Pinecrest Drive to just east of Rand Boulevard.
- Convert entrance to post office to a three-lane facility with 12 foot lanes and two foot paved shoulders on 80 feet of right of way.
- Extend York Place to meet the converted post office entrance. There will be 12 foot lanes and two foot paved shoulders on 80 feet of right of way.
- Widen the existing bridge to support 5-lane bridge with variable median. See Table 2 for existing bridge information.
- Add loop in northwest quadrant that is 14 foot wide with 4 foot paved shoulder on outside and 2 foot curb and gutter inside.
- Relocate I-85 southbound off ramp on 100 foot of right of way.
- Extend Bainbridge Street to connect with SR 1009 (Main Street west of Biscuitville. Ashland Street will stop at the intersection with Bainbridge Street Extension.
- Extend York Place to connect with entrance road to the Post Office.
- Realign Renola Drive to tie in across from Delwood Street. Close the existing connection at Renola Drive and SR 1009 (Main Street).
- Close the western most entrance to Food Lion.

With this proposed cross-section, it is anticipated that there will be four (4) residences and eight (8) businesses relocated due to this project. The total cost of this alternative, including right of way, utility relocation, and construction is estimated to be \$37,400,000.

Right-of-way.....	\$21,900,000
Utility Relocation.....	\$600,000
<u>Construction.....</u>	<u>\$14,900,000</u>
Total Cost	\$37,400,000

Alternate 3 – Diverging Diamond:

- Convert SR 1009 (Main Street) from a five-lane section to a four-lane divided narrow median facility with curb and gutter, 4 foot to 24 foot variable width median and five foot sidewalks on 150 to 200 feet of right of way just west of Pinecrest Drive to just east of Rand Boulevard.
- Within the Diverging Diamond Interchange, convert SR 1009 (Main Street) to a four-lane divided facility with an 18 foot concrete barrier protected median for pedestrian movements. There is an approximately 1250 foot drop lane that starts at the northbound off ramp and terminates at the Food Lion entrance.
- Convert entrance to post office to a three-lane facility with 12 foot lanes and two foot paved shoulders on 80 feet of right of way.
- Extend York Place to meet the converted post office entrance. There will be 12 foot lanes and two foot paved shoulders on 80 feet of right of way.
- Close York Place connection at SR 1009 (Main Street) between west of Waffle House.
- Extend York Place to connect with entrance road to the Post Office.
- Realign Renola Drive to tie in across from Delwood Street. Close the existing connection at Renola Drive and SR 1009 (Main Street).
- Close the western most entrance to Food Lion.

With this proposed cross-section, it is anticipated that there will be 2 (two) residences and four (4) businesses relocated due to this project. The total cost of this alternative, including right of way, utility relocation, and construction is estimated to be \$12,000,000.

Right-of-way.....	\$12,000,000
Utility Relocation.....	\$550,000
<u>Construction.....</u>	<u>\$8,700,000</u>
Total Cost	\$21,250,000

V. Community Issues

A detailed investigation was not conducted for this feasibility study; however no impacts to schools, parks, recreation areas, or community facilities are anticipated with this project.

The Geographic Information System Service of the North Carolina State Historic Preservation Office were used to determine if any historic properties on the National Register of Historic Places (NRHP) or state study lists exist within the project study area. There are no National Register of Historic districts or structures located in the project area.

VI. Natural Environment Issues

The following is a preliminary review of environmental issues that might have a potential impact to the project. The information obtained for the environmental screening is from a Geographic Information System (GIS) database. The purpose of the environmental screening is to identify potential environmental issues early in the process.

Stream Classification

There are no streams identified in the project study area.

Wetlands

There are no wetlands identified in the project study area.

National Heritage Program - Threatened and Endangered Species

There are no State-listed species identified in the National Heritage Program Database in the project study area.

VII. Recommendations

Alternate 3: After reviewing the three alternates, the preferred alternate is the Diverging Diamond. The diverging diamond provides an acceptable level of service with little impacts to residents and businesses, and is Division 8's preferred alternate. See the Table 3 below for a cost comparison on each alternate.

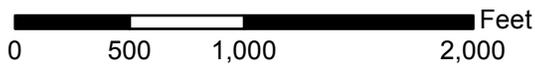
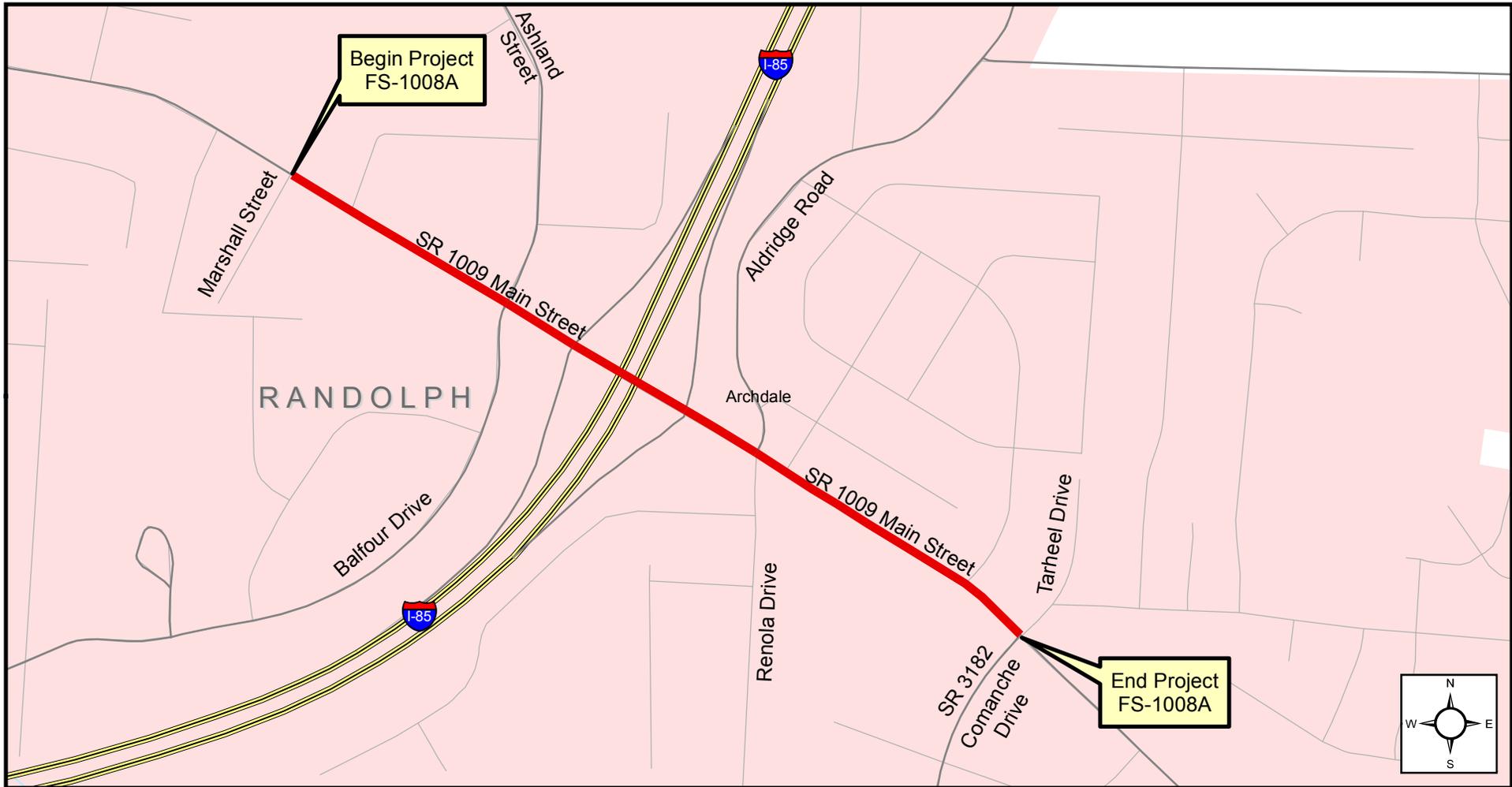
Our recommendation is to carry forward the partial clover and diverging diamond options in later planning and design phases. Both have comparable levels of service. From a programming standpoint, it is preferred to use the cost estimate for the diverging diamond alternative 3.

Table 3: Total Estimated Project Cost

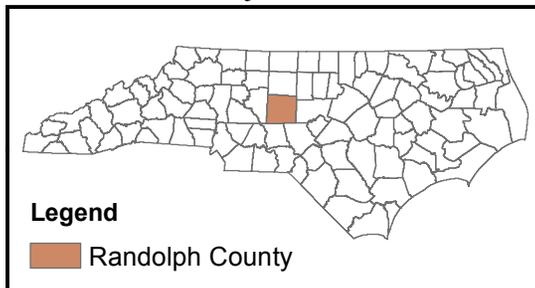
Alternate	Right of way Cost	Utility Relocation	Construction Cost	Total Cost	Residential Relocation	Business Relocation
1	\$12,000,000	\$500,000	\$5,900,000	\$18,400,000	2	4
2	\$21,900,000	\$600,000	\$14,900,000	\$37,400,000	4	8
3	\$12,000,000	\$550,000	\$8,700,000	\$21,250,000	2	4

Table 4: Existing Bridge Information

Structure Number	Facility Carried	Feature Intersected	Structure Description	Structure Length	Vertical Clearance	Horizontal Clearance	Year Constructed	Sufficiency Rating
150	SR 1009 (Main Street)	I-85	RC Deck / Plate Girders	259'	17.833'	76'	1981	83



— FS-1008A Project Limits





STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 PROGRAM DEVELOPMENT BRANCH
 FEASIBILITY STUDIES UNIT

**Project Location Map: FS-1008A
 Figure 1**

Improve Interchange at SR 1009 (Main Street) and I-85
 Randolph County, Division 8