



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

South Carolina

February 28, 2017

1835 Assembly Street, Suite 1270  
Columbia, South Carolina 29201  
803-765-5411  
803-253-3989

In Reply Refer To:  
HDA-SC

Ms. Heather Robbins  
Acting Director Environmental Services Office  
South Carolina Department of Transportation (SCDOT)  
955 Park Street, P.O. Box 191  
Columbia, South Carolina 29202

Dear Ms. Robbins:

The Federal Highway Administration (FHWA) has reviewed the Environmental Assessment (EA) for the Proposed Interstate 85 Widening and Improvements from Mile Marker 96 to 106 (Project No P27116) in Cherokee County, South Carolina and finds that it adequately addresses the potential impacts of the proposal. Based on the analysis provided in the EA and supporting documents we have determined that an Environmental Impact Statement (EIS) is not required. The EA is approved and acceptable for public availability and comment. The EA shall be made available for public review for a minimum of thirty (30) days before FHWA makes its final determination. The public availability shall be announced by a notice similar to a public hearing notice. Also, please provide Notice of Availability of the EA to the affected units of government, and to the State intergovernmental review contacts as specified in 23 CFR 771.119(d).

All project commitments documented in the EA are mandatory and the SCDOT will need to ensure that they are ultimately carried out. The public hearing may be scheduled fifteen (15) days after the document is made available for public review. Enclosed is a copy of the signed document. Please address any questions you may have concerning this project to Michelle Herrell by phone at 803-765-5460, or by email at [michelle.herrell@dot.gov](mailto:michelle.herrell@dot.gov).

Sincerely,

(for) Emily O. Lawton  
Division Administrator

Enclosure

ec: Mr. David Kelly, SCDOT NEPA Project Manager RPG 4



# Environmental Assessment

**Interstate 85 Improvement Project  
Cherokee County, South Carolina**

Interstate 85 Improvement Project



**February 2017**

Date: <input type="text" value="02/09/2017"/>	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	
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Project ID: <input type="text" value="P027116"/>	County: <input type="text" value="Cherokee"/>	District: <input type="text" value="District 4"/>	Total # of Commitments: <input type="text" value="12"/>
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Project Name:

The Environmental Commitment **Contractor Responsible** measures listed below **are to be included in the contract and must be implemented**. It is the responsibility of the Program Manager to make sure the Environmental Commitment **SCDOT Responsible** measures are adhered to. If there are questions regarding the commitments listed please contact:

**CONTACT NAME:** Mr. Brad Reynolds, P.E.

**PHONE #:** 737-1440

### ENVIRONMENTAL COMMITMENTS FOR THE PROJECT

<b>Water Quality</b>	Responsibility: <input type="text" value="SCDOT"/>
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The contractor will be required to minimize possible water quality impacts through implementation of construction BMPs, reflecting policies contained in 23 CFR 650B and the Department's Supplemental Specifications on Seeding and Erosion Control Measures (January 01, 2015). Other measures including seeding, silt fences, sediment basins, etc. as appropriate will be implemented during construction to minimize impacts to Water Quality.

<b>Floodplains</b>	Responsibility: <input type="text" value="SCDOT"/>
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The selected contractor will send a set of final plans and request for floodplain management compliance to the local County Floodplain Administrator.

<b>Noise</b>	Responsibility: <input type="text" value="SCDOT"/>
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SCDOT will inform local planning officials of future, generalized noise levels expected to occur in the project vicinity after FHWA has made a final decision on the Environmental document.

Project ID : <input type="text" value="P027116"/>	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	
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**ENVIRONMENTAL COMMITMENTS FOR THE PROJECT**

<b>USTs/Hazardous Materials</b>	Responsibility: <input type="text" value="SCDOT"/>
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If avoidance of hazardous materials is not a viable alternative and soils that appear to be contaminated are encountered during construction, the South Carolina Department of Health and Environmental Control (SCDHEC) will be informed. Hazardous materials will be tested and removed and/or treated in accordance with the United States Environmental Protection Agency and the SCDHEC requirements, if necessary.

<b>Stormwater</b>	Responsibility: <input type="text" value="SCDOT"/>
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Stormwater control measures, both during construction and post-construction, are required for SCDOT projects with land disturbance and/or constructed in the vicinity of 303(d), TMDL, ORW, tidal, and other sensitive waters in accordance with the SCDOT's MS4 Permit. The selected contractor would be required to minimize potential stormwater impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seed and Erosion Control Measures (January 01, 2015).

<b>Migratory Bird Treaty Act (all bridge and box culvert projects)</b>	Responsibility: <input type="text" value="CONTRACTOR"/>
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The federal Migratory Bird Treaty Act, 16 USC § 703-711, states that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not.

The Department will comply with the Migratory Bird Treaty Act of 1918 in regard to the avoidance of taking of individual migratory birds and the destruction of their active nests. Prior to construction/demolition of the bridges the Resident Construction Engineer (RCE) will coordinate with SCDOT Environmental Services Office to determine if there are any active nests on the bridge. After this coordination, it will be determined whether construction/demolition can begin. After construction/demolition has begun, measures can be taken to prevent birds from nesting, such as screens, noise producers, and deterrents etc. If during construction or demolition a nest is observed on the bridge that was not discovered during the biological surveys, the contractor will cease work and immediately notify the SCDOT Environmental Services Office. SCDOT biologists will determine whether the nest is active and the species utilizing the nest. After this coordination, it will be determined whether construction/demolition can resume or whether a temporary moratorium will be put into effect. All costs for determining the need for, the placing of deterrents, and applying of all special actions including, but not limited to, removing nests and any costs associated with conducting work in compliance with the Migratory Bird Treaty Act as stated herein will not be paid for separately but will be considered to have been included with other items of work.



Project ID: <input type="text" value="P027116"/>	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	
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**ENVIRONMENTAL COMMITMENTS FOR THE PROJECT**

<b>Cultural Resources</b>	Responsibility: <input type="text" value="CONTRACTOR"/>
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The contractor and subcontractors must notify their workers to watch for the presence of any prehistoric or historic remains, including but not limited to arrowheads, pottery, ceramics, flakes, bones, graves, gravestones, or brick concentrations during the construction phase of the project, if any such remains are encountered, the Resident Construction Engineer (RCE) will be immediately notified and all work in the vicinity of the discovered materials and site work shall cease until the SCDOT Archaeologist directs otherwise.

<b>Displacements</b>	Responsibility: <input type="text" value="SCDOT"/>
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The SCDOT will acquire all new right-of-way and process any relocations in compliance with the Uniform Relocation Assistance and Real Property Acquisition policies Act of 1970, as amended (42 U.S. C. 4601 et seq.). The purpose of these regulations is to ensure that owners of real property to be acquired for Federal and federally-assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owner, to minimize litigation and relieve congestion in the courts, and to promote public confidence in Federal and federally-assisted land acquisition programs.

<b>Individual Permit</b>	Responsibility: <input type="text" value="SCDOT"/>
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Impacts to jurisdictional waters will be permitted under a Department of the Army Section 404 permit from the U.S. Army Corps of Engineers. Based on preliminary design, it is anticipated that the proposed project would be permitted under an Individual Army Corps of Engineers Permit (IP). SCDOT will provide the Army Corps with information regarding any proposed demolition activities during the Section 404 permitting process. The required mitigation for this project will be determined through consultation with the USACE and other resource agencies.

Project ID : P027116

SCDOT  
NEPA ENVIRONMENTAL COMMITMENTS  
FORM



**ENVIRONMENTAL COMMITMENTS FOR THE PROJECT**

**Non-Standard Commitment**

Responsibility: SCDOT

Northern Long-Eared Bat

Bridges/Structures have been inspected and there is no evidence of bat activity. Prior to construction/demolition of the bridges/structures the Resident Construction Engineer (RCE) will coordinate with SCDOT ESO Compliance Office to perform an additional inspection 7 business days prior to initiating work at each bridge/structure location. After this coordination it will be determined whether construction/demolition can begin. Based on the results of the inspection(s), any bridges/structures suspected of providing habitat for any species of bat will be removed from work schedules until such time that SCDOT has obtained clearance from USFWS. If during construction/demolition bats are observed that were not discovered during the biological surveys, the contractor will cease work and immediately notify the RCE, who will contact SCDOT ESO Compliance Office. After this coordination, it will be determined whether construction/demolition can resume or whether a temporary moratorium will be put into effect.

**Non-Standard Commitment**

Responsibility: CONTRACTOR

Air Quality - Construction

State and local regulations regarding dust control and other air quality emission reduction controls will be followed. Current state best management practices (BMPs), will be followed during the construction of the project. These include covering earth-moving trucks to keep dust levels down, watering haul roads, and refraining from open burning, except as may be permitted by local regulations.

**Non-Standard Commitment**

Responsibility: CONTRACTOR

Conditional Letter of Map Revision (CLOMAR)

It is anticipated that a CLOMAR would be necessary for impacts to Buffalo Creek on the south side of I-85 in the vicinity of Exit 100. The contractor would be responsible for coordinating with FEMA and local floodplain officials in the preparation of the CLOMR.

Date: 02/09/2017	SCDOT NEPA ENVIRONMENTAL COMMITMENTS FORM	
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Project ID: P027116	County: Cherokee	District: District 4	Total # of Commitments: 4
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Project Name: I-85 Widening and Interchange Improvements - Design Build Preparation

The Environmental Commitment **Contractor Responsible** measures listed below **are to be included in the contract and must be implemented**. It is the responsibility of the Program Manager to make sure the Environmental Commitment **SCDOT Responsible** measures are adhered to. If there are questions regarding the commitments listed please contact:

**CONTACT NAME:** Mr. Brad Reynolds, P.E. **PHONE #:** 737-1440

**ENVIRONMENTAL COMMITMENTS FOR THE PROJECT**

<b>Non-Standard Commitment</b>	Responsibility: SCDOT
<p>Survey for Georgia aster</p> <p>Georgia aster was found within the PSA along a stream north of I-85 near Shaman Road, outside of the existing mainline corridor. The Preliminary Alternative alignment would not impact this area at this time, as it is outside of the construction limits. Candidate species do not currently receive statutory protection under the ESA; thus, an effect determination was not completed. Should this species become listed, or if the final design of the preferred alternative changes in this area, SCDOT and/or FHWA would need to conduct additional consultation with the USFWS.</p>	

<b>Non-Standard Commitment</b>	Responsibility: SCDOT
<p>Dwarf-flowered Heartleaf Survey</p> <p>An additional survey for Dwarf-flowered Heartleaf will be conducted during the USFWS survey season which is March to May.</p>	

<b>Non-Standard Commitment</b>	Responsibility: CONTRACTOR
<p>Hydraulic Analysis</p> <p>A final detailed hydraulic analysis will be conducted during final design development, and will be performed per the <i>SCDOT Requirements for Hydraulic Design Studies</i>.</p>	

**ENVIRONMENTAL COMMITMENTS FOR THE PROJECT**

<b>Non-Standard Commitment</b>	Responsibility: <input type="text" value="CONTRACTOR"/>
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<input type="text" value="Construction Noise"/>
To minimize construction noise, the contractor will be required to comply with the SCDOT 2007 Standard Specifications for Highway Construction, which includes specifications regarding nuisance noise avoidance.

<input type="text"/>	Responsibility: <input type="text"/>

<input type="text"/>	Responsibility: <input type="text"/>



I-85 Widening between Mile Marker 98 and 106  
Cherokee County, South Carolina

ENVIRONMENTAL ASSESSMENT



Submitted Pursuant to 42 U.S.C 4332 (2) (c) by the  
U.S. Department of Transportation, Federal Highway Administration  
and  
S.C. Department of Transportation, Environmental Management Office

2/28/2017

Date of Approval

2/28/17

Date of Approval

David P. Kelly

Digitally signed by David P. Kelly  
DN: cn=David P. Kelly, o=SCDOT, ou=SCDOT,  
email=kellydp@scdot.org, c=US  
Date: 2017.02.28 13:10:42 -05'00'

S.C. Department of Transportation

Michelle L. Herrell

Federal Highway Administration

The following individuals may be contacted for additional information concerning the project:

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S.C. Department of Transportation  
955 Park Street  
Columbia, S.C. 29202-0191  
(803) 737-1440

Project No. P027116

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**APPENDIX B:** Preliminary Study Alternatives

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**APPENDIX H:** Traffic Noise Report

**APPENDIX I:** Environmental Site Assessment

**APPENDIX J:** Cultural Resources Report and Coordination

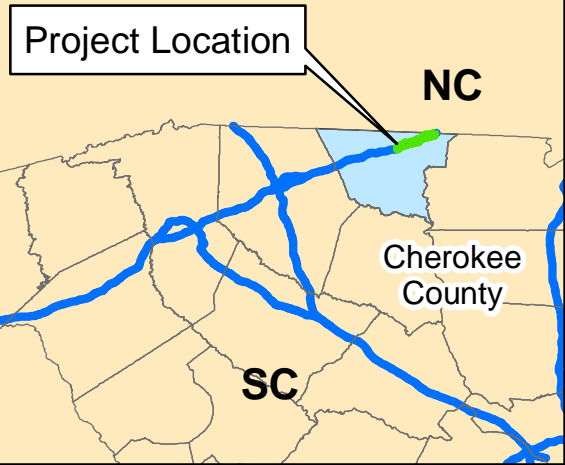
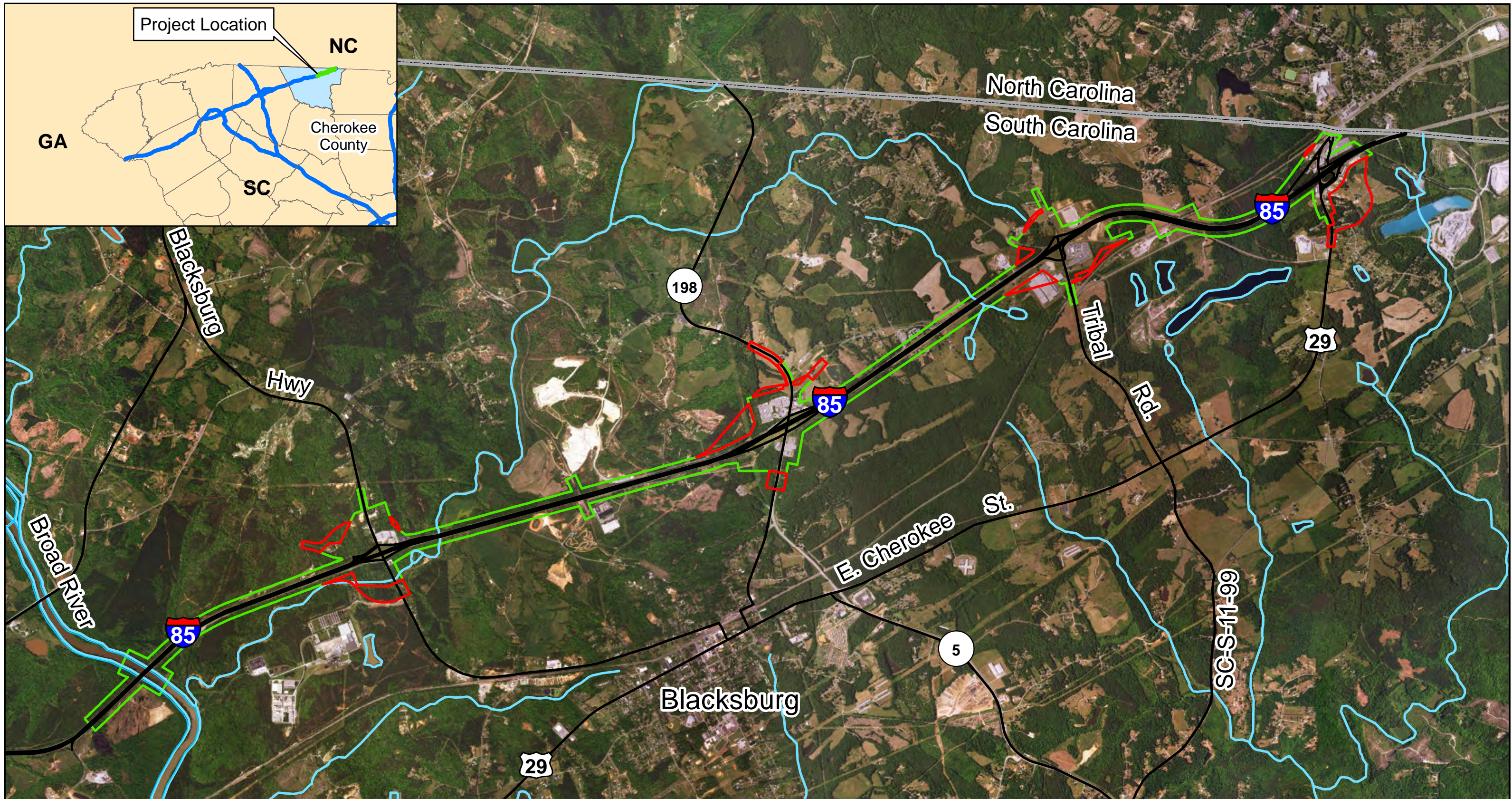
**APPENDIX K:** Agency Coordination

## **1.0 INTRODUCTION**

The South Carolina Department of Transportation (SCDOT) proposes to improve the Interstate 85 (I-85) corridor from approximately one-mile north of SC 18 (Exit 96) to US 29 (Exit 106) near the South Carolina/North Carolina State Line, a distance of approximately 10 miles located in Cherokee County, South Carolina (Figure 1). It is anticipated that the project would add travel lanes along the I-85 mainline and improve the operational efficiency and safety along various interchanges and ramps.

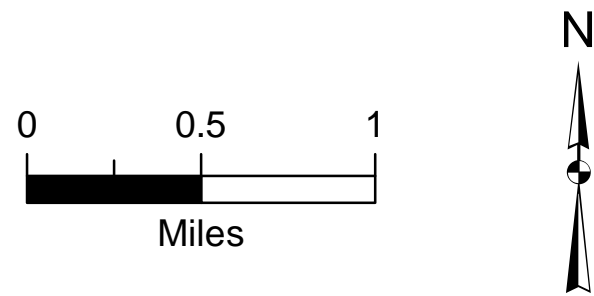
The project, as proposed, would result in certain modifications to the human and natural environment. However, SCDOT has not identified any significant impacts that would occur based on the data collected, and therefore the project meets the criteria under 23 CFR §771.115(c) for processing as an Environmental Assessment. Specific environmental studies were conducted in the early stages of project development and understandings of the scope of work to be performed were utilized in making this decision. These environmental studies are appended and/or incorporated by reference to this document.





**Legend**

- Roads
- I-85
- Streams
- ▭ County Boundary
- Project Boundary
- Additional Project Limits



**FIGURE 1:  
INTERSTATE I-85 WIDENING  
FROM MM 98 TO MM 106  
STUDY AREA MAP**



## 2.0 PURPOSE AND NEED OF THE PROJECT

### 2.1 What types of facilities are currently in place?

I-85 is a north-south interstate system that spans a total of 670 miles from Montgomery, Alabama to Petersburg, Virginia. I-85 extends a total of 106 miles in South Carolina, with direct access to I-385 and I-26. Specifically, I-85 between Exit 98 and Exit 106 currently consists of a four-lane interstate with a grassed median and a posted speed limit of 65 miles per hour throughout the study area. The existing right-of-way is approximately 100 feet to either side of the center line (200 feet total). The project study area (PSA) includes four interchanges and nine major bridge structures along the interstate as shown in Figure 1. Frontage roads parallel one or both sides of the interstate for most of the length of this project. The existing project interchanges are described below, with detailed information included in the *Interstate 85 Widening Traffic Analysis Report MM 96-106, Cherokee County* (Appendix A).

#### Exit 98 (Frontage Road Off Ramp – Northbound Off-Ramp Only)



Exit 98 consists of an I-85 northbound off ramp only that provides direct access to a commercial property and Frontage Road. Frontage Road eventually intersects with the Exit 100 northbound off-ramp and Blacksburg Highway.

Exit 100 (S-83, Blacksburg Highway): The existing facility includes a diamond type interchange with S-83 (Blacksburg Highway), which is a two lane facility within the project area. There are various frontage roads that interconnect with the I-85 interchange ramps. This includes Frontage Road/Milliken Road along the northbound off-ramp; Simper Road along the southbound off-ramp; and Crawford Road along the southbound on-ramp. In addition, there are access driveways along the southbound off-ramp that provide direct access to adjacent commercial developments. The existing ramp intersections do not include any turn lanes or storage areas and have posted advisory speeds of 25 and 35 miles per hour (mph). The Blacksburg Highway bridge over I-85 has insufficient vertical clearance and a Sufficiency





Rating of 80.4.<sup>1</sup> The 2015 annual average daily traffic volumes (AADT) along Blacksburg Highway in the vicinity of the interchanges is 4,300. The area immediately surrounding the interchange includes various commercial retail developments consistent with highway oriented businesses

Exit 102 (SC 5, North Mountain Street): The existing facility includes a tight diamond type interchange with SC 5 (North Mountain Street) and a two-lane bridge over I-85. North Mountain Street is a five lane facility south of I-85, and transitions to SC 198, a four lane facility north of I-85. There are various frontage roads that



interconnect with the I-85 interchange ramps. This includes Henson Road along the northbound off-ramp and Rock Springs Road along the southbound on-ramp. In addition, there is an access driveway along the southbound off-ramp that provides direct access to adjacent

Sufficiency Rating is a numeric value that is indicative of a bridges sufficiency or capability to remain in service.

commercial developments. The existing ramp intersections do not include any turn lanes or storage areas. The bridge has insufficient vertical clearance and has a Sufficiency Rating of 80.4.<sup>2</sup> The 2015 AADT along North Mountain Street in the vicinity of the interchanges is 7,200. The area immediately surrounding the interchange includes various commercial retail developments consistent with highway oriented businesses.

Exit 104 (S-99, Tribal Road): The existing facility includes a diamond type interchange with S-99 (Tribal Road), which is a two-lane facility within the project area. There are various frontage roads that interconnect with the I-85 interchange ramps. This includes Priester Road along the northbound on-ramp; and S-52 (Holly Grove Road) along the southbound on-ramp. In addition, there is an access driveway along the northbound on-ramp that provides direct access to an



<sup>1</sup> S.C Department of Transportation, *I-85 Corridor Analysis, Spartanburg and Cherokee Counties*, SCDOT Office of Planning, 2014.

<sup>2</sup> SCDOT, *I-85 Corridor Analysis, Spartanburg and Cherokee Counties*, SCDOT Office of Planning, 2014.

adjacent commercial development. The existing ramp intersections do not include any turn lanes or storage areas. The bridge has insufficient vertical clearance, a Sufficiency Rating of 81.0<sup>3</sup>, and the horizontal clearance is insufficient to meet design standards if the roadway is widened to six lanes. The 2015 AADT along Tribal Road (S-99) in the vicinity of the interchanges is 650. The area immediately surrounding the interchange includes various commercial developments, including a large truck stop and a manufacturing facility.

Exit 106 (US 29, East Cherokee Street) : The existing facility includes a partial diamond with a loop along the I-85 northbound off-ramp. US 29 (East Cherokee Street), including the bridge over I-85, consists of two travel lanes and provides access to numerous commercial developments. There is a frontage road (S-658, Frontage Road) that interconnects with the I-85 northbound on-ramp. There is also an access point from the loop ramp to the northbound on-ramp.

The loop has a recommended speed of 20 mph and does not have sufficient deceleration lane length along I-85 for this speed. The southbound off-ramp has two direct access points to adjacent commercial retail developments. In addition, the southbound on-ramp accommodates two way traffic for the majority of the ramp, with access to adjacent property and developments. The



bridge has insufficient vertical clearance, is structurally deficient, and has a Sufficiency Rating of 52.<sup>4</sup> The horizontal clearance is also insufficient to meet design standards if the roadway is widened to six lanes. The 2015 AADT along East Cherokee Street in the vicinity of the interchanges is 2,300. The area immediately surrounding the interchange includes various commercial retail developments, and provides access to nearby residential developments.

## 2.2 What is the purpose of the project?

The primary purpose of the project is to improve the operational efficiency of I-85 and correct geometric deficiencies along the various interchanges and overpasses by bringing them into compliance with current state and federal design standards. The secondary purpose of the project is to enhance the safety along the existing facilities.

<sup>3</sup> SCDOT, *I-85 Corridor Analysis, Spartanburg and Cherokee Counties*, SCDOT Office of Planning, 2014.

<sup>4</sup> SCDOT, *I-85 Corridor Analysis, Spartanburg and Cherokee Counties*, SCDOT Office of Planning, 2014.

## 2.3 Why is the project needed?

The project need is based upon the existing and projected operating conditions associated with the current mainline and interchange facilities. Specifically, the projected traffic conditions along the mainline and existing configuration of the interchanges result in unacceptable operating conditions and deficiencies, including undesirable spacing between ramp intersections and side road intersections. This section of I-85 is currently experiencing deteriorating operational conditions, with many of the areas projected to be operating beyond capacity by the design year (2040). In addition, the current design and configurations of the interchanges include interconnection of the interchange ramps and access roads, along with numerous intersections and access points located within close proximity to the interchange ramps. These deficiencies create safety concerns due to congestion, undesirable movements, and vehicular conflicts.

### 2.3.1 What are the current traffic operating conditions along the mainline?

Current traffic volumes on I-85 along the PSA range from 45,800 AADT from Exit 96 to 100 to 36,500 AADT between Exit 104 and 106. This section of I-85 has experienced an annual percentage change in AADT of 1.70% since 1990, resulting in an increase of up to 15,000 AADT. This trend is expected to continue with projected traffic volumes for the year 2040 ranging 63,000 AADT at Exit 96 to 50,200 AADT near Exit 106 (Table 1).

**Table 1. Mainline Traffic Volumes**

I-85 Segment	2015 AADT	2040 AADT <sup>1</sup>
Exit 96 to Exit 100 (SC 18 to S-83)	45,800	63,000
Exit 100 to Exit 102 (S-83 to SC 5)	43,500	59,800
Exit 102 to Exit 104 (SC 5 to S-99)	37,000	50,900
Exit 104 to Exit 106 (S-99 5 to US 29)	36,500	50,200
Exit 106 (US 29) to State Line	37,300	51,300

<sup>1</sup> Based upon 1.5% compounded growth

Level of Service (LOS) is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. There are six LOS letter designations ranging between LOS A and LOS F. LOS A describes completely free-flowing conditions and LOS F describes very unstable flow conditions. The LOS criteria for I-85 segments are shown in Table 1, and are based on definitions from the

Transportation Research Board’s (TRB) *Highway Capacity Manual*.<sup>5</sup> LOS A through D are acceptable under most circumstances and are considered below capacity. LOS E is generally considered at-capacity and LOS F is over-capacity. LOS E and F are generally considered unacceptable. Table 2 includes a summary of existing (2015) and future no-build volumes (2040) for both the northbound and southbound segments of I-85 along the PSA.

**Table 2. Mainline Levels-of-Service**

	Segment	AM Peak Hour		PM Peak Hour	
		2015	2040	2015	2040
NB	Exit 96-100	B	D	D	F
NB	Exit 100-102	B	C	D	F
NB	Exit 102-104	B	C	C	E
NB	Exit 104-106	B	C	C	E
NB	Exit 106 to State Line	B	C	C	E
SB	State Line to Exit 106	B	C	C	F
SB	Exit 106-104	B	C	C	E
SB	Exit 104-102	B	C	C	F
SB	Exit 102-100	B	C	D	F
SB	Exit 100-96	B	D	D	F

In summary, traffic volumes are projected to increase at an annual rate of 1.5 percent per year as documented in the traffic study.<sup>6</sup> As presented in Table 2, the increased traffic volumes by 2040 would result in reductions of LOS. Specifically, it is projected that this segment of I-85 would operate at LOS E or F by 2040 in the PM Peak Hour. Therefore the facility would be operating beyond capacity, and the efficiency of the mainline roadway would be degraded.

### **2.3.2 What design deficiencies need to be addressed at the interchanges and why?**

As presented, there are four interchanges (Exit 100, 102, 104, and 106) associated with this section of I-85. These interchanges have various deficiencies that need to be addressed, including: frontage roads that interconnect with interchange ramps, direct

<sup>5</sup> Transportation Research Board, *Highway Capacity Manual 2010*, National Academy of Sciences, 2010.

<sup>6</sup> Stantec, *Interstate 85 Widening Traffic Analysis Report, MM96-106, Cherokee County*, Prepared for SCDOT, November 2016.



business access off of interchange ramps, lack of storage areas at the ramp intersections, and insufficient vertical and horizontal clearances. These deficiencies create various conflict points for vehicles using these interchange facilities. In addition, the various intersections, access points, and driveways do not currently comply with SCDOT design criteria in regards to the recommended distances from interstate ramp intersections. Per the SCDOT's *Access and Roadside Management Standards (ARMS)*, a minimum distance of 750 feet is recommended from the closest interchange ramp to the first full access intersection, and a minimum distance of 325 feet is recommended between the ramps and the first right-in/right-out access point.<sup>7</sup> In addition, the existing interstate facility, including interchanges, would be improved to comply with *A Policy on Design Standards Interstate System*.<sup>8</sup>

Based upon recent accident data, there is a need for improving accessibility and creating safer connections to surrounding roadways along the I-85 PSA. Modifications at the four interchanges would not only bring them up to design standards, but also help improve safety at and around those interchanges. Table 3 includes a summary of the crash data along the PSA.

**Table 3. 2011-2015 Crash Data Summary**

Location	Types of Crashes							Total
	Rear-End	No collision with Motor Vehicle	Sideswipe	Angle	Head On	Backed Into	Unknown	
I-85 Mainline (MM 95 to 106)	182	388	96	54	5	0	3	728
Blacksburg Highway (Exit 100)	3	6	0	9	0	1	0	19
North Mountain Street (Exit 102)	5	0	1	8	1	0	0	15
Tribal Road (Exit 104)	1	8	1	8	0	1	0	19
East Cherokee	10	3	0	16	1	1	0	31

<sup>7</sup> SCDOT, *Access and Roadside Management Standards (ARMS)*, 2008 Editions, Revised April 27, 2015, [http://www.scdot.org/doing/technicalPDFs/publicationsManuals/trafficEngineering/ARMS\\_2008.pdf](http://www.scdot.org/doing/technicalPDFs/publicationsManuals/trafficEngineering/ARMS_2008.pdf), last accessed October 10, 2016.

<sup>8</sup> American Association of State Highway and Transportation Officials, *A Policy on Design Standards Interstate System*, Book Code: DS-5, ISBN: 1-56051-291-1, January 2005.

Location	Types of Crashes							
	Rear-End	No collision with Motor Vehicle	Sideswipe	Angle	Head On	Backed Into	Unknown	Total
Street (Exit 106)								
<b>TOTAL</b>	<b>201</b>	<b>405</b>	<b>98</b>	<b>95</b>	<b>7</b>	<b>3</b>	<b>3</b>	<b>812</b>

The most common type of crashes along the I-85 mainline within the PSA are “no collision with motor vehicle”, i.e. single car crashes with various fixed objects including guardrail, median, trees, bridges, fences, etc. These types of accidents contributed to 388 of the 728 (53%), followed by “rear-end” collisions which included 182 (25%) of the total accidents. There are various factors that can contribute to these types of crashes, including roadway, human, and vehicle factors. Roadway factors that have the potential to impact safety include access, speed, volumes, pavement conditions, and design/dimension.<sup>9</sup> Specifically along the I-85 mainline, documented roadway factors include access, insufficient clear zones, and congestion.

Crash analysis was also conducted along the exits and cross roads along I-85 within the PSA. This analysis identified numerous areas of concern.

- **Exit 100 - Blacksburg Highway:** Intersection with Crawford/Simper Road and the intersection with Frontage Road/Milliken Road and the I-85 northbound on-ramp.
- **Exit 102 - North Mountain Street:** Intersection with commercial driveways north of I-85, and the intersection with the I-85 northbound on and off-ramps.
- **Exit 104 – Tribal Road:** Intersection with I-85 southbound on and off-ramps, and the intersection with Priester Road.
- **Exit 106 – East Cherokee Street:** Intersection with various business accesses north of I-85 along with a driveway to a local church south of I-85.




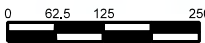
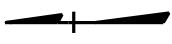
These areas are illustrated on Figures 2-5 with detailed analysis included with the traffic report that has been prepared for the project (Appendix A). In summary, various roadway factors including undesirable intersection designs, intersection spacing, and

<sup>9</sup> FHWA, <http://safety.fhwa.dot.gov/hcip/resources/fhwasa09029/sec3.cfm>, Last Accessed December 5, 2016.





**LEGEND**

-  BUSINESS ACCESS FROM RAMP
  -  OTHER ROAD ACCESS FROM RAMP
  -  SAFETY CONCERNS BASED ON CRASH ANALYSIS
-   
 1 IN = 250 FT  


**EXISTING INTERCHANGE DEFICIENCIES**




**I-85 WIDENING  
MM 98 TO MM 106  
CHEROKEE COUNTY**

**FIGURE NO. 2**





**LEGEND**

-  BUSINESS ACCESS FROM RAMP
-  OTHER ROAD ACCESS FROM RAMP
-  SAFETY CONCERNS BASED ON CRASH ANALYSIS



**EXISTING INTERCHANGE DEFICIENCIES**

**I-85 WIDENING  
MM 98 TO MM 106  
CHEROKEE COUNTY**




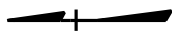
**FIGURE  
NO.  
3**





77' FROM GIBBONS RD.  
TO I-85 NB OFF RAMP

**LEGEND**

-  BUSINESS ACCESS FROM RAMP
  -  OTHER ROAD ACCESS FROM RAMP
  -  SAFETY CONCERNS BASED ON CRASH ANALYSIS
- 0 75 150 300  
1 IN = 300 FT
- 

**EXISTING INTERCHANGE DEFICIENCIES**

**I-85 WIDENING  
MM 98 TO MM 106  
CHEROKEE COUNTY**

**FIGURE NO. 4**





FRONTAGE RD

STONY POINT RD

LAKEVIEW DR




E. CHEROKEE ST

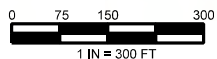
MULBERRY RD

484' FROM LAKEVIEW DR.  
TO I-85 NB ON RAMP

WILE  
106

### LEGEND

-  BUSINESS ACCESS FROM RAMP
-  OTHER ROAD ACCESS FROM RAMP
-  SAFETY CONCERNS BASED ON CRASH ANALYSIS



### EXISTING INTERCHANGE DEFICIENCIES

I-85 WIDENING  
MM 98 TO MM 106  
CHEROKEE COUNTY

FIGURE NO.  
5



frontage road intersections result in driver confusion and expectation, which have the potential to impact the number and location of crashes.

## **2.4 What are Logical Termini and Independent Utility?**

Pursuant to Federal Highway Administration (FHWA) regulations (23 CFR §771.111(f)), a project should have logical termini for transportation improvements as well as an appropriate geographical boundary for evaluating environmental impacts. Logical termini for project development are defined as (1) rational end points for a transportation improvement, and (2) rational end points for a review of the environmental impacts. The environmental impact review frequently covers a broader geographic area than the strict limits of the transportation improvements.<sup>10</sup>

### **2.4.1 How would the project address Logical Termini?**

The southern terminus for the proposed project (i.e. MM 98-106) has been defined as the end of the proposed six-lane section of I-85 just north of Exit 96. Another project from MM 80 to 96 was extended north from Exit 96 to the median barrier south of the existing Broad River Bridge, and includes the removal of the northbound slip ramp at Gaffney Ferry Road. This extension to the median barrier provided continuity and avoided a gap in the median barrier of less than 1,000 feet. Construction of the MM 80-96 project is anticipated to begin in 2017. Exit 106 would serve as the northern terminus for the MM 98-106 project. The northern terminus is considered logical as the mainline is expected to be operating at acceptable levels of service beyond this point and there are no additional deficient interchanges or other facilities adversely impacting the operational conditions of I-85 beyond this point.

### **2.4.2 How would the project address Independent Utility?**

The MM 98-106 project has independent utility since it provides the needed operational, capacity, and safety improvements within the project corridor. This would be achieved by providing additional capacity through the addition of travel lanes, and improving access to cross-roads and the interstate through improved interchange geometric design. These improvements should enhance safety by reducing collisions throughout the project corridor. The proposed project would provide these improvements even if no other projects were completed.

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<sup>10</sup>Federal Highway Administration, <https://www.environment.fhwa.dot.gov/projdev/tdmtermini.asp>. Last Accessed March 1, 2016.



The proposed project is consistent with the Appalachian Council of Governments (ACOG) Long Range Transportation Plan and is included in the 2014-2019 SCDOT Statewide Transportation Improvement Program (STIP) for Cherokee County.

## **2.5 How is the project going to be funded?**

The proposed project is consistent with the Appalachian Council of Governments (ACOG) Long Range Transportation Plan and is included in SCDOT's Statewide Transportation Improvement Program (STIP) for Cherokee County. Act 98 of 2013 provided additional funding for bridge, resurfacing, and mainline interstate projects. Act 98 provides an annual appropriation of \$50 million to SCDOT, which in turn transfers an equivalent amount to the South Carolina Transportation Infrastructure Bank (SCTIB) to be utilized to finance an estimated \$550 million of interstate improvements.<sup>11</sup> The SCDOT 2017-2022 Statewide Transportation Improvement Program (STIP) currently allocates \$171 million dollars for construction.

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<sup>11</sup>SCDOT, State Transportation Improvement Program, Cherokee County, October 11, 2016, [http://206.74.144.42/ESTIP/downloads/Cherokee.html?\\_id=1478876431965](http://206.74.144.42/ESTIP/downloads/Cherokee.html?_id=1478876431965). Last Assessed on November 11, 2016.

## **3.0 ALTERNATIVES**

### **3.1 What improvements are being proposed?**

The SCDOT proposes numerous improvements along I-85 from near Mile Marker 98 (i.e. Broad River Bridge) to Exit 106 in an effort to improve the overall operational efficiency and address the existing deficiencies that have been documented along this facility. To address the capacity need, the SCDOT proposes to add an additional travel lane along I-85 northbound and southbound. In addition, the existing interchanges will be improved to include the replacement of the existing deficient bridges over I-85, relocation of side road intersections, and the elimination of access driveways/intersections from the interstate ramps. Specifically, the proposed improvements include:

- **Mainline:** Adding a travel lane toward the median along both I-85 northbound and southbound. The additional travel lane would result in a total of three travel lanes in each direction which would accommodate the future traffic volumes and result in improved operating conditions along the mainline facility.
- **Interchanges:** The proposed project will modify various movements, side roads, and access points at Exit 100, Exit 102, Exit 104 and Exit 106. In addition, the existing northbound “slip ramp” at Exit 98 would be closed. The interchange modifications would eliminate the interconnection of side roads and interchanges ramps along with driveways and direct access to adjacent businesses. Specifically, the improvements would connect the ramps directly to the crossing arterial roadways at these exits. Frontage roads would be realigned to create separation between the frontage roads and the interstate ramps and provide access to area businesses and residences. The configurations of the interchanges are expected to be a diamond configuration but may include loop ramps, as determined during preliminary design, to mitigate environmental impacts.

### **3.2 How were the alternatives developed and evaluated?**

SCDOT has considered various location and design alternatives in the process of developing the currently proposed “build” alternative. These alternatives were developed based on the purpose and need for the project, required and recommended engineering criteria, traffic data, visual observations, and supplemental data including

previous studies.<sup>12</sup> Specifically, the engineering criteria considered design speed, horizontal and vertical curve criteria, sight distance, and intersection spacing. This includes utilization of the SCDOT's *Access and Roadside Management Standards (ARMS)* which documents minimum spacing guidelines for access placement along interchange areas. A minimum distance of 750 feet is recommended from the closest interchange ramp to the first full access intersection, and a minimum distance of 325 feet is recommended between the ramps and the first right-in/right-out access point.<sup>13</sup> The purpose of this spacing is to avoid traffic congestion and conflicts in the vicinity of interchange ramp terminals. Providing the recommended intersection spacing of 750 feet, and minimizing environmental impacts, provided the greatest design challenge. As such, the alternative analysis considered alternatives that do not fully comply with the recommended intersection spacing for the benefit of minimizing impacts. In addition, the alternatives were developed to avoid and minimize undesirable at grade railroad crossings along the project corridor.

There were five alternatives originally developed for each of the four interchanges during the preliminary development of the project, along with one alternative for the mainline. These alternatives were refined to a total of ten (10) interchange alternatives that were evaluated during the early phases of project development and presented for public input. These ten alternatives were further refined based on continued design, and comments received from early public involvement. As a result, a total of 13 build alternatives for the interchanges and one mainline alternative were ultimately analyzed. These build alternatives were evaluated based on their ability satisfying the purpose and need for the project while minimizing impacts to the human and natural environment. The environmental factors included, but were not limited to impacts to existing residences, commercial businesses, property access, floodplain impacts, wetland impacts, protected species, and community impacts. Various engineering and environmental technical studies were conducted to provide adequate documentation for the alternative analysis including traffic analysis and report, natural resource technical memorandum, cultural resource report, environmental site assessment, and noise report. The findings of these studies, along with applicable references are appropriately documented throughout this document.

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<sup>12</sup> SCDOT, *I-85 Corridor Analysis, Spartanburg and Cherokee Counties*, SCDOT Office of Planning, 2014.

<sup>13</sup> SCDOT, *Access and Roadside Management Standards (ARMS)*, 2008 Editions, Revised April 27, 2015, [http://www.scdot.org/doing/technicalPDFs/publicationsManuals/trafficEngineering/ARMS\\_2008.pdf](http://www.scdot.org/doing/technicalPDFs/publicationsManuals/trafficEngineering/ARMS_2008.pdf), last accessed October 10, 2016.

As fully discussed below, while the preferred location and design of the project represents the best “build” alternative for improving the existing interchange, input received during the public hearing process and during the environmental document availability period will be carefully evaluated in the future project development. Modifications will be made where appropriate.

### **3.3 What is the No-Build Alternative?**

The No-Build Alternative, which consists of SCDOT making no improvements to existing I-85 or the associated interchanges, was considered a baseline for comparison. This alternative would not improve the existing operational conditions of the interchanges nor improve the deteriorating levels of service on I-85 in the design year. As a result, the No-Build Alternative would result in continued operational deficiencies, unacceptable levels of service, congestion, and safety concerns. Therefore, the No-Build Alternative would not satisfy the purpose and need for the project and is not considered an acceptable alternative.

### **3.4 What alternatives were considered but eliminated from further analysis?**

There were various alternatives developed and considered during the initial development of the project but were subsequently eliminated from further analysis. The initial 20 interchange alternatives, five for each interchange, that were originally developed are included in Appendix B (these alternatives are labelled alphabetically on the figures instead of numerically to differentiate them from those alternatives that were carried forward for further analysis). These alternatives included various interchange design and side road configurations. Through further engineering analysis of these alternatives, it was determined that they would have greater impacts to wetlands and streams, result in additional residential and commercial displacements, and some would require additional crossings of existing rail lines. In addition, public comments were considered in which alternatives to carry forward for further evaluation. Based on the engineering analysis and public involvement, the following alternatives were eliminated from further analysis.

- Exit 100: Alt. A, B, and C
- Exit 102: Alt. B, C, and E
- Exit 104: Alt. A, B, and E
- Exit 106: Alt. B, C, and E

The remaining alternatives were further developed and refined based on continued engineering design and data collection, and represent the build alternatives described in Section 3.5.

Various Transportation System Management (TSM) alternatives were considered; including, signalization, selected intersection improvements, and access management. These TSM alternatives, by themselves, did not accommodate the projected traffic deficiencies and the needed safety improvements; therefore, they did not meet the purpose and need of the project.

High occupancy vehicle (HOV) lanes were also considered. These limited construction alternatives are generally relevant only for major projects in urban areas with a population greater than 200,000. Due to the rural nature of this project, incorporating HOV lanes into the project was eliminated from further consideration.

### **3.5 What are the reasonable alternatives that were evaluated?**

The reasonable alternative analysis included various interchange alternatives and side road configurations that would address the key deficiencies and improve the overall operation and safety along the current facility while minimizing impacts to the human and natural environment. These alternatives were developed based on required and recommended engineering criteria including design speed, horizontal and vertical curves, sight distance, intersection spacing, along with maintenance of access. Providing the recommended intersection spacing of 750 feet, and minimizing environmental impacts, provided the greatest design challenge. As such, the build alternatives include alignments that do not fully comply with the recommended intersection spacing for the benefit of minimizing impacts. In addition, only one reasonable mainline alternative was considered due to the limitations of practicable alternatives. The following provides further documentation and analysis of each alternative, including descriptions, illustrations, and a summary of potential impacts (Table 4).

#### **3.5.1 Mainline Alternative**

The proposed mainline widening would occur to the median of the existing facility, with only minor work beyond the existing shoulder to provide adequate clear zones. In addition, minor approach work would be conducted along the rest area facility near mile marker 105. The work along the mainline would also include the elimination of the I-85 northbound Exit 98 “slip ramp”. This ramp currently provides direct access to Frontage Road which ultimately intersects with the Exit 100 northbound off ramp. Exit 98 also provides access to adjacent commercial and industrial property, but is not compliant

with current design criteria. The work along the mainline would also require the replacement of an existing railroad bridge near mile marker 101. Specifically, the existing 218-foot bridge has a vertical clearance of approximately 23 feet, and would be replaced with a similar sized structure with a vertical clearance of a minimum 17 feet. This rail-line is currently off system which will allow the demolition and replacement along existing alignment without interruption of service.

The proposed work along the mainline would result in impacts to approximately 2.6 acres of new right-of-way, 317 feet of stream, 1.7 acres of floodplain (100 year), and 16.7 acres of farmland.

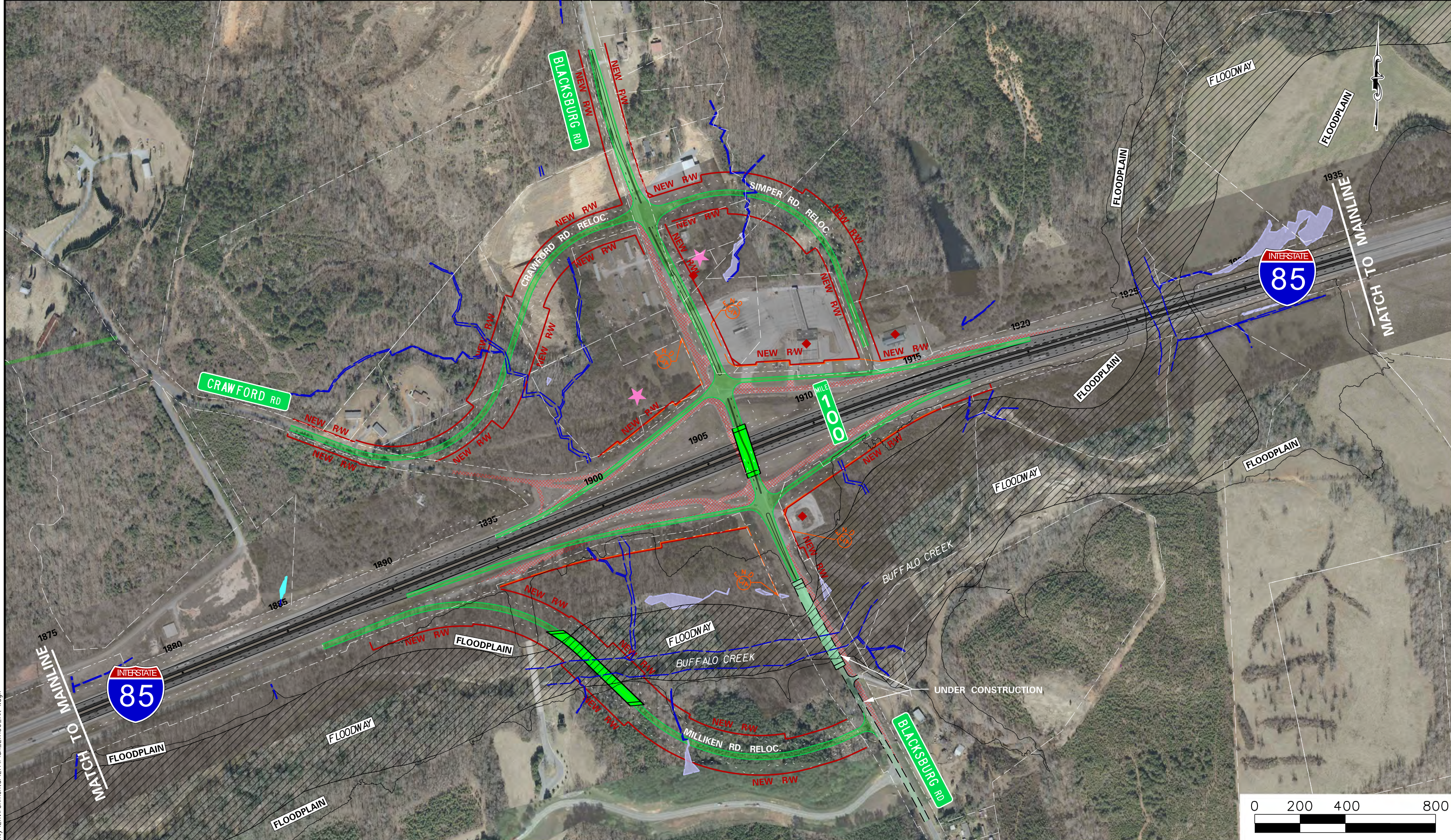
### **3.5.2 Exit 100 - Blacksburg Highway Interchange Alternatives**

**Alternative 1:** Alternative 1 for Exit 100 consists of a diamond interchange with the replacement of the Blacksburg Highway bridge over I-85 to the east (i.e. right) of the existing structure. Due to alignment constraints, the proposed bridge would be constructed in stages and traffic would be maintained during construction. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Frontage Road/Milliken Road from the northbound off-ramp; relocation of Simper Road and the commercial driveways along the southbound off-ramp; and the relocation of Crawford Road from the southbound on-ramp. Specifically, the intersections of these roadways with Blacksburg Highway would be relocated to accommodate at a minimum the desired 750-feet of spacing from the interchange ramp intersections. The relocation of Milliken Road would require a 450-foot bridge over Buffalo Creek. In addition, the SCDOT is currently constructing a new bridge along Blacksburg Highway over Buffalo Creek, just south of I-85. Alternative 1 has been developed to avoid potential conflicts and/or additional work associated with this bridge replacement, including the staged construction of the bridge over I-85.















This alternative would result in impacts to approximately 25 acres of new right-of-way, and result in the relocation of two (2) commercial business along with right-of-way acquisition from four (4) recognized environmental conditions (RECs). In addition, the proposed improvements would impact 1,266 linear feet of stream, 0.02 acres of wetlands, 2.2 acres of floodplains (100 year), and 2.0 acres of potential *Hexastylis naniflora* (dwarf-flowered heartleaf) habitat, a federally threatened species. Exit 100, Alternative 1 is illustrated in Figure 6, with the impacts summarized in the attached impact matrix (Table 4).



2/15/2017  
 L:\256026\_85\_Cherokee\_County\_Environmental\EA\Plan\_EX100\_Alt\_1.dgn



**LEGEND**

- |  |  |  |   |
|--|--|--|---|
|  WETLANDS       |  COMMERCIAL DISPLACEMENT  |  PROPOSED ROADWAY |  RECOGNIZED ENVIRONMENTAL CONDITIONS |
|  OPEN WATER     |  RESIDENTIAL DISPLACEMENT |  PROPOSED BRIDGE  |  HISTORIC SITE                       |
|  STREAMS        |  NEW RIGHT-OF-WAY         |  PAVEMENT REMOVAL |  CONSTRUCTION LIMITS                 |
|  PROPERTY LINES |  CONTROLLED ACCESS        |  |   |

**EXIT 100  
 ALTERNATIVE 1**

**I-85 WIDENING  
 MM 98 TO MM 106  
 CHEROKEE COUNTY**

**FIGURE  
 NO.  
 6**



Impact Category	Table 4. Alternative Impact Analysis														
	No Build	Mainline	Exit 100 Alt. 1	Exit 100 Alt. 2	Exit 100 Alt. 3	Exit 100 Alt. 4	Exit 102 Alt.1	Exit 102 Alt. 2	Exit 104 Alt. 1	Exit 104 Alt. 2	Exit 104 Alt. 3	Exit 104 Alt. 4	Exit 106 Alt. 1	Exit 106 Alt. 2	Exit 106 Alt. 3
Meets Purpose & Need	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Residential relocations/impacts	0	0	0	0	0	0	0	0	0	1	0	1	4	4	0
Commercial relocations/impacts	0	0	1	1	1	1	2	2	2	2	1	1	7	7	7
Right-of-Way (acres)	0	2.6	25	25	21	17	25	25	25	25	20	21	21	20	19
Achieves Recommended Ramp and Frontage Road Separation	No	N/A	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes
Farmland (acres)	0	16.7	0.67	0.67	0.67	0.67	0	0	0	0	0	0	6.9	6.8	5.5
Floodplains (acres)	0	1.7	2.2	2.2	3.1	0.9	0	0	0	0	0	0	0	0	0
Wetlands (acres)	0	0.16	0.02	0.02	0	0	0.001	0.001	0.1	0.1	0.1	0.1	0.02	0.02	0
Streams/Linear Conveyances (linear feet)	0	317	1266	1264	1149	787	2280	2383	791	754	786	714	1,649	1,592	1,734
Permits	None	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP	IP
Threatened/Endangered Species															
<i>Hexastylis</i> Habitat (acres)	0	2.5	2.0	2.0	0.2	0.2	2.4	1.8	2.2	2.5	2.3	2.3	1.6	1.6	2.7
Cultural Resources															
Architectural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Archaeological	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Section 4(f) Resource (parks, wildlife refuges, etc.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noise Impacted Receivers	47	N/A	6	7	7	7	22	22	14	14	14	14	6	6	6
Hazardous Material Sites <sup>1</sup>	0	0	4	4	4	4	4	4	2	2	2	2	5	4	4
Project Cost (millions)	N/A	\$85.0	\$29.0	\$30.5	\$22.8	\$20.4	\$34.9	\$34.7	\$27.5	\$28.9	\$25.3	\$25.3	\$25.6	\$24.8	\$26.0

\*Potential *Hexastylis naniflora* impact; additional survey in Spring 2017

<sup>1</sup>Hazardous material impacts are primarily right-of-way acquisition and not total takes

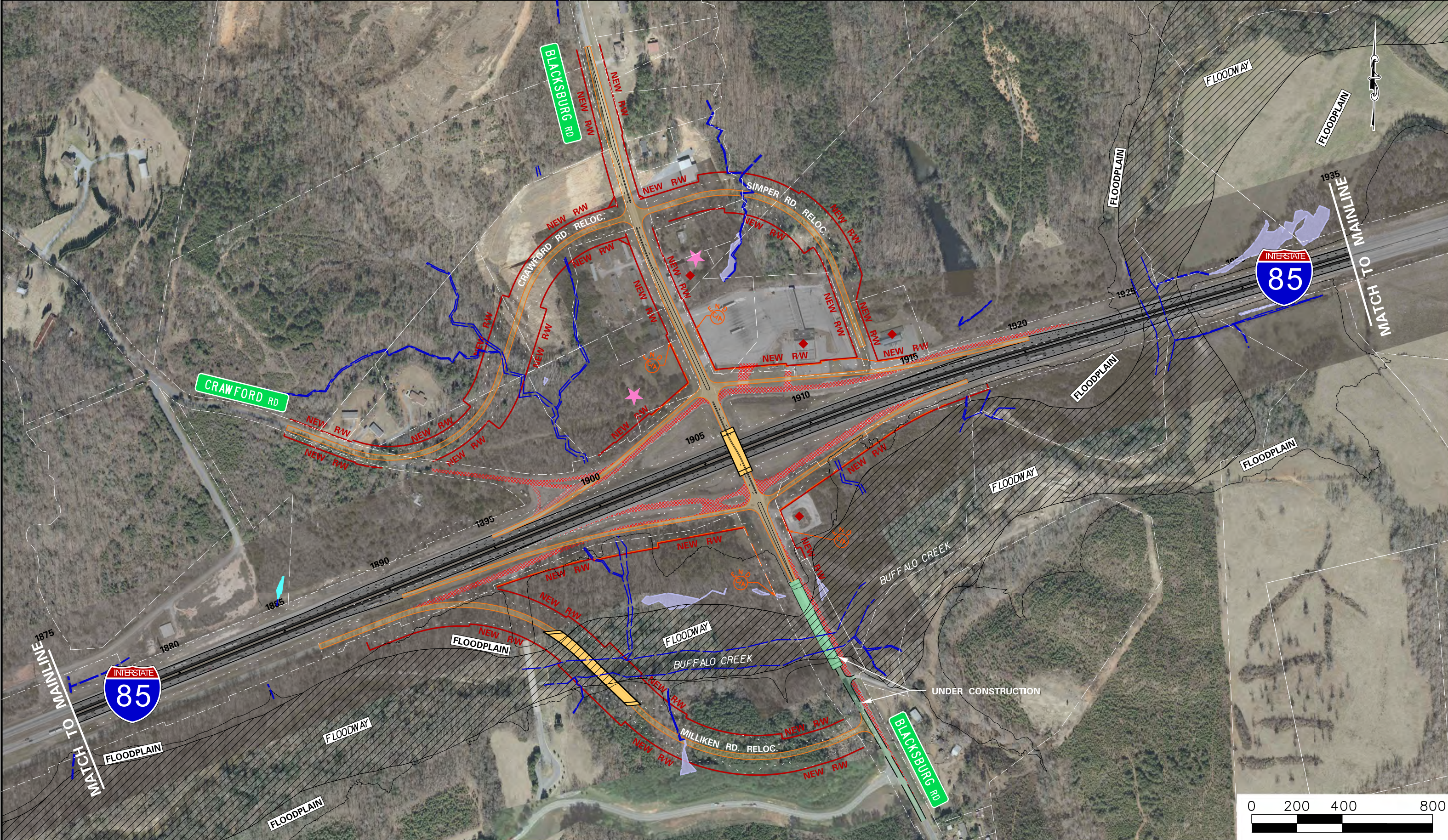
**Alternative 2:** Alternative 2 for Exit 100 consists of a diamond interchange with the replacement of the Blacksburg Highway bridge over I-85 along existing alignment. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. This alternative would require the closing of Blacksburg Highway bridge during construction. Temporary measures would be utilized to maintain on and off ramps; however, some traffic movements would have to utilize Exit 96 to the south and/or Exit 102 to the north. For example, northbound traffic destined for areas north of the interchange could not utilize Exit 100; conversely, southbound traffic destined for areas south of I-85 could not utilize Exit 100 during bridge construction. Alternative 2 would also realign all frontage roads to provide the desirable intersection spacing, including relocation of Frontage Road/Milliken Road from the northbound off-ramp; relocation of Simper Road and the commercial driveways along the southbound off-ramp; and the relocation of Crawford Road from the southbound on-ramp. The relocation of Milliken Road would require a 450-foot bridge over Buffalo Creek. In addition, this alternative would avoid conflicts with the current SCDOT bridge replacement over Buffalo Creek.

This alternative would result in impacts to approximately 25 acres of new right-of-way, and result in the relocation of two (2) commercial business along with right-of-way acquisition from four (4) RECs. In addition, the proposed improvements would impact 1,264 linear feet of stream, 0.02 acres of wetlands, 2.2 acres of floodplains (100 year), and 2.0 acres of *Hexastylis naniflora* habitat. Exit 100, Alternative 2 is illustrated in Figure 7, with the impacts summarized in the attached impact matrix (Table 4).











**Alternative 3:** Alternative 3 for Exit 100 consists of a diamond interchange with the replacement of the Blacksburg Highway bridge over I-85 to the east (i.e. right) of the existing structure. Due to alignment constraints, the proposed bridge would be constructed in stages and traffic would be maintained during construction. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Frontage Road/Milliken Road from the northbound off-ramp; relocation of Simper Road and the commercial driveways along the southbound off-ramp; and the relocation of Crawford Road from the southbound on-ramp. However, the Milliken Road relocation and intersection with Blacksburg Highway would not comply with the 750-foot spacing recommendations. Specifically, Milliken Road would be realigned to parallel the new northbound on-ramp, and intersect with Blacksburg Highway approximately 180 feet south of the ramp intersection. This alignment would avoid construction of a new bridge over Buffalo



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**LEGEND**

- |  |  |  |   |
|--|--|--|---|
|  WETLANDS       |  COMMERCIAL DISPLACEMENT  |  PROPOSED ROADWAY |  RECOGNIZED ENVIRONMENTAL CONDITIONS |
|  OPEN WATER     |  RESIDENTIAL DISPLACEMENT |  PROPOSED BRIDGE  |  HISTORIC SITE                       |
|  STREAMS        |  NEW RIGHT-OF-WAY         |  PAVEMENT REMOVAL |  CONSTRUCTION LIMITS                 |
|  PROPERTY LINES |  CONTROLLED ACCESS        |  |   |

<b>EXIT 100 ALTERNATIVE 2</b>	
<b>I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY</b>	
FIGURE NO. 7	



Creek and avoid potential conflicts and/or additional work associated with the current SCDOT bridge replacement over Buffalo Creek.

This alternative would result in impacts to approximately 21 acres of new right-of-way, and result in the relocation of three (3) commercial business along with right-of-way acquisition from four (4) RECs. In addition, the proposed improvements would impact 1,149 linear feet of stream, 3.1 acres of floodplains (100 year), and 0.2 acres of *Hexastylis naniflora* habitat. Exit 100, Alternative 3 is illustrated in Figure 8, with the impacts summarized in the attached impact matrix (Table 4).

**Alternative 4 (PREFERRED):** Alternative 4 for Exit 100 consists of a diamond interchange with the replacement of the Blacksburg Highway bridge over I-85 to the east (i.e. right) of the existing structure. Due to alignment constraints, the proposed bridge would be constructed in stages and traffic would be maintained during construction. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the elimination of Frontage Road/Milliken Road from the northbound off-ramp; relocation of Simper Road and the commercial driveways along the southbound off-ramp; and the relocation of Crawford Road from the southbound on-ramp. Specifically, Milliken Road would be eliminated, and not relocated to avoid adverse impacts to Buffalo Creek and the associated floodplain. The elimination of this roadway would result in additional right-of-way/access impacts to two properties, including the displacement of one commercial business. Access to Milliken Road would continue to be provided through the current access off Blacksburg Road, just south of Buffalo Creek. This alternative would avoid construction of a new bridge over Buffalo Creek and avoid potential conflicts and/or additional work associated with the current SCDOT bridge replacement over Buffalo Creek.

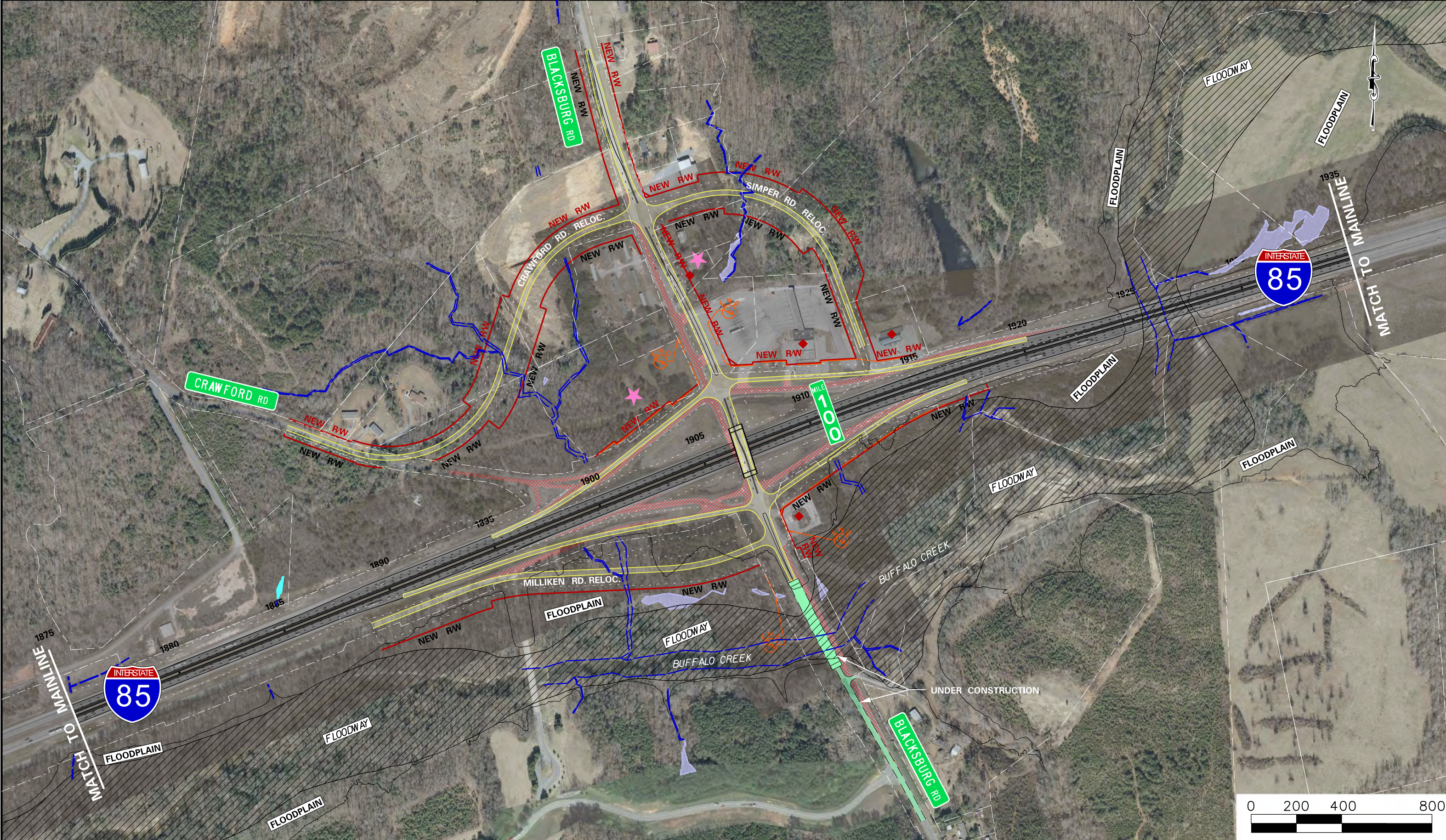
This alternative would result in impacts to approximately 17 acres of new right-of-way, and result in the relocation of three (3) commercial businesses along with right-of-way acquisition from four (4) RECs. In addition, the proposed improvements would impact 787 linear feet of stream, 0.9 acres of floodplains (100 year), 0.2 acre of *Hexastylis naniflora* habitat, and no wetland impacts. Exit 100, Alternative 4 is illustrated in Figure 9, with the impacts summarized in the attached impact matrix (Table 4).

### 3.5.3 Exit 102 - North Mountain Street Interchange Alternatives



**Alternative 1 (PREFERRED):** Alternative 1 for Exit 102 consists of a diamond interchange with the replacement of the N. Mountain Street bridge over I-85 to the east (i.e. right) of



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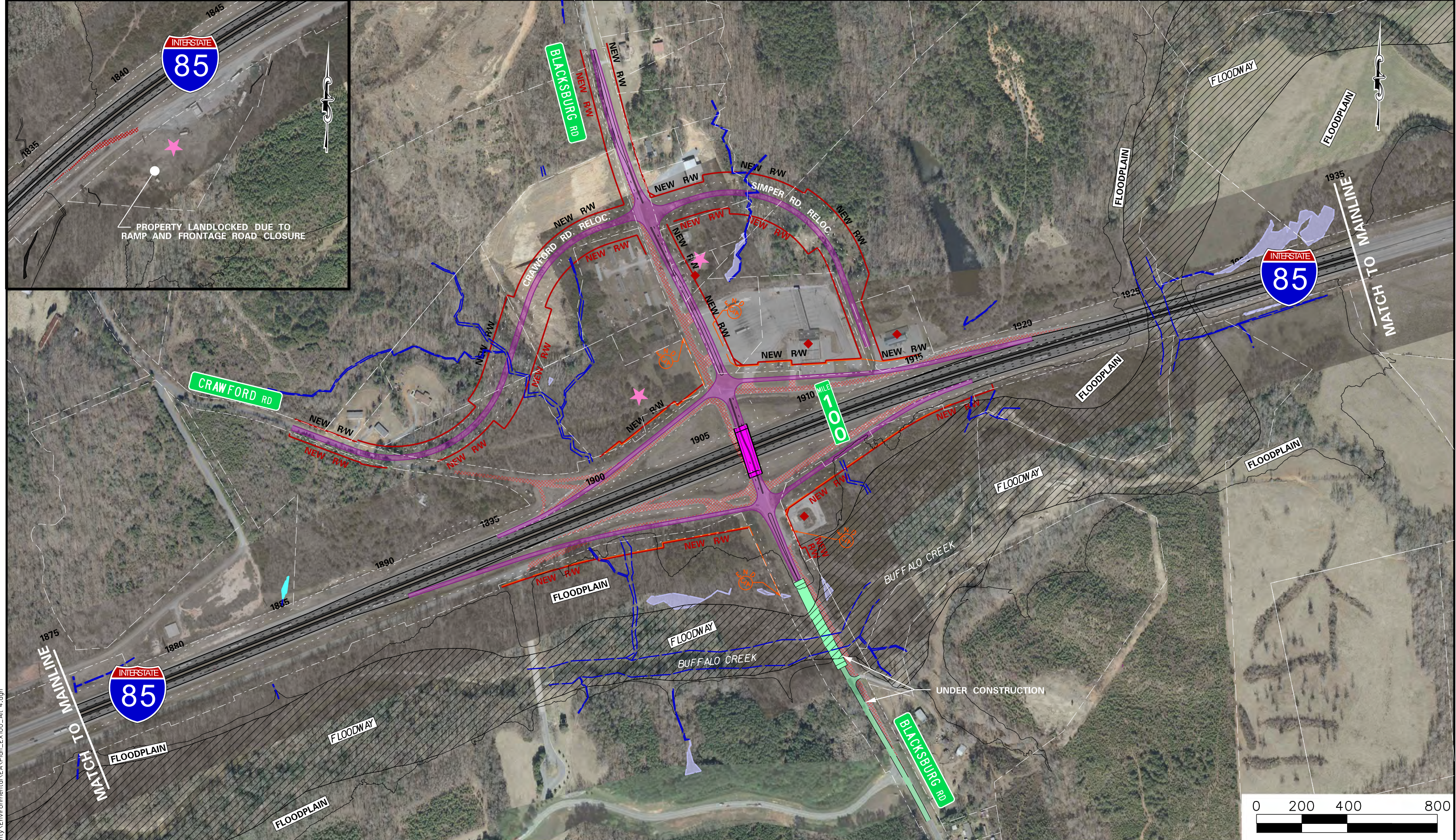


**LEGEND**

- |   |                |   |                          |   |                  |   |                                     |
|---|----------------|---|--------------------------|---|------------------|---|-------------------------------------|
|  | WETLANDS       |  | COMMERCIAL DISPLACEMENT  |  | PROPOSED ROADWAY |  | RECOGNIZED ENVIRONMENTAL CONDITIONS |
|  | OPEN WATER     |  | RESIDENTIAL DISPLACEMENT |  | PROPOSED BRIDGE  |  | HISTORIC SITE                       |
|  | STREAMS        |  | NEW RIGHT-OF-WAY         |  | PAVEMENT REMOVAL |  | CONSTRUCTION LIMITS                 |
|  | PROPERTY LINES |  | CONTROLLED ACCESS        |   |                  |   |                                     |

<b>EXIT 100 ALTERNATIVE 3</b>		<b>FIGURE NO. 8</b>
<b>I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY</b>		





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<b>LEGEND</b>				<b>EXIT 100 ALTERNATIVE 4</b>	
WETLANDS	COMMERCIAL DISPLACEMENT	PROPOSED ROADWAY	RECOGNIZED ENVIRONMENTAL CONDITIONS	<b>I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY</b>	
OPEN WATER	RESIDENTIAL DISPLACEMENT	PROPOSED BRIDGE	HISTORIC SITE		
STREAMS	NEW RIGHT-OF-WAY	PAVEMENT REMOVAL	CONSTRUCTION LIMITS	<b>FIGURE NO. 9</b>	
PROPERTY LINES	CONTROLLED ACCESS				



the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Henson Road from the northbound off-ramp; elimination of direct commercial access driveways along the southbound off-ramp; and the relocation of Shaman Road from the southbound on-ramp. Specifically, the intersections of these roadways with N. Mountain Street would be relocated to accommodate at a minimum the desired 750-foot of spacing from the interchange ramp intersections.

This alternative would result in impacts to approximately 25 acres of new right-of-way, and result in the relocation of four (4) commercial businesses along with right-of-way acquisition from four (4) RECs. In addition, the proposed improvements would impact 2,280 linear feet of stream, 0.001 acres of wetlands, and 2.4 acres of *Hexastylis naniflora* habitat. Exit 102, Alternative 1 is illustrated in Figure 10, with the impacts summarized in the attached impact matrix (Table 4).

**Alternative 2:** Alternative 2 for Exit 102 consists of a diamond interchange with the replacement of the N. Mountain Street bridge over I-85 to the west (i.e. left) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Henson Road from the northbound off-ramp; elimination of direct commercial access driveways along the southbound off-ramp; and the relocation of Shaman Road from the southbound on-ramp. Specifically, the intersections of these roadways with N. Mountain Street would be relocated to accommodate at a minimum the desired 750-foot of spacing from the interchange ramp intersections.

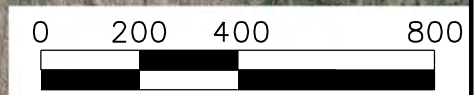
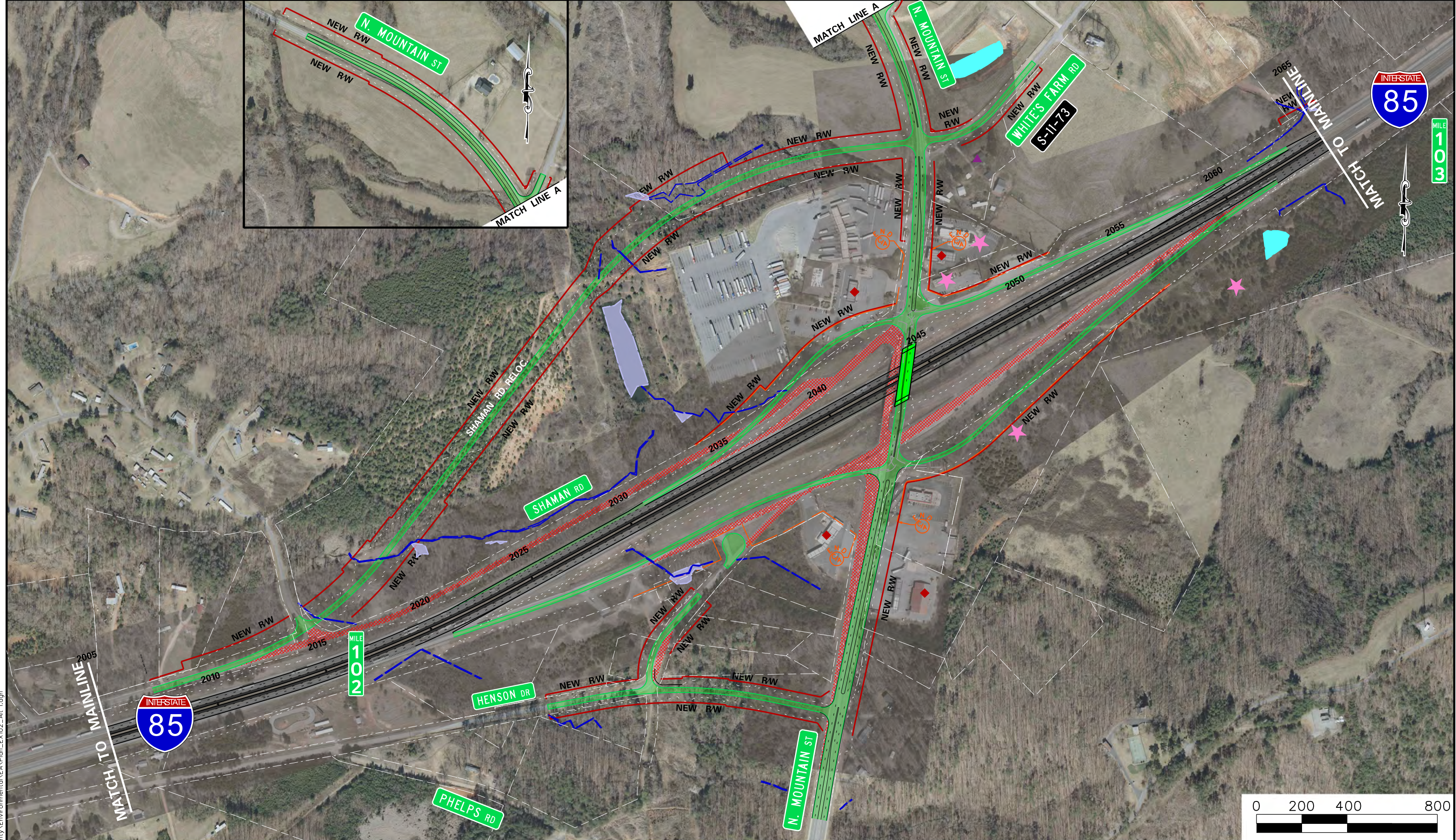
This alternative would result in impacts to approximately 25 acres of new right-of-way, and result in the relocation of four (4) commercial businesses along with right-of-way acquisition from four (4) RECs. In addition, the proposed improvements would impact 2,383 linear feet of stream, 0.001 acres of wetlands, and 1.8 acres of *Hexastylis naniflora* habitat. Exit 102, Alternative 2 is illustrated in Figure 11, with the impacts summarized in the attached impact matrix (Table 4).

### 3.5.4 Exit 104 - Tribal Road Interchange Alternatives

**Alternative 1:** Alternative 1 for Exit 104 consists of a diamond interchange with the replacement of the Tribal Road bridge over I-85 to the east (i.e. right) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and



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LEGEND			
	WETLANDS		PROPOSED ROADWAY
	OPEN WATER		PROPOSED BRIDGE
	STREAMS		PAVEMENT REMOVAL
	PROPERTY LINES		RECOGNIZED ENVIRONMENTAL CONDITIONS
	COMMERCIAL DISPLACEMENT		HISTORIC SITE
	RESIDENTIAL DISPLACEMENT		CONSTRUCTION LIMITS
	NEW RIGHT-OF-WAY		
	CONTROLLED ACCESS		

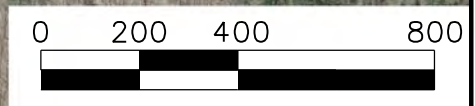
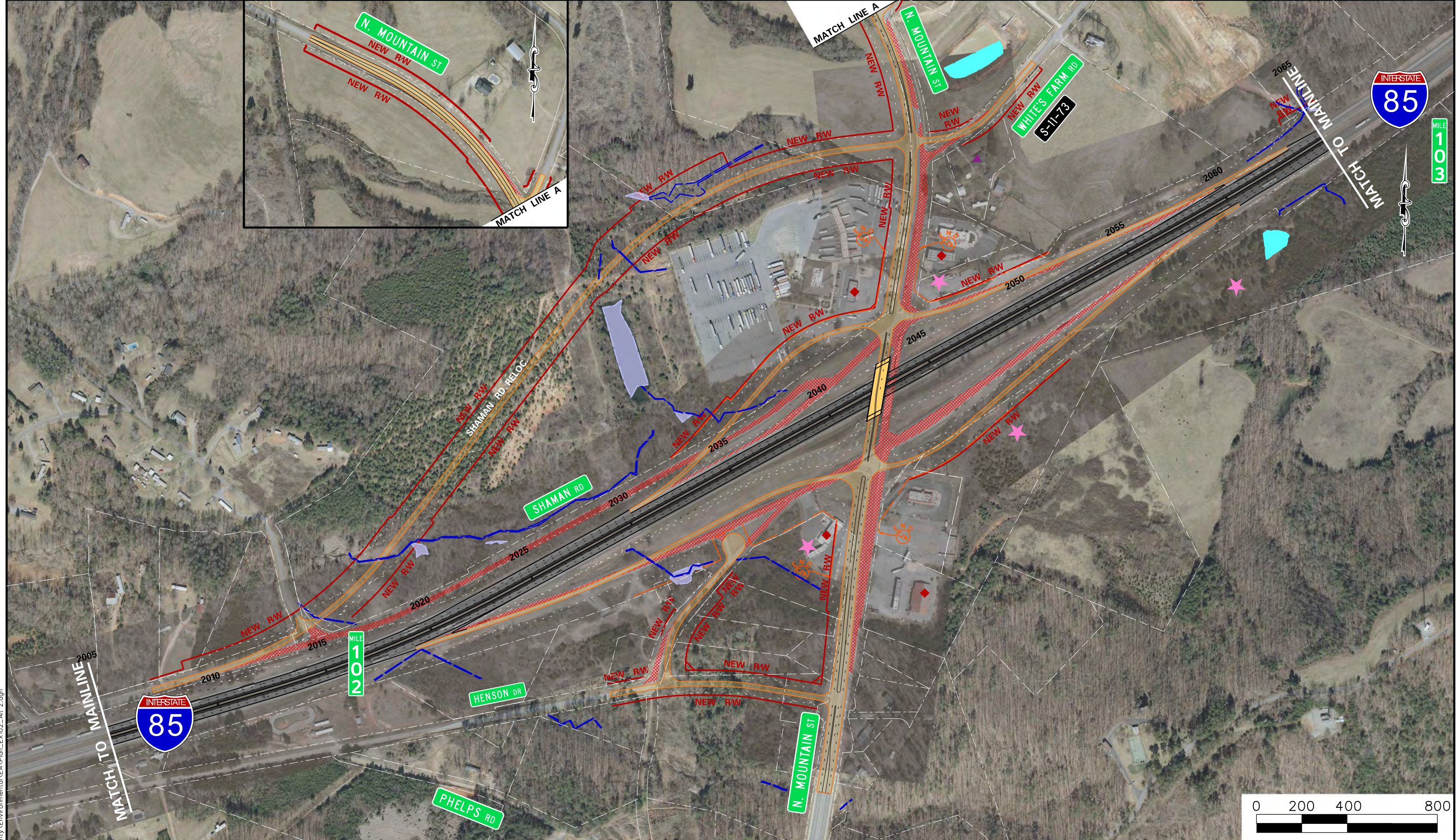
**EXIT 102  
 ALTERNATIVE 1**

**I-85 WIDENING  
 MM 98 TO MM 106  
 CHEROKEE COUNTY**

**FIGURE  
 NO.  
 10**



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LEGEND			
	WETLANDS		NEW RIGHT-OF-WAY
	OPEN WATER		RESIDENTIAL DISPLACEMENT
	STREAMS		COMMERCIAL DISPLACEMENT
	PROPERTY LINES		PROPOSED BRIDGE
	CONSTRUCTION LIMITS		PAVEMENT REMOVAL
	RECOGNIZED ENVIRONMENTAL CONDITIONS		HISTORIC SITE

**EXIT 102  
 ALTERNATIVE 2**

**I-85 WIDENING  
 MM 98 TO MM 106  
 CHEROKEE COUNTY**

**FIGURE  
 NO.  
 11**



vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of S-657 from the northbound off-ramp; relocation of Priester Road from the northbound on-ramp; and the relocation of Holly Grove Road and White's Farm Road from the southbound on-ramp. Specifically, the intersections of these roadways with Tribal Road would be relocated to accommodate at a minimum the desired 750-foot of spacing from the interchange ramp intersections.

This alternative would result in impacts to approximately 25 acres of new right-of-way, and result in the relocation of two (2) commercial businesses along with right-of-way acquisition from two (2) RECs. In addition, the proposed improvements would impact 791 linear feet of stream, 0.1 acres of wetlands, and 2.2 acres of *Hexastylis naniflora* habitat. Exit 104, Alternative 1 is illustrated in Figure 12, with the impacts summarized in the attached impact matrix (Table 4).

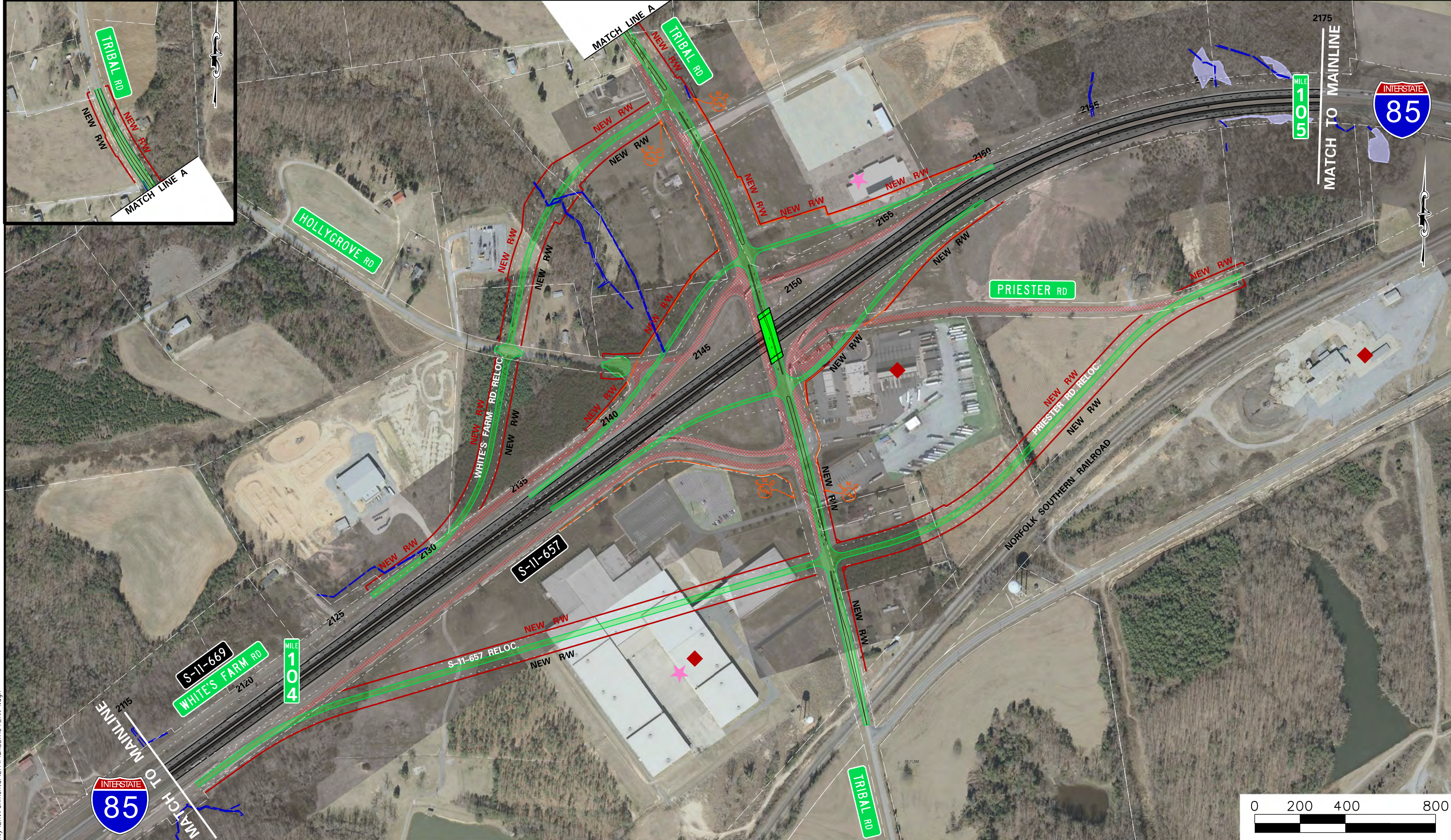
**Alternative 2:** Alternative 2 for Exit 104 consists of a diamond interchange with the replacement of the Tribal Road bridge over I-85 to the west (i.e. left) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of S-657 from the northbound off-ramp; relocation of Priester Road from the northbound on-ramp; and the relocation of Holly Grove Road and White's Farm Road from the southbound on-ramp. Specifically, the intersections of these roadways with Tribal Road would be relocated to accommodate at a minimum the desired 750-foot of spacing from the interchange ramp intersections.

This alternative would result in impacts to approximately 25 acres of new right-of-way, and result in the relocation of two (2) commercial businesses and one (1) residential development, along with right-of-way acquisition from two (2) RECs. In addition, the proposed improvements would impact 754 linear feet of stream, 0.1 acres of wetlands, and 2.5 acres of *Hexastylis naniflora* habitat. Exit 104, Alternative 2 is illustrated in Figure 13, with the impacts summarized in the attached impact matrix (Table 4).

**Alternative 3:** Alternative 3 for Exit 104 consists of a diamond interchange with the replacement of the Tribal Road bridge over I-85 to the east (i.e. right) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the



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- WETLANDS
- OPEN WATER
- STREAMS
- PROPERTY LINES

- COMMERCIAL DISPLACEMENT
- RESIDENTIAL DISPLACEMENT
- NEW RIGHT-OF-WAY
- CONTROLLED ACCESS

- PROPOSED ROADWAY
- PROPOSED BRIDGE
- PAVEMENT REMOVAL

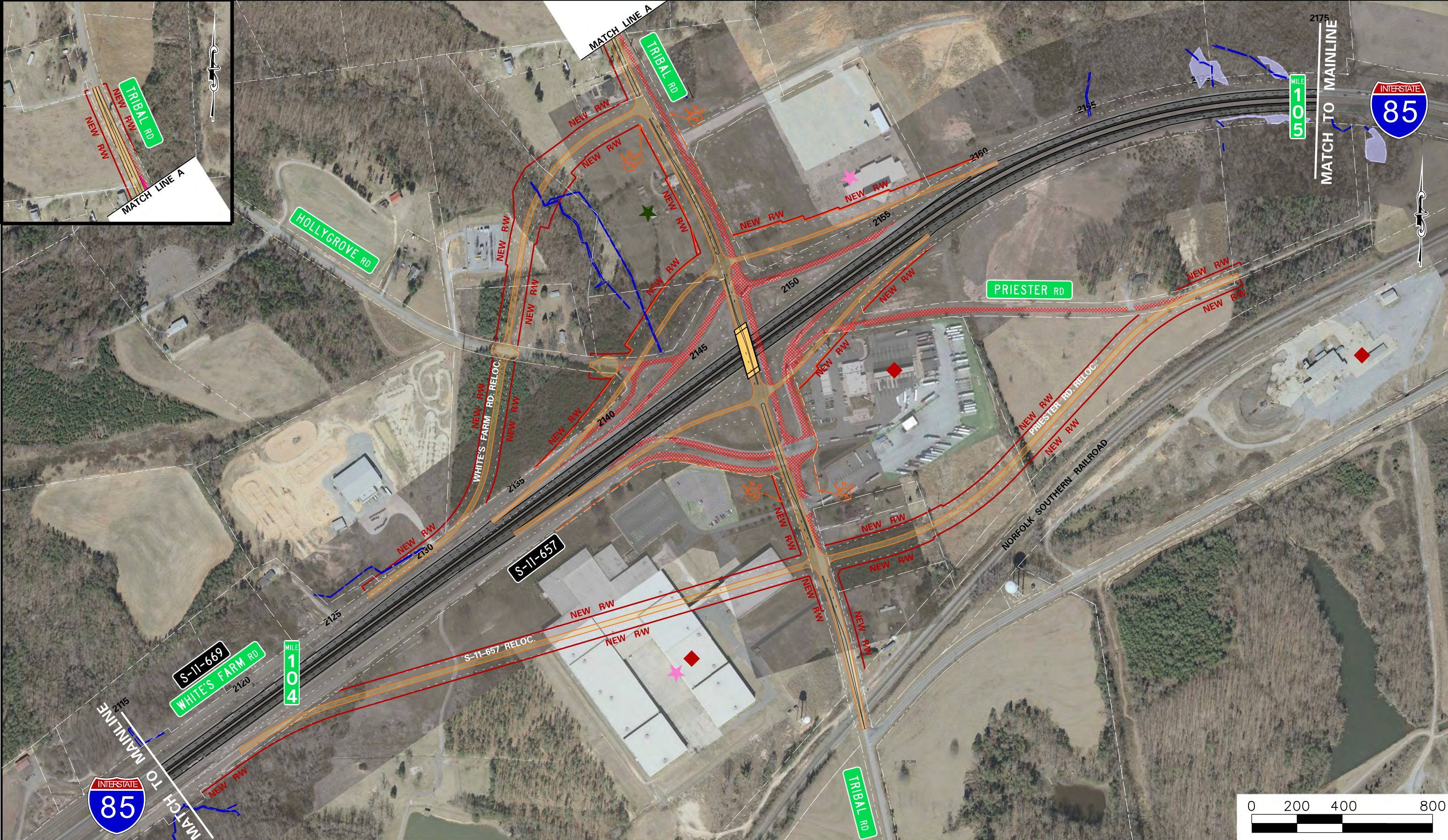
- RECOGNIZED ENVIRONMENTAL CONDITIONS
- HISTORIC SITE
- CONSTRUCTION LIMITS

**EXIT 104  
 ALTERNATIVE 1**

**I-85 WIDENING  
 MM 98 TO MM 106  
 CHEROKEE COUNTY**

**FIGURE  
 NO.  
 12**





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LEGEND			
	WETLANDS		COMMERCIAL DISPLACEMENT
	OPEN WATER		RESIDENTIAL DISPLACEMENT
	STREAMS		NEW RIGHT-OF-WAY
	PROPERTY LINES		RECOGNIZED ENVIRONMENTAL CONDITIONS
	PROPOSED ROADWAY		HISTORIC SITE
	PROPOSED BRIDGE		CONSTRUCTION LIMITS
	PAVEMENT REMOVAL		

<b>EXIT 104 ALTERNATIVE 2</b>	
<b>I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY</b>	
<b>FIGURE NO. 13</b>	



desirable intersection spacing. This includes the relocation of S-657 from the northbound off-ramp; relocation of Priester Road from the northbound on-ramp; and the relocation of Holly Grove Road and White's Farm Road from the southbound on-ramp. The frontage road intersections would be located to accommodate the desired 750-foot spacing with the exception of S-657. The relocation of S-657 would be aligned to avoid and minimize impacts to an industrial site, resulting in approximately 250-foot of spacing between the proposed intersection and the ramp intersection. This alignment would also minimize impacts to the existing parking lot along the industrial site.

This alternative would result in impacts to approximately 20 acres of new right-of-way, and result in the relocation of one (1) commercial business, along with right-of-way acquisition from two (2) RECs. In addition, the proposed improvements would impact 786 linear feet of stream, 0.1 acres of wetlands, and 2.3 acres of *Hexastylis naniflora* habitat. Exit 104, Alternative 3 is illustrated in Figure 14, with the impacts summarized in the attached impact matrix (Table 4).

**Alternative 4 (PREFERRED):** Alternative 4 for Exit 104 consists of a diamond interchange with the replacement of the Tribal Road bridge over I-85 to the east (i.e. right) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of S-657 from the northbound off-ramp; relocation of Priester Road from the northbound on-ramp; and the relocation of Holly Grove Road and White's Farm Road from the southbound on-ramp. The frontage road intersections would be located to accommodate the desired 750-foot spacing with the exception of S-657. The relocation of S-657 and Priester Road would be aligned to form a four-way intersection with approximately 450-foot of spacing from the ramp intersection. This alternative would impact a portion of the existing parking lot along the industrial site along with impacting the internal movements associated with a commercial truck stop.

This alternative would result in impacts to approximately 21 acres of new right-of-way, and result in the relocation of one (1) commercial business and one (1) residence, along with right-of-way acquisition from two (2) RECs. In addition, the proposed improvements would impact 714 linear feet of stream, 0.1 acres of wetlands, and 2.3 acres of *Hexastylis naniflora* habitat. Exit 104, Alternative 4 is illustrated in Figure 15, with the impacts summarized in the attached impact matrix (Table 4).



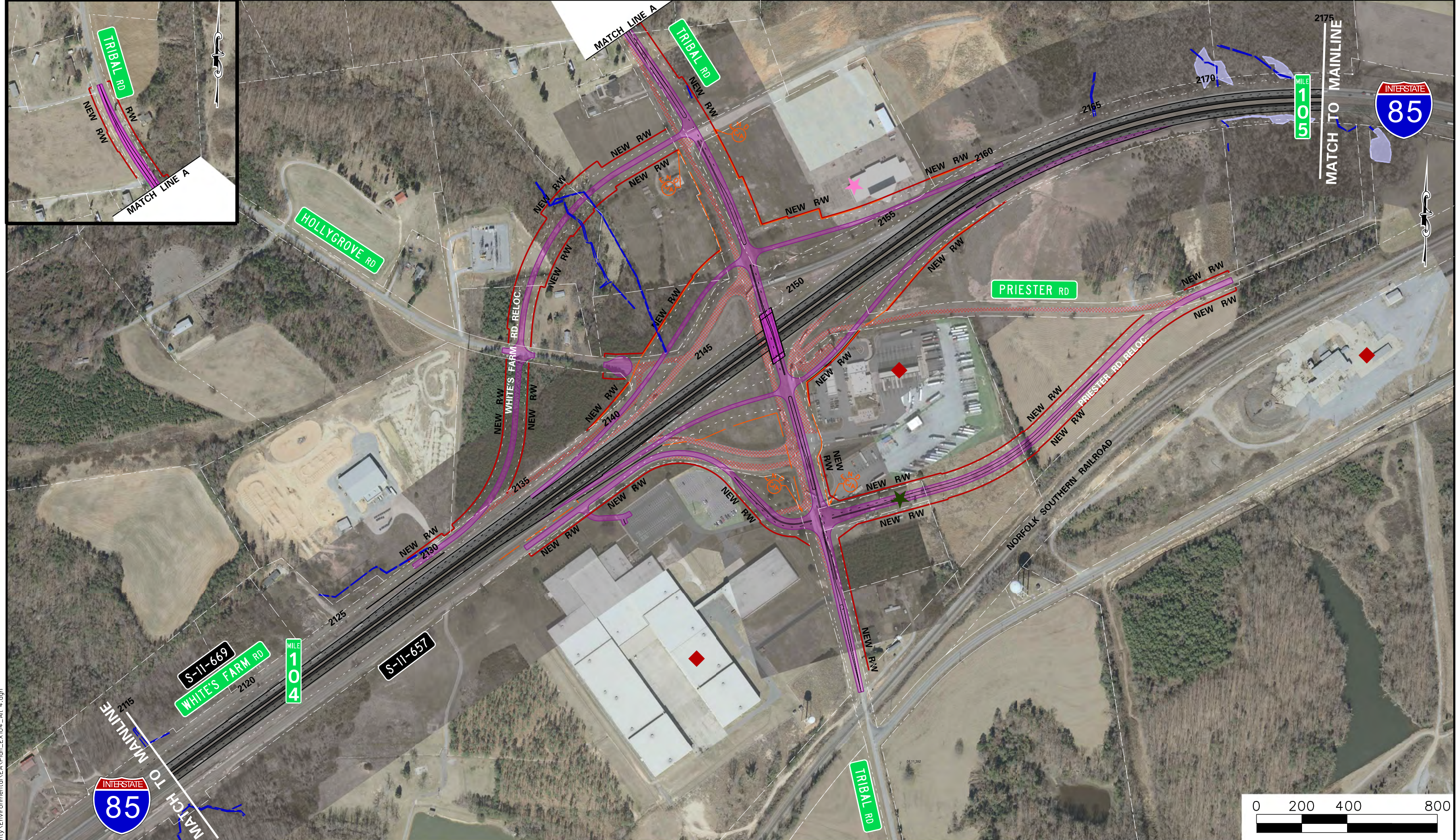
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LEGEND			
	WETLANDS		COMMERCIAL DISPLACEMENT
	OPEN WATER		RESIDENTIAL DISPLACEMENT
	STREAMS		NEW RIGHT-OF-WAY
	PROPERTY LINES		CONTROLLED ACCESS
	PROPOSED ROADWAY		RECOGNIZED ENVIRONMENTAL CONDITIONS
	PROPOSED BRIDGE		HISTORIC SITE
	PAVEMENT REMOVAL		CONSTRUCTION LIMITS

<b>EXIT 104 ALTERNATIVE 3</b>	
<b>I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY</b>	
<b>FIGURE NO. 14</b>	

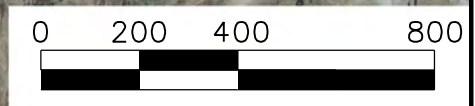




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LEGEND							
	WETLANDS		COMMERCIAL DISPLACEMENT		PROPOSED ROADWAY		RECOGNIZED ENVIRONMENTAL CONDITIONS
	OPEN WATER		RESIDENTIAL DISPLACEMENT		PROPOSED BRIDGE		HISTORIC SITE
	STREAMS		NEW RIGHT-OF-WAY		PAVEMENT REMOVAL		CONSTRUCTION LIMITS
	PROPERTY LINES		CONTROLLED ACCESS				

<b>EXIT 104 ALTERNATIVE 4</b>	
<b>I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY</b>	
<b>FIGURE NO. 15</b>	





### 3.5.5 Exit 106 - US 29 Interchange Alternatives

**Alternative 1:** Alternative 1 for Exit 106 consists of a diamond interchange with the replacement of the E. Cherokee Street bridge over I-85 to the east (i.e. right) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Frontage Road from the northbound on-ramp; elimination of direct commercial access driveways along the southbound off-ramp; and the elimination of the two-way southbound on-ramp. Frontage Road would be relocated to provide at a minimum the desired 750-foot of spacing from the interchange ramp intersections. However, the 750-foot of spacing is not feasible to the north of the interchange due to the location of an existing railroad line. Therefore, the intersection associated with the relocated property access roadway would be located approximately 600 feet from the ramp intersections.

This alternative would result in impacts to approximately 21 acres of new right-of-way, and result in the relocation of eight (8) commercial businesses and four (4) residences, along with right-of-way acquisition from five (5) RECs. In addition, the proposed improvements would impact 1,649 linear feet of stream, 0.02 acres of wetlands, and 1.6 acres of *Hexastylis naniflora* habitat. Exit 106, Alternative 1 is illustrated in Figure 16, with the impacts summarized in the attached impact matrix (Table 4).

**Alternative 2:** Alternative 2 for Exit 106 consists of a diamond interchange with the replacement of the E. Cherokee Street bridge over I-85 to the west (i.e. left) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Frontage Road from the northbound on-ramp; elimination of direct commercial access driveways along the southbound off-ramp; and the elimination of the two-way southbound on-ramp. Frontage Road would be relocated to provide at a minimum the desired 750-foot of spacing from the interchange ramp intersections. However, the 750-foot of spacing is not feasible to the north of the interchange due to the location of an existing railroad line. Therefore, the intersection associated with the relocated property access roadway would be located approximately 600 feet from the ramp intersections.

This alternative would result in impacts to approximately 20 acres of new right-of-way, and result in the relocation of eight (8) commercial businesses and four (4) residences, along with right-of-way acquisition from four (4) RECs. In addition, the proposed



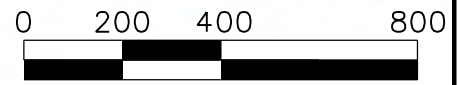


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MATCH TO MAINLINE

MILE 106



**LEGEND**

- |  |  |  |   |
|--|--|--|---|
|  WETLANDS       |  COMMERCIAL DISPLACEMENT  |  PROPOSED ROADWAY |  RECOGNIZED ENVIRONMENTAL CONDITIONS |
|  OPEN WATER     |  RESIDENTIAL DISPLACEMENT |  PROPOSED BRIDGE  |  HISTORIC SITE                       |
|  STREAMS        |  NEW RIGHT-OF-WAY         |  PAVEMENT REMOVAL |  CONSTRUCTION LIMITS                 |
|  PROPERTY LINES |  CONTROLLED ACCESS        |  |   |

**EXIT 106  
ALTERNATIVE 1**

**I-85 WIDENING  
MM 98 TO MM 106  
CHEROKEE COUNTY**

**FIGURE  
NO.  
16**



improvements would impact 1,592 linear feet of stream, 0.02 acres of wetlands, and 1.6 acres of *Hexastylis naniflora* habitat. Exit 106, Alternative 2 is illustrated in Figure 17, with the impacts summarized in the attached impact matrix (Table 4).

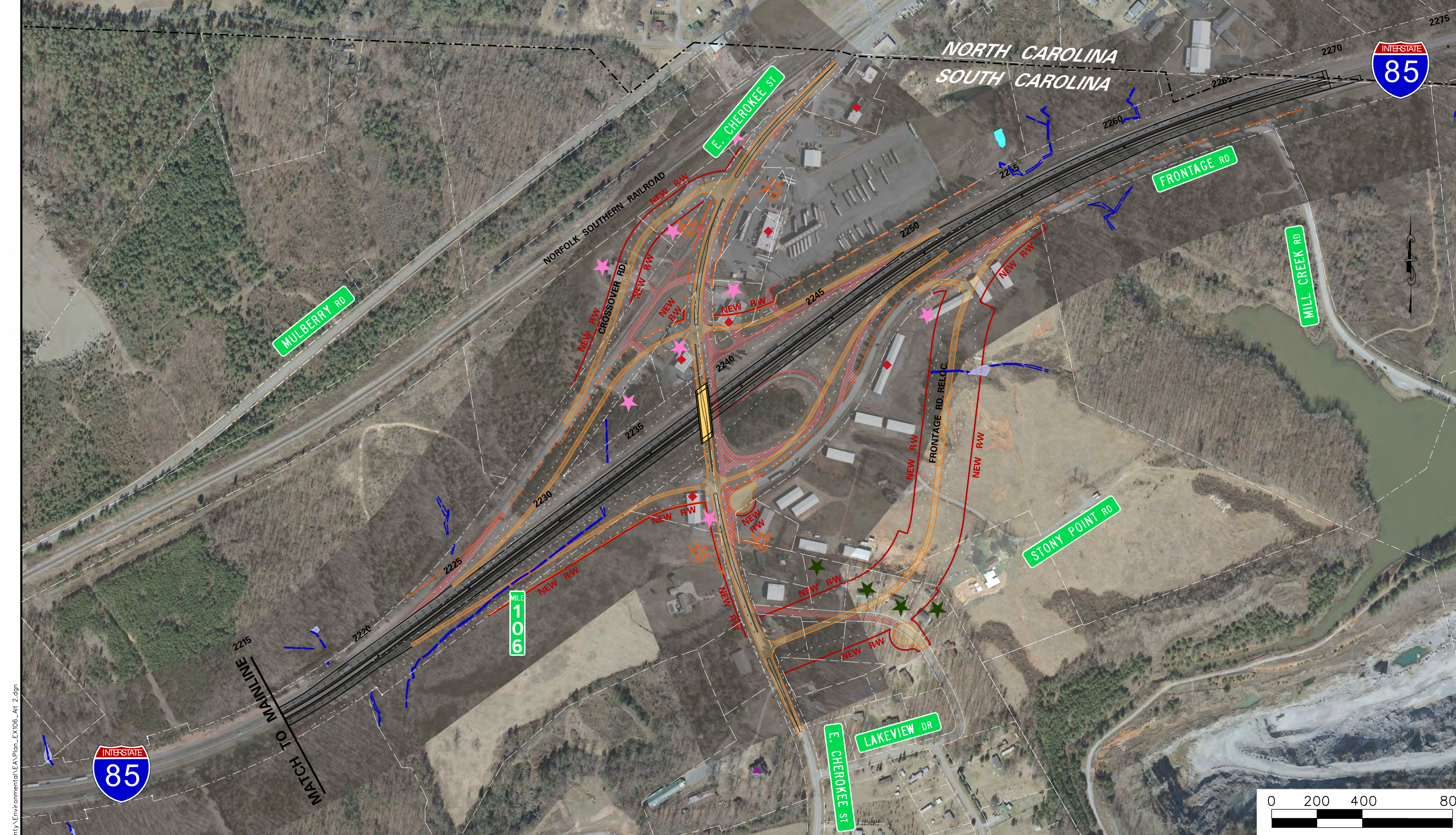
**Alternative 3 (PREFERRED):** Alternative 3 for Exit 106 consists of a diamond interchange with the replacement of the E. Cherokee Street bridge over I-85 to the west (i.e. left) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Frontage Road from the northbound on-ramp; elimination of direct commercial access driveways along the southbound off-ramp; and the elimination of the two-way southbound on-ramp. Frontage Road would be relocated to intersect with Lakeview Drive to minimize right-of-way impacts and avoid residences. This alignment would exceed the desired 750-foot of spacing from the interchange ramp intersections. However, the 750-foot of spacing is not feasible to the north of the interchange due to the location of an existing railroad line. Due to potential safety and traffic concerns with the substandard spacing, this alternative would eliminate access to two properties which include a vacant commercial structure and an undeveloped property.

This alternative would result in impacts to approximately 19 acres of new right-of-way, and result in the relocation of eight (8) commercial businesses and no residences, along with right-of-way acquisition from four (4) RECs. In addition, the proposed improvements would impact 1,734 linear feet of stream, 2.7 acres of *Hexastylis naniflora* habitat, and no wetland impacts. Exit 106, Alternative 3 is illustrated in Figure 18, with the impacts summarized in the attached impact matrix (Table 4).

### 3.6 What is the Preferred Alternative?

The preferred alternatives along the mainline and each interchange were selected largely based on the ability to satisfy the purpose and need while minimizing environmental impacts. The mainline build alternative, along with Exit 100 – Alternative 4, Exit 102 – Alternative 1, Exit 104 – Alternative 4, and Exit 106 – Alternative 3 are recommended as the overall preferred alternative for this project. As presented above, this alternative accommodates future traffic needs and improves existing operational efficiency of the interchanges while minimizing impacts to the commercial/residential developments, wetlands/streams, and access.





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LEGEND			
	WETLANDS		COMMERCIAL DISPLACEMENT
	OPEN WATER		RESIDENTIAL DISPLACEMENT
	STREAMS		NEW RIGHT-OF-WAY
	PROPERTY LINES		CONTROLLED ACCESS
			PROPOSED ROADWAY
			PROPOSED BRIDGE
			PAVEMENT REMOVAL
			RECOGNIZED ENVIRONMENTAL CONDITIONS
			HISTORIC SITE
			CONSTRUCTION LIMITS

<b>EXIT 106 ALTERNATIVE 2</b>	
<b>I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY</b>	
FIGURE NO. 17	





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LEGEND			
	WETLANDS		COMMERCIAL DISPLACEMENT
	OPEN WATER		RESIDENTIAL DISPLACEMENT
	STREAMS		NEW RIGHT-OF-WAY
	PROPERTY LINES		CONTROLLED ACCESS
	PROPOSED ROADWAY		RECOGNIZED ENVIRONMENTAL CONDITIONS
	PROPOSED BRIDGE		HISTORIC SITE
	PAVEMENT REMOVAL		CONSTRUCTION LIMITS

**EXIT 106  
ALTERNATIVE 3**

**I-85 WIDENING  
MM 98 TO MM 106  
CHEROKEE COUNTY**

**FIGURE  
NO.  
18**



### 3.6.1 Mainline Alternative

The proposed mainline widening would occur to the median of the existing facility, with only minor work beyond the existing shoulder to provide adequate clear zones. In addition, minor approach work would be conducted along the rest area facility near mile marker 105. The proposed work along the mainline would result in impacts to approximately 317 linear feet of stream impact, 0.16 acres of wetland and 1.7 acres of floodplain.

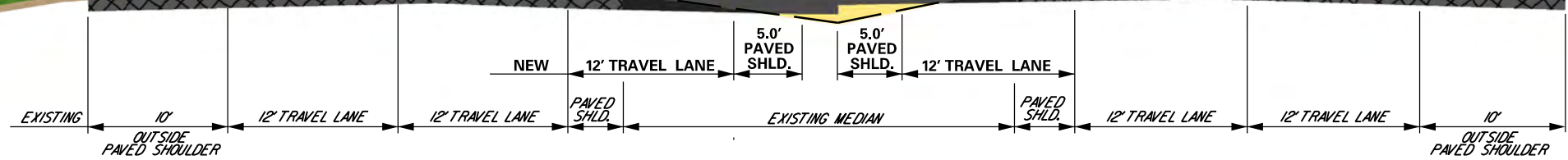
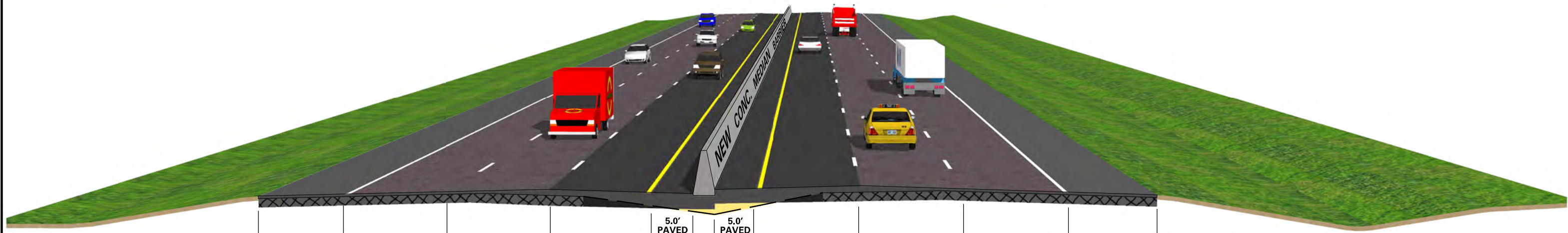
The proposed typical section for the majority of the corridor is shown in Figure 19. This typical section allows for any widening to be constructed in the median. The majority of the corridor has a 100 foot right-of-way (ROW) from the centerline or 200 foot total. Minor amounts of new right-of-way would be required to meet clear zone design standards.

The additional capacity provided by the construction of a third lane in each direction along I-85 would result in substantial improvement in LOS compared to the 2040 No-Build condition, with LOS results comparable to those experienced under existing conditions. The 2040 Build analysis results indicate that during the AM peak hour, all freeway segments operate at LOS B, and during the PM peak hour, all freeway segments operate at LOS C or D (Table 5).

**Table 5. Proposed LOS Conditions.**

	Segment	AM Peak Hour	PM Peak Hour
		2040 Build	2040 Build
NB	Exit 96-100	B	D
NB	Exit 100-102	B	D
NB	Exit 102-104	B	C
NB	Exit 104-106	B	C
NB	Exit 106 to State Line	B	C
SB	State Line to Exit 106	B	C
SB	Exit 106-104	B	C
SB	Exit 104-102	B	C
SB	Exit 102-100	B	C
SB	Exit 100-96	B	D





Typical Section with Concrete Median Barrier

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### **3.6.2 Exit 100 - Blacksburg Highway Interchange**

**Alternative 4** for Exit 100 consists of a diamond interchange with the replacement of the Blacksburg Highway bridge over I-85 to the east (i.e. right) of the existing structure. Due to alignment constraints, the proposed bridge would be constructed in stages and traffic would be maintained during construction. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the elimination Frontage Road/Milliken Road from the northbound off-ramp; relocation of Simper Road and the commercial driveways along the southbound off-ramp; and the relocation of Crawford Road from the southbound on-ramp. Specifically, Milliken Road would be eliminated, and not relocated to avoid adverse impacts to Buffalo Creek and associated floodplain. The elimination of this roadway would result in additional right-of-way/access impacts to two properties, including the displacement of one commercial business. Access to Milliken Road would continue to be provided through the current access off Blacksburg Road, just south of Buffalo Creek. This alternative would avoid construction of a new bridge over Buffalo Creek and avoid potential conflicts and/or additional work associated with the current SCDOT bridge replacement over Buffalo Creek.

This alternative requires the fewest acres of additional right-of-way and floodplains, less potential Hexastylis habitat impacts, lower stream impacts, no wetland impacts, and achieves the ramp and frontage road separation as recommended by the SCDOT ARMS manual.

### **3.6.3 Exit 102 - North Mountain Street Interchange**

**Alternative 1** for Exit 102 consists of a diamond interchange with the replacement of the N. Mountain Street bridge over I-85 to the east (i.e. right) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Henson Road from the northbound off-ramp; elimination of direct commercial access driveways along the southbound off-ramp; and the relocation of Shaman Road from the southbound on-ramp. Specifically, the intersections of these roadways with N. Mountain Street would be relocated to accommodate at a minimum the desired 750-foot of spacing from the interchange ramp intersections.



This alternative is very similar to Alternative 2 except it has less stream impacts, and lower costs. It also has less impacts to the parking areas at the Flying J Truck Stop. Alternative 2 impacts more Flying J parking and also encroaches closer to the diesel fuel islands. Although Alternative 1 has higher impacts to potential Hexastylis habitat, this is due to the expanded project area. The original project area was surveyed for Hexastylis and none were found (Appendix C). Although, the overall potential Hexastylis habitat is greater for Alternative 1, part of it has been determined to not contain Hexastylis.

### **3.6.4 Exit 104 - Tribal Road Interchange**

**Alternative 4** for Exit 104 consists of a diamond interchange with the replacement of the Tribal Road bridge over I-85 to the east (i.e. right) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of S-657 from the northbound off-ramp; relocation of Priester Road from the northbound on-ramp; and the relocation of Holly Grove Road and White's Farm Road from the southbound on-ramp. The frontage road intersections would be located to accommodate the desired 750-foot spacing with the exception of S-657. The relocation of S-657 would be aligned to avoid and minimize impacts to an industrial site, resulting in approximately 450-foot of spacing between the proposed intersection and the ramp intersection. However, this alternative would impact a portion of the existing parking lot along the industrial site.

This alternative requires the second fewest acres of additional right-of-way, second less potential Hexastylis habitat impacts, less stream impacts, and lower costs than the other alternatives. This alternative was developed to avoid impacts to the Atlas Industrial parking lot from the Henson Road realignment. An Atlas Industrial representative discussed the potential impacts to the parking lot with SCDOT and stated that the existing configuration was setup to provide security to the facility. Although there is available land to reconfigure the parking, it would not provide the level of security necessary to the facility. All other impacts are relatively similar.

### **3.6.5 Exit 106 - US 29 Interchange**

**Alternative 3** for Exit 106 consists of a diamond interchange with the replacement of the E. Cherokee Street bridge over I-85 to the west (i.e. left) of the existing structure. The proposed bridge would accommodate the appropriate horizontal and vertical clearances for traffic along I-85. All frontage roads and business access points would be eliminated along the interchange ramps, and realigned to provide the desirable intersection spacing. This includes the relocation of Frontage Road from the



northbound on-ramp; elimination of direct commercial access driveways along the southbound off-ramp; and the elimination of the two-way southbound on-ramp. Frontage Road would be relocated to intersect with Lakeview Drive to minimize right-of-way impacts and avoid residential developments. The Lakeview Drive alignment would exceed the desired 750-foot of spacing from the interchange ramp intersections. However, the 750-foot of spacing is not feasible to the north of the interchange due to the location of an existing railroad line. Therefore, the intersection associated with the relocated property access roadway would be located approximately 350 feet from the ramp intersections and avoid commercial displacements.

This alternative requires the fewest acres of additional right-of-way, less farmland acres, no wetland impacts, no residential relocations, and achieves the ramp and frontage road separation as recommended by the SCDOT ARMS manual. It does have higher potential *Hexastylis* impacts, higher stream impacts, and higher costs. The alternative was developed to avoid displacing, and bi-secting, a small neighborhood located on south US 29 on Wendy Drive. Table 6 lists the impacts resulting from the preferred alternative.

Impact Category	Table 6. Preferred Alternative Impacts					
	Mainline	Exit 100 Alt. 4	Exit 102 Alt. 1	Exit 104 Alt. 4	Exit 106 Alt. 3	Totals
Residential Relocations/Impacts	0	0	0	1	0	1
Commercial Relocations/Impacts	0	3	4	1	8	16
Right-of-Way (acres)	2.6	17	25	21	19	84.6
Farmlands (acres)	16.7	0.67	0	0	5.5	22.9
Floodplains (acres)	1.7	0.9	0	0	0	2.6
Wetlands (acres)	0.16	0	0.001	0.1	0	0.26
Streams/Linear Conveyances (linear feet)	317	787	2280	714	1,734	5832
Permits	IP	IP	IP	IP	IP	IP
Threatened/Endangered Species						
<i>Hexastylis</i> Habitat (acres)	2.5	0.2	2.4	2.3	2.7	10.1
Cultural Resources						
Architectural	0	0	0	0	0	0
Archaeological	0	0	0	0	0	0
Section 4(f) Resource (parks, wildlife refuges, etc.)	0	0	0	0	0	0
Noise Impacted Receivers	N/A	7	22	14	6	49
Hazardous Material Sites <sup>1</sup>	0	4	4	2	4	14
Project Cost (millions)	\$85.0	\$20.4	\$34.9	\$25.3	\$26.0	\$191.6



## 4.0 ENVIRONMENTAL RESOURCES AND POTENTIAL IMPACTS

The following section includes a discussion on the environmental resources and the probable beneficial and adverse social, economic, and environmental effects of the preferred alternative, and describes the measures proposed to mitigate any adverse impacts. Environmental studies conducted by various SCDOT representatives indicate the absence of any significant adverse impact on the human and natural environment. These studies are incorporated by reference and used to support this conclusion. Figures 20-27 illustrate the impacts associated with the preferred alternative. The following paragraphs provide a brief overview of SCDOT's environmental findings.

### 4.1 What is the current land use in the project study area?

An initial 907 acre project study area (PSA) was identified during early project development based on the potential improvements and alternatives. This PSA was increased to 1,065 acres during development of the alternatives to ensure adequate coverage and data collection for alternative analysis. This PSA is located within the piedmont region of South Carolina, which is the transitional boundary between the mountainous regions along the Appalachians (northwest) and the coastal plain (southeast). Specifically, the PSA is located along the "Southern Outer Piedmont" ecoregion which is characterized by lower elevation and less relief with expansive areas of pine and mixed oak forests and the "Kings Mountain" ecoregion which is characterized by a hilly, rugged area with some northeast to southwest trending ridges.<sup>14</sup>

The project corridor is located along a rural area between the City of Gaffney and the SC/NC state line. The majority of the surrounding area includes upland forest and agricultural land uses with some urbanized land uses including transportation, commercial development, industrial, and residential land uses. According to Cherokee County, there is no zoning along the I-85 corridor within the PSA.<sup>15</sup> As such, the PSA consists of various land uses including infrastructure, commercial, industrial, residential, forested, and agricultural. The immediate PSA consists largely of highway oriented and

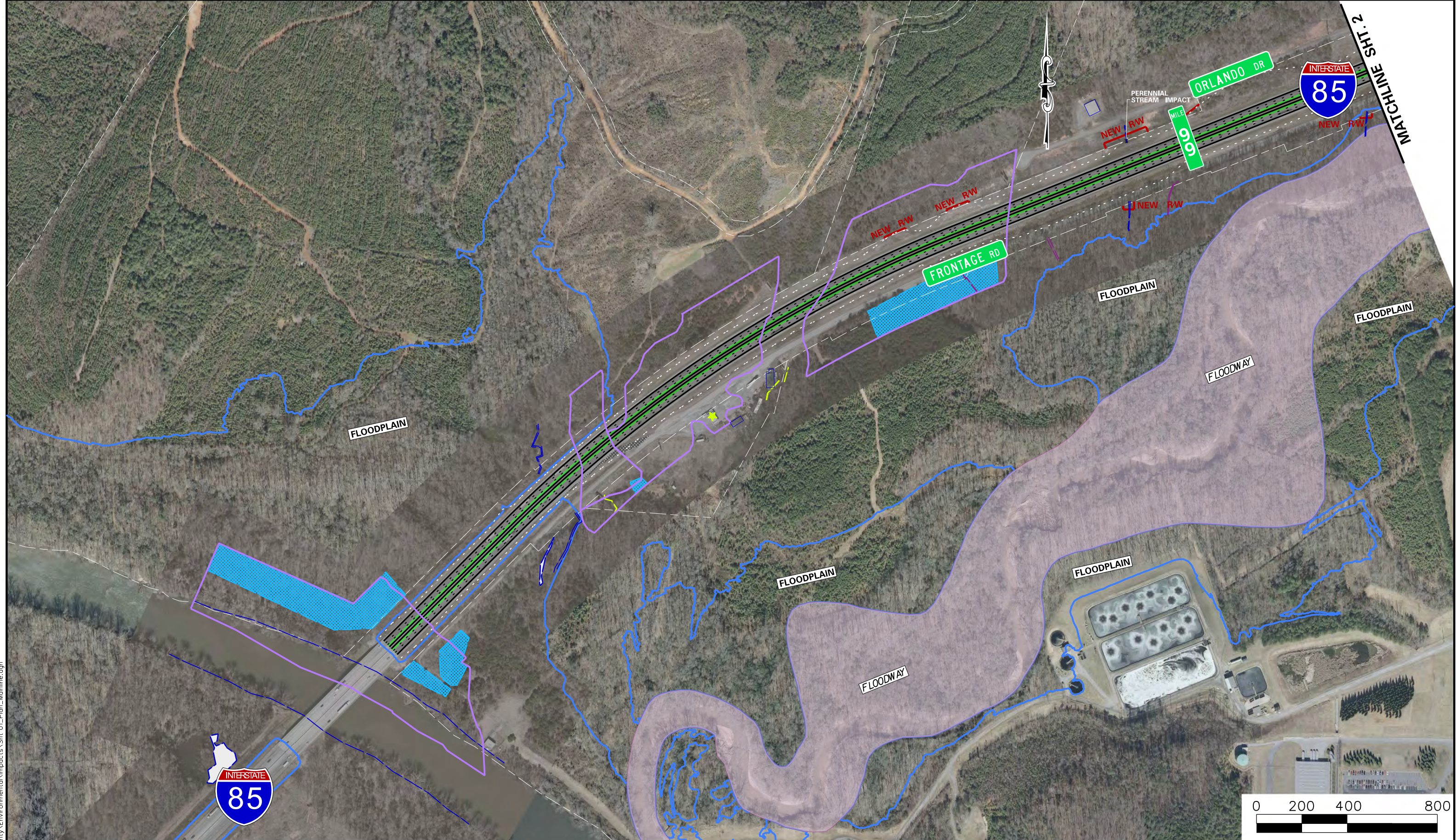
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<sup>14</sup> Griffith, G.E., Omernik, J.M., Comstock, J.A., Glover, J.B., and Shelburne, V.B., 2002, Ecoregions of South Carolina, U.S. Environmental Protection Agency, Corvallis, OR, accessed October 11, 2016.

<sup>15</sup> <http://www.scacog.org/CherokeeCountyParcels>. accessed August 2, 2016.



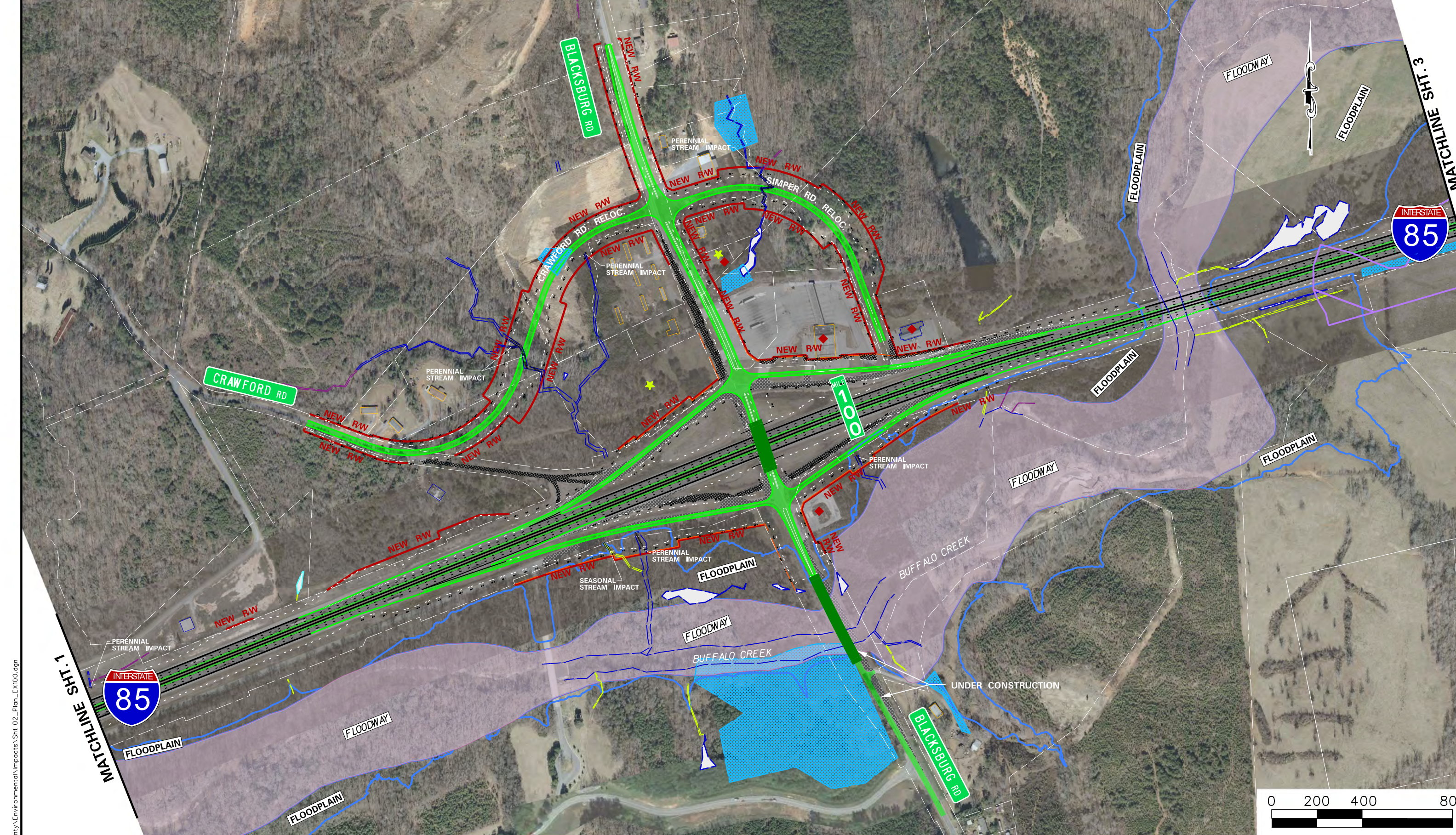
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LEGEND			
PROPERTY LINES	NEW RW	PROPOSED ROADWAY	WETLANDS IMPACT
CONTROLLED ACCESS	PROPOSED BRIDGE	OPEN WATER IMPACT	COMMERCIAL DISPLACEMENTS
CONSTRUCTION LIMITS	NO NOISE IMPACT	PERENNIAL STREAM IMPACT	RESIDENTIAL DISPLACEMENTS
PAVEMENT REMOVAL	NOISE IMPACT	INTERMITTENT STREAM IMPACT	RECOGNIZED ENVIRONMENTAL CONDITIONS
		SEASONAL STREAM IMPACT	HISTORIC SITES
		HEARTLEAF HABITAT	
		PRIME FARMLAND	

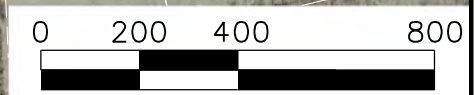
<b>ENVIRONMENTAL IMPACTS</b>	
<b>I-85 WIDENING</b> <b>MM 98 TO MM 106</b> <b>CHEROKEE COUNTY</b>	
FIGURE NO.	20





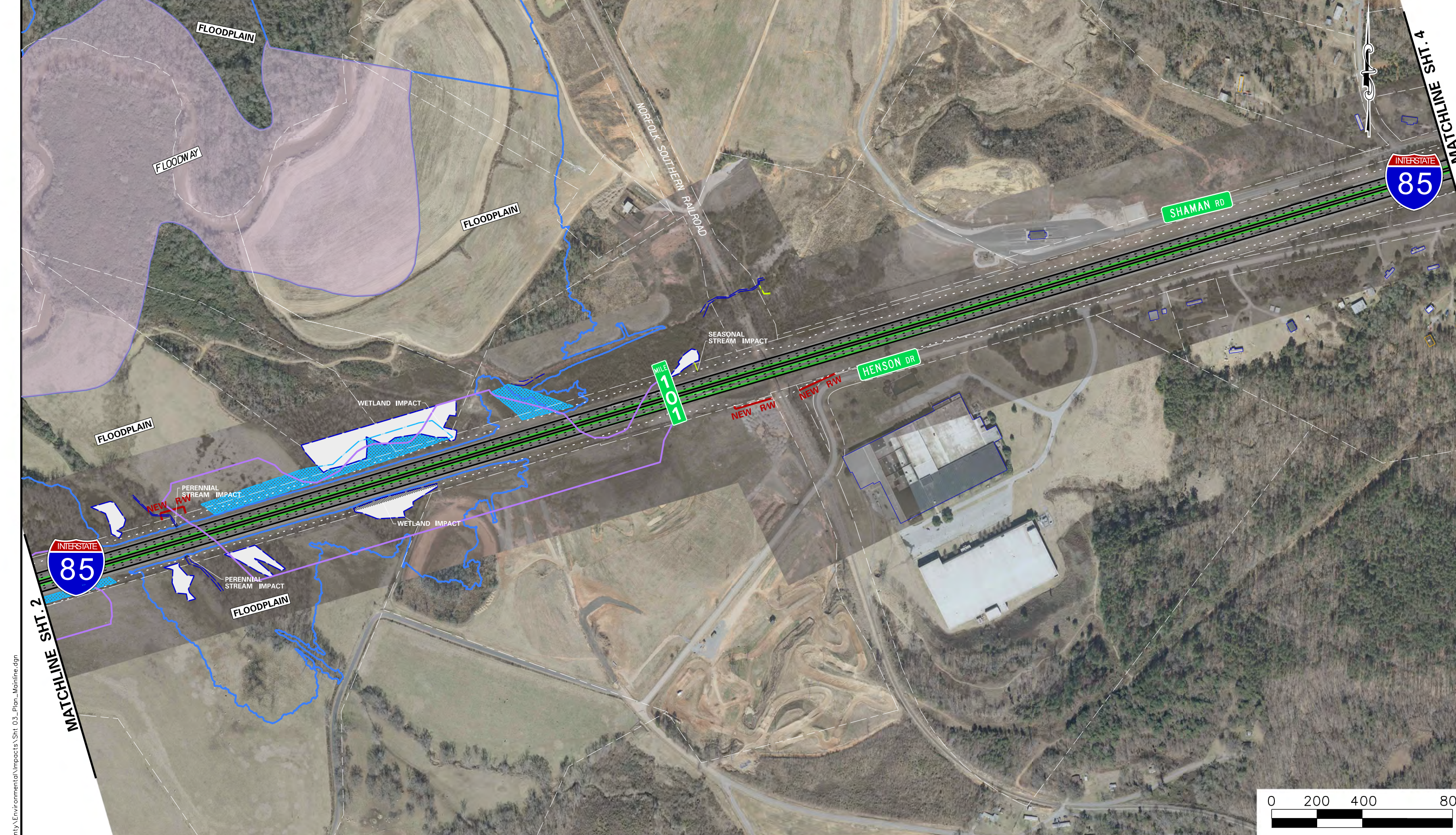
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LEGEND	
PROPERTY LINES	PROPOSED ROADWAY
NEW RW NEW RIGHT-OF-WAY	WETLANDS IMPACT
CONTROLLED ACCESS	OPEN WATER IMPACT
CONSTRUCTION LIMITS	PERENNIAL STREAM IMPACT
PAVEMENT REMOVAL	INTERMITTENT STREAM IMPACT
NO NOISE IMPACT	SEASONAL STREAM IMPACT
NOISE IMPACT	COMMERCIAL DISPLACEMENTS
	RESIDENTIAL DISPLACEMENTS
	RECOGNIZED ENVIRONMENTAL CONDITIONS
	HISTORIC SITES
	HEARTLEAF HABITAT
	PRIME FARMLAND



<b>ENVIRONMENTAL IMPACTS</b>	
I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY	
FIGURE NO. 21	



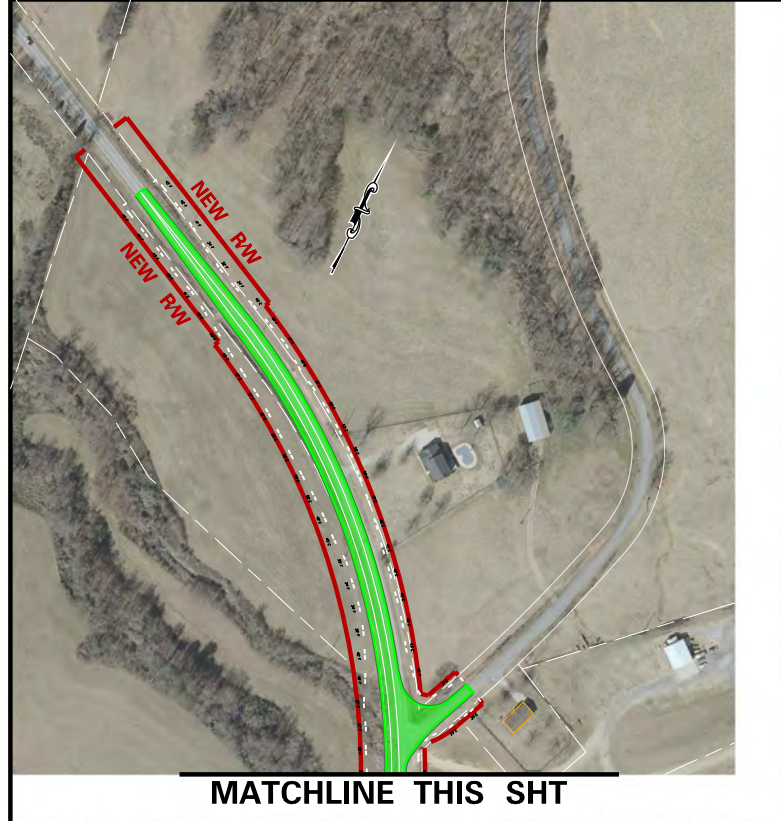


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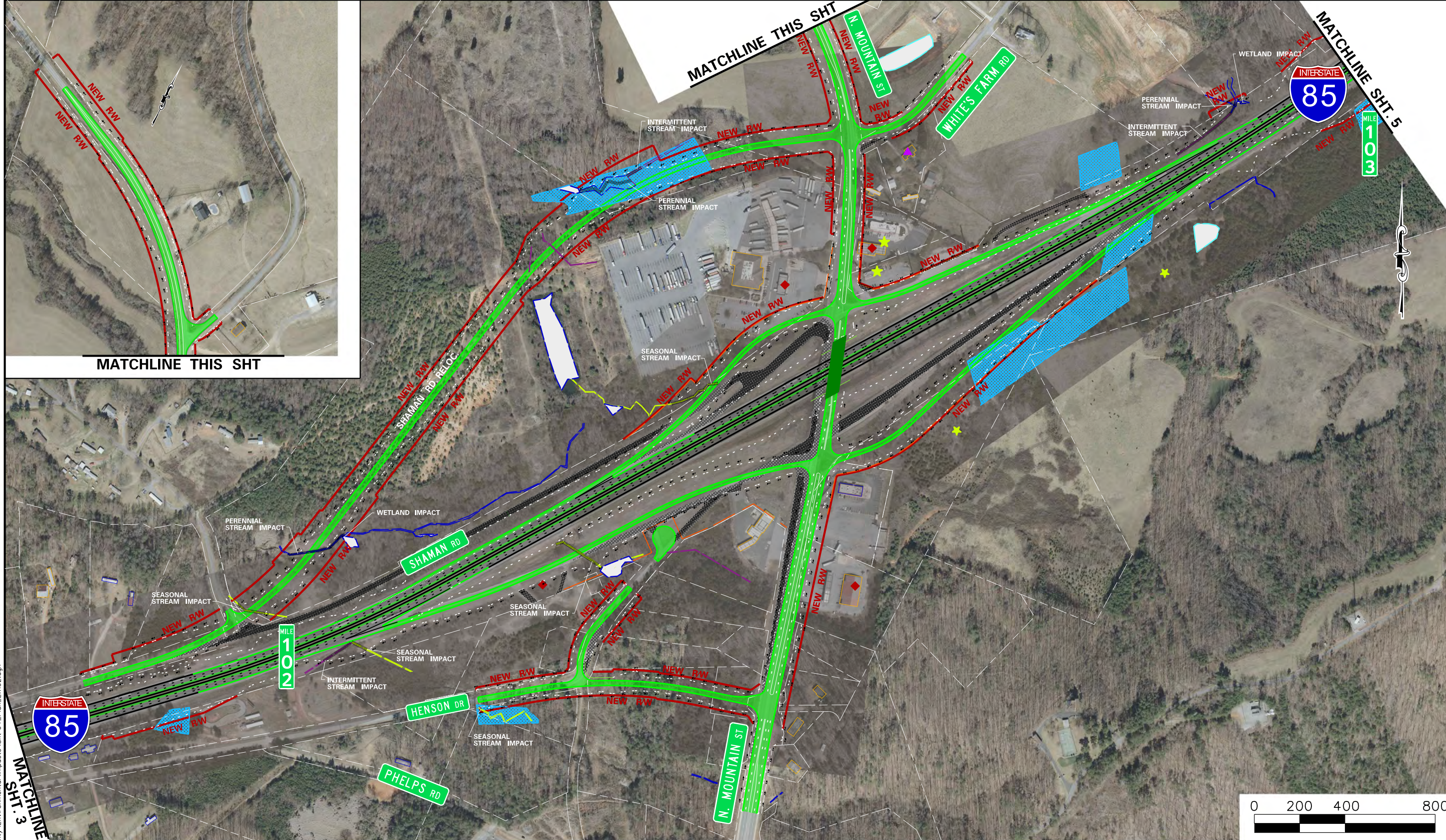
PROPERTY LINES		LEGEND		DISPLACEMENTS		ENVIRONMENTAL CONDITIONS	
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	NEW RIGHT-OF-WAY		PROPOSED BRIDGE		RESIDENTIAL DISPLACEMENTS		HISTORIC SITES
	CONTROLLED ACCESS		WETLANDS IMPACT		HEARTLEAF HABITAT		PRIME FARMLAND
	CONSTRUCTION LIMITS		OPEN WATER IMPACT		PERENNIAL STREAM IMPACT		
	PAVEMENT REMOVAL		PERENNIAL STREAM IMPACT		INTERMITTENT STREAM IMPACT		
	NO NOISE IMPACT		SEASONAL STREAM IMPACT				
	NOISE IMPACT						

<b>ENVIRONMENTAL IMPACTS</b>		
<b>I-85 WIDENING</b> <b>MM 98 TO MM 106</b> <b>CHEROKEE COUNTY</b>		<b>FIGURE NO.</b> <b>22</b>





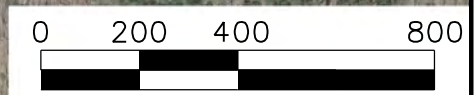
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MATCHLINE THIS SHT

MATCHLINE SHT. 5

MATCHLINE SHT. 3



LEGEND	
PROPERTY LINES	PROPOSED ROADWAY
NEW RW	PROPOSED BRIDGE
CONTROLLED ACCESS	WETLANDS IMPACT
CONSTRUCTION LIMITS	OPEN WATER IMPACT
PAVEMENT REMOVAL	PERENNIAL STREAM IMPACT
NO NOISE IMPACT	INTERMITTENT STREAM IMPACT
NOISE IMPACT	SEASONAL STREAM IMPACT
COMMERCIAL DISPLACEMENTS	RESIDENTIAL DISPLACEMENTS
RECOGNIZED ENVIRONMENTAL CONDITIONS	HEARTLEAF HABITAT
HISTORIC SITES	PRIME FARMLAND

<b>ENVIRONMENTAL IMPACTS</b>	
I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY	
FIGURE NO. 23	

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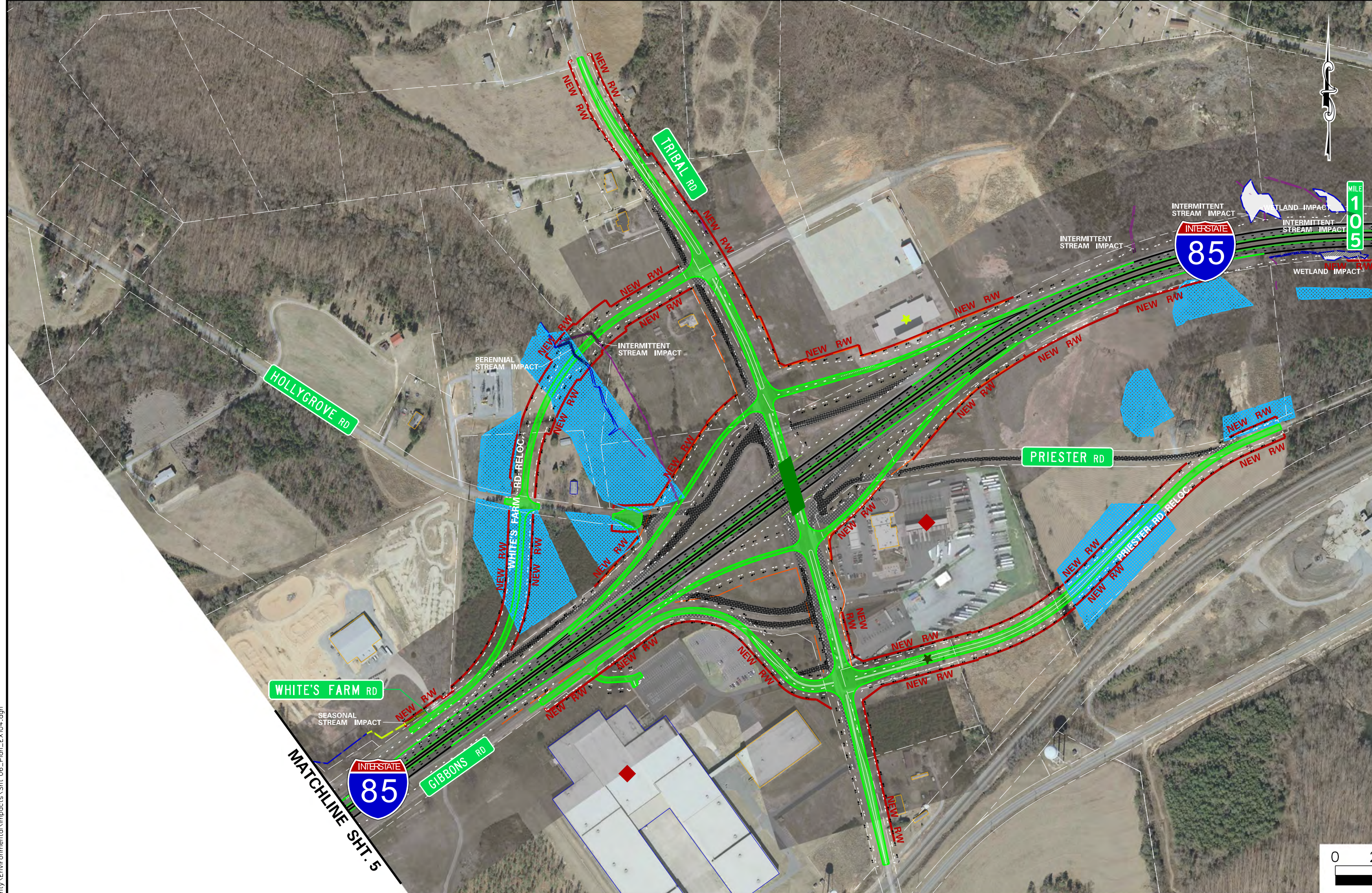


LEGEND			
PROPERTY LINES	PROPOSED ROADWAY	WETLANDS IMPACT	COMMERCIAL DISPLACEMENTS
NEW RW	PROPOSED BRIDGE	OPEN WATER IMPACT	RESIDENTIAL DISPLACEMENTS
CONTROLLED ACCESS	NO NOISE IMPACT	PERENNIAL STREAM IMPACT	RECOGNIZED ENVIRONMENTAL CONDITIONS
CONSTRUCTION LIMITS	NOISE IMPACT	INTERMITTENT STREAM IMPACT	HISTORIC SITES
PAVEMENT REMOVAL		SEASONAL STREAM IMPACT	HEARTLEAF HABITAT
			PRIME FARMLAND

<b>ENVIRONMENTAL IMPACTS</b>	
<b>I-85 WIDENING</b> <b>MM 98 TO MM 106</b> <b>CHEROKEE COUNTY</b>	
FIGURE NO. 24	



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MATCHLINE SHT. 7

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MATCHLINE SHT. 5

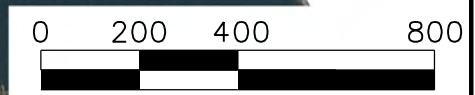
LEGEND			
	PROPERTY LINES		PROPOSED ROADWAY
	NEW RIGHT-OF-WAY		PROPOSED BRIDGE
	CONTROLLED ACCESS		WETLANDS IMPACT
	CONSTRUCTION LIMITS		OPEN WATER IMPACT
	PAVEMENT REMOVAL		PERENNIAL STREAM IMPACT
	NO NOISE IMPACT		INTERMITTENT STREAM IMPACT
	NOISE IMPACT		SEASONAL STREAM IMPACT
	COMMERCIAL DISPLACEMENTS		HEARTLEAF HABITAT
	RESIDENTIAL DISPLACEMENTS		PRIME FARMLAND
	RECOGNIZED ENVIRONMENTAL CONDITIONS		
	HISTORIC SITES		

<b>ENVIRONMENTAL IMPACTS</b>	
I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY	
FIGURE NO. 25	



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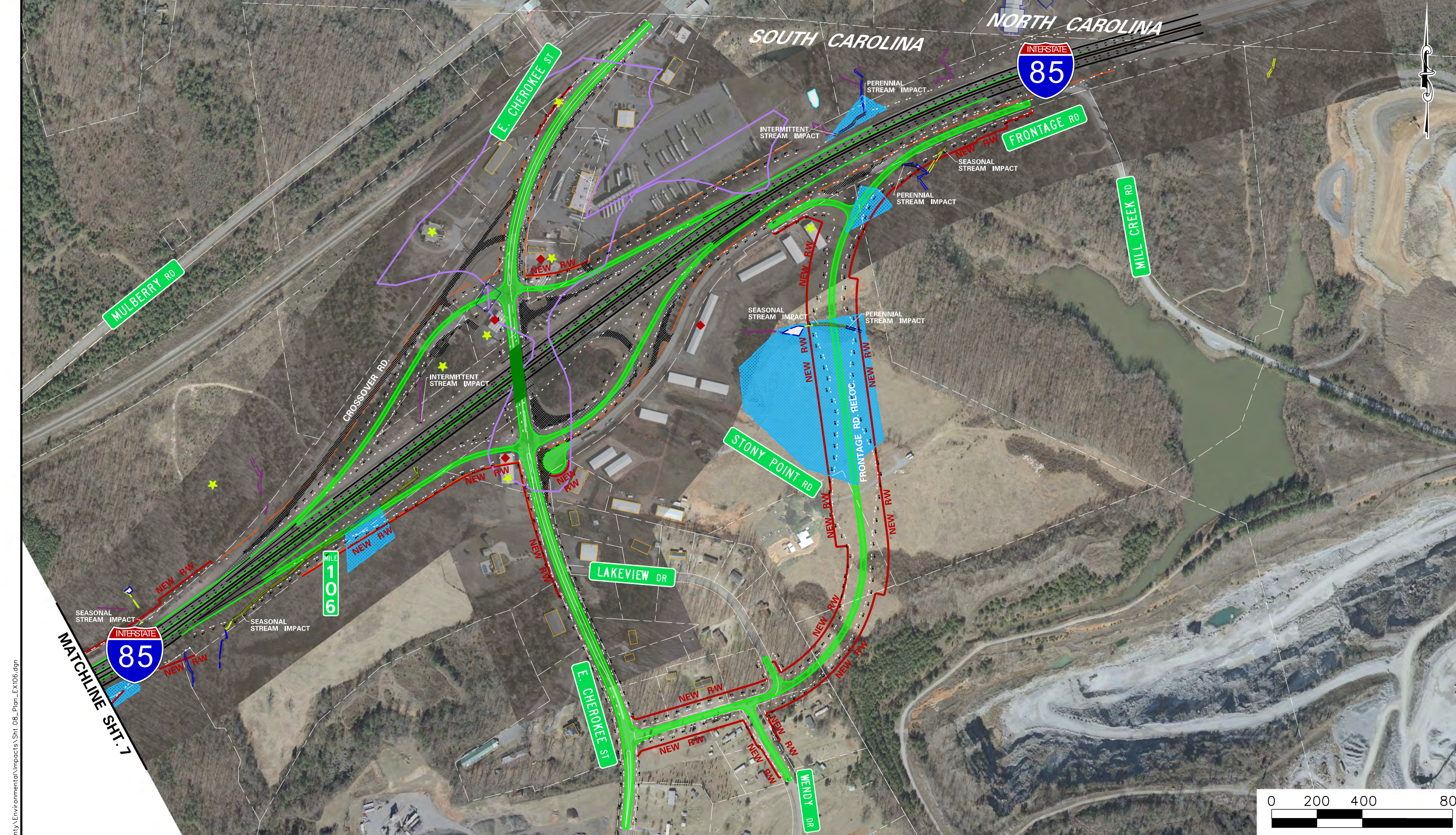
MATCHLINE SHT. 6



LEGEND			
PROPERTY LINES	NEW RIGHT-OF-WAY	PROPOSED ROADWAY	WETLANDS IMPACT
CONTROLLED ACCESS	PROPOSED BRIDGE	OPEN WATER IMPACT	COMMERCIAL DISPLACEMENTS
CONSTRUCTION LIMITS	NO NOISE IMPACT	PERENNIAL STREAM IMPACT	RESIDENTIAL DISPLACEMENTS
PAVEMENT REMOVAL	NOISE IMPACT	INTERMITTENT STREAM IMPACT	RECOGNIZED ENVIRONMENTAL CONDITIONS
		SEASONAL STREAM IMPACT	HISTORIC SITES
			HEARTLEAF HABITAT
			PRIME FARMLAND

<b>ENVIRONMENTAL IMPACTS</b>	
<b>I-85 WIDENING          MM 98 TO MM 106          CHEROKEE COUNTY</b>	
FIGURE NO. 26	





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LEGEND	
PROPERTY LINES	PROPOSED ROADWAY
NEW RW NEW RIGHT-OF-WAY	PROPOSED BRIDGE
CONTROLLED ACCESS	WETLANDS IMPACT
CONSTRUCTION LIMITS	OPEN WATER IMPACT
PAVEMENT REMOVAL	PERENNIAL STREAM IMPACT
NO NOISE IMPACT	INTERMITTENT STREAM IMPACT
NOISE IMPACT	SEASONAL STREAM IMPACT
COMMERCIAL DISPLACEMENTS	RECOGNIZED ENVIRONMENTAL CONDITIONS
RESIDENTIAL DISPLACEMENTS	HISTORIC SITES
HEARTLEAF HABITAT	PRIME FARMLAND

<b>ENVIRONMENTAL IMPACTS</b>	
I-85 WIDENING MM 98 TO MM 106 CHEROKEE COUNTY	
FIGURE NO. 27	



transient developments including gas stations, truck stops, hotels, restaurants, general retail, and industrial. Sparse residential areas are interspersed throughout the PSA.

The project would require approximately 85 acres of new right-of-way to accommodate the proposed improvements. Specifically, this new right-of-way would be acquired from approximately 122 tracts, including commercial, residential, and undeveloped land. The SCDOT would acquire all new right-of-way and process relocations in compliance with the Uniform Relocation Assistance and Real Properties Acquisition Policies Act of 1970, as amended (42 USC §460 et. seq.). The purpose of these regulations is to ensure that owners of real property to be acquired for Federal or federally-assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owner, to minimize litigation and relieve congestion in the courts, and to promote public confidence in Federal and federally-assisted land acquisition programs. The project would modify various business driveways and current access to adjacent properties. However, the project would maintain adequate access to these properties.

## 4.2 What are Waters of the U.S.?

Waters of the U.S. (WOUS), as it applies to the jurisdictional limits of the authority of the U.S. Army Corp of Engineers (USACE), is defined in 33 CFR Part 328, and includes:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters including interstate wetlands;
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds;
- All impoundments, tributaries, and adjacent wetlands to the waters defined above;
- The territorial seas.

Potential wetland and WOUS were identified along the PSA through a combination of desktop and field evaluations. This included a review of available mapping, specifically the National Wetland Inventory (NWI) maps, soil surveys, USGS topographic quadrangles (*Cherokee, Grover*), color aerial photography, GIS data, and 2006 NAPP false-color infrared aerial photography. The review of initial mapping documents that the PSA includes potential tributaries associated with the Broad River, Buffalo Creek, and Kings Creek. The location of these areas have been identified through the above mapping and subsequent field survey.



Numerous field visits were conducted to confirm these findings and further identify and delineate potential wetlands and WOUS within the PSA. These delineations were conducted according to the *1987 Corps of Engineers Wetland Delineation Manual, Eastern Mountains and Piedmont Region Supplement*, and other applicable USACE guidelines and procedures.<sup>16</sup> The field visits confirmed the presence of numerous stream systems, various open waters/ponds, and wetland areas within the PSA. The Broad River and Buffalo Creek are both considered as 'Traditional Navigable Waters' as defined by the USACE. Other features identified included perennial, seasonal, and intermittent stream reaches, along with forested and emergent wetlands. These features, excluding the intermittent stream reaches, are considered WOUS under the direct jurisdiction of the USACE. These findings and determinations are currently being coordinated with the USACE for final verification/determination of the jurisdictional status. A detailed review of the resources identified within the PSA can be found in the Natural Resources Technical Memorandum (NRTM) in Appendix C.

#### **4.2.1 What types of streams and open waters were identified within the PSA?**

As documented, the PSA includes various streams associated with the Broad River, Buffalo Creek, and Kings Creek. These streams primarily consist of first and second order streams with perennial, seasonal, or intermittent flow. A total of 88 stream reaches, extending 32,406 linear feet (LF) were identified within the PSA. This includes 24,629 LF of jurisdictional streams<sup>17</sup> (i.e. perennial and seasonal streams only). Two of the most prominent rivers/streams are described below.

##### **Broad River**

The Broad River, a perennial stream, flows through the PSA near the westernmost extent of the project. The Broad River is a Traditionally Navigable Water (TNW). It originates north of the PSA and flows south. Approximately 1,568 linear feet (lf) of the Broad River are within the PSA. The Broad River is approximately 250-320 feet wide with bank height of approximately 5-12 feet. During the site visit the Broad River flowed with a moderate velocity and clarity was turbid. Aquatic life was not observed. The Broad River is depicted on the USGS Topographic map as a perennial river.

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<sup>16</sup> USACE, <http://www.sac.usace.army.mil/Missions/Regulatory/Permitting-Process/>. Last Accessed December 1, 2016

<sup>17</sup> Jurisdiction is pending as the Jurisdictional Determination has not yet been approved by the ACOE



### **Buffalo Creek**

Buffalo Creek, a perennial stream, flows through the PSA near the midpoint of the project. Buffalo Creek is considered a Traditionally Navigable Water (TNW). It originates north of the PSA and flows south across the PSA east of Blacksburg Highway/Exit 100; it then curves and flows west across Blacksburg Highway/Exit 100 before discharging into the Broad River. Approximately 2,447 lf of Buffalo Creek are within the PSA. Within the PSA, Buffalo Creek is approximately 60-120 feet wide with bank height of approximately 4-8 feet. During the site visit Buffalo Creek flowed with a moderate velocity and clarity was turbid. Aquatic life was not observed. Buffalo Creek is depicted on the USGS Topographic map as a perennial river.

In addition to Broad River and Buffalo Creek, 30 perennial stream reaches were identified, totaling 17,708 LF (17.26 acres) within the PSA. These systems exhibited a bed and bank with continuous flows. These systems also provide habitat for various aquatic species, including macro-invertebrates. A total of 24 seasonal stream reaches were identified totaling 6,921 LF (0.6088 acre). These systems also included a bed and bank but do not exhibit continuous flow. In addition, they systems generally do not support abundant aquatic biology due to flow patterns. A total of 34 intermittent stream reaches were identified totaling 7,777 LF (0.7113 acre) within the PSA. The intermittent reaches include various linear features that are not considered to be jurisdictional waters of the U.S. based on observed hydrologic conditions and indicators. However, the final status of these waters is dependent upon the jurisdictional determination and verification by the U.S. Army Corps of Engineers (USACE).

Four ponds totaling 0.706 acre were identified within the PSA. These were primarily agricultural features associated with local farming operations.

#### **4.2.2 What types of wetlands were identified within the PSA?**

Wetland habitats are defined as those areas that are inundated by water with sufficient frequency and duration to support vegetation that is tolerant of saturated soil conditions. The USACE utilizes specific hydrologic, soil, and vegetation criteria in establishing the boundary of wetlands within their jurisdiction. One method of assessing the value and function of wetlands is in terms of wildlife habitat. The U.S. Fish and Wildlife Service (USFWS) Resource Category criteria are outlined in the USFWS Mitigation Policy, 46 CFR 7644-7663. Resource categories and mitigation planning techniques are assigned based on the following criteria:



Category 1 - Communities of one-of-a-kind high value to wildlife, unique and irreplaceable on a national or eco-regional basis, habitat is not replaceable in kind based on present-day scientific and engineering skills within a reasonable time frame.

Category 2 - Communities of high value to wildlife, which are relatively scarce or are becoming scarce on a national, or eco-regional basis, habitat can be replaced in kind within a reasonable time frame based on present-day scientific and engineering skills.

Category 3 - Community types of high to medium wildlife value which are relatively abundant on a national basis, out-of-kind replacement is allowable if a tradeoff analysis demonstrates equivalency of substituted habitat type and/or habitat values. These sites are often in conjunction with a replenishing source.

Category 4 - Community types of low to medium wildlife value, generally losses would not have a substantial adverse effect on important fish and wildlife resources. These sites have often been affected by the present roadway or human disturbances and are usually isolated.

Potential wetland areas within the PSA were initially identified through evaluation of the available mapping resources (National Wetland Inventory, Aerial Photography, County/City GIS, Soil Survey, etc.). Upon further project development, specific wetland areas and boundaries were identified in the field through a combination of vegetation analysis, hydrological observations, and soil sampling. The field surveys identified 36 wetland areas totaling 7.05 acres within the PSA. These wetland areas primarily included palustrine forested and palustrine emergent wetland types as described below.

#### **Palustrine Forested Wetlands**

Dominant tree species within the forested wetlands (PFO1B) included but was not limited to; tulip poplar (*Liriodendron tulipifera*), white oak (*Quercus alba*), red maple (*Acer rubrum*), american sycamore (*Platanus occidentalis*), sweetgum (*Liquidambar styraciflua*), and water oak (*Quercus nigra*). The sapling/shrub stratum included but was not limited to; Box Elder (*Acer negundo*), Downy Poplar (*Populus heterophylla*), Green Ash (*Fraxinus pennsylvanica*), and Willow Oak (*Quercus phellos*). The herb stratum included; Blackberry (*Rubus sp.*), Sedges (*Carex sp.*), Common Cattail (*Typha latifolia*), and Japanese Honeysuckle (*Lonicera japonica*), among others. Primary and secondary wetland hydrology indicators included; surface water, water stained leaves, drainage patterns, and saturation. Hydric soil indicators including depleted matrix were also



observed in these wetland areas. In general, these areas are considered Category 3 and 4 resources.

### **Palustrine Emergent Wetlands**

The palustrine emergent wetlands (PEM2B) were dominated by sweetgum, common rush (*Juncus effusus*), blackberry, fescue (*Festuca sp.*), and marsh-fleabane (*Pluchea sp.*). Primary and secondary hydrology indicators included; surface water, water stained leaves, and micro-topographic relief. Hydric soil indicators, including depleted dark surface, and depleted matrix were also observed in the wetland.<sup>18</sup> In general, these areas are considered Category 4 resources.

### **4.2.3 What direct impacts would the project have on streams and wetlands?**

The proposed improvements would result in various unavoidable impacts to streams and wetlands. The following is a summary of the impacts associated with each element of the project:

- **Mainline:** The mainline improvement would result in approximately 317 LF of stream impact and 0.16 acre of wetland impact. The 317 LF of stream impacts include perennial, seasonal, and intermittent streams; however, the mainline would only impact 264 LF of jurisdictional waters (i.e. perennial and seasonal streams) would be impacted.
- **Exit 100:** The improvements along the Exit 100 would result in approximately 787 LF of stream impact with no impact to any wetland areas. The 787 LF of impact does not include any intermittent streams, and therefore includes only jurisdictional waters.
- **Exit 102:** The improvements along the Exit 102 would result in approximately 2,280 LF of stream impact and 0.001 acre of wetland impact. The 2,280 LF of stream impacts include perennial, seasonal, and intermittent streams; however, only 1,298 LF of jurisdictional waters (i.e. perennial and seasonal streams) would be impacted.
- **Exit 104:** The improvements along the Exit 104 would result in approximately 714 LF of stream impact and 0.1 acre of wetland impacts. The 714 LF of stream

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<sup>18</sup> Three Oaks Engineering. *Natural Resources Technical Memorandum: Proposed Interstate 85 (I-85) Widening & Interchange Improvements Project From Mile Marker 96 to Mile Marker 106, Cherokee County, SC.* December 2016.



impacts include perennial, seasonal, and intermittent streams; however, only 279 LF of jurisdictional waters (i.e. perennial and seasonal streams) would be impacted.

- **Exit 106:** The improvements along the Exit 106 would result in approximately 1,734 LF of stream impact and no wetland impacts. The 1,734 LF of stream includes impacts associated with perennial, seasonal, and intermittent streams; however, only 1,408 LF of jurisdictional waters (i.e. perennial and seasonal streams) would be impacted.

Table 7 shows the overall wetland and stream impacts resulting from the preferred alternative.

**Table 7. Impacts to Wetlands and Streams**

Roadway Element	Wetland Impacts (acres)	Stream Impacts (linear feet)
<b>Mainline</b>	0.16	317
<b>Exit 100</b>	0.0	787
<b>Exit 102</b>	0.001	2280
<b>Exit 104</b>	0.1	714
<b>Exit 106</b>	0.0	1734
<b>Totals</b>	<b>0.26</b>	<b>5832</b>

Executive Order 11990 – Protection of Wetlands was issued, in furtherance of the National Environmental Policy Act, in order to avoid impacts to wetlands wherever there is a feasible alternative. Therefore, Executive Order 11990 requires new construction in wetlands to be avoided unless there are no practicable alternatives to the impacts, and the project incorporates all practicable measures to minimize impacts. The assessment of the applicability of alternatives to wetland impacts and the incorporation of avoidance measures considers economic, environmental, and other pertinent factors. Therefore, wetlands were given special consideration during development and evaluation of the project in an attempt that the preferred design would pose the least disruption to wetlands other than the "No-Build" alternative, and the project complies with Executive Order 11990.

The preferred alternative for improving the mainline and various interchanges results in the least environmentally damaging practicable alternative in regards to jurisdictional waters of the U.S. (Table 4). Additional minimization measures would be incorporated with final project delivery, including the implementation of appropriate erosion control



measures, including but not limited to seeding of slopes, silt fences, and sediment basins. Other best management practices would be required of the contractor to ensure compliance with policies reflected in 23 CFR 650B. Unavoidable impacts would be appropriately permitted and mitigated according to the USACE regulation and guidelines. The preferred mitigation techniques would be the purchase of mitigation credits from an approved mitigation bank, followed by permittee-responsible mitigation. According to the USACE Regulatory In-lieu Fee and Bank Tracking System (RIBITS) there are two banks whose service areas include this corridor and have some available credits.

Based on the above considerations, it appears that there is no practicable alternative to the proposed new construction in these wetland areas; the proposed action would include all practicable measures to minimize harm to wetlands that may result from construction.

#### **4.2.4 What permits would be required to construct the project?**

As documented above, the proposed project would result in unavoidable impacts to 4,036 LF of jurisdictional tributaries and 0.26 acre of wetland. As such, a USACE permit, under Section 404 of the Clean Water Act, would be required for alteration and placement of fill material within the boundaries of jurisdictional waters along the project corridor. This activity would also require a 401 Water Quality Certification from SCDHEC, which is generally coordinated in conjunction with USACE permit. The project would also require prior authorization from the SCDHEC NPDES Stormwater Program for a construction site exceeding 1.0 acre through the State Sediment, Erosion, and Stormwater Management Program.

The permitting processes associated with these programs require extensive documentation in support of these impacts. This includes detailed documentation regarding avoidance and minimization techniques, along with compensatory mitigation to comply with the specific program regulations. As a result, these programs provide additional review and final approval of these impacts.

#### **4.3 How would the project affect water quality?**

The preferred alternative has the potential to impact water quality through both the quantity and quality of stormwater runoff. The proposed project would result in an increase in paved areas, or impervious areas. The majority of these increased paved areas would be along the median of the existing I-85 corridor. This would increase the amount of runoff due to the increase in impervious material. The proposed project also has the potential to impact the quality of the stormwater runoff through pollutant



loading from vehicular traffic. Water quality pollutants commonly associated with vehicular traffic include suspended solids, heavy metals, nutrients, and oil-and-grease. Short-term temporary impacts could occur during construction due to additional sedimentation and runoff which could lead to an increase in turbidity.

#### **4.3.1 What watershed(s) is the project located in?**

The PSA is located within the *Upper Broad River Basin* (03050105), with the majority of the PSA within the *Buffalo Creek Watershed* (03050105-08) along with the extreme northern portion located within the *Kings Creek Watershed* (03050105-09). The *Buffalo Creek Watershed* drains approximately 17,309 acres, with the majority of the area comprised of forested land (50.6%) or agricultural land (32.9%). The *Kings Creek Watershed* drains approximately 43,903 acres, with the majority of the area comprised of forested land (66.6%), followed by agricultural land (22.1%).<sup>19</sup> Buffalo Creek ultimately provides drainage throughout much of the PSA, and flows directly into the Broad River along the western portion of the project area.

#### **4.3.2 How are the waters classified?**

The S.C. Department of Health and Environmental Control (SCDHEC) is charged with establishing a system and rules for managing and protecting the quality of South Carolina's surface and ground water. This is accomplished through various regulations and programs within SCDHEC which establish official classified water uses for all waters of the State; rules/criteria for protecting classified water uses; and procedures for classifying water uses.

Regulation 61-69, *Classified Waters* provides a listed of all named waterbodies, classification, and locations. Further, Regulation 61-68, *Water Classifications & Standards* establishes water uses along with the rules and standards to protect these uses for all documented classified waters in South Carolina.

Through these regulations, SCDHEC classifies Broad River, Buffalo Creek, and King Creek as "Freshwaters (FW)", which are: "suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of SCDOT. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of flora and fauna."<sup>20</sup> As

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<sup>19</sup>SCDHEC,

<http://www.scdhec.gov/HomeAndEnvironment/Water/Watersheds/WatershedMap/BroadWatershed/>

Last Accessed October 23, 2016.

<sup>20</sup>SCDHEC, *R.61-68, Water Classifications & Standards, Effective June 27, 2014.*

<http://www.scdhec.gov/Agency/docs/water-reqs/R.61-68.pdf>. Last Accessed October 26, 2016.



such, there are certain water quality parameters and standards the must be maintained to support the documented aquatic life and recreation uses for these freshwaters, which are documented in Regulation 61-68.

### 4.3.3 Are the waters currently impaired?

As required by Section 303(d) of the Clean Water Act, all states must develop and maintain a list of waterbodies that do not meet water quality standards. In South Carolina, SCDHEC is currently responsible for this list. As such, SCDHEC develops and publishes the Section 303(d) List of Impaired Waters for South Carolina. Per the Environmental Protection Agency (EPA), this list must be developed every two years and approved by EPA prior to final publication.<sup>21</sup> An integral part of this process is SCDHEC Water Quality Monitoring Program which is responsible for the monitoring and assessment of water quality. SCDHEC publishes the *State of South Carolina Monitoring Strategy* annually, which includes the details regarding the various monitoring programs, and the compliance with various federal and state requirements.<sup>22</sup>

SCDHEC maintains two water quality monitoring sites and one aquatic biological monitoring site within the vicinity of the PSA. This includes Station B-042, located along the Broad River at S-18 (Shelby Highway); Station B-057, located along Buffalo Creek at Blacksburg Highway; and Station B—740 located along Bee Branch at SC 198 along Buffalo Creek near Blacksburg, SC.

According to the 2014 303(d) List, Station B-042 and Station B-057 are located within an approved total maximum daily load (TMDL) watershed (Note: The 2016 303(d) list has yet to be approved as of February 2017). Specifically, these stations were historically listed as impaired for recreation use (i.e. swimming) for elevated levels of *Fecal coliform* bacteria.<sup>23</sup> SCDHEC established a TMDL for the Upper Broad River Watershed in 2004. The TMDL is a detailed study and modeling of pollutant loading, and establishes the level of pollutant reduction needed to be removed from “impairment” status. The TMDL study for the Upper Broad River Watershed documents a 48-86% reduction in *F. coliform* bacteria within the watershed, with specific reductions of 68% for Station B-042 and 72% for Station B-057. Sources of *F. coliform* include both

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<sup>21</sup> SCDHEC, <http://www.scdhec.gov/HomeAndEnvironment/Water/ImpairedWaters/>. Last Accessed October 26, 2016.

<sup>22</sup> SCDHEC, <http://www.scdhec.gov/HomeAndEnvironment/Water/MeasuresSurface/>. Last Accessed October 26, 2016.

<sup>23</sup> SCDHEC, [http://www.scdhec.gov/HomeAndEnvironment/Docs/tmdl\\_14-303d.pdf](http://www.scdhec.gov/HomeAndEnvironment/Docs/tmdl_14-303d.pdf). Last Accessed October 26, 2016.



point and non-point sources including, but not limited to facility discharges, agricultural practices, wildlife, septic tank failures, and urban runoff.<sup>24</sup>

#### **4.3.4 How would the project address impacts to water quality?**

The potential impacts (during and upon construction) of the proposed project on the surrounding water quality would be evaluated through Section 401 of the Clean Water Act, which is administrated through SCDHEC's Section 401 Water Quality Certification Program. The proposed project would likely require a 401 Water Quality Certification from SCDHEC, in conjunction with a Section 404 permit from the U.S. Army Corps of Engineers. As part of the 401 Certification, SCDHEC would assess the potential impacts of the proposed project on water quality, and ensure compliance with water quality standards and classified uses.

In addition, the Clean Water Act, as amended, regulates stormwater discharges from construction sites greater than 1 acre through the National Pollutant Discharge Elimination System (NPDES) Stormwater Program. In South Carolina, SCDHEC is responsible for administering this program. SCDOT is considered a Municipal Separate Storm Sewer System (MS4), and therefore has been issued a NPDES Permit (i.e. No. SCS040001) by SCDHEC for stormwater discharges. However this permit consists of detailed requirements and conditions that must be maintained, including the development and implementation of a Stormwater Management Program (SWMP). As part of the SWMP, the SCDOT has developed the *Stormwater Quality Design Manual* (SWQDM) which provides specific requirements and NPDES permitting processes for SCDOT construction projects; stormwater management related to post-construction water quality control; and design guidelines and best management practices (BMPs) to be implemented on SCDOT projects.<sup>25</sup>

These programs would ensure that the potential impacts would be avoided and minimized through the use of BMPs, including installation of silt fences, grassed swales, ditch checks, temporary sediment basins, seeding, and other similar practices. This includes TMDL compliance plans for *F. coliform* bacteria, which achieves the waste load allocations (WLA) defined in the TMDL.<sup>26</sup> The contractor would also be required to minimize potential impacts through implementation of construction best management

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<sup>24</sup> SCDEHC, [http://www.scdhec.gov/HomeAndEnvironment/Docs/tmdl\\_ubroad\\_fc.pdf](http://www.scdhec.gov/HomeAndEnvironment/Docs/tmdl_ubroad_fc.pdf). Last Accessed October 26, 2016.

<sup>25</sup> SCDOT *Stormwater Quality Design Manual*, December 2014

<sup>26</sup> SCDOT, [http://www.scdot.org/doing/technicalPDFs/SCDOT\\_SWQDM.pdf](http://www.scdot.org/doing/technicalPDFs/SCDOT_SWQDM.pdf). Last Accessed October 26, 2016.



practices, reflecting policies contained in 23 CFR 650 B and SCDOT's *Supplemental Specifications on Seeding and Erosion Control Measures* (latest edition).

#### **4.4 Would the project impact any regulated floodplains?**

The Federal Emergency Management Agency (FEMA) regulates floodplains that are prone to inundation at some frequency. In general, a flood that has a 1% chance of occurring in a given year is referred to as the "100 year flood". The floodplains that would be inundated by the 100 year flood are considered to be the 100 year floodplains. A "Zone AE" floodplain is considered the base 100 year floodplain where base flood elevations (BFE) are provided from computer modeling. A "Zone A" is considered a floodplain that is expected to be inundated, but with no established BFEs. These areas are depicted of Flood Insurance Rate Maps (FIRM) published by FEMA to illustrate the various flood hazards areas.

There are various federal, state, and local laws and regulations regarding the protection and management of regulated floodways and floodplains. This includes Executive Order 11988 (Floodplain Management), and 23 CFR 650 subpart A which requires federal agencies to avoid, where possible, adverse impacts to floodplains. EO 11988 was subsequently amended by EO 13690 in January 2015, and establishes a Federal Flood Risk Management Standard (Standard). This Standard ultimately protects against flooding and preserves the natural values and functions of floodplains.

Based on FIRMs published along PSA, the proposed project would involve construction within the existing 100-year flood limits of adjacent waters. The FIRMs 45021C0180D and 45021C0070D, both effective September 11, 2011, document special flood hazard areas associated with the Broad River and Buffalo Creek.<sup>27</sup> These areas are illustrated on Figures 20-27.

##### **4.4.1 What floodplains are located within the PSA?**

The applicable FIRMS were evaluated to determine and identify regulated floodplains within the PSA. This evaluation determined the following regulated floodplains:

###### *Broad River (FIRM 45021C0180D)*

Available mapping indicates a "Zone A" floodplain associated with the Broad River that crosses under I-85 approximately 1.5 mile southwest of Exit 100. An approximate 650-foot long bridge structure carries I-85 northbound and southbound traffic over the Broad River, and appropriately accommodates conveyance and maintenance of the floodplain.

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<sup>27</sup> FEMA Map Service Center; <https://msc.fema.gov>. Accessed February 22, 2016.



*Buffalo Creek (FIRM 45021C0070D, 45021C0180D)*

Available mapping indicates “Zone A” and “Zone AE” floodplains and floodway associated with Buffalo Creek located within the PSA. Buffalo Creeks flows under I-85 approximately 2,000 feet northeast to Exit 100, and ultimately crosses under Blacksburg Highway and parallels I-26 prior to flowing into the Broad River. An approximate 650-foot long bridge structure carries I-85 northbound and southbound traffic over Buffalo Creek, and appropriately accommodates conveyance and maintenance of the floodplain. In addition, the SCDOT is currently constructing a new 390-foot long bridge along Blacksburg Highway over Buffalo Creek. The new structure is designed to appropriately convey and maintain the regulated floodway and floodplain along this area.

**4.4.2 What are the impacts to floodplains and how are they studied?**

The I-85 mainline currently crosses regulated floodways and floodplains associated with Broad River and Buffalo Creek. The mainline currently includes bridge structures at these crossings to accommodate and maintain adequate conveyance for these systems. In addition, the existing bridges can accommodate the proposed travel lanes without any major construction and modifications to the structure. Therefore the proposed improvements along the mainline would not result in any direct floodplain impacts.

The reconstruction of Exit 100 would result in direct impacts to “Zone A” floodplains associated with Buffalo Creek. Specifically, the proposed relocation of the I-85 northbound off-ramp and on-ramp would impact 0.9 acres of floodplain.

To comply with these EO, appropriate hydraulic analysis would be conducted for each encroachment of a FEMA-regulated floodplain. The hydraulic analysis is used to determine if the project is likely to increase the risk of flooding within the floodplain. In order to meet the requirements of a “No-Rise” condition, FEMA requires projects which would encroach on Regulated Floodways and Zone AE floodplains to result in a change no greater than 0.1 feet from the established 100-year flood elevations. Furthermore, SCDOT requires all Zone A crossings to be analyzed for the 100-year flood to ensure that the floodplain encroachment does not cause one (1) foot or more of backwater when compared to unrestricted or natural conditions.

Preliminary hydraulic analysis has been completed, and is documented in The “South Carolina Department of Transportation – Location and Hydraulic Design of Encroachments of Floodplains Checklist” included in Appendix D. A final detailed hydraulic analysis would also be conducted during final design development, and would



be performed per the *SCDOT Requirements for Hydraulic Design Studies*.<sup>28</sup> These studies would more precisely determine the effects of the project on the base floodplains. However, based on a preliminary evaluation, the proposed project is anticipated to require a CLOMR. The final analysis and preparation of a CLOMR would require coordination with FEMA and the Cherokee County floodplain manager.

#### **4.5 What impacts would the project have on terrestrial and aquatic wildlife?**

The proposed project was evaluated to determine any potential impacts to terrestrial and aquatic wildlife. These impacts are expected to be minimal as much of the PSA is heavily disturbed by the existing transportation facilities and commercial development. Although the PSA is heavily developed, there is sparse undeveloped land and habitat that provides minimal habitat for aquatic or terrestrial wildlife. Terrestrial wildlife habitat along the PSA includes cutover/successional forest, mixed pine forest, piedmont alluvial forest, bottomland hardwood forest, and mesic mixed hardwood forest. These communities are frequented by various common mammals, bird, and reptile species. The PSA also includes various rivers, streams, ponds, and wetlands that provide habitat for numerous common fish, reptiles, and macro-invertebrates.

The proposed improvements would be largely constructed within and/or immediately adjacent to the existing transportation facilities. As such, the project is expected to require approximately 85 acres of new right-of-way that would directly adjoin the existing right-of-way. The areas of new right-of-way may maintain isolated areas of the forested habitat, but the majority of the area would be directly converted to transportation facilities or be subject to routine maintenance and access. However, the potential loss of terrestrial habitat would be along the edge of the existing roadways, which would not create further fragmentation of the undeveloped land.

The project would result in the direct loss of approximately 5,832 LF of aquatic habitat through the filling, piping and/or armoring of existing open tributary systems. Many of these systems have been previously altered from their historic state; however, they may provide suitable habitat for various aquatic species, including, but not limited to, aquatic macro-invertebrates, amphibians, reptiles, and fish. These impacts would be isolated along portions of the tributaries with additional suitable habitat provided upstream and/or downstream of the impacts. The stream habitat to be impacted is not

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<sup>28</sup> SCDOT, <http://www.scdot.org/doing/technicalPDFs/hydraulic/requirements2009.pdf>. Last accessed October 31, 2016.



considered a rare or unique habitat, and there are no listed species dependent upon this habitat. In addition, the species associated with these streams are highly mobile (i.e. fish) and abundant due to the availability of this aquatic habitat.

#### 4.6 How could the project affect Threatened or Endangered Species?

Pursuant to Section 7 of the Endangered Species Act of 1973, a field survey of the PSA was conducted by Department representatives in 2015 and 2016 that coincided with the optimal survey time for each species. The following lists of endangered (E) and threatened (T) species for Cherokee County were obtained from the U.S. Fish and Wildlife Service (USFWS) (last updated August 2015):

**Table 8. Threatened and Endangered Species**

<u>Animals</u>	<u>Federal Status</u>
<i>Myotis septentrionalis</i> (Northern long-eared bat)	Threatened
<u>Plants</u>	
<i>Hexastylis naniflora</i> (Dwarf-flowered heartleaf)	Threatened
<i>Symphotrichum georgianum</i> (Georgia aster)	Candidate

SCDOT representatives conducted appropriate literature research and field investigations regarding the potential presence of any threatened or endangered species within the PSA. A *Natural Resources Technical Memorandum* (NRTM) was prepared to document the methods and findings of this review. A description of the listed species and habitat requirements are documented below. The project is currently being coordinated with the USFWS so the effects determination is currently unresolved.

##### Northern Long-Eared Bat (*Myotis septentrionalis*)

The northern long-eared bat (NLEB) is a medium-sized bat about 3 -3.7 inches in length with a wingspan of 9-10 inches. Its fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. The bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*. NLEB emerges at dusk to feed in the understory of forested hillsides and ridges. They hunt moths, flies, leafhoppers, caddisflies, and beetles using echolocation, but have been known to glean motionless insects from vegetation and water surfaces.

NLEB roosts singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees during summer months. It does not appear to show a species preference for tree roosts instead choosing trees opportunistically based on bark retention,



cavities, and crevices. Non-reproductive females and males may also roost in cooler places like caves and mines during the summer.<sup>29</sup>

On January 14, 2016, the US Fish and Wildlife Service (USFWS) published in the Federal Register the Final 4(d) rule, which “focuses prohibitions on protecting [northern long-eared] bats when and where they are most vulnerable: maternity roost trees during June and July pup-rearing and at hibernation sites” (USFWS 2016). On May 3, 2016, SCDOT consulted with USFWS to revise its prior commitment to eliminate the restriction on clearing of trees greater than 3 inches in diameter between November 15 and March 31. USFWS concurred on May 4, 2016.

Based on coordination with the USFWS, the USFWS determined that potentially suitable habitat exists in the project area for the NLEB but the project is not located within 150 feet of a known NLEB maternity roost tree or within 0.25 miles of a known NLEB hibernaculum. Therefore, potential take of this species through project construction is not prohibited according to the final 4(d) rule for the species.

Therefore, there are no restrictions on the clearing of trees associated with the Northern long-eared bat.

#### Dwarf-flowered Heartleaf (*Hexastylis naniflora*)

Dwarf flowered heartleaf is a low growing, evergreen, perennial plant with dark green, leathery, heart shaped leaves that are 4-5 inches long supported by long thin stems connected to an underground stem. Flowers are jug-shaped, found near the base of leaf stems, and range from beige to dark brown to purple; they are inconspicuous and often buried beneath leaf litter. Superficially, Dwarf-flowered Heartleaf is known to closely resemble *H. minor* and *H. heterophylla*. A combination of floral and vegetative morphology and habitat characteristics must be used to accurately identify Dwarf-flowered Heartleaf. Dwarf-flowered Heartleaf almost exclusively occurs over acidic, sandy loam soils on north-facing slopes.

Dwarf-flowered heartleaf is endemic to the western Piedmont and foothills of North and South Carolina. This herbaceous evergreen is found in moist to rather dry forests along bluffs; boggy areas next to streams and creek heads; and adjacent hillsides, slopes, and ravines. Requiring acidic, sandy loam soils, the species is found in soil series such as Pacolet, Madison, and Musella, among others. Occurrences are generally found on a north facing slope. Undisturbed natural communities such as Piedmont/Coastal

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<sup>29</sup> U.S. Fish and Wildlife Service (USFWS) Environmental Conservation Online Systems (ECOS). 2015. Northern Long-eared Bat (*Myotis septentrionalis*). Accessed November 10, 2015. [http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?spcode=A0JE](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE)



Plain Heath Bluff, Dry-Mesic Oak Hickory Forest, and Mesic Mixed Hardwood Forest hold the most viable occurrences. However, less viable remnant occurrences are found in disturbed habitats, including logged, grazed, mown, and residential/commercial developed lands; areas converted to pasture, orchards, and tree plantations; roadside rights-of-way; and on upland slopes surrounding manmade ponds or lakes.<sup>30</sup>

Dwarf-flowered heartleaf surveys were conducted within the original 905 acre PSA on March 29 and April 5, 2016. The survey consisted of traversing all suitable habitat within the PSA for the presence/absence of Dwarf-flowered heartleaf. Representative *Hexastylis* specimens were then identified to species level, and dwarf-flowered heartleaf was not found in the PSA. After this survey, this PSA was increased to 1,065 acres during development of the alternatives to ensure adequate coverage and data collection for alternative analysis. The additional area was assessed in August 2016, with the identification of suitable habitat. *Hexastylis* sp. was also observed in the expanded PSA, but could not be identified to species level. Since this was outside the optimal survey period, these areas were recorded and mapped. However, the newly identified areas were outside of the construction limits of the preferred alternative, and would not impact these areas where *Hexastylis* sp. was observed. Therefore, it was recommended that the project would have a “no effect” on the dwarf-flowered heartleaf. An additional survey within the USFWS survey window (i.e. March to May) would be required if the preferred alternative is modified and results in impacts to the newly identified areas (Figures 20-27).

#### Georgia Aster (*Symphyotrichum georgianum*)

Georgia aster is a rhizomatous perennial herb, reaching heights of 17-32 inches. It commonly forms colonies and is capable of extensive clonal growth/clumping. Its dark purple ray flowers (up to 0.8 inches long) surround white disc florets. Individual heads, from ray tip to ray tip, can reach 2 inches in diameter. It has thick, lanceolate to oblanceolate, scabrous, clasping leaves. Georgia aster can be distinguished from other similar asters by its involucre, which can be nearly 0.5 inches high.

Georgia aster is found in dry open woods, roadsides, and other openings. Soils vary from sand to heavy clay, with pH ranging from 4.4 to 6.8. It is a good competitor during early succession but declines as it is shaded by woody species. Georgia aster is most likely a relict species of the post oak savannah/prairie communities that covered much of the

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<sup>30</sup> U.S. Fish and Wildlife Service (USFWS). 2011. Dwarf-flowered Heartleaf (*Hexastylis naniflora*). Accessed November 10, 2015. [http://www.fws.gov/raleigh/species/es\\_dwarf-flowered\\_heartleaf.html](http://www.fws.gov/raleigh/species/es_dwarf-flowered_heartleaf.html)



southeast prior to the extirpation of large native grazing animals and widespread fire suppression. As of 2013, 146 populations are known to occur in the Southwest, 28 of which are considered extirpated or historical.<sup>31</sup> Georgia aster was found within the PSA along a stream north of I-85 near Shaman Road, outside of the existing mainline corridor. The Preferred Alternative alignment would not impact this area at this time, as it is outside of the construction limits. Candidate species do not currently receive statutory protection under the ESA; thus an effect determination was not completed. Should this species become listed, or if the final design of the preferred alternative changes in this area, SCDOT and/or FHWA would need to conduct additional consultation with the USFWS.

Based on the NRTM, the SCDOT and FHWA recommended that the proposed action would have no effect on resources under the jurisdiction of the USFWS that are currently protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). This information was sent to the USFWS on January 9, 2017 and is currently under review. For more detailed coordination, refer to Appendix K.

#### **4.7 What are prime farmlands and would the project impact these areas?**

The PSA has been evaluated with regard to the Farmland Protection Policy Act (FPPA) of 1981. Through the use of county farmland listings provided by the Natural Resources Conservation Service (NRCS), it has been determined that the PSA would involve lands protected under the Act. Altavista fine sandy loam, Madison and Cecil sandy loams, State fine sandy loam, and Wickman sandy loam are identified as “prime farmland” by the NRCS. In addition, Appling sandy loam, Davidson loam, Nason very fine sandy loam, and Tatum are identified “farmland of statewide importance”.<sup>32</sup> A Farmland Conversion Impact Rating Form SCS-CPA-160 has been completed for the project corridor. The form provides a site assessment scoring system with criteria for evaluating adverse effects of projects on the protection of farmland. Sites receiving highest scores up to a maximum of 260 are considered most suitable for protection while those with lowest scores are considered least suitable. Sites receiving scores less than the maximum allowable score of 160 are to be given minimal consideration for protection. The score computed for this proposed action was 157. As the total points are less than 160, neither

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<sup>31</sup> NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>. (Accessed: November 11, 2015).

<sup>32</sup> NRCS. Web Soil Survey 2.2. <http://websoilsurvey.nrcs.usda.gov/>. Accessed March 1, 2016.



consideration of alternative sites nor additional studies for the study area are required under the Act. A copy of the Farmland Conversion Impact Rating Form is included in Appendix E.

#### **4.8 How would the project affect air quality?**

The project was evaluated with regard to the Clean Air Act Amendments of 1990. These amendments identify six criteria pollutants (ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, and lead), along with the National Ambient Air Quality Standards (NAAQS) for each pollutant. The Environmental Protection Agency (EPA) designates geographical areas that have pollutant concentrations below the NAAQS as these pollutants vary, but automotive vehicles are considered a source for four (ozone, particulate matter, nitrogen oxides, and carbon monoxide) of the criteria pollutants. A review of current air quality data determined that the EPA has designated Cherokee County 'in attainment' for the criteria pollutants, and in compliance with the NAAQS.<sup>33</sup>

The proposed project is not expected to require any additional transportation control strategies to maintain the County's current attainment status, and the project is anticipated to be consistent with the State Air Quality Implementation Plan (SIP). However, the proposed project must be continually evaluated throughout project development to ensure compliance with the most current air quality regulations and attainment status.

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

##### **4.8.1 What are Mobile Source Air Toxics?**

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

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<sup>33</sup> U.S. EPA website. <https://www.epa.gov/green-book>. Last Accessed December 6, 2016.



It is anticipated that the proposed project would have low potential for impacts to MSAT emissions. Due to the limited tools and techniques for assessing project-specific health impacts, the following evaluation includes a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, along with a qualitative assessment of emission projections associated with the proposed project. The MSAT evaluation is based on recent updated guidance from FHWA, and includes prototype language described at FHWA's web site and included in Appendix F.<sup>34</sup>

#### **4.8.2 What type of air quality analysis would be necessary for the project?**

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at: [www.fhwa.dot.gov/environment/air\\_quality/air\\_toxics/research\\_and\\_analysis/mobile\\_source\\_air\\_toxics/msatemissions.cfm](http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm).

For each build alternative in this EA, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each of the Build Alternatives is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. Refer to Table 9 regarding the VMT for the preferred alternative. This increase in VMT would lead to higher MSAT emissions for the preferred alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to the Environmental Protection Agency's (EPA) MOVES2014 model, emissions of all of the priority MSAT decrease as speed increases. Because the estimated VMT under each of the alternatives are nearly the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050 (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway

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<sup>34</sup>FHWA, [http://www.fhwa.dot.gov/environment/air\\_quality/air\\_toxics/policy\\_and\\_guidance/msat/index.cfm](http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/index.cfm). Last Accessed December 6, 2016.



Administration, October 12, 2016). Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

**Table 9. Vehicle Miles Traveled (VMT)**

Roadway Segment	AM	PM
I-85 Study Area	2,929,133	4,588,853

### 4.8.3 What are the impacts to greenhouse gas emissions?

Greenhouse gases (GHGs) are those that trap heat in the atmosphere of the Earth, and include carbon dioxide, methane, nitrous oxide, and fluorinated gases.<sup>35</sup> According to the U.S. Environmental Protection Agency (USEPA), the most common of the GHGs is carbon dioxide (CO<sub>2</sub>), which accounted for almost 81% of all U.S. GHG emissions due to human activities in 2014. The combustion of fossil fuels, land use changes, as well as some industrial processes are the main emission generators of greenhouse gases.<sup>36</sup> In 2014, the transportation sector was responsible for almost 27% of the CO<sub>2</sub> emissions in the US.<sup>37</sup> Because GHGs trap heat in the atmosphere, the outcome has been a warming of the Earth’s temperature, which has led to a change in the climate of the Earth, resulting in more extreme weather events, melting of glaciers, and sea level rise.<sup>38</sup>

On August 2, 2016, the Council on Environmental Quality (CEQ) issued *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*. While this guidance does not legally require agencies to mitigate for impacts to the climate due to GHG emissions, it does direct agencies to disclose the potential amounts of GHG being released due to the agency’s action, as well as the agency’s influence on climate change.

<sup>35</sup> USEPA, “GHG Overview,” <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>. (Last accessed 1/5/17).

<sup>36</sup> USEPA, “GHG Overview,” <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>. (Last accessed 1/5/17).

<sup>37</sup> USEPA, “Greenhouse Gas Inventory Data Explorer,” <https://www3.epa.gov/climatechange/ghgemissions/inventoryexplorer/#allsectors/allgas/econsect/current>. (Last accessed 1/5/17).

<sup>38</sup> USEPA, “Climate Change Basic Information,” <https://www.epa.gov/climatechange/climate-change-basic-information>. (Last accessed 1/5/17).



#### 4.8.4 What are the results of the GHG analysis?

For this project, the operations, fuel cycle, and construction/maintenance emissions were estimated. A GHG Analysis was completed for the No-build Alternative and the Reasonable Alternatives, and included the emissions from constructions, operations, and fuel cycle. Operations and fuel cycle emissions were determined for the No-build, Reasonable, and Preferred Alternatives using lookup tables from the Motor Vehicle Emission Simulator (MOVES2014a) provided by the FHWA. The assumptions used for this analysis can be found in Appendix G. The results of the analysis are shown below in Table 10. The amount of CO<sub>2</sub>e emitted would be expected to decrease with the advent of better technologies between now and 2040, as noted in the table.

**Table 10. Estimated GHG Operations and Fuel Cycle Emissions, CO<sub>2</sub>e**

Year	Metric Tons of CO <sub>2</sub> e/year
2015 Existing Conditions	100,261.85
2040 No Build Conditions	96,922.00
2040 Build Conditions	111,463.00

To determine the construction and maintenance emissions over the lifespan of the project, the FHWA’s Infrastructure Carbon Estimator (ICE) Tool was used. The ICE Tool can be used to create estimates of energy usage and GHG emissions for a life-cycle of a project, including construction/rehabilitation and routine maintenance. However, it should be noted that this tool is not appropriate to inform engineering analysis and pavement selection.<sup>39</sup> The assumptions used for the ICE Tool are included in Appendix G. The results below in the tables include both annualized energy use (Table 11) and annual GHG emissions (Table 12), per year over the 25-year analysis cycle (2040), and include both unmitigated and mitigated scenarios.

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<sup>39</sup> FHWA, “Infrastructure Carbon Estimator Final Report and User’s Guide,” September 2014, [https://www.fhwa.dot.gov/environment/climate\\_change/mitigation/tools/carbon\\_estimator/users\\_guide/page00.cfm](https://www.fhwa.dot.gov/environment/climate_change/mitigation/tools/carbon_estimator/users_guide/page00.cfm). (Last accessed 1/5/17.)



Table 11. Annualized Energy Use (MMBTUs) Per Year over 25 Years

	Unmitigated						Mitigated					
	Roadway New Construction	Roadway Rehabilitation	Roadway - Total	Bridges	Rail, Bus, Bicycle, And Pedestrian	Total	Roadway New Construction	Roadway Rehabilitation	Roadway - Total	Bridges	Rail, Bus, Bicycle, and Pederstians	Total
Upstream Energy												
Materials	10,859	4,109	14,968	253		15,221	10,859	3,436	14,295	253		14,295
Direct Energy												
Construction Equipment	4,096	475	4,571	91		4,662	4,096	397	4,493	91		4,493
Routine Maintenance						883						883
<b>Total</b>	<b>14,955</b>	<b>4,584</b>	<b>19,539</b>	<b>344</b>		<b>20,766</b>	<b>14,955</b>	<b>3,833</b>	<b>18,788</b>	<b>344</b>		<b>20,015</b>

Table 12. Annual GHG Emissions (MT CO<sub>2</sub>E) Per Year over 25 Years

	Unmitigated						Mitigated					
	Roadway New Construction	Roadway Rehabilitation	Roadway - Total	Bridges	Rail, Bus, Bicycle, And Pedestrian	Total	Roadway New Construction	Roadway Rehabilitation	Roadway - Total	Bridges	Rail, Bus, Bicycle, and Pederstians	Total
Upstream Emissions												
Materials	693	236	929	22		929	693	202	895	22		894
Direct Emissions												
Construction Equipment	299	35	334	7		334	299	30	329	7		329
Routine Maintenance						65						65
<b>Total</b>	<b>992</b>	<b>271</b>	<b>1,263</b>	<b>29</b>		<b>1,357</b>	<b>992</b>	<b>232</b>	<b>1,224</b>	<b>29</b>		<b>1,318</b>



#### **4.8.5 What is the impact of the project on climate change?**

Climate change is not likely to impact the proposed project, as it is not located in a coastal area or in a floodplain area that would be susceptible to sea level rise. Thus, no resiliency measures have been incorporated into the Preferred Alternative at this time.

### **4.9 What is traffic noise and why is it necessary to analyze noise impacts?**

As stated in 23 CFR, §772.5(h), a traffic noise analysis is required for proposed Federal-aid highway projects that would construct a highway on new location or physically alter an existing highway, which would significantly change either the horizontal or vertical alignment of the road or increase the number of through-traffic lanes. As such, a detailed traffic noise analysis was conducted along the project corridor to identify potential noise impacts associated with the preferred alternative. The noise analysis and subsequent noise abatement evaluation were conducted in accordance with 23 CFR Part 772 and the current SCDOT Traffic Noise Abatement Policy.

#### **4.9.1 How was traffic noise evaluated for this project?**

An analysis was performed to determine the effect of the proposed project on traffic noise levels in the immediate area. This investigation included an inventory of existing noise sensitive land uses, and a field survey of background (existing) noise levels in the project study area. It also included a comparison of the predicted noise levels and the background noise levels for all reasonable alternatives to determine if traffic noise impacts could be expected resulting from the proposed project. Based on the results of the analysis, traffic noise impacts are predicted for this project.

Due to substantial differences in traffic volumes on the mainline between the four interchanges, the traffic analysis divided the project into four noise analysis areas to better capture the traffic volumes for each section. The noise analysis areas are described in detail in the “*I-85 Traffic Noise Analysis Report*” included in Appendix H.

As described in 23 CFR Part 772, the FHWA has established Noise Abatement Criteria (NAC) in evaluating traffic noise impacts associated with the existing and predicted noise levels. The NAC are identified and described in Table 13.

Traffic noise impacts are defined in 23 CFR §772.5(g), and occur when the predicted noise levels approach or exceed the NAC for the applicable activity code or when the predicted noise levels substantially exceed the existing noise levels.



**Table 13. NAC Categories and Description**

Activity Category	Activity Criteria <sup>2</sup>		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its purpose.
B <sup>3</sup>	67	70	Exterior	Residential
C <sup>3</sup>	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E <sup>3</sup>	72	75	Exterior	Motels, hotels, offices, restaurant/bars, and other developed lands, properties or activities not included in A-D or F.
F	--	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	--	--	Undeveloped lands that are not permitted.

<sup>1</sup> Either Leq(h) or L10(h) (but not both) may be used on a project

<sup>2</sup> The Leq(h) and L10(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures

<sup>3</sup> Includes undeveloped lands permitted for this activity category

The SCDOT Traffic Noise Abatement Policy (2014) defines “approaching” as noise levels within 1dBA of the NAC, and a “substantial” increase as 15dBA increase or greater. Therefore, traffic noise impacts occur when a receiver is within 1 dBA of the NAC for the applicable activity code, or when the predicted noise levels are greater than 15 dBA over the existing noise levels.



#### 4.9.2 What noise impacts were identified?

The FHWA Traffic Noise Model 2.5 was utilized to analyze the existing and predicted noise levels associated with the project. Noise measurements along with the corresponding traffic volumes were taken in the field at eight locations along the PSA (Table 14). The model was run utilizing the observed traffic volumes from the field, and the modeled noise levels were compared to the field measurements. The difference between field measured and calculated noise levels at 7 of 8 locations is less than 3 dBA, validating the results of the TNM model. The one location that didn't validate was an unoccupied farm house located approximately 800 feet from the interstate. Validation becomes more difficult as the distance between the noise source and validation site increases. For receiver distances greater than 300 feet from the source, atmospheric effects have a much greater influence on measured sound levels.<sup>40</sup>

A total of 114 receivers were analyzed in the existing, no-build, and build conditions.

**Table 14. Existing TNM Field Measurements vs. Calculated Noise Levels**

Site Receiver	Location	Field Measurement Noise Level (dBA)	TNM Calculated Noise Level (dBA)	Difference (dBA)
1	1319 Blacksburg Highway	58.9	60.5	1.6
2	338 Henson Road	66.7	69.5	2.8
3	360 Shaman Road	62.2	65.1	2.9
4	108 White Farm Road	54.5	48.8	5.7
5	248 Cherokee Creek Road	64.2	66.3	2.1
6	571 White Farm Road	65.3	65.8	0.5
7	148 Mulberry Road	60.5	62.4	1.9
8	161 Poplar Drive	63.9	64.8	0.9

The noise analysis determined the ambient noise levels for existing conditions, and predicted future traffic noise levels for the 'build' and 'no-build' conditions. A summary of the findings is included as Table 15, with detailed findings including in Appendix H.

<sup>40</sup> <https://www.fhwa.dot.gov/environment/noise/measurement/mhrn00.cfm>. Last accessed on February 3, 2017.



**Table 15. Summary of Noise Analysis**

	Noise Levels Range (dBA)	Number of Impacted Receivers		
		B	C	E
Existing Conditions	55-78	30	2	8
2040 No-Build Conditions	56-78	35	2	11
2040 Build Conditions	57-79	36	2	11

Source: "I-85 Traffic Noise Analysis Report". December 2016.

As shown, the existing conditions noise levels range from 55-78 dBA with 40 receivers impacted. These receivers are impacted due to noise levels approaching or exceeding the NAC, and include single family residential, commercial, and churches.

The noise levels calculated for the 2040 no-build conditions range from 56-78 dBA, with 48 receivers predicted to be impacted. These receivers are impacted due to noise levels approaching or exceeding the NAC, and include single family residential, commercial, and churches.

The noise levels calculated for the 2040 Build conditions range from 57-79 dBA, with 49 receivers predicted to be impacted. These receivers are impacted due to noise levels approaching or exceeding the NAC. The impacted receivers include single family residential, commercial, and churches, and are included in the *I-85 Traffic Noise Analysis Report* in Appendix H.

In addition, temporary noise impacts are expected to occur during construction, and would be isolated within the immediate vicinity of the construction activities. The exact noise levels cannot be predicted because the specific types of construction equipment, and methods and schedule, are unknown at this time. To minimize construction noise, the contractor would be required to comply with the *SCDOT 2007 Standard Specifications for Highway Construction*, which includes specifications regarding nuisance noise avoidance. Potential minimization strategies would include work-hour limits, equipment muffler requirements, location of haul roads, community rapport, and complaint mechanisms.

#### **4.9.3 Would noise abatement measures be necessary to mitigate noise impacts?**

An evaluation of the project corridor was completed to determine any areas that included high densities of impacted receivers that may warrant barrier analysis. Four



sites were identified for barrier analysis. In addition, a sample barrier analysis was completed for single isolated receiver and two receiver sites.

The noise analysis prepared for this project is included in Appendix H, and includes the detailed analysis and findings supporting this determination. In addition, as required by 23 CFR §772.117, SCDOT will provide the local planning officials with the appropriate noise impact information to aid in the planning and minimization of noise impacts on adjacent projects.

#### **4.10 What types of contaminated sites were identified and will the project impact any of these areas?**

Hazardous waste/material sites are regulated by the Resource Conservation and Recovery Act (RCRA), as amended, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and the Superfund Amendments and Reauthorization Act of 1986 (SARA). A Phase I Environmental Site Assessment (ESA) was conducted to identify any Recognized Environmental Conditions (RECs) within or in proximity to the PSA. RECs include, but are not limited to possible sites involving the presence and/or past use of underground storage tanks (USTs), above ground storage tanks (ASTs), and/or other hazardous materials within the project study area. The ESA included federal and state database research along with an on-site reconnaissance survey of the project study area.

The ESA identified numerous recognized environmental conditions (RECs) within the PSA. These sites are primarily associated with current and/or former gasoline service stations; auto repair facilities; trucking/transport facilities; industrial facilities; and other retail facilities. The ESA further identified approximately 17 of these sites to have moderate to high potential for subsurface contamination, seven (7) of these sites to have low to moderate potential for subsurface contamination and noted seven (7) additional incidental environmental conditions (Figures 20-27).<sup>41 42</sup> These findings are summarized below, with the full reports included in Appendix I.

Multiple sites considered to represent RECs were identified within the scope of this assessment. Based on the findings of this assessment and the available information, the following sites are considered to represent a **moderate to high potential** for adverse impact to the study area:

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<sup>41</sup> ARM Environmental Services. *I-85 Widening Project, Cherokee County, Phase I Environmental Site Assessment*. September 14, 2015.

<sup>42</sup> ARM Environmental Services. *I-85 Widening Project, Cherokee County, Phase I ESA Addendum Letter*. September 28, 2016.



- Former Brown and Williamson Tobacco Corporation / Former Monsanto Textiles Company / RJ Reynolds Tobacco Company / Pharmacia site, located at 153 Gibbons Road, adjacent to the south of the study area
- Flying J Travel Plaza, located within the study area at 1011 North Mountain Street (Exit 102)
- Broad River Truck Stop, located within the study area, at 415 Milliken Road (Exit 98)
- Loves Travel Stop 397 (Former Mr. Waffle Truck Stop. Suspected former 99 Peak Station and Road King facilities), located within the study area at 116 Priester Road (Exit 104)
- Southern Store 583, located within the study area at 1326 Blacksburg Highway (Exit 100)
- Speedway Express (J&R Travel Plaza), located within the study area at 123 Simper Road (Exit 100)
- Former Stuckeys 200 (currently an adult store), located within the study area at 143 Simper Road (Exit 100)
- Wilco Travel Plaza 9 (former Hambright Properties), located within and adjacent to the study area at 2768 East Cherokee Street (Exit 106)
- JK Food Mart, located within the study area at 2738 East Cherokee Street (Exit 106).
- Quick C Food Mart 602, located within the study area at 2726 East Cherokee Street (Exit 106).
- Small site south I-85 containing empty, 55-gallon drums.

Based on the findings of this assessment and the available information, the following sites are considered to represent a **low to moderate** potential for adverse impact to the study area:

- TNS Mills Blacksburg, located adjacent to the south of the study area at 210 Henson Street (Exit 102).
- J. Grady Randolph, Inc., located adjacent to the south of the study area at 336 Quarry Road.
- Blackfield Dump Site (Monsanto), located within or near the study area near the Junction of I-85 and S-99; however, the exact location is unknown.
- Milliken and Company Plants (Allen Plant and Magnolia Plant), located approximately 1,400 feet south of the study area, off of New Milliken Road.
- Mike's Food Store, located within the study area at 2731 East Cherokee Street (Exit 106).



- J Express, located within the study area at 2705 East Cherokee Street (Exit 106).
- Sloan Construction Company Site

While not considered to be RECs, additional incidental environmental conditions include the following:

- Potential use of heating oil tanks on nearby residential properties.
- Potential presence of asbestos containing materials or lead based paint in structures located within or in the vicinity of the study area.
- A collection of warehouse type buildings used as a large flea market is located on the south side of I-85 at Exit 106. Large quantities of construction/ demolition (C&D) debris, including primarily brick, concrete, and wood, are located beyond these buildings along the boundary of the study area. No hazardous waste disposal was apparent at this location; however, the quantity and type of debris observed is indicative of an unpermitted C&D landfill.
- A small automobile dirt racing track is located on the south side of I-85 near the Norfolk Southern Railroad crossing. No large scale fueling facilities were observed to be associated with this site.
- A small metal shop-type building is located on Orlando Drive, which is a frontage road along the north side of I-85, between the Broad River and Exit 100. The building appears to be used by a private entity, possibly for mechanic type work. While various materials may be used on site, no obvious environmental concerns were evident from the limited site reconnaissance.
- Another small metal shop-type building is also located on Orlando Drive and may potentially be used by a small private contractor. While various materials may be used on site, no obvious environmental concerns were evident from the limited site reconnaissance.
- An abandoned house is located on Crawford Road, on the north side of I-85, near Exit 100. Several abandoned automobiles are located in the overgrown wooded lot. Minor surficial soil contamination may be present from the prolonged storage of these automobiles.

The preferred alternative would require right-of-way from 14 identified RECs but would not involve total takes. It may be warranted to conduct detailed investigations of those suspect sites potentially impacted by the roadway improvements, or any portion of the project corridor that has the potential to be adversely impacted by any of the referenced environmental sites. It is the SCDOT's policy to avoid the acquisition of underground storage tanks and other hazardous materials, if possible. If avoidance is not a viable alternative, tanks and other hazardous materials will be tested and removed and/or



treated in accordance with the USEPA and SCDHEC requirements. Cost of necessary remedial actions would be considered during the right-of-way appraisal and acquisition process.

#### **4.11 What are Cultural Resources?**

Section 106 of the National Historic Preservation Act of 1966, as amended, requires federal agencies to consider the effects of their actions on historic properties. In accordance with 36 CFR §800.4, archival research, field investigations, and coordination with the State Historic Preservation Officer (SHPO) were performed to identify and help predict the locations of significant cultural resources in the vicinity of the proposed project. The archaeological and architectural surveys performed were designed to provide the necessary management data to allow for the sites and properties to be evaluated for recommendations of eligibility to the National Register of Historic Places (NRHP).

##### **4.11.1 How were cultural resources identified?**

A literature review and records search was undertaken prior to the field surveys. Background research was conducted to identify all previously recorded cultural resources located within the project study area and to develop a cultural and historic context to evaluate newly recorded resources identified within the study area of the proposed project during the cultural resource field survey.

##### **4.11.2 Would the project impact any cultural resources?**

As a result of the cultural resources survey 22 architectural resources, two archaeological sites and one isolated find were recorded and evaluated. One architectural resource is recommended eligible for listing on the NRHP, while all other resources were determined not eligible for listing on the NRHP. The proposed project would not impact the eligible site as the site is located beyond the proposed construction limits and no new right-of-way is anticipated to be acquired from this property.

A detail of the study and findings is included in the *Phase I Cultural Resources Survey of Approximately 12 Miles of Improvements Along I-85, Cherokee County, SC*, found in Appendix I. Copies of SHPO coordination, including applicable correspondences and concurrences also provided in Appendix K.

#### **4.12 What are Section 4(f) Resources?**

Section 4(f) of the US DOT Act of 1966 (49 U.S.C. §303) and Federal regulations 23 CFR Part 774 regulate how publicly-owned properties such as parks, recreational lands,



wildlife and waterfowl refuges, and historic sites that are on or eligible for the National Register of Historic Places (NRHP), are used for transportation projects. Section 4(f) takes into account direct, temporary and/or constructive use impacts.

#### **4.12.1 What Section 4(f) resources were identified within the PSA?**

No Section 4(f) properties were identified within the PSA. Thus, no impacts would result to Section 4(f) resources from the Preferred Alternative.

#### **4.13 Would the project relocate or displace any residences or businesses?**

The proposed project would result in the potential relocation/displacement of 16 businesses and one residence (Figures 20-27). The SCDOT would acquire all new right-of-way and process these relocations in compliance with the Uniform Relocation Assistance and Real Property Acquisition policies Act of 1970, as amended (42 U.S. C. 4601 *et seq.*). The purpose of these regulations is to ensure that owners of real property to be acquired for Federal and federally-assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owners, to minimize litigation and relieve congestion in the courts, and to promote public confidence in Federal and federally-assisted land acquisition programs. In addition, these regulations ensure that persons displaced as a direct result of Federal or federally-assisted projects are treated fairly, consistently, and equitably so that such displaced persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole, and that agencies implement these regulations in a manner that is efficient and cost effective.

#### **4.14 What are social and economic impacts and how are they identified?**

The proposed project was evaluated to identify potential social and economic impacts. This evaluation included both beneficial and adverse impacts associated with the transportation improvements. Social impacts, or community impacts, can be defined as the “effects of a transportation action on a community and its quality of life.”<sup>43</sup> This evaluation generally focuses on the various aspects that are important to the surrounding communities and people such as mobility, safety, employment, property

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<sup>43</sup> FHWA. *Community Impact Assessment: A Quick Reference for Transportation*. Publication No. FHWA-PD-96-036, September 1996. [https://www.fhwa.dot.gov/livability/cia/quick\\_reference/](https://www.fhwa.dot.gov/livability/cia/quick_reference/).



impacts, fragmentation of communities, and other items important to the quality of life along the project areas. Social impacts are generally identified through public involvement and participation, along with an analysis of how the proposed improvements may impact the various items that are important to the local communities.

Potential economic impacts are also considered, and include how the project may benefit or harm the local businesses, local municipalities, and communities. The evaluation of potential economic impacts generally considered project costs, impacts to businesses, mobility/access, and employment potential.

#### 4.14.1 What are the social demographics along the project area?

The proposed project is located along a rural section of Cherokee County with the existing I-85 transportation facilities providing access for local commuters as well as for interstate commerce. The majority of the surrounding land use is comprised of upland forests and agricultural fields with interspersed urban/commercial/residential land uses, including, restaurants, hotels, automotive service centers, gas stations, and manufacturing industry. The commercial/retail establishments are focused along the interchanges, which provide convenient access to and from I-85.



The PSA is located within Census Tract 9704.01, Cherokee County. A review of the 2010 U.S. Census data indicates that the project is located along a rural, predominately white, lower-middle aged, lower-middle class area of Cherokee County (Table 16). Specifically, the census tract along the PSA includes a minority population of approximately 16%, as compared to 25% in Cherokee County and 26% statewide. The median age is consistent with Cherokee County and statewide averages, with a median household income that is approximately \$4,000 lower than Cherokee County and \$15,000 lower than statewide income. In addition, available data documents that 94% of the workers along the PSA rely on cars, trucks, or vans for transportation to work, with a mean travel time of 24.5



minutes. Finally, the entire Census Tract 9704.01 is considered a rural area with no housing units within urbanized areas or clusters.

**Table 16. Demographic Data**

	<b>South Carolina</b>	<b>Cherokee County</b>	<b>Census Tract 9704.01</b>
Total Population	4,625,364	55,342	3,646
White	3,060,000 (66%)	41,525 (75%)	3,076 (84%)
Black or African American	1,290,684 (28%)	11,278 (20%)	460 (13%)
Asian	59,051 (1%)	313 (0.6%)	3 (0.1%)
Hispanic or Latino	235,682 (5%)	2,032 (4%)	53 (2%)
Median Household Income*	\$45,033	\$34,766	\$30,714
Median Age	37.9	38.3	37.7

Sources: U.S. Census 2010; \*2010-1014 American Community Survey 5-Year Estimates<sup>44</sup>

**4.14.2 What are the social impacts resulting from the project?**

The social impacts identified in this assessment are largely associated with impacts to the existing commercial establishments, mainly in regards to access and mobility to and from these destinations. Other potential adverse social impacts include a change in travel patterns, direct right-of-way acquisition, and temporary impacts during construction. In addition, the proposed improvements are expected to result in beneficial social impact by improving the operational efficiency and safety of the transportation facility, resulting in decreased travel times and safer driving conditions.

The proposed project would require the relocation of 16 businesses and 1 residence, which results in a direct impact on these properties. In addition, the reconstruction of the four interchanges would alter the existing mobility and access points along many businesses. This includes the addition of

Control of Access is defined as the regulated limitation of public access rights to and from properties abutting a highway facility.

controlled access along the cross roads for some distance from the interchange ramp intersections to ensure adequate operation of the interchange facilities. The improvements would also eliminate direct access to and from the interchange ramps for

<sup>44</sup> <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>, Last Accessed December 6, 2016.



various businesses, further impacting access and mobility. Numerous side roads would be relocated at desirable distances from the interchange ramp intersections and some frontage roads would be realigned to create better separation from interstate ramps. In addition, Gibbons Road at Exit 104, would be realigned to avoid the industrial park in the southwest quadrant. As such, the proposed improvements would result in a change in local travel patterns and access points along numerous businesses and undeveloped properties. While access to many of these areas will be maintained with similar access, additional internal improvements along these facilities may be warranted. There are also several adjacent properties in which access would not be maintained: a parcel at Exit 98; one parcel at Exit 100; two parcels at Exit 102; and two parcels at Exit 106 would be acquired. In this case, these parcels are considered a total take and are included as a commercial or residential relocation.

The preferred alternative would require approximately 85 acres of new right-of-way. This right-of-way would be acquired from various land-uses (commercial, undeveloped, residential, etc.) immediately adjacent to the existing right-of-way. The 85 acres of new right-of-way is not expected to alter the existing or projected land-uses.

The proposed improvements are also expected to have beneficial social impacts by improving the operation of the existing interchanges and increasing the capacity along I-85. This would ultimately reduce traffic delays, enhance mobility along the PSA for local and transient traffic, and provide a safer facility. In addition, the project has been coordinated with the local citizens and stakeholders in an effort to accommodate the various needs of the surrounding community.

#### **4.14.3 What are the economic impacts resulting from the project?**

The proposed project was evaluated for potential economic impacts to the surrounding communities. The economic impacts considered include the anticipated impacts to local businesses, employment, and tax base. As a result, it is anticipated that the proposed project would result in both positive and negative economic impacts. A portion of the project cost would be a direct cost to the local and regional governments. Also, the acquisition of approximately 85 acres of additional right-of-way would result in a slight reduction in property tax assessments.

The surrounding area is largely comprised of industry and travel-oriented businesses including truck stops, restaurants, and gas stations along with general retail businesses and light industrial. As such, many of these businesses have been developed and depend upon the local transportation facilities. These developments also provide various employment opportunities for local residents. The proposed project would result in 16 commercial displacements, along with changes to access to and from



various other facilities. Where possible, access and local mobility would be maintained with more desirable operational conditions. In addition, there appears to be sufficient opportunities to relocate the impacted businesses and residences within the same area, and continue operation. Further, the business owners would be appropriately compensated for the physical right-of-way acquisition, along with other property damages (i.e. complete loss of access), refer to Section 4.13.

The proposed project could also have beneficial economic impacts through improved operations, reduced travel delays, and safer conditions. Regional benefits would include additional capacity on I-85 that should reduce travel times for freight and motorists. These improvements would improve the overall quality of life by reducing time delays and providing safer driving conditions, which would encourage and sustain the existing retail centers. The project would also result in a direct savings to motorists by decreasing travel time and reducing the potential for traffic accidents and property damage.

#### **4.15 What is Environmental Justice?**

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, requires federal agencies to identify community issues of concern during the NEPA planning process, particularly those issues relating to decisions that may have a disproportionate impact to low-income or minority populations.

##### **4.15.1 How were these areas identified?**

U.S. Census data was used to determine the presence of minority and low-income communities, along with visual observations along then the PSA. As summarized in Table 11, the demographics of the study area include an approximate 16% minority population compared to the approximate 33% minority population for Cherokee County and 26% for statewide. The census data also reveals that the median household income for Census Tract 9704.01 is \$30,714. While this median income level is 47% lower than the statewide level, it is greater than the \$24,300 (family of four) poverty guidelines established for 2016 by the U.S. Department of Health and Human Services.<sup>45</sup> The 2010-2014 American Community Survey 5-Year Estimates documents that approximately 22% of people within Census Tract 9704.01 is below the poverty status, which is consistent with Cherokee County and lower than the statewide rate of 28%.<sup>46</sup>

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<sup>45</sup> U.S. Department of Health and Human Services. <https://aspe.hhs.gov/poverty-guideline>. Last Accessed November 8, 2016.

<sup>46</sup> <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml> , Last Accessed October 4, 2016.



These findings are consistent with the field observations of the immediate PSA, which is largely commercially developed with isolated residential areas.

#### **4.15.2 Would the project impact any of the identified areas?**

Based on the census data, the project is not expected to result in specific benefit, harm, or disproportionately impact any social group, including low-income and minority groups.

#### **4.16 What are indirect and cumulative impacts?**

It is the FHWA's and other federal agencies responsibility to consider direct, indirect, and cumulative impacts in the NEPA process as established in the Council on Environmental Quality (CEQ) Regulations for implementing the Procedural Provisions of NEPA. The CEQ regulations define the impacts and effects that must be addressed and considered by federal agencies in satisfying the requirements of the NEPA process. The CEQ regulations note three impact categories - direct, indirect, and cumulative. According to FHWA guidance, the determination or estimation of reasonably foreseeable actions is essential to both indirect and cumulative impact analysis.

##### **4.16.1 What indirect impacts are anticipated from the project?**

Indirect impacts, or effects, are reasonably foreseeable impacts to the environment that are caused by an action, but occur later in time, or are further removed in distance from the PSA. Indirect impacts are generally associated with impacts from induced growth, and other impacts that result from the induced changes in the existing land use patterns, population density, or growth rate of an area.<sup>47</sup> Transportation projects often reduce travel time, enhancing the attractiveness of surrounding land for development through changes in accessibility. These changes in access could influence local development trends. Subsequently, these land use changes could lead to environmental impacts such as habitat fragmentation or water quality issues.<sup>48</sup>

The indirect impact analysis focused on potential impacts to land use patterns, local businesses, and jurisdictional waters of the U.S., mainly streams. The identification of these resources took into consideration input received during the agency coordination, public involvement process, and general characteristics of the PSA. The potential indirect impacts along the PSA could result from induced growth, land use changes, and/or changes in travel patterns as a result of the proposed activity. Induced growth

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<sup>47</sup> FHWA Interim Guidance: *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process* (2003).

<sup>48</sup> AASHTO Center for Environmental Excellence, *Indirect and Cumulative Impacts*  
[http://environment.transportation.org/environmental\\_issues/indirect\\_effects/](http://environment.transportation.org/environmental_issues/indirect_effects/).



and land use changes would be specific to secondary development as a result of improved access resulting from the interchange improvements. Changes in travel patterns could result in the need for additional roadways and access drives in order to maintain desirable access to local businesses and/or residences. In addition, the relocation of various businesses and residences could further impact the surrounding land uses. Jurisdictional waters and streams were identified as a resource that could be further impacted through the indirect impacts.

### **Step 1 – Study Area Boundaries**

Indirect impacts are analyzed for resources of concern within particular geographic and temporal boundaries. This allows for the appropriate context to be developed for each resource. Study area boundaries are developed through consideration of input received during the agency coordination and public involvement process.

The indirect impacts will be assessed for each notable resource within a particular geographical area with the naturalized condition after construction of I-85 being the historical baseline. For the indirect analysis, the study area coincides with the project study area boundary. The project corridor is located along a rural area that includes various urbanized land uses including transportation, commercial development, industrial, and residential land uses. The project corridor includes the existing I-85 freeway and adjacent interchanges. The study area contains approximately 1,065 acres (Figure 1).

### **Step 2 – Study Area Communities Trends and Goals**

The PSA is located within the Piedmont of South Carolina, which is the transitional boundary between the mountainous regions along the Appalachians (northwest) and the coastal plain (southeast). Specifically, the PSA is located along the “Southern Outer piedmont” and “Kings Mountain” Level IV ecoregions, which is characterized by lower elevation and less relief with expansive areas of pine and mixed oak forests.<sup>49</sup>

The project corridor is located along a rural area between the City of Gaffney and the SC/NC state line. The majority of the area includes upland forest and agricultural land uses with some urbanized land uses including transportation, commercial development, industrial, and residential land uses. According to Cherokee County, there is no zoning along the I-85 corridor within the PSA.<sup>50</sup>

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<sup>49</sup> “Ecoregions of North Carolina and South Carolina (EPA)”. Griffith, Glenn; et. al. 2002. Omernik, James. <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-4#pane-38>. Last Accessed November 9, 2016.

<sup>50</sup> <http://www.scacog.org/CherokeeCountyParcels>. Accessed March 2, 2016.



The immediate PSA consists of upland forested and agricultural land uses interspersed with commercial, industrial, and residential land uses. The commercial and industrial developments area isolated along the Exit 100, 102, 104 and 106 interchanges. These establishments consist largely of highway oriented and transient developments including gas stations, hotels, restaurants, and industrial uses. Residential land uses are interspersed throughout the PSA. These land uses are generally located outside of the immediate vicinity of the interchanges. Approximately 85 acres of the new right-of-way would be required to accommodate the proposed improvements. Much of this right-of-way would be acquired from existing commercial/developed and undeveloped property that is located immediately adjacent to the existing right-of-way.

The PSA includes a crossing of Buffalo Creek and various other tributaries that drains directly into the Broad River. These tributaries primarily consist of first and second order streams with perennial flow, intermittent, and seasonal flow. These systems have been previously impacted by the construction of the existing transportation facilities and surrounding developments, mainly through relocation, channelization, dimension, and profile. These streams also function largely for stormwater capacity and conveyance, which affects downstream water quality.

### **Step 3 – Inventory Notable Features**

The indirect impact analysis focuses on potential impacts to the surrounding land use, commercial developments, and streams as these resources have been identified as the primary concern. As described above, these include, but are not limited to the various commercial truck stops and businesses along the interchanges; the existing interstate and local road network, and jurisdictional waters largely associated with Buffalo Creek, Bee Branch, and unnamed tributaries.

### **Step 4 – Identify Impact Causing Activities of the Proposed Action**

The proposed project is adding capacity along the median of the mainline and modifying existing access roads and interchange ramps. However, the project is not expected to create additional access or new interchanges along the I-85 corridor. The proposed improvements include the closure of Exit 98, and reconstruction of Exits 100, 102, 104, and 106 to improve the spacing between the ramp intersections and adjacent intersections and improve the operational efficiency of the roadways in the immediate vicinity of the interchanges through controlled access. In addition, the project would require the relocation of 16 businesses and one residence. The following are specific modifications that have the potential to result in indirect impacts: additional travel lanes, access changes along interchanges, improved operation, frontage road relocations.



### **Steps 5 & 6 – Identify and Analyze Potential Impacts**

Indirect impacts include the potential land use changes, including the transportation facilities that could result in the surrounding area, impacts to existing local businesses, and impacts to streams.

The immediate area surrounding the interchanges are currently developed with various highway oriented businesses and light industrial. In addition, there is existing open space in the vicinity of the interchanges that could be developed for similar uses. The interchanges and associated freeway components would be controlled access which would preclude any development directly adjacent to the freeway, and control access to existing developments. Any potential new development would likely occur at the interchange areas, along the undeveloped areas. These developments would be considered consistent with the existing land uses as they would be dependent upon interstate access and would not extend beyond the immediate vicinity. Therefore, the induced growth may convert currently fallow, wooded, and/or agricultural land to commercial properties.

The proposed improvements and configuration of the preferred alternative would result in modification to existing access along with the relocation of various frontage road intersections. The relocated roadways would remain in the vicinity of the interchanges (i.e. <750 feet) and maintain existing travel patterns and access to the overall network. The improvements would also impact various access and internal mobility associated with various businesses. This includes eliminating business access along ramps; relocating existing access points along the side roads, and implementation of controlled access along the interchange side roads. While access would be maintained along many of these facilities, there would be modifications that result in longer distances from the ramps intersections, modifications to the internal parking and mobility, and limited access points. These access modifications ultimately result in a potential for a decrease in business. However, the location of and design of these modifications have been developed based on SCDOT guidance, site conditions, and minimization of impacts in an effort to avoid adverse impacts to the businesses. If access is not maintained, the SCDOT would appropriately compensate the property owner.

The construction of the project is anticipated to directly impact approximately 5832 linear feet of stream through channel relocation, fill, and extension of existing culvert structures. These systems are located immediately adjacent to the existing roadway facilities, and function largely for conveyance and storage for roadway stormwater. Potential indirect impacts to these systems would include increased stormwater runoff from surrounding developments, leading to downstream degradation of water quality.



Induced growth along the immediate area and additional access improvements along existing developments have the potential to result in increased impacts due to the number and location of these streams. In addition, increased impervious area associated with the induced growth could potentially increase the volume and quality of stormwater runoff further impacting downstream waters.

**Step 7 – Evaluate Analysis Results**

Both qualitative and quantitative methods were used to identify and analyze the potential indirect impacts to the resources of concern resulting from this proposed project. These methods and/or resources included:

- GIS information obtained from public and private sector agencies
- Historical photographs
- Computer Aided Drawing and Design (CADD)
- County planning documents
- Internet research

Table 17 lists the potential impacts resulting from this project.

**Table 17. Indirect and Cumulative Impact Matrix**

Resources	Direct Impacts	Indirect Impacts	Cumulative Impacts			
			Past	Present	Reasonable Foreseeable	Overall
Commercial Developments/Land Use	Change in some access; acquisition of additional right-of-way and 16 businesses	Modifications to the parking/internal mobility required due to access changes; business impacts due to change in access	Transportation; commercial, industrial, and residential development	Increase in capacity; change in access; limited development due to control of access, geographic location, and local economy	Minimal development expected due to local demographics, existing developments, and local economy	Adds additional capacity; changes in access; minimal development expected due to control of access; improve operational efficiency along the interchanges
Streams	5832 LF of impact	Impacts to water quality based on additional impervious surfaces	Direct physical stream impacts from the construction of I-85, and surrounding facilities; commercial/residential	Stormwater runoff from adjacent transportation and urbanized development;	Direct physical impacts associated with future transportation improvements;	Replaces existing conditions in regards to water conveyance



Resources	Direct Impacts	Indirect Impacts	Cumulative Impacts			
			Past	Present	Reasonable Foreseeable	Overall
			development	current construction of Blacksburg Rd. bridge over Buffalo Creek (permitted)	water degradation from increased urbanization	and stream dimensions; minimal water degradation as no changes in land uses anticipated

The project is not expected to result in induced development along the area as general access from I-85 will not change. However, access along the side roads and within the immediate vicinity of the interchange has the potential to result in additional development within the existing developed corridor. This change of access may also result in various indirect impacts to the existing commercial establishments. These primarily include a change in access, need for additional improvements within the commercial facilities, properties/parking lots, conversion of undeveloped land to commercial land uses, and impacts on the number of users. While the access changes may result in new and longer distances between the interchange ramp intersections, the improved operation of the transportation facilities would continue to accommodate and promote use of these businesses from motorists along I-85. The larger retail centers (i.e. truck stops) along the project may also determine the need to modify the internal movements and parking of their facilities as a result of the changes in access.

The potential for new development and modifications to existing facilities also have the potential to result in indirect impacts to streams and water quality. New development would ultimately increase the area of impervious material. This would ultimately impact the quantity and quality of stormwater that could eventually drain to jurisdictional streams. However, any new facility, or modifications to an existing facility, would be required to obtain the required local and state permits. This includes construction permits for land disturbing activities which would ensure that area water quality standards are maintained.

**Step 8 – Assess Consequences and Develop Mitigation**

In conclusion, the proposed project is anticipated to have minimal induced development and the potential indirect impacts associated with such development. As documented the project does have the potential to indirectly impact local businesses through modifications to existing access. This has the potential for both positive and negative impacts. The operational efficiency and safety of the existing facilities would be



improved, decreasing travel time and congestion along the commercial establishments. However, many of the existing access points would be relocated changing the distances, and requiring additional internal improvements to the facilities. In addition, any induced development and conversion of undeveloped land has the potential to impact streams and downstream water quality.

The potential indirect impacts to local businesses would be mitigated through the maintenance of access, where possible, along with improved operation and safety for access to and from these facilities. If access cannot be safely maintained, and/or is modified, the SCDOT would negotiate just compensation during the right-of-way process. The project would also improve the existing transportation facilities to comply with current design standards, resulting in increased operation and safety along the corridor. The potential indirect impacts on streams and water quality would be mitigated through various other local and state regulations to ensure water quality standards are maintained.

#### **4.16.2 What cumulative impacts are anticipated from the project?**

Cumulative impacts, or effects, are the impacts on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. According to the FHWA, cumulative impact analysis is resource specific and generally performed for the environmental resources directly impacted by a Federal action under study, such as a transportation project. Cumulative impacts would occur when impacts resulting from the proposed project are added to historical changes in land use as well as reasonably foreseeable future actions anticipated in the study area.

The various transportation facilities and land use were identified for study as part of the Indirect and Cumulative Impact Analysis. The identification of these resources took into consideration input received during the agency coordination and public involvement process.

##### **Step 1 – Identify Resources of Importance**

Similar to the indirect impact analysis, the cumulative impact analysis focuses on potential impacts to land use patterns, local businesses, and jurisdictional waters of the U.S., mainly streams. Specifically, these features and resources were evaluated to determine the past, present, and reasonable foreseeable future impacts.



## **Step 2 – Identify Study Area**

Cumulative impacts are analyzed for resources of concern within particular geographic and temporal boundaries. This allows for the appropriate context to be developed for each resource. Study area boundaries are developed through consideration of input received during the agency coordination and public involvement process, and are consistent with the overall PSA. The cumulative impacts will be evaluated based on the I-85 freeway construction in 1965, and subsequent development, with a future horizon of 20 years to coincide with the project's design year.

## **Step 3 – Discuss Current Health and Context of the Affected Resources**

I-85 is a major interstate highway within the southeastern United States. Its southern terminus is at I-65 in Montgomery, Alabama and its northern terminus is at I-95 in Petersburg, Virginia. I-85 provides the major transportation route for the Upstate of South Carolina, linking together Greenville and Spartanburg with other major regional centers such as Atlanta, Georgia and Charlotte, North Carolina. Within the study area, I-85 is a four-lane median divided freeway with a posted speed limit of 65 mph. I-85 has grade separated interchanges at Blacksburg Highway (Exit 100); North Mountain Road (Exit 102); Tribal Road (Exit 104); and US 29 (Exit 106). There is also an existing structure carrying the Norfolk Southern Railroad over I-85 near milepost 101 and 105.1. The existing year (2014) average annual daily traffic (AADT) volumes along mainline I-85 vary from 35,300 to 46,400 within the PSA.

From the start, I-85 brought an economic boom to the upstate areas of South Carolina. Within ten years of its opening in South Carolina, land values in Greenville County along the I-85 corridor doubled.<sup>51</sup> The I-85 corridor has continued to attract numerous commercial and industrial businesses that have transformed the once rural area to a commercial/industrial corridor.

The immediate PSA consists largely of highway oriented and transient developments including gas stations, hotels, restaurants, general retail, and industrial. Residential land uses are interspersed throughout the PSA. These residential land uses are generally located outside of the commercial/industrial developments that are primarily located in the immediate vicinity of the interchanges. Approximately 85 acres of new right-of-way would be required to accommodate the proposed improvements. The majority of this right-of-way would be acquired from existing commercial developments, or areas that are zoned for commercial land uses.

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<sup>51</sup> Highway History - I-85 *The Boom Belt, South Carolina*.  
<https://international.fhwa.dot.gov/infrastructure/boombelt.cfm> .



The PSA includes various tributaries associated with the Broad River and Buffalo Creek. These tributaries primarily consist of first and second order streams with perennial flow. These systems have been previously impacted by the construction of the existing transportation facilities and surrounding developments. Many of these areas also function largely for stormwater capacity and conveyance, which affect downstream water quality. In addition, an existing bridge replacement project is occurring on Blacksburg Road which could potentially affect local water quality.

Based on a review of available historical mapping, there have been minimal changes to the surrounding land-uses and businesses over the past 20 years. Isolated development has occurred along Exit 104 and 106; however, the existing conditions are very similar to project conditions from the 1990's. This further documents that future development is expected to be very minimal, and located along undeveloped areas within the immediate vicinity of the interchanges.

**Step 4 – Identify Direct and Indirect Impacts of the Proposed Project That Might Contribute to a Cumulative Impact**

The proposed project is adding capacity along the median of the mainline and modifying existing access and side roads and interchange ramps. However, the project is not expected to create additional access or new interchanges along the I-85 corridor. The proposed improvements include the closure of Exit 98, and reconstruction of Exits 100, 102, 104, and 106 to improve the spacing between the ramp intersections and adjacent intersections and improve the operational efficiency of the roadways in the immediate vicinity of the interchanges through controlled access. These modifications would include; eliminating frontage road connections with ramps, removing direct business accesses onto the ramps, incorporating turn storage areas, and correcting insufficient vertical and horizontal bridge clearances along I-85. These improvements would require the acquisition of 85 acres of additional right-of-way, 16 commercial displacements, 1 residential displacement, changes to access, and 5,832 LF of stream impacts. Potential indirect impacts would be secondary development that could result in land use changes in the surrounding area, impacts to the volume of business due to access changes, need for reconfiguration of existing commercial facilities, and increased stormwater associated with the development of undeveloped land.

**Step 5 – Identify any other Reasonably Foreseeable Actions**

The SCDOT and Appalachian Council of Governments (ACOG) have various other active and/or programmed projects within the vicinity of the PSA. These projects vary from



major interstate widening to pavement resurfacing projects, as described in the following summary.<sup>52</sup>

- I-85 Widening between MM 80 and MM 96
- Old Post Road Widening between SC 105 and SC11
- SC 150 @ S-111 Intersection Improvement
- US 29 @ Southern Railroad Bridge Replacement

The PSA is located along a rural portion of Cherokee County, with the existing commercial businesses consisting largely of highway oriented and transient developments including gas stations, hotels, restaurants, general retail, and industrial. These land uses are primarily located adjacent to the interchange areas, and dependent upon I-85 access and commuters. Residences are interspersed throughout the PSA. These residences are generally located outside of the commercial/industrial development in the immediate vicinity of the PSA. Minimal new development has been observed along the PSA during the numerous site reviews. In addition, the area is sparsely populated with various closed/vacant businesses and buildings. There are isolated areas, mainly along Exit 104, that is conducive for future development. However, based on local economy trends, any future development would be isolated along the immediate interchange areas, and consists of highway oriented businesses.

#### **Step 6 & 7 – Assess Potential Cumulative Impacts and Report Results**

The past impacts along the PSA include the original construction of I-85 and interchanges. As a result, various commercial businesses were constructed along these interchanges as a result of the increased traffic and direct interstate access. Sparse residential developments were also established along the corridor during this time. These transportation facilities ultimately lead to the success of these facilities, which converted undeveloped farmland and forested land. The original construction of the roadway also impacted numerous streams by filling, relocating, channelizing, and piping. In addition, these areas resulted in an increase in the volume and pollutant loading of stormwater runoff. Potential future impacts are most likely to be contributed to additional roadway projects that may increase to traffic volumes along the PSA.

As documented above, there are various other projects in the foreseeable future that would improve the conditions of these transportation facilities by providing additional capacity, improve access, and improve operational efficiency. These roadway projects may result in the conversion of land and increased impervious surfaces. However, these

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<sup>52</sup> SCDOT. Statewide Transportation Improvement Program (STIP) 2017-2022



improvements are anticipated to be constructed along existing facilities, minimizing overall impacts.

Cumulative impacts to streams are also expected to be minimal as the project would maintain water conveyance along with overall stream habitat and functions, with minimal foreseeable impacts associated with these waters. The project would result in increased impervious area with potential for sediment and other pollutant loading during construction. This could have cumulative impact on downstream water quality and with altering physical characteristics of the stream. The greatest potential for these impacts would be directly associated with the various land disturbance activity during construction. However, numerous strategies would be utilized, including required sediment and erosion control practices, to avoid and minimize potential water quality impacts. The direct stream impacts and potential water quality impacts would also require authorization from the appropriate regulatory agencies, which further minimizes impact potential and requires appropriate compensatory mitigation for the unavoidable impacts.

#### **Step 8 – Assess the Need for Mitigation**

The potential cumulative impacts on land use, commercial developments, and streams would be minimized and mitigated through various strategies. The proposed project, along with foreseeable impacts, would be localized along existing interchange facilities. Controlled access would be implemented along these areas to ensure operational efficiency and safety along these areas. The commercial developments would continue to operate as the proposed project would provide convenient access to and from I-85. Future development would be dependent upon local economy, but is expected to be isolated along the interchange facilities. This development would be controlled and approved through regulations and approvals. If it is determined during the ROW acquisition process that access cannot be maintained, the SCDOT would appropriately compensate the property owner. Future development would be dependent upon local economy, but is expected to be isolated along the interchange facilities. This development would be controlled and approved through regulations and approvals. Future transportation project are also expected to be located along existing facilities to minimize impacts to travel patterns, communities, and natural features. Direct stream impacts associated with the proposed project and future impacts would be permitted and mitigated according to Section 404 of the Clean Water Act. In addition, best management practices and other controls would be required for all SCDOT construction projects, further minimizing impacts.



## 5.0 AGENCY AND PUBLIC INVOLVEMENT

The project has been coordinated with various local, state and federal agencies; local stakeholders; and the general public to identify issues to be considered in the development of the project.

### 5.1 What agencies provided input on the project?

SCDOT sent approximately 45 Letters of Intent (LOI) to representatives from the following agencies and municipalities:

#### **Federal Agencies:**

- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- U.S. Housing and Urban Development
- U.S. Fish and Wildlife Service
- Federal Highway Administration
- Catawba Indian Nation

#### **State Agencies:**

- SC Department of Archives and History
- SC Department of Archaeology and Anthropology
- SC Department of Natural Resources
- SC Department of Health and Environmental Control
- SC Department of Parks, Recreation, and Tourism
- SC Commissioner of Human Affairs
- SC Secretary of Commerce
- SC Department of Agriculture
- SC Budget and Control Board
- SC Forestry Commission

#### **Municipalities:**

- City of Gaffney
- City of Blacksburg
- Cherokee County
- SC Appalachian Council of Governments
- SC State Senate, Districts: 14
- SC House of Representatives, Districts: 29, 30

#### **Others:**

- The Nature Conservancy



The National Wild Turkey Foundation  
SC Wildlife Federation

The LOI's were disseminated on April 14, 2016, and included a brief description of the proposed project, a location map, contact information, and a request for comments. Response letters were received from the following:

The U.S. Fish and Wildlife Service  
SC Department of Natural Resources

These agencies expressed concern about potential impacts to water quality and its potential effects to fish species, wetlands, protected species, and impacts from potential adjacent development. Recommendations included appropriate erosion and sediment control practices, analysis of direct and indirect impacts to wetland habitat due to construction, and appropriate alternatives analysis.

A copy of the LOI and the response letters are included in Appendix K.

## **5.2 How was the public engaged in the project?**

A Public Information Meeting was also held on June 2, 2016 at Blacksburg Primary School located at 1010 East Cherokee Street in Blacksburg, SC. The purpose of the meeting was to provide an opportunity to review and discuss individually with representatives from the SCDOT the need for the project, limits of the project, and the various alternatives that had been developed. The Public Meeting was advertised through a local newspaper advertisement, signage along the roadway, and SCDOT's website.

A total of 67 people registered their attendance at the meeting. Twenty-two (22) written comments were received at the meeting, and an additional six (6) were received after the meeting during the 15-day response period. A detailed summary of the Public Information Meeting is included in Appendix K.

Upon approval of the EA, SCDOT will conduct a Public Hearing to provide an opportunity to review and comment on the project. The Public Hearing will be appropriately advertised, along with notification of availability of the approved EA, which will be made available for review prior to the Public Hearing at the appropriate Department's Central and District office. A public hearing certification package will be prepared that includes responses to all comments received as part of the public hearing process.