

FEASIBILITY STUDY

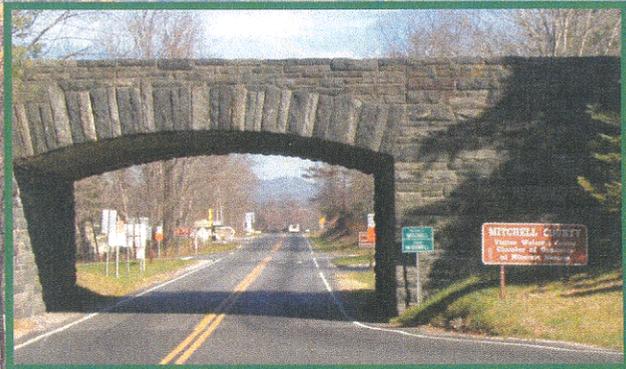
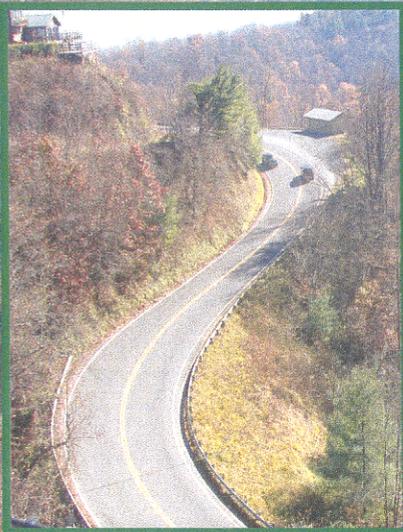
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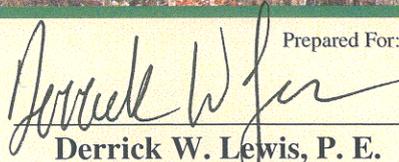
FEASIBILITY STUDY



From US 221 in Woodlawn, McDowell County
To US 19E in Spruce Pine, Mitchell County

Division 13



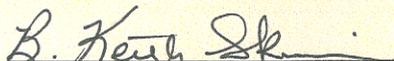
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12/19/07
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FS-0613A

FEASIBILITY STUDY



**From US 221 in Woodlawn, McDowell County
To US 19E in Spruce Pine, Mitchell County**

Division 13

I. General Description

This feasibility study addresses widening improvements to NC 226 from US 221 in Woodlawn, McDowell County to US 19E in Spruce Pine, Mitchell County for a distance of approximately 10 miles. Please refer to **Exhibit 1 - Project Location Map**.

As seen on the Project Location Map, the project has been divided into 5 sections. The McDowell County portion of the study is just over 5 miles long and includes Sections A and B of the project. The proposed cross section studied in Section A is a two-lane undivided section with 12-foot lanes and 8-foot shoulders, 4 feet of which are paved, within a minimum 100-foot proposed right-of-way. In Section B, where a steep climbing grade is present on the existing roadway, the proposed cross section studied is a four-lane undivided section with 12-foot lanes and 8-foot shoulders, 4 feet of which are paved, within a minimum 150-foot proposed right-of-way. There is a 0.45-mile section of roadway approaching the Blue Ridge Parkway at the northern end of Section B for which no feasible improvements can be made outside of current safety and maintenance efforts (as shown on **Map 3**).

The Mitchell County portion of the study includes slightly less than 5 miles of NC 226. The proposed cross section studied in the Mitchell County portion of this study (Sections C, D, and E) is a four-lane divided section with 12-foot lanes, 2 ½-foot curb-and-gutter, 10-foot berms, and a 23-foot raised grass median within a minimum 120-foot proposed right-of-way.

This study is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project, including costs, and to identify issues that may warrant more detailed study in the subsequent planning and design phases.

II. Background

This study considers widening improvements to NC 226 through McDowell and Mitchell Counties in order to accommodate future traffic with safe and efficient traffic operations.

This study has been initiated in conjunction with the safety improvements of R-5002, which will be implemented by Division 13 personnel. Division 13 supports this study and has participated in the development of the improvements in this study. Congressman Patrick McHenry also supports improvements to this facility.

NC 226 is currently a two- and three-lane highway classified as a major collector/major thoroughfare through McDowell and Mitchell Counties. Road classifications are from the NCDOT Transportation Planning Branch (TPB) Rural Functional Classification Maps and the Spruce Pine Thoroughfare Plan. No thoroughfare plans are currently available for McDowell or Mitchell Counties. The Blue Ridge Parkway, which bisects the project at the county line, is classified as a minor arterial. US 221 and US 19E, at either end of the project, are classified as principal arterials and are Strategic Highway Corridors.

NC 226 in McDowell County (from US 221 to the Blue Ridge Parkway) is a two-lane shoulder section with 11-foot lanes, minimal shoulders, and minimal existing right-of-way. Sections A and B are in the McDowell County portion of the project. Numerous horizontal curves in both sections are substandard. There is a section of steep grade varying from 10 to 14% in Section B. However, several safety features exist, such as the two segments of climbing lanes, pavement widening through the sharpest curves, and the truck safety features. Posted signs warn truck drivers of the dangerous grade and curves and advise them of the truck pull-offs. The existing roadway, although mountainous, is well maintained.



NC 226 in Mitchell County (from the Blue Ridge Parkway to Spruce Pine) is a two- and three-lane section with 12-foot lanes, 6-foot shoulders, and 4-foot ditches. The Mitchell County portion has been broken up into Sections C, D, and E. Section D, which covers NC 226 from SR 1117 (Carters Ridge

Road) to south of SR 1120 (McHone Road), is a two- and three-lane curb-and-gutter section with approximately 4 feet of clear space behind the curb. Existing right-of-way is approximately 100 feet wide through Sections C, D, and E. Section E is located within the Spruce Pine city limits.

Land Use through the McDowell County portion of the project is rural agricultural, residential, and undeveloped mountain forestlands. The mountainous terrain rises up along the eastern side of the roadway as it climbs up to the Blue Ridge Parkway. Residential development is sparse and Cox Creek follows closely along the western side of the roadway in Section A.

Land Use through the Mitchell County portion of the project is a mix of residential, commercial, and agricultural land. The density of development increases as you approach the town of Spruce Pine to the north. The topography through Section C is fairly flat and becomes more rolling as you travel north to US 19E. Community features have been located on the maps for your reference.

The only current NCDOT project directly affecting this study is TIP project R-5002. As mentioned previously, the project covers this study area and includes interim safety improvements along the NC 226 corridor. The R-5002 project, as shown in the 2007-2013 TIP, is scheduled for Right-of-Way and Construction in 2009.

There is an adjacent CSX Railroad line that approaches NC 226 in Section B near the Blue Ridge Parkway. The railroad is approximately 300' east of NC 226 at its closest points. Proposed improvements in this study will not directly affect the railroad. However, care should be taken to ensure new construction does not adversely affect existing railroad tunnels.

Although there are no bridges on NC 226 within the study area, there are numerous bridges on driveways and side roads where creeks parallel the roadway. Cox Creek parallels NC 226 in Section A and Grassy Creek parallels NC 226 in Sections C and D. Improvements proposed in this study maintain all existing bridges.

There are several existing box culverts carrying NC 226 in Sections C and D of the project. These culverts are on average 50 years old. This study recommends replacing these culverts.

III. Traffic & Safety

Base year 2006 and design year 2035 traffic forecasts for the Annual Average Daily Traffic (AADT) used in this study were provided by the NCDOT Transportation Planning Branch. Please refer to the traffic diagrams located on **Figures A.1 and A.2**. The base year AADT on NC 226 ranges from 7,600 at the southern end of the project to 20,900 vehicles per day (vpd) near the northern end. The estimated design year AADT ranges from 12,800 to 35,100 vpd. The highest percentage of truck traffic occurs in the McDowell County portion of the project and is 11% (6% Duals and 5% TTST's) for both base year and design year traffic.

Traffic analyses in this report are based on the Highway Capacity Manual and on NCDOT Analysis Guidelines. Synchro and HCS software were used to analyze traffic components. The levels of service (LOS) shown below reflect results of base year and design year traffic analyses. These analyses are preliminary and should be examined in greater detail in the subsequent stages of the project.

Although a level of service (LOS) C is desirable for collector roads, a LOS D is acceptable where unusually high traffic volumes exist or where terrain is rolling or mountainous. Since NC 226 consists mostly of rolling and mountainous terrain, a LOS D is therefore considered acceptable.

Existing Conditions

Based on capacity analyses of current conditions, NC 226 in McDowell County is operating at a LOS D or better and is anticipated to operate at a LOS D in design year 2035. In the Mitchell County portion, from the Blue Ride parkway to SR 1106 (Dale Road), NC 226 is currently operating at a LOS D and is anticipated to fall to a LOS E by design year 2035. In the remaining portion of NC 226 in Mitchell County, from SR 1106 (Dale Road) to US 19E, NC 226 is currently operating at a LOS E and is anticipated to fall to an LOS F by design year 2035. The failing levels of service of the NC 226 highway segments within Mitchell County indicate the need for widening improvements.

There are four existing signalized and ten existing unsignalized intersections along the NC 226 included in this study corridor. Traffic volumes of the existing signalized intersection at the golf course/shopping center entrance (SR 1119 White Oak Road) were not included in the forecast. Traffic volumes were assumed and estimated for comparative purposes only.

Based on current conditions, both the signalized and unsignalized intersections in McDowell County are operating at a LOS D or better but will fail around year 2011. Additionally, both the signalized and unsignalized intersections in Mitchell County from the Blue Ridge Parkway to SR 1106 (Dale Road) are currently operating at an acceptable LOS but will fail within a few years. The remaining intersections in Mitchell County from SR 1106 (Dale Road) to US 19E are currently operating at failing levels of service. The failing intersection levels of service indicate the need for intersection improvements along NC 226. All of the numbered intersections on the study maps, with the exception of SR 1111 (Dula Road), meet traffic signalization warrants prior to design year 2035. Determination of when a traffic signal is actually installed will be made by the Regional Traffic Engineer in later planning and design stages. Given the spacing of the potential and existing traffic signals near the Blue Ridge Parkway and from SR 1114 (Halltown Road) to US 19E a coordinated signal system will likely be needed in the future.

Anticipated Conditions with Proposed Improvements

Two-lane highway segments of NC 226 within McDowell County are anticipated to operate at a LOS D or better in design year 2035 based on the recommended proposed improvements. NC 226 is estimated to operate at a LOS C in design year 2035 with the four-lane widening improvements to the steep grade portion of Section B. Proposed four-lane segments of NC 226 within Mitchell County from the Blue Ridge Parkway to SR 1106 (Dale Road) are anticipated to operate at a LOS B or better in 2035. Proposed four-lane segments of NC 226 in the remaining portion, from SR 1106 (Dale Road) to US 19E, are anticipated to operate at a LOS D or better in the design year.

Based on the recommended improvements, all of the NC 226 intersections achieve a LOS C or better in design year 2035 with the exception of the US 221 and US 19E intersections. Two additional exclusive right-turn lanes at the US 221 intersection achieve a LOS D in the design year.

At the US 19E intersection, dual-turning movements have been added on each approach to and from NC 226. This maximizes the at-grade intersection and achieves a LOS E in the design year. It is estimated that the improved intersection will operate at acceptable levels of service for approximately 20 years and fall to a LOS E in year 2028. However, additional studies are needed regarding the US 19E intersection. The additional improvements needed to achieve an acceptable LOS in design year 2035 are outside the scope of this project.

An accident analysis was conducted for the study section of NC 226 for the period of September 1, 2003 through August 31, 2006. The results for this three year period included 240 reported crashes consisting of 1 fatal crash, 117 non-fatal injury crashes, and 122 property damage only crashes. The total crash rate (per 100 million vehicle miles traveled) for the studied section of roadway is 235.92 which is significantly higher than the 2003-2005 Statewide crash rate of 191.04 for two-lane rural NC Routes. The fatality rate of 0.98 for the same section is lower than the statewide rate of 2.24 at the time of this analysis. However, Division personnel have reported that at least one fatality has occurred on the steep grade segment since August, 2006.

The predominant crash types were rear-end/slow/stop crashes (37% of total). The second-most predominant crash types were collisions with fixed objects (16% of total). Through the McDowell County portion of the study, crashes occur at intersections, as expected, but also appear to occur at locations with poor horizontal alignment. The steep climbing grade and narrow shoulders are likely contributing factors as well. The combination of sharp curves and steep grade causes heavy trucks and recreational vehicles to operate at crawling speeds. Improvements to the alignment recommended in this study reduce the potential for accidents in the McDowell County portion of the project.

Through the Mitchell County portion of the study, crashes occur predominantly at intersections and within the Spruce Pine Shopping Center area. As traffic increases, higher accident rates can be expected to occur unless improvements are made. Improvements recommended in this study reduce the potential for these types of accidents.

IV. Description of Alternatives

Widening improvements to NC 226 are being considered to accommodate future traffic with safe and efficient traffic operations. Studied improvements in this report have been separated into five sections, Sections A through E, and shown on **Maps 1 through 5** located at the end of the document. Improvements considered have been established based on traffic analyses, geometric deficiencies, design standards, and input garnered from NCDOT personnel. The following describes the studied improvements for each section of the project:

Section A

Section A, located within McDowell County, begins at the US 221/SR 1558 (Old Highway 221) intersection and proceeds north for approximately 2.8 miles to the base of the steep, climbing grade. Section A includes the US 221 intersection and an additional intersection at the southern end of NC 226A.

Improvements to NC 226 include widening the existing two-lane shoulder section with 11-foot lanes and minimal shoulders to a two-lane section with 12-foot lanes and 8-foot shoulders, 4 feet of which are paved, within a minimum 100-foot proposed right-of-way. See **Exhibit 2** for the proposed typical section.

Improvements to 10 deficient horizontal curves are proposed. Although it is not reasonable to improve all of the curves to a desirable design speed in this mountainous terrain, all of the proposed curves meet or exceed the posted speed limit. There are two retaining walls proposed on the east side of the roadway in this section to reduce earthwork and right-of-way costs.

There are also some intersection improvements included in Section A. Proposed lane configuration diagrams have been included on the study maps at each intersection. Analysis of the US 221 intersection with projected future traffic indicates the need for an additional exclusive right-turn lane on each approach to southbound US 221 and southbound NC 226. Improvements also include reconfiguring the NC 226A intersection. Currently, southbound NC 226 traffic must stop before proceeding on to US 221. The proposed improvements include reconfiguring the intersection so that NC 226 traffic has priority. Analysis of this intersection indicates the need for exclusive turning-lanes as well as the possible need for signalization.

It is anticipated that **Section A** improvements will require the relocation of fourteen (14) residences and one (1) business. The total cost, including construction and right-of-way, is estimated to be \$ 14,400,000.

Construction.....	\$ 11,800,000
<u>Right-of-Way & Utilities.....</u>	<u>\$ 2,600,000</u>
Total Cost.....	\$ 14,400,000

Section B

Section B begins at the base of the steep, climbing grade and proceeds north for approximately 2.5 miles to the McDowell/Mitchell County line. Section B includes steep roadway grade (varying from 10 to 14%) and the intersection at the northern end of NC 226A. Improvements to NC 226 include widening the existing two- and three-lane shoulder section with 11-foot lanes and minimal shoulders to a four-lane undivided section with 12-foot lanes and 8-foot shoulders, 4 feet of which are paved, within a minimum 150-foot proposed right-of-way. See **Exhibit 2** for the proposed typical section.

Several new location alternatives were considered (as shown on **Maps 2 and 3**) but none of them improved upon the existing grade. Therefore, improvements were limited to improving the roadway geometry along the existing corridor. Improvements to over 15 deficient horizontal curves are proposed. Several broken-back and reverse curve combinations have been improved. Not all of the horizontal curve improvements meet the posted speed, but each does improve upon the existing condition. Widening the roadway to a four-lane section provides greater uphill passing opportunities and adds a downhill passing lane.

The existing locations of the truck turn-outs and the truck runaway ramp are generally maintained. There are two retaining walls proposed on the west side of the roadway in this section to reduce earthwork and right-of-way costs (see **Map 3**). There is a 0.45-mile section of roadway approaching the Blue Ridge Parkway at the northern end of Section B for which no feasible improvements can be made outside of current safety and maintenance efforts (as shown on the map).

Analysis of the northern NC 226A intersection with projected future traffic indicates the possible need for signalization. No exclusive turn lanes are necessary to meet an acceptable LOS.

As mentioned previously, an adjacent CSX Railroad line approaches NC 226 near the northern end of Section B. The railroad is approximately 300' east of NC 226 at its closest points. Proposed improvements in this study will not directly affect the railroad. However, care should be taken to ensure new construction does not adversely affect existing railroad tunnels.

It is anticipated that **Section B** improvements will require the relocation of three (3) residences and zero (0) businesses. The total cost, including construction and right-of-way, is estimated to be \$ 17,800,000.

Construction.....	\$ 16,900,000
<u>Right-of-Way & Utilities.....</u>	<u>\$ 900,000</u>
Total Cost.....	\$ 17,800,000

Section C

Section C begins at the McDowell/Mitchell County line and continues north for approximately 2.25 miles to the southern SR 1117 (Carters Ridge Road) intersection. The Blue Ridge Parkway crosses over NC 226 on a stone archway bridge at the county line. No widening is proposed under the bridge. Improvements to NC 226 include widening the existing two-lane shoulder section to a four-lane divided

section with 12-foot lanes, 2 ½-foot curb-and-gutter, 10-foot berms, and a 23-foot raised grass median within a minimum 120-foot proposed right-of-way. See **Exhibit 2** for the proposed typical section and **Maps 3 and 4** for the plan view.

The existing horizontal and vertical alignments in the Mitchell County sections of the project meet the design speeds and do not require improvements.

Section C includes improvements at the four main intersections within the section. Analysis of the Blue Ridge Parkway ramp/Mineral Museum entrance intersection indicates the possible need for signalization. The four-lane roadway is developed through this intersection as well. The sight-lines under the archway bridge may require special consideration to the location of any new traffic signals. The subsequent SR 1111 intersection requires neither signalization nor additional lanes on its approach to NC 226.

Proposed improvements include upgrading the existing traffic signal at the SR 1114 (Halltown Road) intersection. In order to provide adequate access for the Wal-Mart Supercenter and for the dual left-turning lanes onto SR 1114, approximately 1,400 feet of widening is needed along SR 1114. Proposed widening adds a second eastbound lane from NC 226 to the eastern Wal-Mart Supercenter entrance.

Analysis of the southern SR 1117 (Carters Ridge Road) intersection indicates the possible need for signalization. More detailed consideration should be given to this intersection in subsequent design and planning due to the close proximity of several driveway access points, the proposed U-turn bulb, and triple box culvert replacement. Also, Grassy Creek Fire Department owns a parcel to the north of the intersection.

There are, in total, four box culverts to be replaced along NC 226 in Section C. There is one retaining wall proposed on the west side of Intersection #7 in conjunction with the culvert replacement.

Several left-overs and U-turn bulbs have been provided in Section C. U-turn and left-over locations have been determined on a functional level only and should be examined in greater detail in subsequent stages of the project to ensure compliance with access management guidelines.

It is anticipated that **Section C** improvements will require the relocation of two (2) residences and seven (7) businesses. The total cost, including construction and right-of-way, is estimated to be \$ 9,900,000.

Construction.....	\$ 5,900,000
<u>Right-of-Way & Utilities.....</u>	<u>\$ 4,000,000</u>
Total Cost.....	\$ 9,900,000

Section D

Section D, located in Mitchell County, begins north of SR 1117 (Carters Ridge Road) and continues for approximately 1.7 miles to south of SR 1120 (McHone Road). Improvements to NC 226 include widening the existing two- and three-lane curb-and-gutter section to a four-lane divided section with 12-foot lanes, 2 ½-foot curb-and-gutter, 10-foot berms, and a 23-foot raised grass median within a minimum 120-foot proposed right-of-way. See **Exhibit 2** for the proposed typical section.

Section D includes improvements at three main intersections. Analyses of the SR 1106 (Dale Road) and northern SR 1117 (Carters Ridge Road) intersections indicate the possible need for signalization. The SR 1119 (White Oak Road) intersection is currently signalized. Please refer to the intersection lane configuration diagrams on **Maps 4 and 5**.

Two left-over turning movements and a U-turn bulb are provided in Section D. There are two box culverts to be replaced along NC 226. Several retaining walls are proposed along NC 226 in this section to reduce stream impacts and right-of-way and construction costs. The horizontal alignment has been shifted west along the Shopping Center properties in order to reduce business relocations.

It is anticipated that **Section D** improvements will require the relocation of one (1) residence and three (3) businesses. The total cost, including construction and right-of-way, is estimated to be \$ 13,200,000.

Construction.....	\$ 9,400,000
<u>Right-of-Way & Utilities.....</u>	<u>\$ 3,800,000</u>
Total Cost.....	\$ 13,200,000

Section E

Section E begins south of SR 1120 (McHone Road) and continues north for approximately 0.7 miles to US 19E. Improvements to NC 226 include widening the existing three-lane shoulder section to a four-lane divided section with 12-foot lanes, 2 ½-foot curb-and-gutter, 10-foot berms, and a 23-foot raised grass median within a minimum 120-foot proposed right-of-way. Proposed construction north of SR 1297 (Summit Avenue) can be accomplished mostly within existing right-of-way. See **Exhibit 2** for the proposed typical section.

Section E includes improvements at three main intersections. Analyses of the SR 1120 (McHone Road) and SR 1297 (Summit Avenue) intersections indicate the possible need for signalization. A U-turn bulb is provided at the SR 1297 (Summit Avenue) intersection. The US 19E intersection is currently signalized. Please refer to the intersection lane configuration diagrams on **Map 5**.

Intersection improvements at the US 19E/SR 1403 (Highland Avenue) intersection include additional exclusive turning lanes on all approaches. Dual turning movements are provided to and from NC 226, maximizing the at-grade intersection configuration. As stated previously in the document, additional studies are needed regarding the US 19E intersection. The additional improvements needed to achieve an acceptable LOS in design year 2035 are outside the scope of this project.

It is anticipated that **Section E** improvements will require the relocation of three (3) residences and one (1) business. The total cost, including construction and right-of-way, is estimated to be \$ 3,400,000.

Construction.....	\$ 2,700,000
<u>Right-of-way & Utilities.....</u>	<u>\$ 700,000</u>
Total Cost.....	\$ 3,400,000

V. Community and Natural Environment Issues

A detailed environmental study was not conducted for this feasibility study. However, an environmental screening resulted in the following possible occurrences, which need further evaluation in later stages of the development of this project:

- A significant portion of the project in McDowell County travels through the Pisgah National Forest.
- Armstrong Creek, Cox Creek, and Grassy Creek each parallel portions of this project. Although none are impaired (303-d listed) streams, Grassy Creek will be affected by construction in the Mitchell County portions of the project. All efforts should be made to comply with permitting requirements.
- There were no environmental justice issues observed along the project corridor during the development of this study. A more detailed investigation of environmental justice issues will be required in the later planning phases of this project.
- There are no known community facilities, schools, parks, recreation areas, or historical/archaeological sites observed during the development of this study that will be affected by this project.

- National Wetland Inventory mapping indicates that this project should not impact wetlands.
- The Department of Natural Resources – National Heritage Section indicates that there are no known occurrences of threatened or endangered species located within the project area.
- There are no known critical watersheds that will be affected by this project.

VII. Recommendations

The studied improvements described above are recommended to improve the safety and operating efficiency of NC 226 from Woodlawn, McDowell County to Spruce Pine, Mitchell County. Funding and scheduling strictly based on operational level of service would prioritize Mitchell County improvements over McDowell County improvements. However, funding and scheduling strictly based on traffic safety would prioritize McDowell County improvements. **Table 1** shows the anticipated project costs:

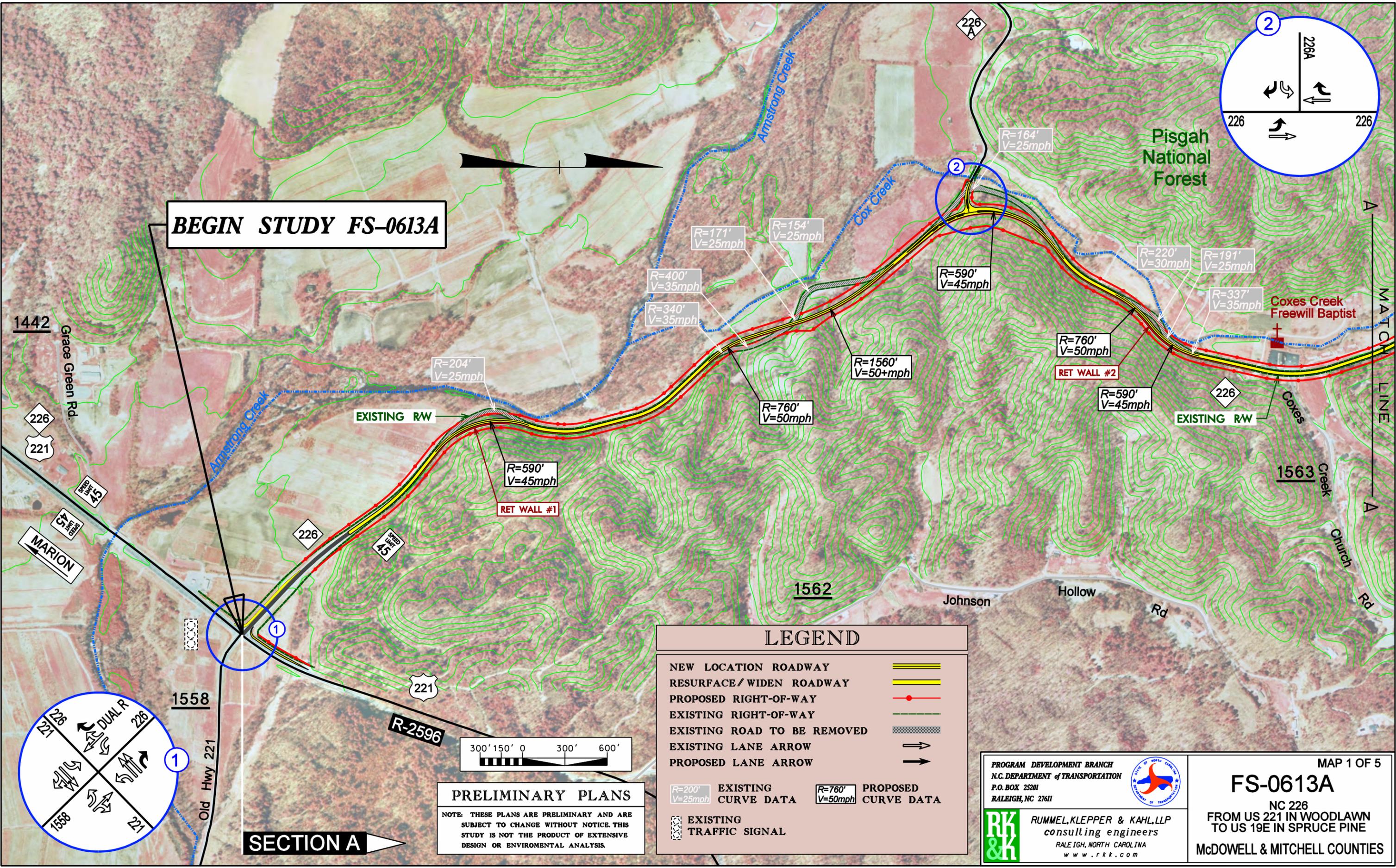
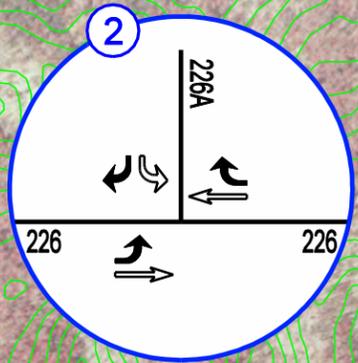
TABLE 1 – PROJECT COST				
Section	Construction	Right-of-Way and Utilities	Relocateses (Res./Bus.)	Section Cost
A	\$11,800,000	\$ 2,600,000	14/1	\$14,400,000
B	\$16,900,000	\$ 900,000	3/0	\$17,800,000
C	\$5,900,000	\$ 4,000,000	2/7	\$9,900,000
D	\$9,400,000	\$3,800,000	1/3	\$13,200,000
E	\$2,700,000	\$700,000	3/1	\$3,400,000
McDowell County	\$28,700,000	\$3,500,000	17/1	\$32,200,000
Mitchell County	\$18,000,000	\$8,500,000	6/11	\$26,500,000
Total Project	\$46,700,000	\$12,000,000	23/12	\$58,700,000

The total project cost for the recommended improvements is **\$58,700,000**.

VIII. Additional Comments

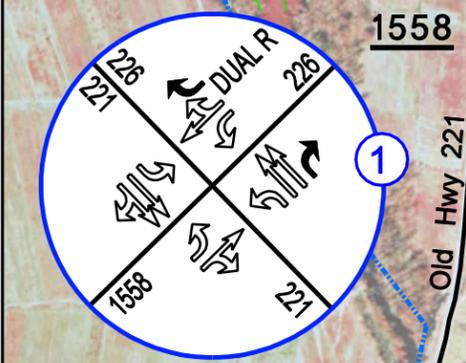
- Future widening improvements should be coordinated with the safety improvements implemented by the R-5002 division project.
- Given the accident history along the corridor and the recent completion of the R-2598 project, Division personnel have recommended the following priority for improvements in this study: Sections B, A, C, E, and D.

BEGIN STUDY FS-0613A



1442 Grace Green Rd.
226 221
MARION

MATCH LINE A



SECTION A

EXISTING RW

EXISTING RW

RET WALL #1

RET WALL #2

Coxes Creek Freewill Baptist

LEGEND

- NEW LOCATION ROADWAY
- RESURFACE/WIDEN ROADWAY
- PROPOSED RIGHT-OF-WAY
- EXISTING RIGHT-OF-WAY
- EXISTING ROAD TO BE REMOVED
- EXISTING LANE ARROW
- PROPOSED LANE ARROW

R=200' EXISTING CURVE DATA R=760' PROPOSED CURVE DATA
V=25mph V=50mph

[Symbol] EXISTING TRAFFIC SIGNAL



PRELIMINARY PLANS

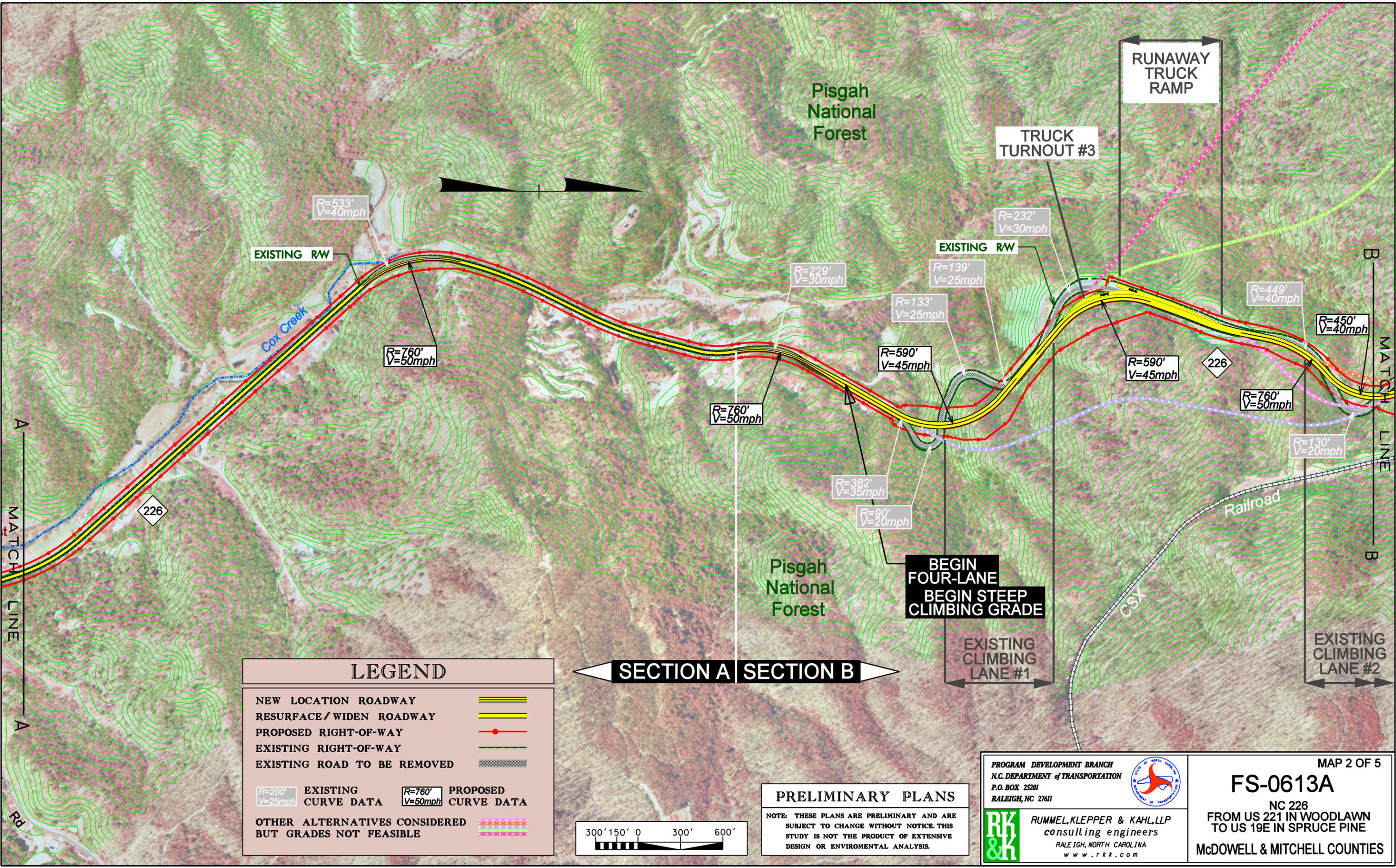
NOTE: THESE PLANS ARE PRELIMINARY AND ARE SUBJECT TO CHANGE WITHOUT NOTICE. THIS STUDY IS NOT THE PRODUCT OF EXTENSIVE DESIGN OR ENVIRONMENTAL ANALYSIS.

PROGRAM DEVELOPMENT BRANCH
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MAP 1 OF 5
FS-0613A
NC 226
FROM US 221 IN WOODLAWN
TO US 19E IN SPRUCE PINE
MCDOWELL & MITCHELL COUNTIES



LEGEND	
NEW LOCATION ROADWAY	
RESURFACE/WIDEN ROADWAY	
PROPOSED RIGHT-OF-WAY	
EXISTING RIGHT-OF-WAY	
EXISTING ROAD TO BE REMOVED	
EXISTING CURVE DATA	PROPOSED CURVE DATA
OTHER ALTERNATIVES CONSIDERED BUT GRADES NOT FEASIBLE	

SECTION A SECTION B



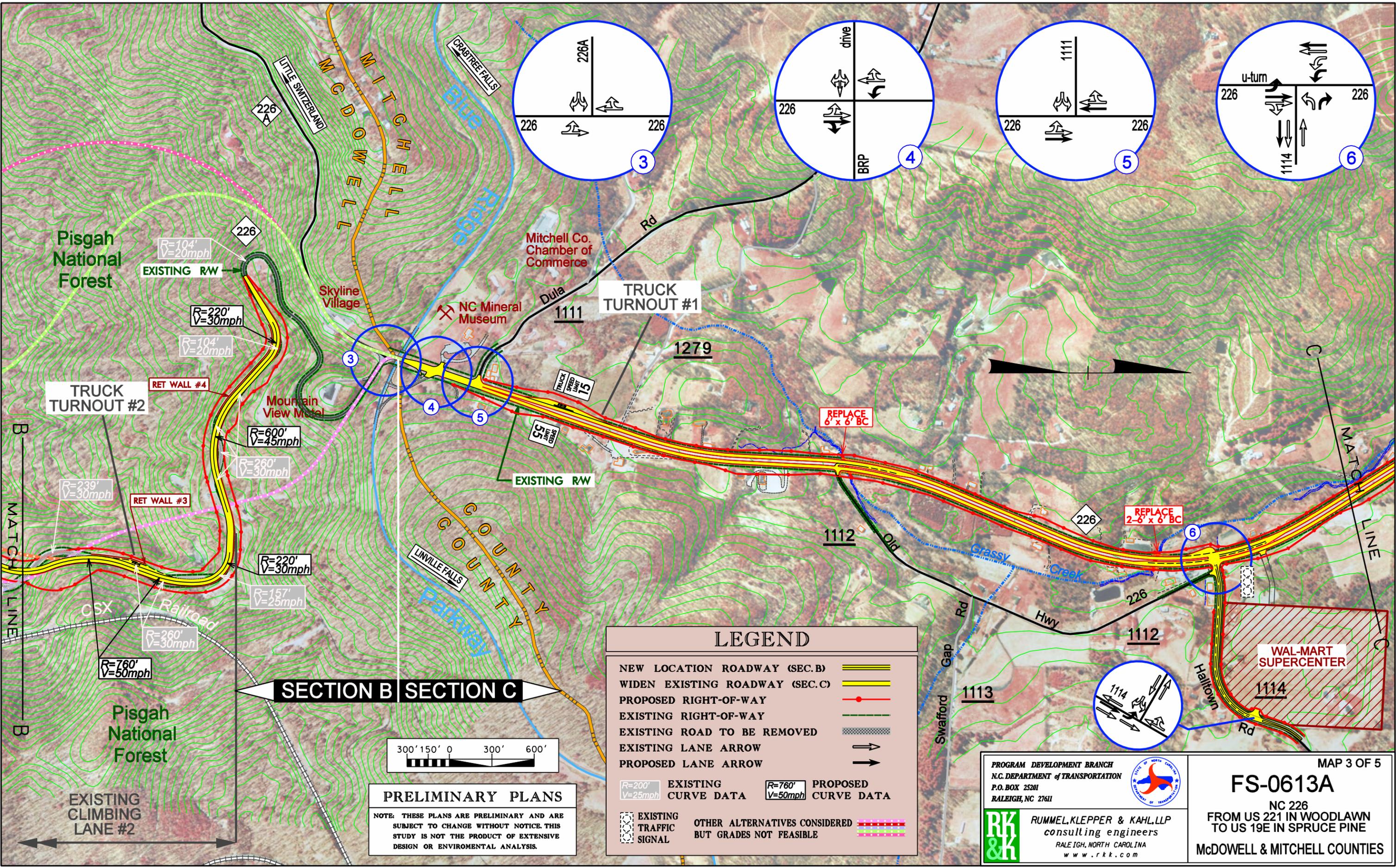
PRELIMINARY PLANS
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MAP 2 OF 5
FS-0613A
 NC 226
 FROM US 221 IN WOODLAWN
 TO US 19E IN SPRUCE PINE
 McDOWELL & MITCHELL COUNTIES

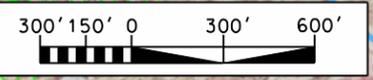


LEGEND

	NEW LOCATION ROADWAY (SEC. B)
	WIDEN EXISTING ROADWAY (SEC. C)
	PROPOSED RIGHT-OF-WAY
	EXISTING RIGHT-OF-WAY
	EXISTING ROAD TO BE REMOVED
	EXISTING LANE ARROW
	PROPOSED LANE ARROW
	EXISTING CURVE DATA
	PROPOSED CURVE DATA
	EXISTING TRAFFIC SIGNAL
	OTHER ALTERNATIVES CONSIDERED BUT GRADES NOT FEASIBLE

PRELIMINARY PLANS

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SECTION B | SECTION C

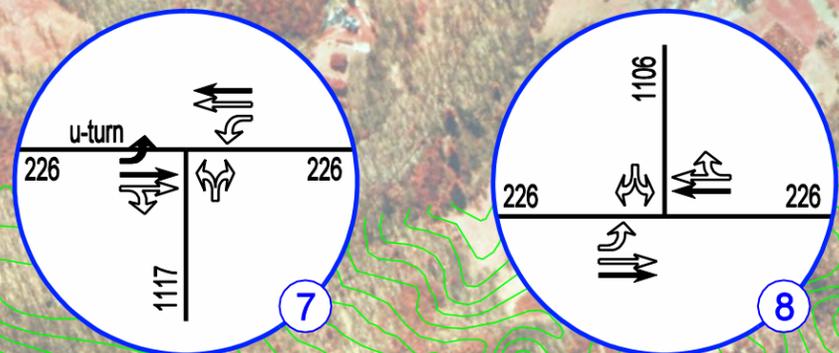
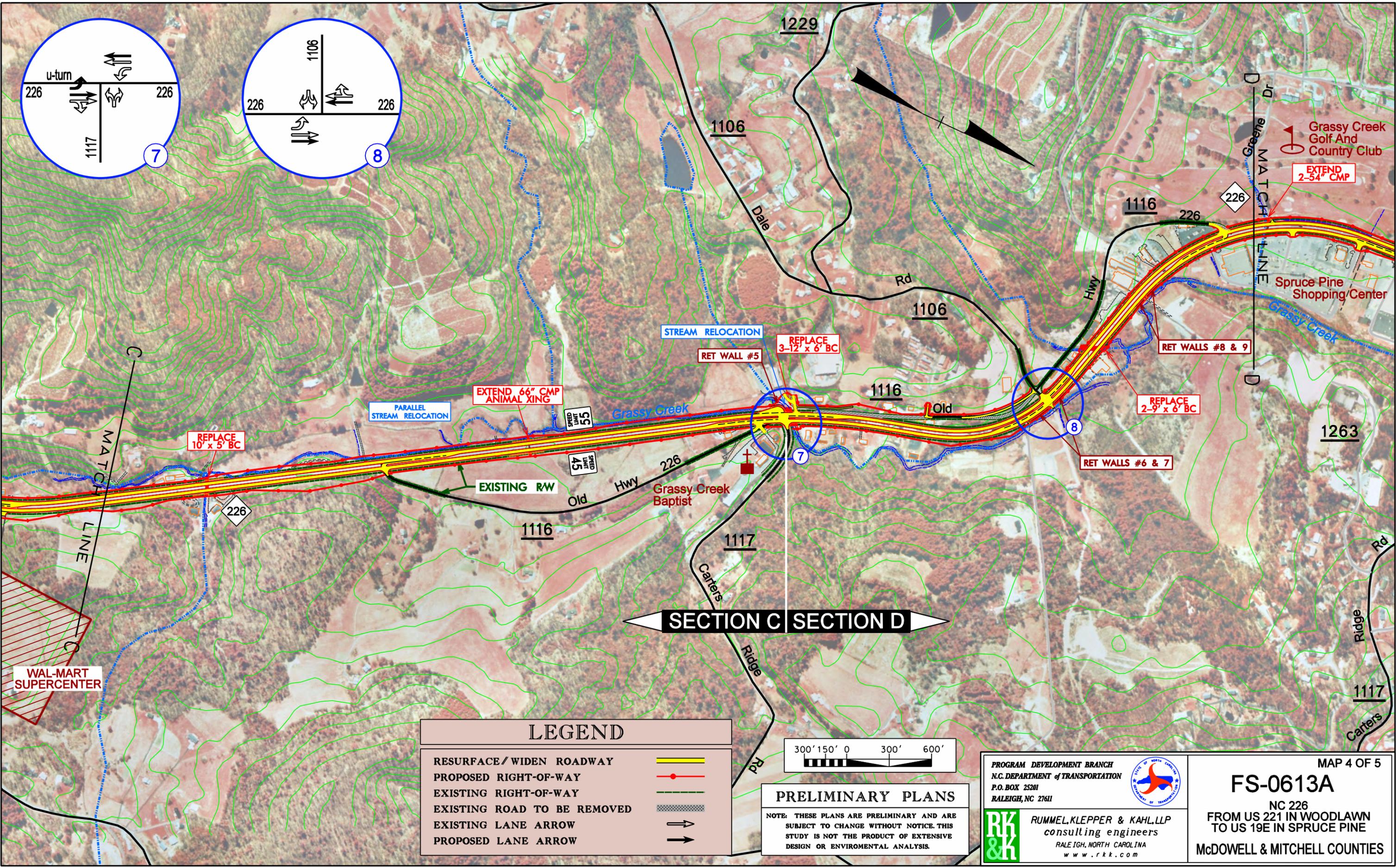
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MAP 3 OF 5

FS-0613A

NC 226
 FROM US 221 IN WOODLAWN
 TO US 19E IN SPRUCE PINE
 MCDOWELL & MITCHELL COUNTIES



SECTION C SECTION D

LEGEND	
RESURFACE/WIDEN ROADWAY	
PROPOSED RIGHT-OF-WAY	
EXISTING RIGHT-OF-WAY	
EXISTING ROAD TO BE REMOVED	
EXISTING LANE ARROW	
PROPOSED LANE ARROW	

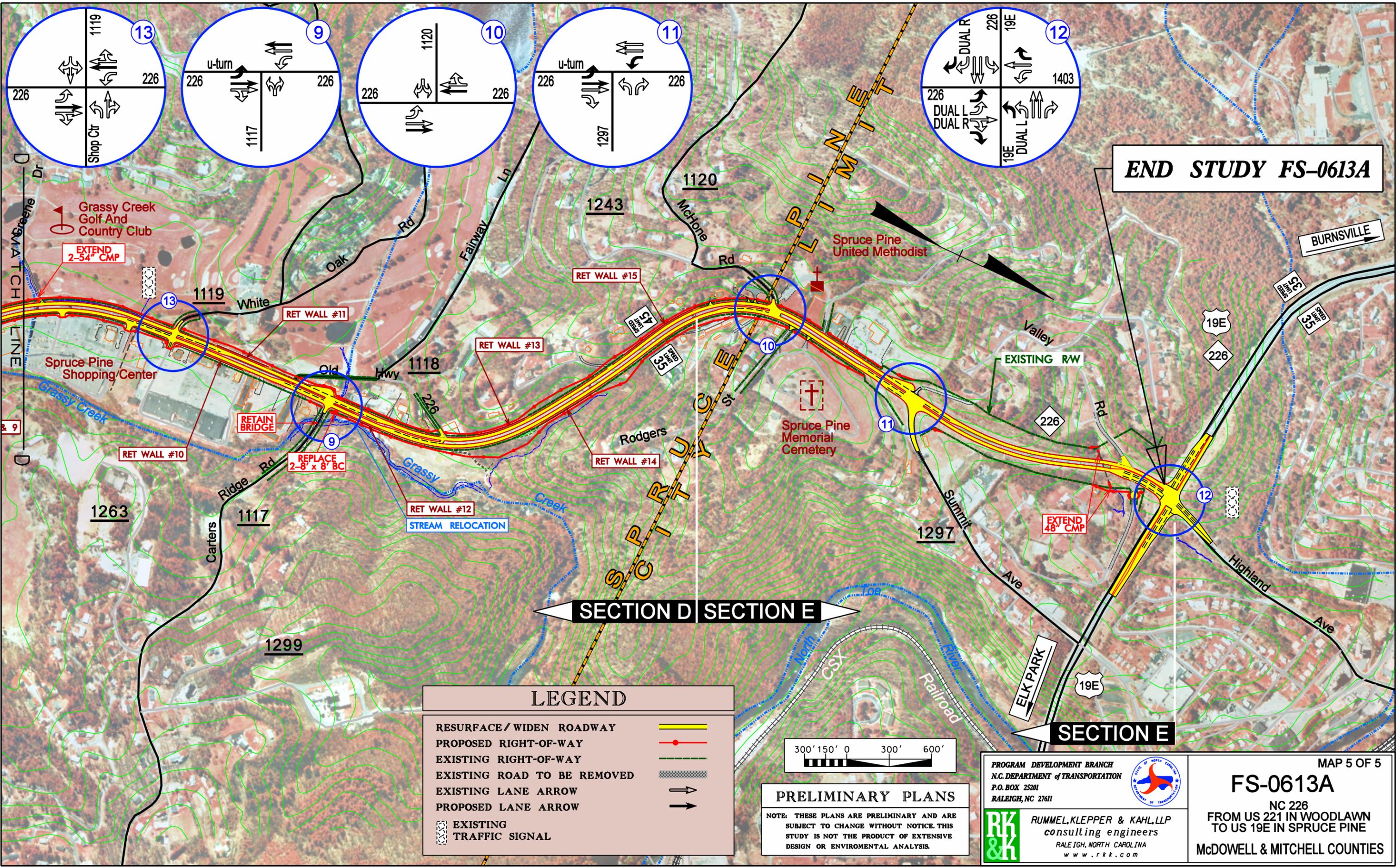


PRELIMINARY PLANS
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MAP 4 OF 5
FS-0613A
 NC 226
 FROM US 221 IN WOODLAWN
 TO US 19E IN SPRUCE PINE
 McDOWELL & MITCHELL COUNTIES



END STUDY FS-0613A

SECTION D SECTION E

SECTION E

LEGEND	
RESURFACE/WIDEN ROADWAY	
PROPOSED RIGHT-OF-WAY	
EXISTING RIGHT-OF-WAY	
EXISTING ROAD TO BE REMOVED	
EXISTING LANE ARROW	
PROPOSED LANE ARROW	
EXISTING TRAFFIC SIGNAL	

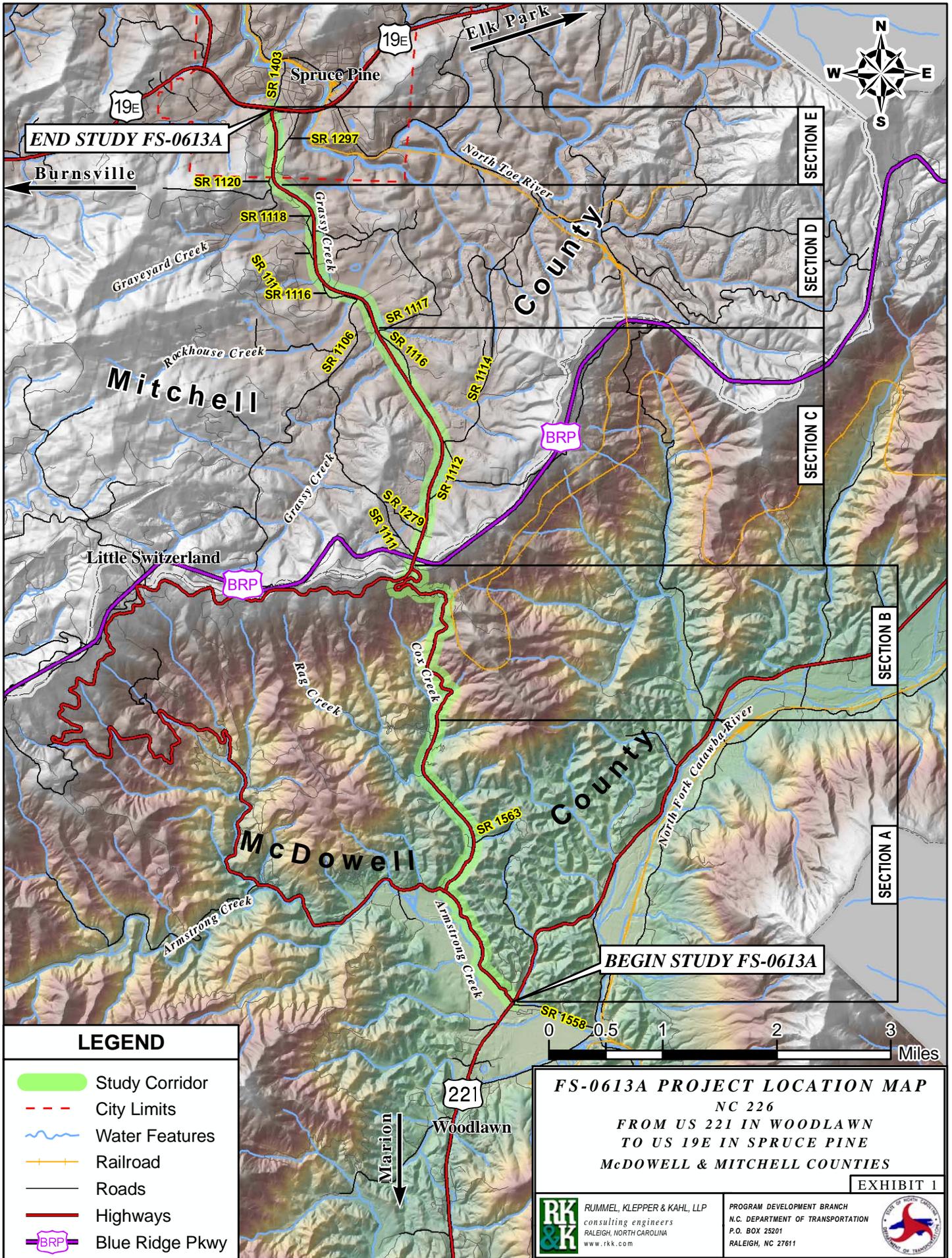


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MAP 5 OF 5
FS-0613A
 NC 226
 FROM US 221 IN WOODLAWN
 TO US 19E IN SPRUCE PINE
 McDOWELL & MITCHELL COUNTIES



END STUDY FS-0613A

Burnsville

Spruce Pine

Elk Park



SECTION E

SECTION D

SECTION C

SECTION B

SECTION A

Mitchell

County

County

McDowell

Little Switzerland

Woodlawn

BEGIN STUDY FS-0613A

LEGEND

- Study Corridor
- City Limits
- Water Features
- Railroad
- Roads
- Highways
- Blue Ridge Pkwy



FS-0613A PROJECT LOCATION MAP
 NC 226
 FROM US 221 IN WOODLAWN
 TO US 19E IN SPRUCE PINE
 McDOWELL & MITCHELL COUNTIES

EXHIBIT 1

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