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FEASIBILITY STUDY

US 421
From East of Wilkesboro to I-77
Wilkes-Yadkin Counties
R-2239

Prepared by
Planning and Research Branch
Division of Highways
N. C. Department of Transportation

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From East of Wilkesboro to I-77
Wilkes-Yadkin Counties
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General Description

This project is included in the 1987-1995 NCDOT Transportation Improvement Program for a feasibility study and/or right of way protection. The following report summarizes the findings of a preliminary study to determine appropriate improvements to the 18.0-mile segment of US 421 from SR 1001 east of Wilkesboro (Wilkes County) to west of I-77 (Yadkin County). The project area is shown in the attached figure.

Existing Facility

US 421 is classified as a Rural Principal Arterial in the North Carolina Functional Classification System. The westernmost 7.2-mile segment of the existing highway between SR 1101 and SR 2433 was constructed in 1967-1968. The remainder of the project was constructed in 1956-1958. No improvements other than resurfacing have been made since original construction was completed.

The westernmost 7.2-mile portion of the existing facility consists of a 2-lane, 24-foot pavement with 12-foot shoulders (4 feet paved) on a right of way varying in width from 260 to 320 feet. From SR 1001 to west of SR 2440 (approximately 4.9 miles) access is fully controlled. Interchanges exist at NC 115 and SR 2433, and grade separations exist at SR 2461 and SR 2340. The structures at these four locations (each carries the intersecting route over US 421) were built to accommodate south side widening to a 4-lane divided facility with a 30-foot median. In addition, the highway is offset within the existing right of way to allow the construction of two additional lanes to the south without acquiring additional right of way.

The remaining 10.8-mile segment of the existing facility consists of a 24-foot pavement with 10-foot shoulders on a 150-foot symmetrical right of way. There is no access control along this portion, and all intersections are at-grade and stop sign-controlled.

The project area is primarily rural in character with commercial and residential development intermixed. Development on either side of the road is about equal. Left-turn lanes have been constructed at SR 2309 and SR 2325. The entire project has a posted speed limit of 55 mph. Approximately 65 percent of the project has unrestricted passing sight distance greater than 1500 feet. The existing alignment is generally good. Terrain in the project area is rolling.

Accident rates (per 100 million vehicle miles) along the project between January 1984 and February 1987 are summarized below:

	US 421 Wilkes Co. <u>15.1 miles</u>	US 421 Yadkin Co. <u>2.9 miles</u>	Statewide average for similar routes <u>(1986)</u>
Total accident rate	87.4	94.2	191.9
Fatal accidents	2.6	0.0	4.0
Non-fatal accidents	33.2	26.9	91.7
Night accidents	27.1	26.9	56.7
Wet accidents	23.6	20.2	44.2

These figures indicate the accident rates along the project are lower than the Statewide rate for rural "US" routes. Twenty-six percent of these accidents involved vehicles running off the road. Thirty-one percent involved rear-end collisions.

Present traffic volumes (1987) range from 9600 vehicles per day (vpd) at the west project terminal to 6300 vpd at the midpoint of the project to 7200 vpd at the east terminal. Truck traffic comprises approximately 14% of these volumes. Traffic volumes at these three locations for the year 2007 are estimated at 16,900, 11,000 and 12,700 vpd, respectively. A capacity analysis of the project indicates that at peak periods of the day the existing highway is currently operating at level-of-service E near the west project terminal and at level-of-service D at the project midpoint and at the east terminal. Based upon the above traffic projections, it is anticipated the entire studied section of US 421 will operate at level-of-service E in twenty years.

Project Terminals

West of the project is a 1.8-mile segment of US 421 which is a four-lane divided facility with full access control. The 1.4-mile segment of US 421 east of the project in the vicinity of I-77 is also a four-lane divided facility with full access control.

Recommended Improvements

It is recommended an additional 24-foot pavement with 10-foot useable shoulders (2 feet paved) be constructed south of the existing highway. A 30-foot grass median should be provided to separate the two pavements. Construction of 2-foot paved shoulders along the existing pavement from SR 2433 to SR 1103 (10.8 miles) is recommended. Milling (approximately 33% of the project) and resurfacing the existing pavement are also recommended.

As noted previously, access along US 421 is fully controlled between SR 1001 and SR 2440. It is recommended partial access control (defined as no driveway connections allowed, but intersections allowed at-grade) be acquired along the remainder of the project (approximately 13.1 miles). In addition, full access control should be acquired down each intersecting road to protect for possible future interchanges.

These features will increase the level of service of the highway and minimize the number of accidents. It is anticipated approximately 100 feet of additional right of way will be required south of the existing highway to accommodate the recommended improvements within the easternmost 13.1-mile segment of the project.

Project Costs

Construction	\$21,900,000
Right of Way	<u>9,600,000</u>
Total project cost	\$31,500,000

Bridge Improvements

The above cost figures do not include costs to upgrade the four Y-line structures located along the project. However, improvements such as rehabilitation and increased vertical clearance beneath each bridge may be warranted and should be considered if the project is implemented. As noted earlier, each bridge was built to accommodate a four-lane divided facility. No main-line structures exist along the project.

Need for Project

US 421 is the principal east-west route in northwestern North Carolina. This highway provides a connector between I-40 (at Winston-Salem), I-77 and the resort areas located within the Blue Ridge Mountains. Local officials and residents from the area are in favor of a multilane US 421 facility.

Several segments of US 421 in northwestern North Carolina are included in the NCDOT Transportation Improvement Program (TIP) for widening to a multilane facility. Completion of these projects would provide a multilane US 421 facility from Winston Salem to Boone, a distance of approximately 76 miles. From I-40 to the Yadkin River (approximately 13 miles) US 421 is presently a four-lane, freeway-type route. The 16-mile segment of US 421 from the Yadkin River to I-77 is included in the TIP for four-laning under Project R-2120. Construction is scheduled for Fiscal Year 1992. Under the subject R-2239 project US 421 would be four-laned from I-77 to east of Wilkesboro (18 miles). Widening US 421 to a multilane facility from west of Wilkesboro to Maple Springs (12 miles) is included in the TIP for a feasibility study under Project R-2240. The 6-mile segment of US 421 from Maple Springs to the Watauga County line is presently a four-lane divided facility with partial access control. The remaining 11-mile segment of US 421 to Boone is scheduled in the TIP to be four-laned beginning in Fiscal Year 1993 under Project R-529.

Anticipated Environmental Impacts

Several streams are crossed by US 421. Box culverts provide cross drainage at each of these locations. Wetland communities may be present along these streams. However, it is anticipated wetland takings

that will result from this project will be minor. Noise levels along the project will likely increase due to the recommended four-laning. Development along the project is sparse. However, the recommended partial control of access feature (no driveway connections allowed) will result in approximately 90 residential and business relocations, unless service roads are provided.

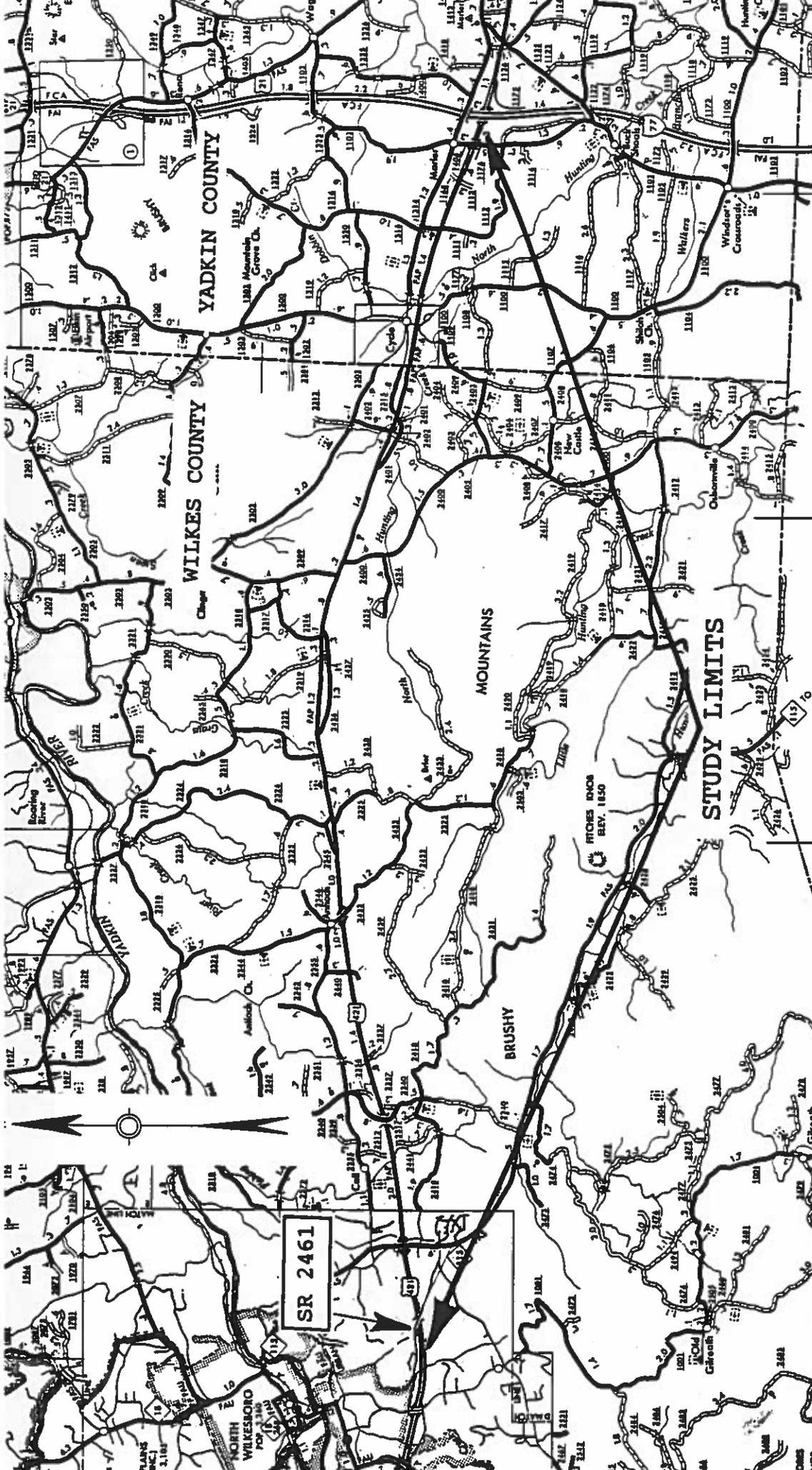
Alternatives

If the project is to be implemented at a future date, all feasible alternatives and their associated impacts will need to be evaluated in a planning/environmental document prior to that time, and a final decision made as to the most appropriate improvement. For example, variations of the access control feature (no control, partial control with one access per property and full control) should be considered. In addition, transitioning to north-side widening to minimize relocations should be considered. Providing service roads to reduce the number of relocations should also be investigated.

Basis of Study

Field investigation and correspondence with the Division Engineer served as the bases for the improvements recommended in this report. An aerial mosaic of the project, original construction plans for the US 421 North Wilkesboro Bypass, and a project report detailing the results of a 1965 study to widen US 421 were used to develop these recommendations. The Right of Way Branch and Design Services Unit provided the cost estimates.

JWS/sdt



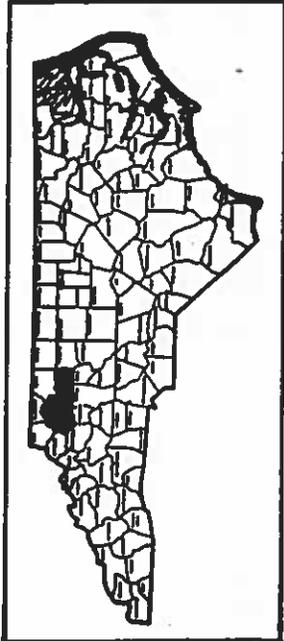
NORTH CAROLINA DEPARTMENT OF
TRANSPORTATION
DIVISION OF HIGHWAYS
PLANNING AND RESEARCH BRANCH



US 421
FROM WILKESBORO TO I-77
WILKES-YADKIN COUNTIES
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WILKES-YADKIN COUNTIES



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