R-2302
Project File

FEASIBILITY STUDY

US 21, Alleghany County
From Twin Oaks to Sparta
R-2302

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

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I. DESCRIPTION

This report covers a preliminary study of the proposed widening and realignment of the subject road to a multi-lane facility for a distance of approximately 2.5 miles. Specifically, the study extends from SR 1347 just west of US 21-221 at Twin Oaks eastwardly to the beginning of a curb and gutter section at Maple Street in Sparta. Location of the project is shown on the attached maps. This project is included in the 1988-1996 Transportation Improvement Program for feasibility and/or right of way protection but is not currently funded.

II. PURPOSE OF PROJECT

Existing Route Characteristics

US 21 is designated as a minor arterial in the statewide highway system. It provides an important routing from I-77 at Elkin through the northwestern section of North Carolina into southwest Virginia.

The studied section of road basically consists of an 18-foot pavement with variable shoulder widths of up to 5 feet. The existing right of way width is 60 feet. The existing alignment is poor with practically no safe passing sight distance. Curves along this route limit safe speeds to 30-35 MPH. Grades range up to 7 percent. From US 221 eastward for approximately one mile, the vertical alignment is a continuous upgrade of 6 to 7 percent.

Roadside development is primarily light to moderate density residential with some commercial uses. Development increases as US 21 approaches Sparta. Most of the development are located close to the existing road. Existing speed limits are 55 MPH outside and 35 MPH inside the Sparta corporate limits. Terrain conditions adjacent to the road is mountainous.

To the east of this project, the adjoining section of road through Sparta has variable 44 to 48-foot curbed widths operating as three lanes, including a continuous center lane for left turns, with parallel parking. To the west of the project, the adjacent section has a 20-foot pavement with adequate shoulders.

Traffic Volumes, Capacity, and Accident Record

Current traffic volumes range from 3500 vehicles per day at Twin Oaks to 9000 vpd in Sparta. Estimated 2010 traffic volumes are 6000 and 15,000 vpd, respectively. These volumes include 4 percent heavy trucks. Beyond Twin Oaks, approximately 40 percent of the traffic continue on US 21 north and the remaining 60 percent travel US 221 west.

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Present capacity along the two-lane facility in rural areas is approximately 1500 vpd at level of service C. In the urban area, capacity increases to about 6000 vpd. Thus, capacity is exceeded by current traffic volumes at all points along the existing road.

Some 24 accidents were reported on the studied portion of US 21 during a four-year period of 1984-1987. This record yielded an accident rate of 1.0 accident per million vehicle miles, which compares favorably with the 1987 statewide average of 1.7 acc/mvm for two-lane US routes.

Need for Project

Purpose of the project is to provide additional lanes with some alignment adjustment for smoother and safer traffic operation. Traffic operation is hindered by inadequate capacity and long grades that significantly reduce truck speeds.

III. RECOMMENDATIONS AND COSTS

Widening and realignment of the studied section of US 21 to an adequate multi-lane facility are immediately warranted. Recommended improvements are as follows: From SR 1347 easterly to a point near SR 1135, widen to a four-lane shoulder section (48' pavement with 10' shoulders, including 4' paved) on an estimated 150-foot right of way. From a point near SR 1135 to the existing curb and gutter section in Sparta, widen to a 4-lane curb and gutter section (52' face to face of curbs) on estimated 80 to 100-foot rights of way. In conjunction with the widening, improvements are recommended to the grades and curves at certain locations.

The above recommendations basically coincide with the preliminary plans of a previous project that was programmed by the State Highway Commission until late 1973 at which time the first statewide, seven-year Highway Improvement Program was published.

Total estimated costs of the recommended improvements are as follows:

Construction		$4,200,000
Right of Way		1,460,000
	Total	$5,660,000

IV. ALTERNATIVES

Due to severe terrain conditions, no other corridor for a US 21 routing was considered feasible.

Consideration was given to reducing the cross section along the western portion of the project where traffic volumes are lower and adjacent terrain conditions are more severe. The lesser cross section would consist of a 3-lane shoulder and/or curb and section section. However, cost estimates prepared by the Roadway Design and Right of Way staff do not show a significant reduction in cost. The total estimated cost for the alternative plan is $5,000,000, a little more than 10% less than the cost of the recommended plan.

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The alternative plan is not as desirable as the recommended plan in that it does not provide a uniform four-lane section throughout the project. A four-lane width is needed to provide passing lanes in both directions. This is especially beneficial where there are steep grades of prolonged lengths that severely affect truck speeds. Furthermore, it would allow left turns without hindering through traffic.

V. ENVIRONMENTAL EFFECTS

The project should have no significant adverse impact on the overall environment. Negative impacts would be limited to the following:

(a) Displacements of approximately 9 residences and 1 business
(b) Possible siltation of the drainage area of Bledsoe Creek
(c) Increased noise level for remaining development adjacent to the improved roadway

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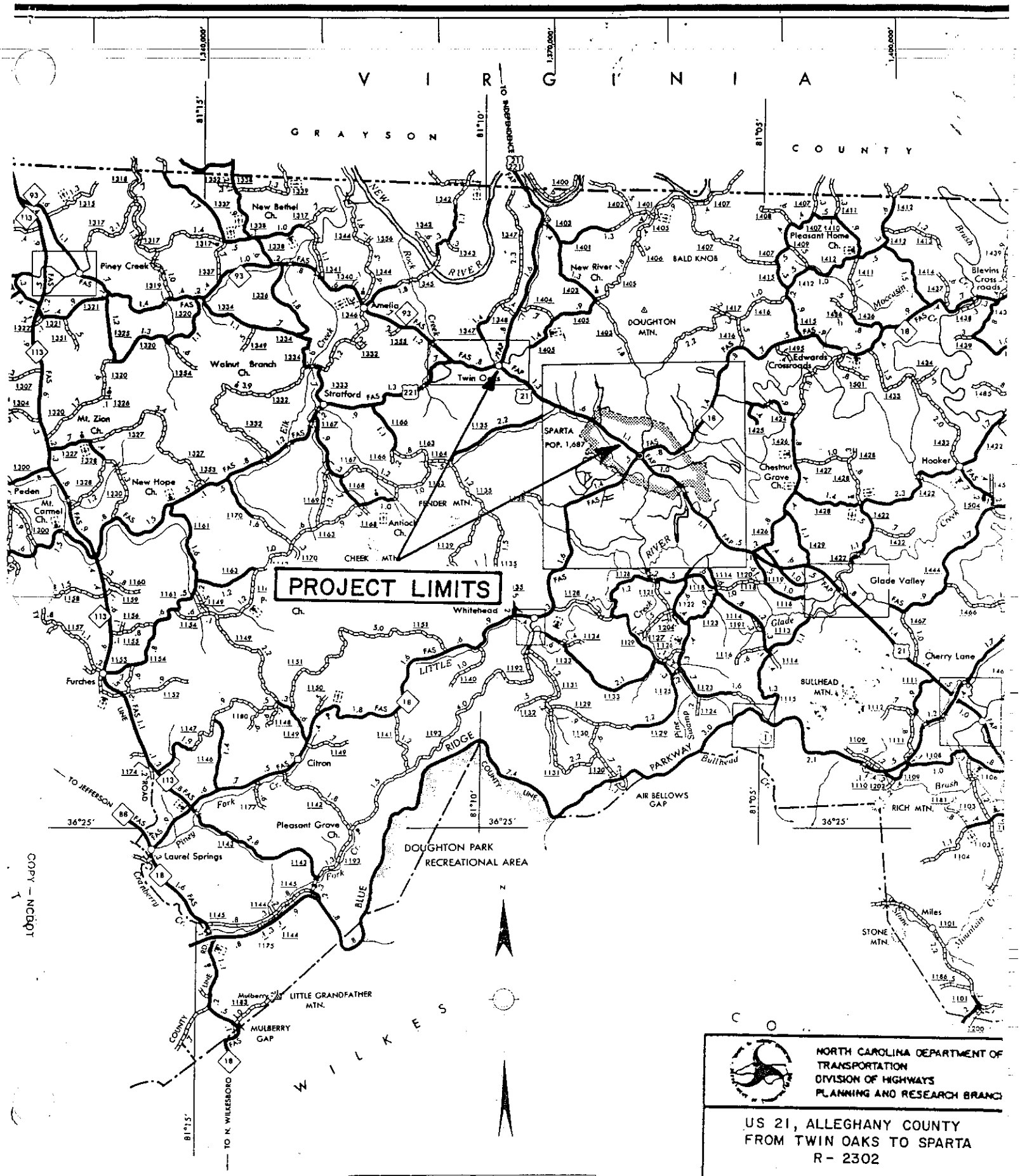

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FROM TWIN OAKS TO SPARTA
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FIG. 1

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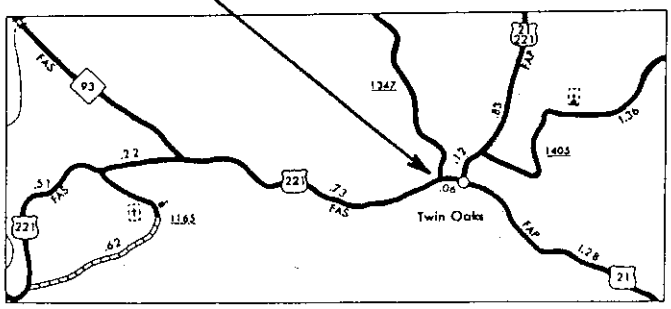
END PROJECT

SPARTA
POP. 1,687

BEGIN PROJECT



TWIN OAKS

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US 21, ALLEGHANY COUNTY
FROM TWIN OAKS TO SPARTA
R - 2302

12/88 FIG. 2

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