U-2202

FEASIBILITY STUDY

NC 105
From US 421 to SR 1107
Boone, Watauga County
T.I.P. # U-2202

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

June, 1987

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From US 421 to SR 1107
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The subject project is included in the 1987-1995 Transportation Improvement Program for feasibility study and/or right-of-way protection. This report provides a brief, initial analysis of possible improvements. The project is not currently funded.

I. GENERAL DESCRIPTION

The subject study reviewed the widening of NC 105 from US 421 to SR 1107, a distance of 2.9 miles. The location of the project is shown on the attached Figure 1. On-the-ground photographs along the project are shown on Figure 2.

For study purposes the project was divided into 3 sections. These sections are shown on Figure 1 and are described as follows:

Section 1: From US 421 to US 321, 0.9 mile
Section 2: From US 321 to east of SR 1625, 0.6 mile
Section 3: From east of SR 1625 to SR 1107, 1.4 mile

Five lane cross-sections with curb and gutter were studied for the project and are considered desirable.

II. PURPOSE OF PROJECT

A. Existing Roadway

NC 105 is a major thoroughfare in the Boone Thoroughfare Plan. The subject roadway serves as an inner loop in the Boone street system.

1. Section 1, from US 421 to US 321 is basically a two-lane roadway with a 22 to 24-foot travelway and 3 to 6 foot shoulders (1 to 2-foot paved). Exceptions to the 2-lane cross-section are three lanes at US 421, a center left turn lane midway of Section 1, and 4 lanes with curbs at US 321.

The speed limit along Section 1 is 35 mph, and exceeds the design speed in places due to the poor horizontal and vertical alignment of the existing roadway.

2. Section 2, from US 321 to east of SR 1625 is basically four lanes, 48 feet face-to-face of curbs with gutter. Section 2 also has five lanes at US 321 and tapers to 2 lanes on the west end of the section.

There are two box culverts located under this section of NC 105. One has a cross-section of 10' X 8' and the other is 7'X 7'.

The speed limit along Section 2 is 35 mph, and the horizontal and vertical alignments are good.

3. Section 3, from SR 1625 to SR 1107 is a two-lane roadway with a 24-foot travelway and 8-foot shoulders (4-foot paved).

This section of NC 105 also has a box culvert with a cross-section of 6' X 6'.

Section 3 has a speed limit of 35 mph on the east half and 45 mph on the west half. Horizontal and vertical alignments along this section are good.

Power lines, street lights, and water lines are located along both sides of Sections 1 and 2 and along most of Section 3.

Right-of-way along the project is that which is maintained (40 to 60 feet).

B. Traffic Volumes and Capacity

Existing traffic along the subject section of NC 105 ranges from 12,000 to 16,000 vehicles per day. Projected future traffic (year 2007) ranges from 25,000 to 32,000 vehicles per day.

The existing roadway is operating at a level of service D-E and improvements are needed to provide a good level of service.

Accident records along the subject roadway for the period of January, 1984 to February 1987 show a total of 238 accidents and no fatalities. The accident rate during this period was 4.45 accidents per million vehicle miles as compared to a statewide average of 3.72 ACC/MVM for similar roadways. Most of the accidents were "rear end slow or stop" (38%) and "angle" (23%).

C. Need for Project

The subject roadway is a major traffic facility in the Town of Boone. This roadway acts as an inner loop for local traffic and as a bypass of downtown for through traffic.

Sections 1 and 2 are already fully developed commercially and the subject roadway also facilitates business traffic to this development. Section 3 is partially developed and is a prime area of economic expansion.

Widening the existing roadway to five lanes will improve existing traffic operations, will aid economic development, and should improve motoring safety along the project.

III. STUDIED IMPROVEMENTS AND COST ESTIMATES

As previously stated, the project was divided into 3 sections for study (see Figure 1). The following cross-sections were considered as being the most appropriate for initial project study:

1. Section 1, from US 421 to U S. 321, a five lane section 59 feet face-to-face of curbs with gutter is proposed to provide the best level of service and least impact upon existing development. An 80-foot wide right-of-way plus easements is suggested for this section.

   Section 1 also has poor horizontal and vertical alignment and it is proposed that the alignment be improved.

2. Section 2, from US 321 to SR 1625, a five lane section, 59 feet face-to-face of curbs with gutter was studied to provide an improved level of service with minimum additional impact upon existing development. An 80-foot wide right-of-way plus easements was studied for this section.

3. Section 3, from SR 1625 to SR 1107, a five lane section, 64 feet face-to-face of curbs with gutter is recommended. Much of the roadside along this section is currently undeveloped and the setback of most existing development is good. A 90-foot wide right of way plus easements is proposed for Section 3.

Cost estimates for each of the three studied sections are as follows:

	Construction[1]	R/W[2]	Total
Section 1	1,400,000	1,218,000[3]	2,618,000
Section 2	525,000	619,000	1,144,000
Section 3	1,800,000	1,062,000[4]	2,862,000
Totals	$3,725,000	$2,899,000	$6,624,000

[1] Construction costs include the cost of culvert extensions, engineering, and contingencies.
[2] Right of way costs include the costs of relocation and utility adjustments.
[3] Section 1 involves 2 residential and 1 business relocatees.
[4] Section 3 involves 1 business relocatee.

IV. ENVIRONMENTAL IMPACTS

The studied project involves 3 stream crossings and culvert extensions. As a result of wetland involvement with these crossings and sections of parallel streambeds, the project may require a Section 404 permit.

The project would also involve the relocation of an estimated 2 residences and 2 businesses.

Based on conversations with officials of the Town of Boone, the project has strong local support and is considered to be of high priority.

V. BASIS FOR FINDING

The information and recommendations of this report are based on the following:

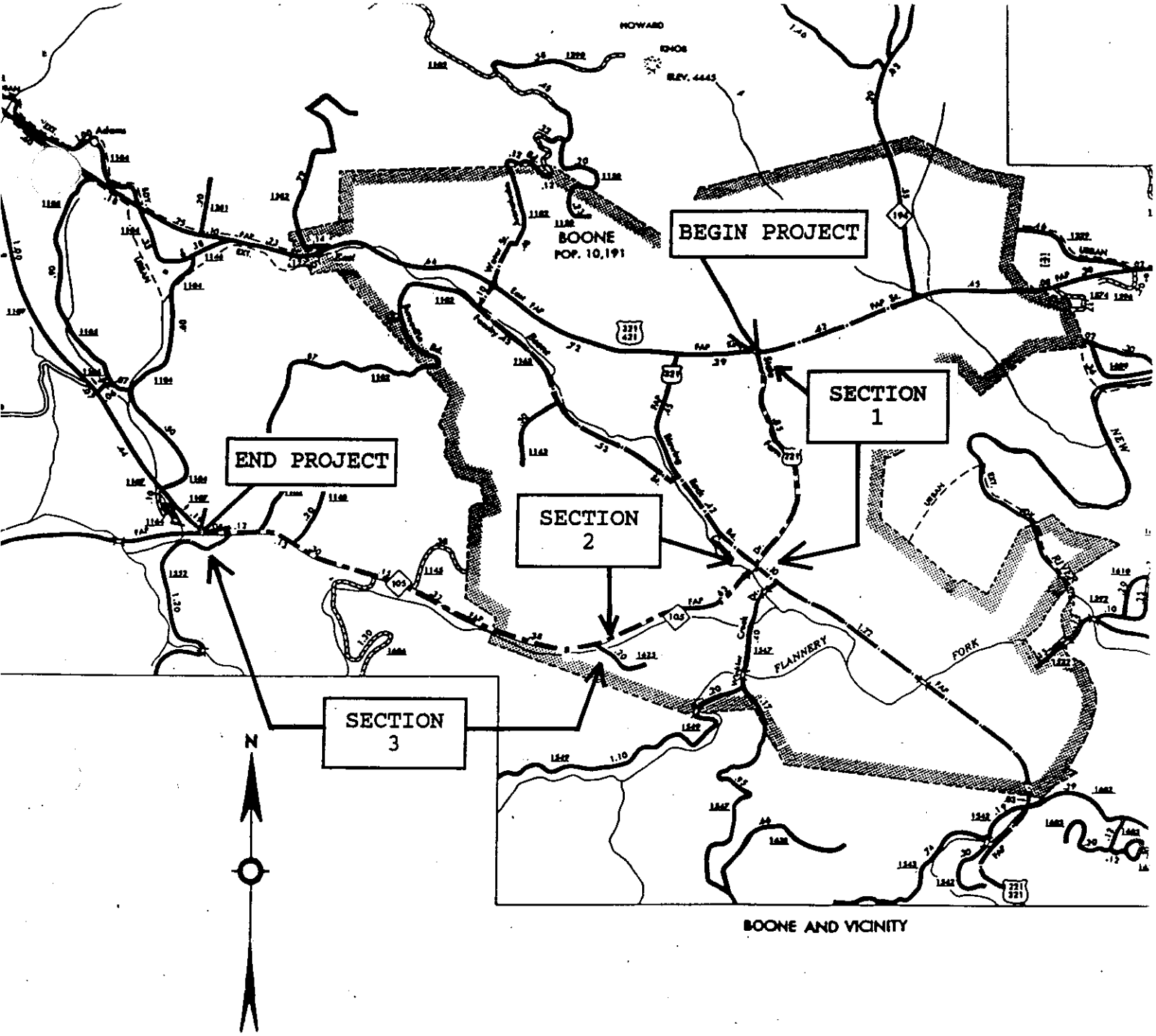
1. Field Investigation
2. Input from the Thoroughfare Planning Unit
3. Contacts with Boone's Town Manager and Town Planner
4. Contacts with the Assistant Division Engineer and Division Traffic Engineer
5. Aerial mapping at 1"=500'
6. Accident reports from the Traffic Engineering Branch
7. Construction cost estimates from the Roadway Design Unit
8. Right of way cost estimates from field personnel of the Right of Way Branch

VI. ADDITIONAL COMMENTS

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.

In view of development that is occurring along Section 3 of the project corridor, the Town of Boone is encouraged to direct development such as to protect right-of-way for the project and to insure good traffic operations.

LVP/rm



BOONE AND VICINITY

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

NC 105

FROM US 421 TO SR 1107
BOONE, WATAUGA COUNTY

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5/87	0 mile 1/2	FIG. 1

NC 105
FROM US 421 TO SR 1107
BOONE , WATAUGA COUNTY
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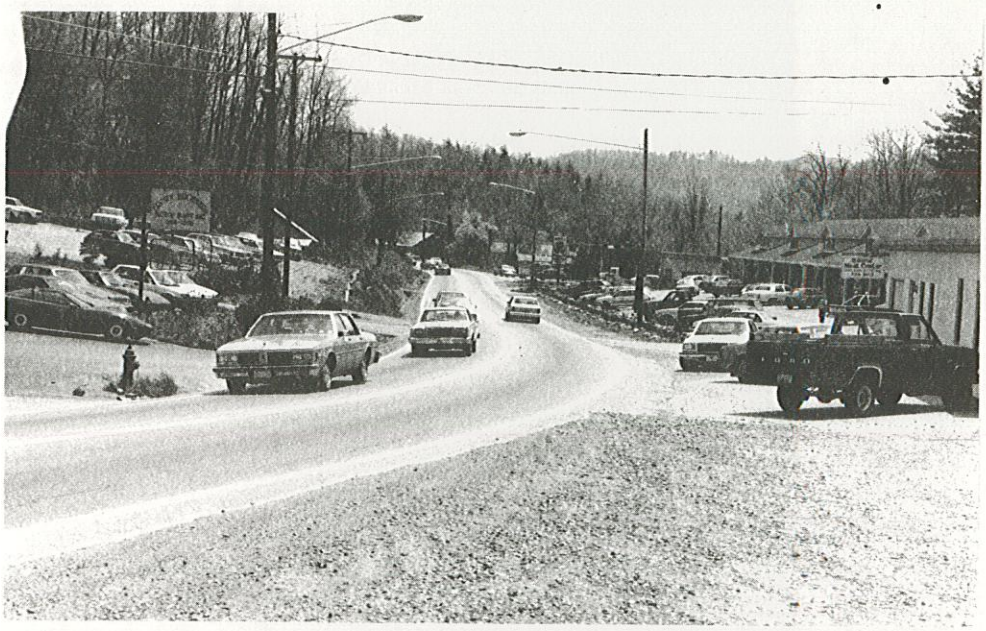
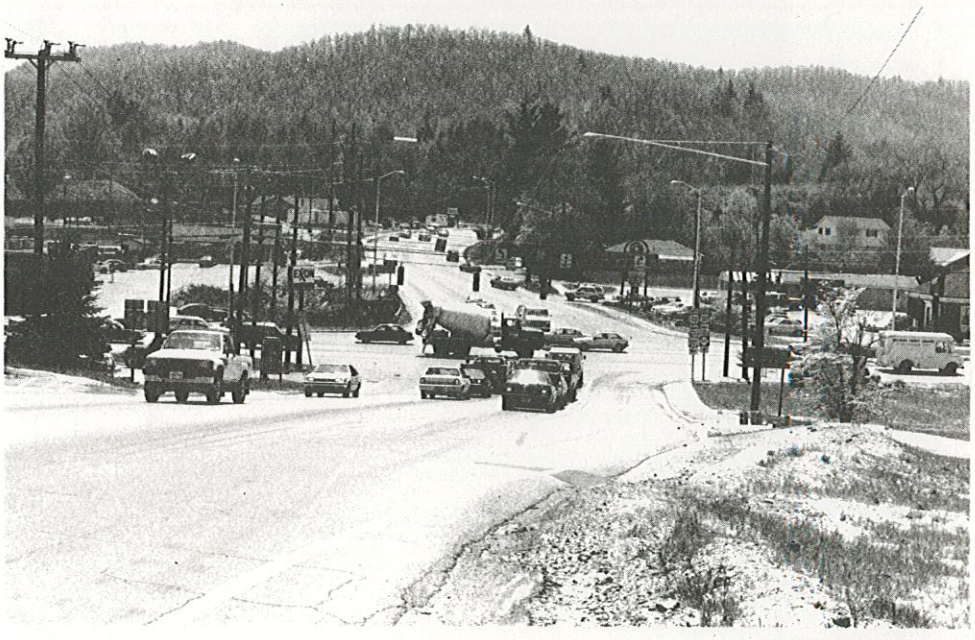


NC 105 BETWEEN
US 421 AND US 321



NC 105 AT US 321

NC 105 ALONG WESTERN
END OF PROJECT

FIGURE 2