FEASIBILITY STUDY

FILE COPY
DO NOT REMOVE

NC 184
from NC 105 to NC 194
Avery County

R-2811

Prepared by
Program Development Branch
Division of Highways
N.C. Department of Transportation

Thomas E. Devens, P.E.
Highway Planning Engineer

Mohammed B. Mustafa
Highway Planning Engineer

9/24/92
Date

Whitmel H. Webb, III, P.E.
Head of Feasibility Studies

Feasibility Study

NC 184
from NC 105 to NC 194
Avery County

R-2811

I. GENERAL DESCRIPTION

This is a feasibility study for the widening of NC 184 for 4.3 miles from NC 105 to NC 194 in Avery County (See Figure 1). This study recommends widening a two-lane shoulder section to a five-lane, 64-foot curb and gutter section with 8-foot berms. Recommended right-of-way ranges from 100 to 375 feet, depending upon cut and fill requirements. Estimated cost is $21,500,000 ($12,700,000 for right-of-way and $8,800,000 for construction).

A feasibility study presents recommended cross sections for improvements, general alignments of improvements, and estimated cost of construction and right-of-way. This study attempts to identify any potential environmental, permitting, or other observed issues which deserve consideration in the planning and construction stages.

This study is not an exhaustive environmental investigation.

II. NEED FOR PROJECT

This project was requested by the Town of Banner Elk. Widening NC 184 to multi-lanes from NC 105 to NC 194 will improve regional transportation needs (See Figure 1). NC 184 is a two-lane highway which provides access to resort areas and small towns in the Blue Ridge Mountains. Golf, snow skiing, and mountain vistas attract large numbers of tourists in summer, fall, and winter. Mountain festivals of various themes also serve to draw large weekend crowds. Because a cluster of resorts centers around the Banner Elk and Grandfather Mountain area, tourism concentrates on the NC 184 corridor.

In this resort area, NC 184 is a primary connector road between NC 105 and NC 194. NC 105 and NC 194 are oriented southwest-to-northeast in Avery and Watauga Counties. Very few roads connect the two highways. Therefore, NC 184 is a major thoroughfare for tourists traveling between various resorts and restaurants in other towns. NC 184 is also a major thoroughfare for regional residents and commercial traffic.

NC 105 is classified as a Principal Arterial in the Statewide Functional Classification System, and is the major thoroughfare between Linville and Boone. It is the preferred route for tourists wishing to visit resort areas in the Banner Elk vicinity. Tourists from the south travel through Linville to NC 105 to NC 184. Tourists from the east and north travel through Boone to NC 105 to NC 184. The Department of Transportation is completing safety improvements on NC 105. Project R-2566 proposes the widening of NC 105 to multi-lanes from Linville to Boone. Because NC 105 will have increased capacity, traffic volumes will likely increase on NC 184, potentially creating a "bottleneck" situation. Therefore, widening NC 184 is the next step for regional transportation needs.

The studied section of NC 184 is a two-lane shoulder section with 22 feet of pavement and 8-foot usable shoulders on 60 to 100 feet of right-of-way with no control of access. The section begins at a signalized intersection with NC 105, and ends at a signalized intersection with NC 194 in Banner Elk. The section has vertical grades up to 7% and horizontal degrees of curvature up to 12%. Trucks climbing hills can significantly impede traffic flow.

Land adjacent to NC 184 is commercially developed, with light industry, motels, condominiums, and many retail shops (See Figure 2). A small amount of adjacent land near Banner Elk is agricultural. Most undeveloped plots are those with a high degree of slope. Cannon Memorial Hospital is located on the north side of NC 184 just east of Banner Elk. The Sugar Mountain resort community is located on the south side of NC 184, and has hundreds of residential units. Sugartop condominium itself has over 300 units; hundreds of other vacation homes and condos are located along the Sugar Mountain access road (Grousemore Drive).

This section of NC 184 is classified as a Rural Major Collector in the Statewide Functional Classification System, and is a Federal Aid Secondary route. NC 184 is a Major Thoroughfare in the 1985 mutually adopted Banner Elk Thoroughfare Plan.

The North Carolina Bicycle Program has determined that no special accommodations for bicycle traffic are necessary.

The 1992 Average Daily Traffic (ADT) ranges from 9,800 to 10,400 vehicles per day (vpd) traveling through the section, with an estimated range of 16,700 to 18,800 ADT in the design year of 2012. The existing road configuration currently experiences a Level Of Service (LOS) E, and is expected to experience a LOS F before the design year. If NC 184 is widened to a five-lane curb and gutter section, level of service at current traffic demand should increase to a LOS B rating, with a LOS D expected in the design year.

During the period from January 1, 1989 through December 31, 1991, a total of 96 accidents were reported along the studied portion of NC 184. This resulted in an accident rate of 223 accidents per 100 million vehicle miles, compared to a statewide average of 202. No fatalities were reported. Most prevalent

accident types were rear-end collisions (31%), turning movements (19%), and running off the road (19%). The recommended cross-section and center left-turn lane should reduce accident rates by providing a wider highway with safer and more efficient turning movements via the sheltered center left-turn lane.

III. RECOMMENDATIONS

It is recommended that NC 184 be widened to a five-lane, 64-foot curb and gutter section with 8-foot berms. Total project length is 4.3 miles, beginning at NC 105 and ending at NC 194 (See Figure 2). The typical section is to contain a center 12-foot left-turn lane with 12-foot inside and outside travel lanes.

Minimum recommended right-of-way is 100 feet, although some cut and fill sections may require as much as 375 feet. No control of access is recommended. This five-lane section will provide a continuous multi-lane highway through the resort area, increasing roadway capacity to meet future traffic demands. It will relieve congestion in developed areas by providing a sheltered left-turn lane, and will encourage future development. Although it is unusual to recommend curb and gutter sections in rural areas, due to the topography of this area, a curb and gutter section is desirable to minimize cut and fill.

Widening should be carried out both symmetrically and asymmetrically as desirable to minimize adverse impacts. The existing alignment of the highway should be retained and utilized to the extent possible.

Consideration should be given to realigning sections of NC 184 to straighten several horizontal curves. It is recommended that NC 184 be realigned on new location between SR 1342 and SR 1337 to eliminate a sharp curve. Slight shifting of alignment should be considered near the curve at SR 1342, the curve at SR 1341, and the curve just south of SR 1338. All realignments should accommodate a 50 mph design speed.

Upgraded traffic signals will be required at intersections with NC 105 and NC 194. NC 194 may require a left-turn lane at its intersection with NC 184. Actuated traffic signals may be required at the entrance to Sugar Mountain condominiums (Grousemore Drive) and at the entrance to public parking for Sugar Mountain (Sugar Mountain Drive).

A retaining wall with a length of approximately 300 feet and height of 15 feet may be required to enable widening in the vicinity of Blue Ridge Village Condominiums.

Structure number 05-162 is a dual, arched pipe (corrugated steel) culvert which carries NC 184 over Shawneehaw Creek (north of SR 1342). A lengthening of this culvert will be required.

Total project cost is estimated at:

Right-of-Way	$ 12,700,000
Construction	$ 8,800,000
Total Project Cost	$ 21,500,000

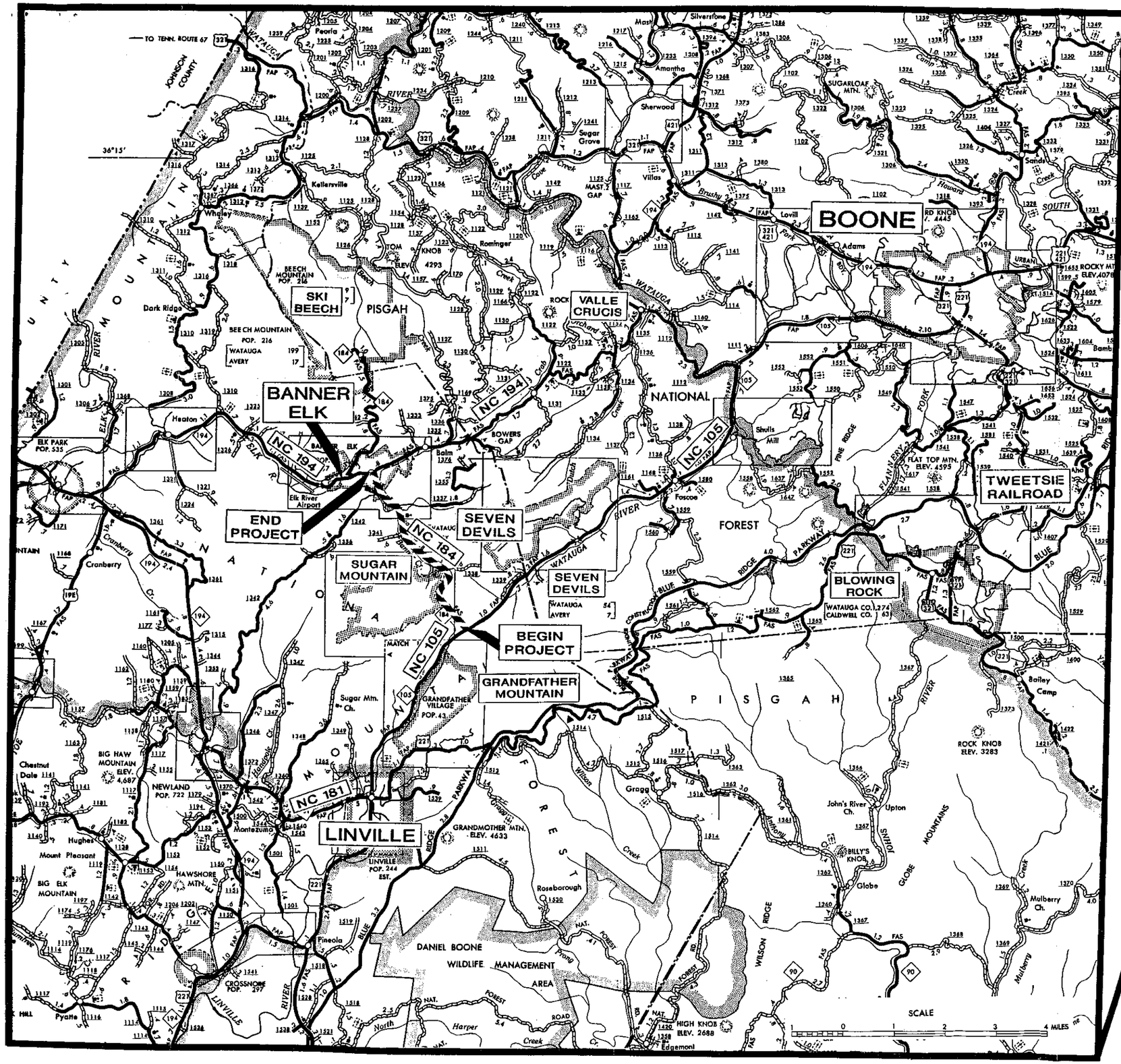
Medium utility conflicts are expected. In some sections, utility poles may be relocated to the opposite side of widening.

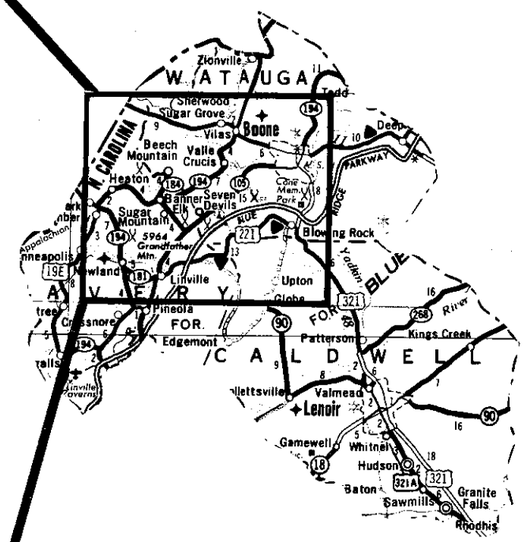
IV. OTHER COMMENTS AND CONCERNS

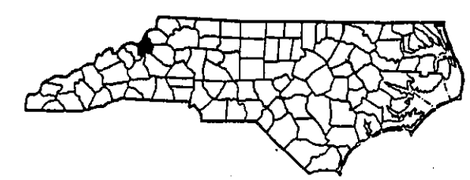
An ecological screening was not conducted for this study. However, the widening of NC 184 may require placing fill in Flattop Creek, Horse Bottom Creek, Shawneehaw Creek, and the Elk River. Because the Elk River is potentially a trout stream, any rechannelization may be subject to restrictions. A Corps of Engineers Individual Permit may be required.

A preliminary historical screening did not identify any sites on or eligible for the National Register of Historic Places.

Twenty business and six residential relocations are expected. No public parks are known to be affected.

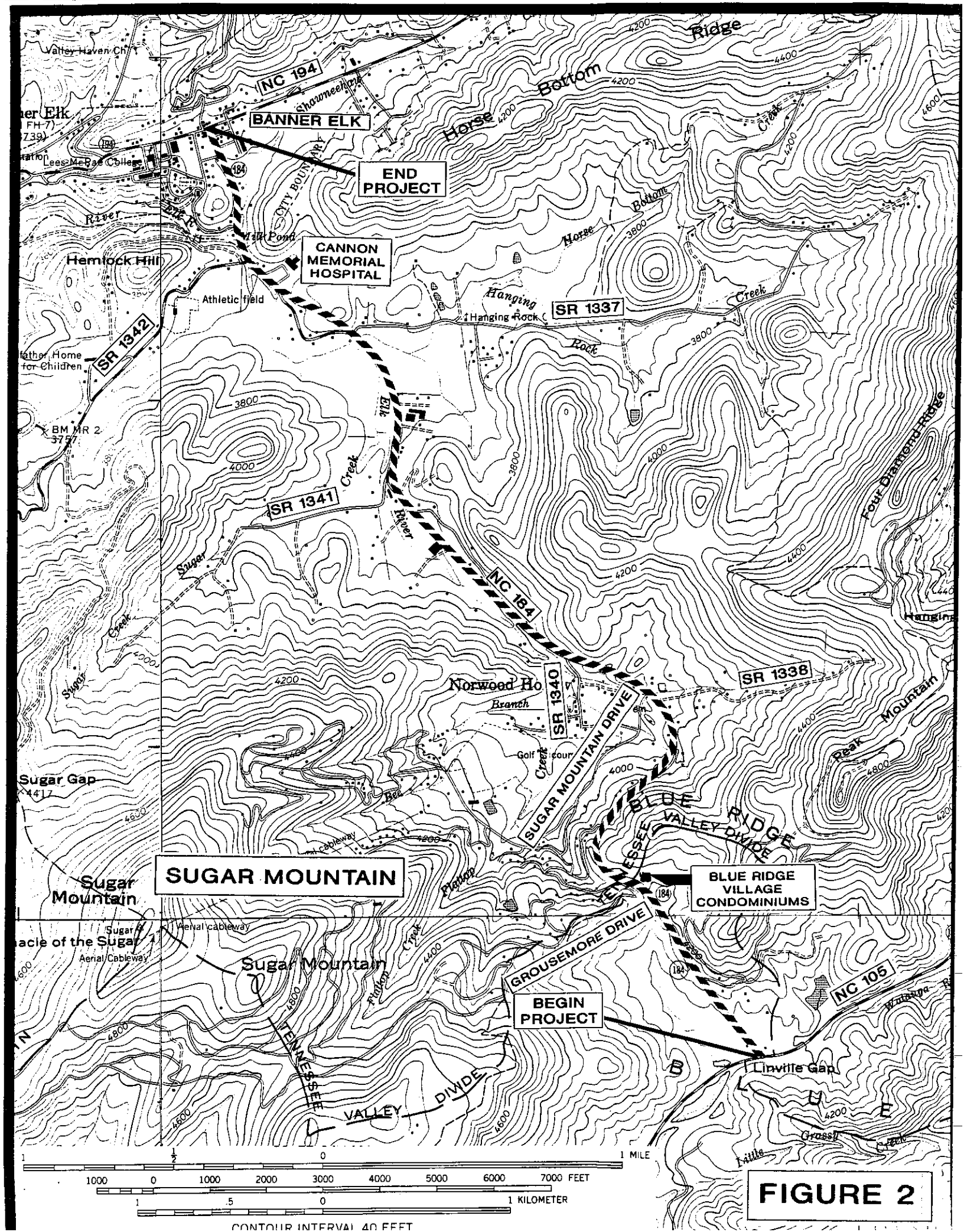






NC 184
FROM NC 105 TO NC 194
IN BANNER ELK
AVERY COUNTY
R-2811

DATE: JULY 1992	FIGURE 1



NC 194
BANNER ELK
END PROJECT
CANNON MEMORIAL HOSPITAL
SR 1337
SR 1342
SR 1341
NC 184
SR 1340
SR 1338
SUGAR MOUNTAIN DRIVE
BLUE RIDGE VILLAGE CONDOMINIUMS
GROUSEMORE DRIVE
BEGIN PROJECT
NC 105
SUGAR MOUNTAIN
Sugar Mountain
Sugar Gap
Hemlock Hill
Athletic field
Hanging Rock
Norwood Ho
Golf Cour
Linville Gap
Four Diamond Ridge
Horse Bottom Ridge
Valley Haven Ch
Lees-McRae College
Aerial cableway
Aerial Cableway
Flatlop Creek
Sugar Creek
Elk River
Hanging Rock Creek
Bee Branch
Little Grassy Creek
Watauga R
Reak Mountain
BLUE RIDGE
VALLEY DIVIDE
TENNESSEE
1 MILE
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 40 FEET

FIGURE 2