

FEASIBILITY STUDY

NC 16, From Lucia to I-40
Gaston, Lincoln, and Catawba Counties
R-2206

Prepared by
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Division of Highways
N. C. Department of Transportation

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I. DESCRIPTION

This report covers a preliminary study of possible improvements to the subject facility extending for approximately 30 miles from the end of the R-58 project at Lucia to I-40 (see Figure 1). This project is included in the 1987-1995 Transportation Improvement Program for feasibility study and/or right of way protection. It is not currently funded. This study examines traffic and roadway conditions along the existing route, function of the route in the overall highway system, and determines the need and practical plan for improvements.

II. HIGHWAY PLANNING IN AREA

From Lucia southward to the end of a divided section north of Charlotte, NC 16 is currently being widened and relocated to provide a four-lane divided highway. This project (R-58) is anticipated to be open to traffic in 1990.

For years, there was a plan to connect the NC 16 project at Lucia with the proposed US 321 Dallas to Hickory freeway (R-85 and R-212) in the vicinity of Lincolnton. The connector was included in the Transportation Program (R-207) until 1981. It was designed to provide high level access for the NC 16 traffic with trips between Charlotte and Lincolnton - Hickory areas. A general location previously studied for the connector is shown on Figure 1. Approximately 1600 feet of right of way has already been acquired for the connector extending west of NC 16 in conjunction with the R-58 project.

US 321 between Dallas and Hickory will be relocated to provide a four-lane freeway. As shown on Figure 1, a portion of the new facility between Dallas and High Shoals is under construction. The remaining portions to Hickory are scheduled for construction at various times from FY 88 to 94. The entire freeway section will probably be open to traffic around 1995.

III. EXISTING NC 16

Function

NC 16 north of Lucia to I-40 is designated as a major collector in the Functional Classification Plans for Gaston, Lincoln, and Catawba Counties and also in the Thoroughfare Plan for Catawba County. (No thoroughfare plans for Lincoln and Gaston Counties are available.) This classification assumes the future connection of NC 16 at Lucia to US 321 at Lincolnton.

The US 321-NC 16 connector, coupled with the ultimately improved section of NC 16 south of Lucia to Charlotte, is shown as a principal arterial on the North Carolina Arterial System Plan. The connector is also included as a major facility in the approved Lincolnton Thoroughfare Plan.

Existing Conditions

The existing road consists primarily of a 24-foot pavement with 5-foot shoulders. The facility widens to variable curb and gutter widths as it passes through the Newton-Conover areas at I-40. Existing right of way is uncertain. From old highway plans, a 100-foot width is indicated for the most part, but few right of way agreements are available to support this width. With few exceptions, alignment of the existing road is good. Maximum curvature is 7 degrees, and maximum grade is 6 percent. Adequate passing sight distance is limited to about 30 percent of the studied length.

The highway is bounded by a noticeable amount of residential development with commercial concentrations at major intersections. Other than the Newton-Conover areas, heaviest buildup occurs in the Denver area which was recently incorporated. Because of increased development, speed limits are reduced to 45 and 50 mph for the most part between Lucia and NC 150. North of NC 150, the speed limit remains at 55 MPH. In Newton and Conover, speed limits drop to 20 and 35 mph. Outside of Newton and Conover, traffic signalization is confined to four locations: NC 73, SR 1387 (Triangle), SR 1373 (Denver) and NC 150.

During 1986, average daily traffic volumes ranged from 7000 vehicles per day at SR 1003 (Catawba County) to 9000 vpd at Denver, to 10,000 vpd near Lucia and 14,000 vpd in downtown Conover. Approximately 10 percent of the total traffic constitutes trucks. A large portion of the NC 16 traffic is through or long distance traffic. The major traffic users are the Hickory-Charlotte area travelers. It is estimated that at least 5000 vpd travel between these areas.

An operating speed of 45 mph is considered the minimum level of service for this facility. At this level of service, the facility can accommodate up to 5000 vpd. On this basis, traffic flow exceeds the road's capacity along the entire studied section. In fact, locations with the highest traffic volumes are almost twice the practical capacity level.

IV. STUDIED IMPROVEMENTS

The need for improvements to NC 16 depends on whether a connector to US 321 as previously mentioned will be provided. With the connector, approximately 50-70 percent of the total traffic and a large majority of trucks could be transferred from NC 16 to the connector. This would offer significant relief to the entire length of NC 16 between Lucia and I-40 to the extent that no major improvements to the existing route would be necessary for many years.

Of several alternative routes considered in past studies for the connector, the most feasible route, which is shown on Figure 1, would be approximately 12 miles long and would cost about \$42.0 million, including \$39.0 million for construction and \$3.0 million for right of way. The cost is based on provision of a 4-lane divided section with limited access and major at-grade intersections.

Without the connector, major improvements to NC 16 would be warranted immediately on the basis of inadequate capacity. Thus, two alternative types of improvement were considered: (1) widening of existing roadway with a bypass of the Denver area, and (2) total relocation. Either plan would extend to the point where a proposed outer loop of the Newton-Conover area would cross NC 16. (The outer loop is recommended in the updated thoroughfare plan for Hickory-Newton-Conover urban areas. The east side loop around Newton and Conover is a priority project locally).

In the widening scheme, approximately 24.0 miles of improvement would be involved, including a 4 to 5-mile relocation around Denver. A bypass on either side of the Denver community (see Figure 2) is appropriate, because available right of way through this area is restricted by the proximity of dense development on both sides of the road. Appropriate cross section for the improvement is a five-lane undivided pavement, with shoulders in certain areas and curb and gutter in other areas. Total cost of the widening scheme is approximately \$38.4 million, including \$8-10 million for the bypass, depending on which side of Denver the bypass would follow. If a 6-mile portion of the Newton-Conover outer loop between NC 16 and I-40 is to be added to give NC 16 traffic improved access to I-40, then the above total cost would increase to \$51.4 million, including \$44.4 million for construction and \$7.0 million for right of way.

Logical location for a possible relocation of NC 16 is west of the existing route as shown approximately on Figure 1. Such a relocation would shorten travel distance slightly and reduce travel time significantly. However, it is a much more costly alternative. To provide a limited access, four-lane divided facility would cost approximately \$86.4 million, increasing to a \$99.4 million if the outer loop portion is included. The total cost includes \$91.4 for construction and \$8.0 million for right of way.

V. RECOMMENDATION

For years, it has been the desire of local interests that the planned improvement of NC 16 be extended northward from Lucia to Newton. Such an improvement is certainly warranted by the overloading volume of traffic, especially trucks, that use the existing route.

The problem facing NCDOT is there are two major routes in the general area - US 321 and NC 16 that need extensive improvements. To upgrade both highways to high type facilities for the entire length to I-40 is beyond the realm of economy. In these days of funding constraints, the money required to accomplish both is simply not available.

Thus, the most cost effective way to address the total highway needs in the Charlotte-Hickory corridor is to revive a prior long-standing plan to connect NC 16 at Lucia with proposed US 321 at Lincolnton. Such a connection (noted as R-207 in the TIP until 1981) would: (1) provide high level service to through traffic, (2) provide significant traffic relief to existing NC 16 and thereby improve operating conditions, (3) comply with all area thoroughfare plans, and (4) more importantly, be a more economical plan than the alternative of relocating a lengthy section of NC 16. Total estimated cost is \$42 million.

There is no way to significantly improve existing NC 16 short of four-laning some 24 miles and constructing part of a loop around Newton/Conover at a cost of over \$51 million. Included in this would be a bypass of the Denver area to avoid major impacts on dense development adjacent to the existing road. Bypassing Denver at a cost of about \$8 million without widening the remainder of the road would provide traffic relief to the community, but would do little to improve total traffic operations between Charlotte and Hickory.

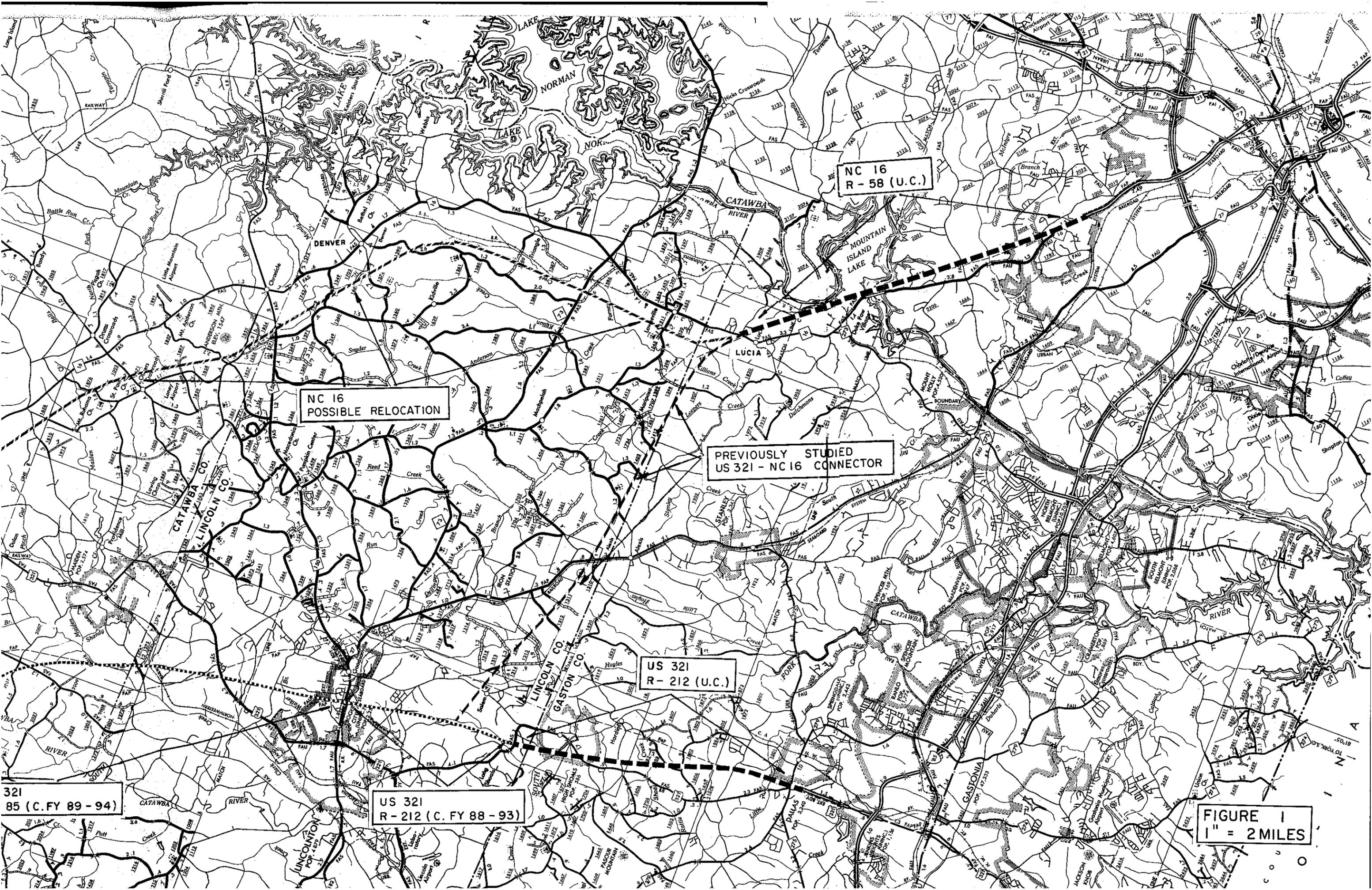
Since it is highly unlikely that both a widening of NC 16 and a new connector to US 321 could be funded, the region is best served by the construction of the connection, noting that this in turn removes sufficient traffic from NC 16 north of Lucia to improve traffic operations to an acceptable level.

VI. OTHER COMMENTS

Potential negative impacts of the new connector between NC 16 and US 321 are: (1) removal of agricultural and timber lands from production; (2) loss of wildlife habitat, (3) new stream crossings with filling of wetlands, and (4) relocation of residences and businesses. However, the alternative of widening NC 16 would have greater negative impacts on existing development along NC 16 and subject the people along NC 16 to an increasing volume of traffic and vehicular noise to contend with.

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.

RGD/sdt



NC 16
R-58 (U.C.)

NC 16
POSSIBLE RELOCATION

PREVIOUSLY STUDIED
US 321 - NC 16 CONNECTOR

US 321
R-212 (U.C.)

321
85 (C.FY 89-94)

US 321
R-212 (C.FY 88-93)

FIGURE 1
1" = 2 MILES



PROPOSED OUTER LOOP

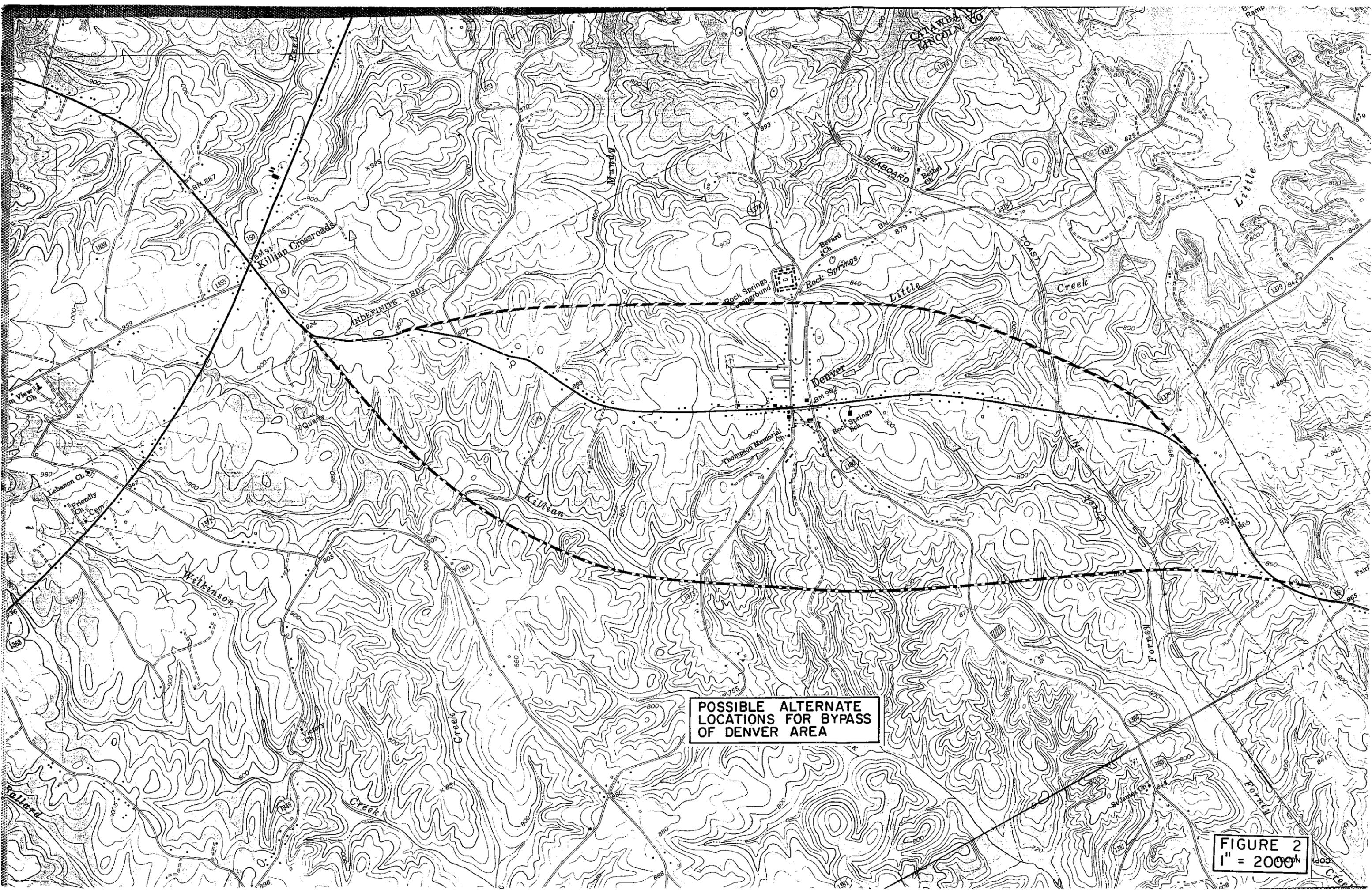
NC 16 POSSIBLE RELOCATION

PREVIOUSLY S US 321 - NC 16

US 321 R-212 (U.C.)

US 321 R-85 (C.F.Y. 89-94)

US 321 R-212 (C.F.Y. 88-93)



POSSIBLE ALTERNATE
LOCATIONS FOR BYPASS
OF DENVER AREA

FIGURE 2
1" = 2000'