

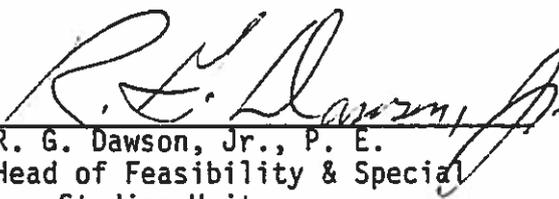
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FEASIBILITY STUDY

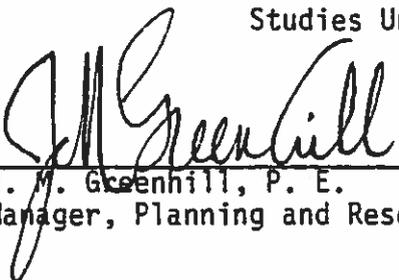
NC 28  
From Fontana Village  
To US 19  
Graham and Swain Counties  
R-2407

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

  
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## I. GENERAL DESCRIPTION

This report covers the improvement of NC 28 to more modern two-lane roadway standards from Fontana Village to US 19 (See Figures 1 and 2). The proposed project is 24.7 miles long. This project is included in the 1988-1996 Transportation Improvement Program for feasibility study and/or right-of-way protection.

## II. PURPOSE OF PROJECT

### Existing Route Characteristics

NC 28 is the primary access into the resort area around Fontana Village. It is classified as a Minor Arterial in the North Carolina Functional Classification System and is a Federal Aid Primary route.

For purposes of this study, the project is divided into three sections (See Figure 2). Section A extends from the bridge at Lake Cheoah to SR 1245, a distance of 3.8 miles. Section B is 12.5 miles long, extending from SR 1245 to SR 1235. Section C runs from SR 1235 to US 19, a distance of 8.4 miles. These three sections were chosen because of the existing changes in cross section, alignment, and grade that occur on NC 28 at SR 1235 and SR 1245.

The existing cross section on Section A of the project consists of a 20-foot paved roadway with 2-foot unpaved shoulders. The horizontal alignment is poor with numerous curves of 20° or greater resulting in a design speed of approximately 20 mph. The vertical alignment is also poor. This entire section is on a steep grade varying from 7% to 12%. On Section B, the pavement width widens to 22 feet and the shoulders vary from 2 to 4 feet in width. The horizontal alignment is fair throughout this section. There are 62 horizontal curves of 10° or greater including twenty-eight 20° curves. The vertical alignment is also considered to be fair for this mountainous region. Approximately 60% of the roadway on this section has a grade of 3% or greater with the maximum grade being 8%. Section C also has a 22-foot pavement, but the shoulders are uniform 6 feet wide throughout this section. Both the horizontal and vertical alignments are considered to be good on this section. Approximately 35% of the roadway on is on a grade of 3% or greater with the maximum grade being 8%. There are nine 10° curves on this section of the project but no curves in excess of 10°. The right-of-way throughout the project length is claimed 30 feet, symmetrical about the existing centerline, with some specific parcels where 100-foot and 150-foot rights-of-way have been recorded.

All intersections along the studied portion of NC 28 are at grade and are stop sign controlled. The speed limit on NC 28 is 55 mph.

There is one bridge on the project. It is located approximately 1 mile west of US 19 where NC 28 crosses over the Nantahala River portion of Fontana Lake and the Southern Railway. This bridge was constructed in 1988 and has a clear roadway width of 32 feet. This bridge will not need any upgrading in conjunction with the proposed project.

At the western project terminal, the roadway ties into the bridge over Lake Cheoah (Little Tennessee River). This bridge is 529 feet long with a clear width of 19.8 feet. This bridge was built in 1943 and has a sufficiency rating of 54.7 out of a possible 100 points. West of this bridge, NC 28 has a 22-foot roadway with 2-foot unpaved shoulders. At the eastern project terminal, NC 28 ties into US 19 and runs concurrent with US 19 for 3.1 miles before turning southward at Lauada. The portion of US 19 from NC 28 eastward to the existing four lanes (0.91 mile) is scheduled to be upgraded to a four-lane facility in the 1988-1996 North Carolina Transportation Improvement Program. Construction is scheduled to begin in fiscal year 1989.

### Traffic Volumes, Capacity and Accident Record

The current traffic volume on NC 28 ranges from a high of 1600 vehicles per day (vpd) at the US 19 intersection to a low of 700 vpd in the vicinity of SR 1267. These volumes are projected to increase to approximately 2900 vpd and 1400 vpd, respectively, by the year 2010 (See Figure 3). With these traffic volumes, the existing highway will operate at Level of Service C or better throughout the planning period.

During the period from January 1, 1985 through December 31, 1987 a total of 17 accidents were reported on the studied portion of NC 28. This resulted in an accident rate of 336.9 accidents per 100 million vehicle miles (ACC/100 MVM) compared to a statewide average of 223.2 ACC/100 MVM for all two-lane, rural NC routes over the same period. There were no fatalities during the period, but 9 of the accidents resulted in injuries. The primary accident type involved vehicles running off the road. This type of accident accounted for 65% of the recorded accidents. Provision of a wider pavement and shoulders should reduce the potential for this type of accident.

### Need for Project

The widening of the NC 28 pavement, along with the provision of wider shoulders, will enhance the safety and driving comfort on the highway. The existing paved roadway has many blind curves, and the shoulders are too narrow for disabled vehicles to pull onto in case of an emergency.

## III. RECOMMENDATIONS AND COSTS

It would be desirable to widen NC 28 to an improved two-lane roadway with adequate shoulders. The recommended cross section is a 22-foot paved roadway with 2-foot paved shoulders, and total 6-foot usable shoulders. On Sections A and B, the pavement widening should be accomplished on the inside of the curves, where practical, to improve the curvature of the highway. On Section C, the recommended improvement is the resurfacing of the existing 22-foot paved roadway and the addition of 2-foot paved shoulders within the existing 6-foot usable shoulders. The additional pavement widening on Section C should be symmetrical about the existing centerline. This improvement should greatly improve safety and driver comfort along NC 28.

The total estimated costs of this project are as follows:

Construction	\$ 17,700,000
Right-of-Way	\$ <u>3,200,000</u>
TOTAL	\$ 20,900,000

The construction cost includes engineering and contingencies and the right-of-way cost includes acquisition and utility costs.

#### IV. STAGING

Because of the costs involved with widening a long section of highway and the three distinct sets of alignment and cross section characteristics along NC 28, the project is divided for possible staging into three sections described in Section I and shown on Figure 2. The table below shows the length, estimated number of relocatees and estimated costs of each of the three sections:

HIGHWAY SECTION	LENGTH (Miles)	RELOCATION		COST		TOTAL
		RESIDENCES	BUSINESSES	CONSTRUCTION	RIGHT-OF-WAY	
A	3.8	0	0	\$ 5,600,000	\$ 600,000	\$ 6,200,000
B	12.5	6	1	\$ 8,800,000	\$2,600,000	\$11,400,000
C	8.4	0	0	\$ 3,300,000	0	\$ 3,300,000
				<u>\$17,700,000</u>	<u>\$3,200,000</u>	<u>\$20,900,000</u>

If a decision is made to stage construct the project, it is recommended Section A be built initially. Section A should be given first priority because it has narrower pavement and shoulders constructed on critical alignment. Section B is recommended for the second priority, leaving Section C for the final stage of the improvement. The existing roadway characteristics of Section C are less critical than those of the other segments of the studied project.

#### V. ALTERNATIVES

Since the project involves the improvement of an existing roadway through an area where the location is restricted by the heavy mountainous terrain, no alternative alignments were considered.

A wider cross section containing 12-foot travel lanes was considered for the improvement of NC 28. This cross section would increase both the construction and right-of-way costs. The estimated cost of this wider alternative is \$28,400,000, including \$22,900,000 for construction and \$5,500,000 for right-of-way. It would also require the relocation of an additional 10 residences and 5 businesses. Since the recommended cross section will provide adequate capacity at a lower cost, and with fewer relocatees, the wider roadway width is not recommended.

## VI. ENVIRONMENTAL EFFECTS

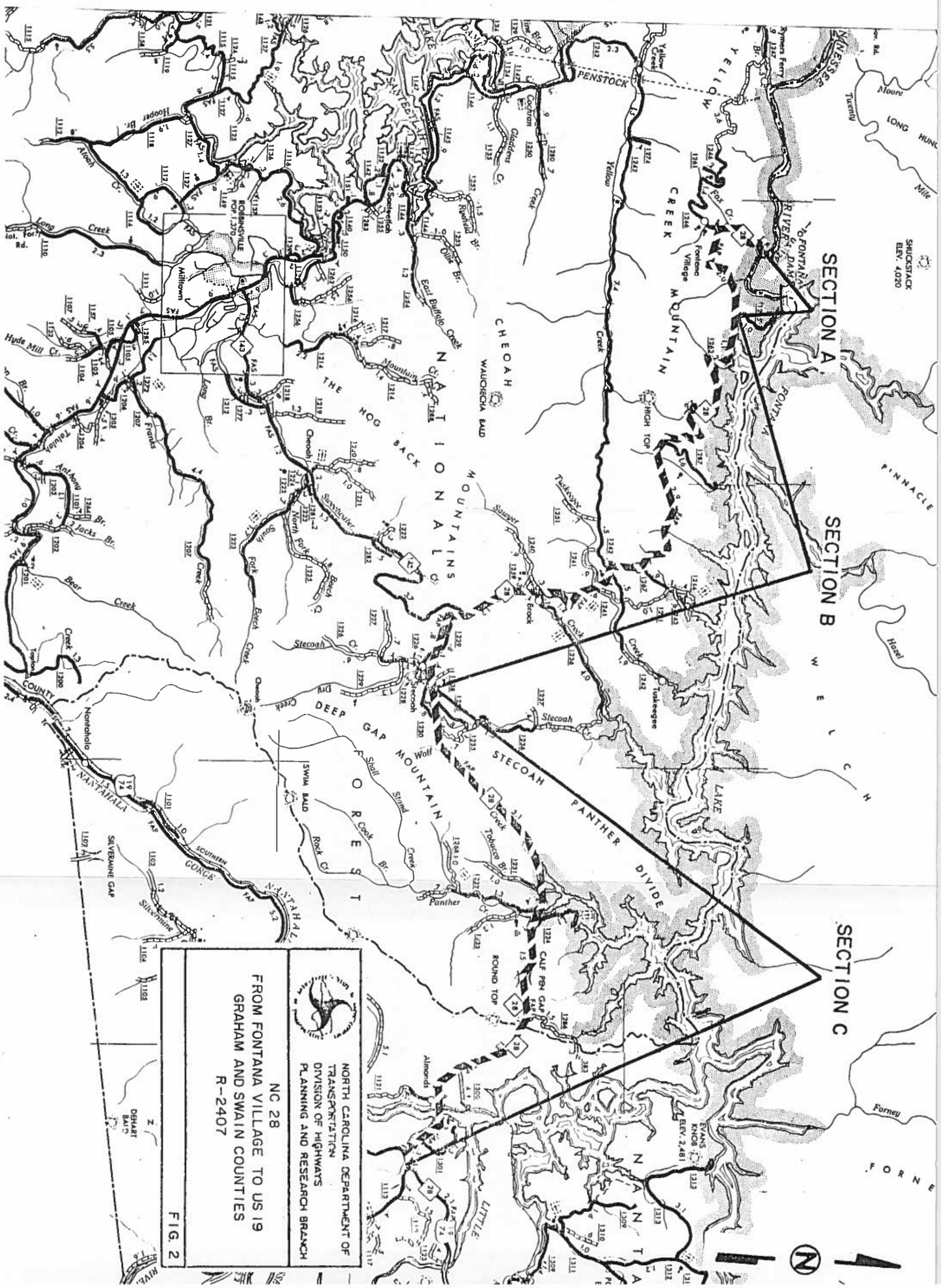
The implementation of the proposed project is not expected to result in any significant impact on the environment. The construction of the project will require the relocation of an estimated six residences and one business. The project will also result in increased noise levels for remaining development adjacent to the roadway. NC 28 crosses the Nantahala River as well as numerous smaller streams between Fontana Village and US 19. Several of these streams are designated trout streams. In addition, the Little Tennessee River (which the project area drains to) and some of its tributaries are habitat for the Spotfin Chub. This fish is federally listed as an endangered species. If any of the streams crossed by the project are found to be habitat for the Spotfin Chub, the construction of the project will require agency consultation with the U. S. Fish and Wildlife Service and other interested federal agencies. In any case, measures to minimize impacts on these streams should be implemented, such as special construction techniques to minimize impacts and stringent erosion control measures. Other impacts will be primarily related to the actual construction of project and will cease upon completion of the project. These include increased noise levels from construction machinery and delay and inconvenience to motorists using NC 28.

## VII. FUTURE ACTIVITIES

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.

RBD/plr





SECTION A

SECTION B

SECTION C

  
 NORTH CAROLINA DEPARTMENT OF  
 TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 PLANNING AND RESEARCH BRANCH  
 NC 28  
 FROM FONTANA VILLAGE TO US 19  
 GRAHAM AND SWAIN COUNTIES  
 R-2407  
 FIG. 2

NC 28, FROM FONTANAVILLAGE TO US 19-74  
IN GRAHAM AND SWAIN COUNTIES  
ESTIMATED 1990/2010 ADT IN HUNDREDS

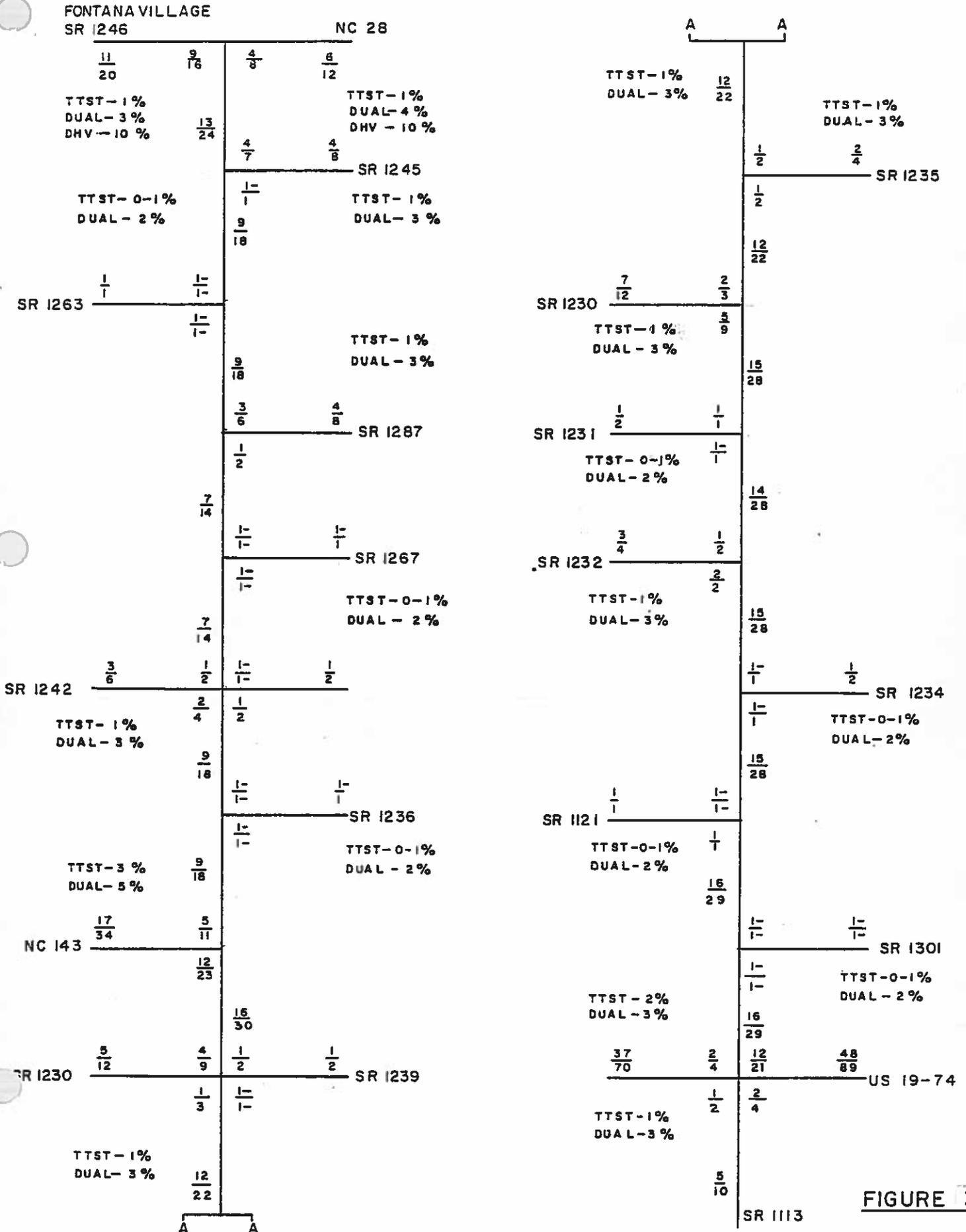


FIGURE 3