FEASIBILITY STUDY

Wilmington

Widen US 17-74-76 / NC 133
From the NC 133 / SR 1472 Interchange
To the US 421 / NC 133 Interchange
Brunswick County

Division 3

R-3601

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

Derrick W. Lewis, P.E.
Feasibility Studies Engineer

H. Franklin Vick, P.E.
Head of Feasibility Studies

3/2/01
Date

Wilmington
Widen US 17-74-76 / NC 133
From the NC 133 / SR 1472 Interchange
To the US 421 / NC 133 Interchange
Brunswick County
R-3601

I. General Description

This feasibility study describes the widening of US 17-74-76 / NC 133 in order to provide ramp to ramp auxiliary lanes between the NC 133 / SR 1472 and US 421 / NC 133 Interchanges, a distance of 1.5 miles (2.4 km). The project location is shown on Figure 1. Considering the wetland conditions along this project, we evaluated both widening toward the shoulder and median as possible alternatives. With either alternative, we recommend widening Bridge No. 108 over the Alligator Creek as well as both bridges (No. 103 and No. 105) over the Brunswick River. However, Bridge No. 107 over the Alligator Creek will need to be replaced under this project. It is anticipated that there will be no residences or businesses relocated due to this project.

The total cost for each of these alternatives, including construction and right-of-way, is as follows:

Alternative	*Cost*
1. Widening to the outside shoulder.	$13,530,000
2. Widening to the median in order to provide ramp to ramp lane between the NC 133 / SR 1472 and US 421 / NC 133 interchanges.	$10,850,000 (Recommended)

This study is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including costs, and to identify potential problems that may require consideration in the planning and design phases.

II. Need for Project

The purpose of this project is to improve the traffic safety and operations of US 17-74-76 / NC 133 by providing an auxiliary lane in each direction from the NC 133 / SR 1472 interchange to the US 421 / NC 133 interchange. These auxiliary lanes will improve the weaving / merge area between the interchanges and reduce the adverse traffic impacts of the Cape Fear Memorial Bridge.

US 17-74-76 / NC 133 is designated as a freeway in the Brunswick County Thoroughfare Plan and in the North Carolina Statewide Functional Classification System.

There is no development within the project limits. US 17-74-76 / NC 133 is currently a four-lane divided controlled-access roadway with 12-foot (7.3 m) travel lanes, 10-foot (3.0-m) paved outside shoulders, 4-foot (1.2-m) paved inside shoulders, and a variable 68-foot (20.7-m) to 200-foot (61.0-m) median.

Bridge No. 103 carries eastbound traffic over the Brunswick River. This bridge is 777 feet (236.9 m) long with a deck width of 42.0 feet (12.8 m). Built in 1977, this bridge currently has a sufficiency rating of 96.5.

Bridge No. 105 services westbound traffic over the Brunswick River. This bridge is 786 feet (239.6 m) long and has a deck width of 42 feet (12.8 m). Built in 1977, this bridge currently has a sufficiency rating of 85.3.

Bridge No. 107 carries eastbound traffic over Alligator Creek. This bridge is 236 feet (72.0 m) long with a deck width of 39.0 feet (11.9 m). Built in 1948, this bridge currently has a sufficiency rating of 57.1.

Bridge No. 108 services westbound traffic over Alligator Creek. This bridge is 287 feet (87.5 m) long and has a deck width of 36.7 feet (11.2 m). Built in 1968, this bridge currently has a sufficiency rating of 78.8.

TIP Project R-2633 will construct US 17 Bypass as a four-lane divided facility on new location. It is anticipated that the construction of the US 17 Bypass will divert traffic from existing US 17-74-76 / NC 133.

There are several utilities buried in the shoulders and attached to the bridges on this project, including CATV and fiber optic cable, as well as underground power lines for adjacent highway lighting.

The current year Average Daily Traffic (ADT) along US 17-74-76 / NC 133 is 55,000 vehicles per day (vpd). For the design year 2025, the estimated traffic volumes on this facility will be 92,400 vpd. Truck traffic is estimated to make up six percent of daily traffic.

Currently, this section of US 17-74-76 is operating at Level of Service (LOS) D. If no improvements are made, it is projected that the roadway will operate at LOS F in the design year 2025. If US 17-74-76 is widened to provide a ramp to ramp lane between the US 421 / NC 133 and NC 133 / SR 1472 interchanges, the facility should operate at a LOS C in the current year and at LOS F in the 2025 design year. While the proposed ramp to ramp lane

will not accommodate the projected traffic volumes, it is a significant improvement over the existing facility because the ramp to ramp lane will allow eastbound motorists to access the US 421-NC 133 ramp when the Cape Fear Memorial Draw Bridge is closed to traffic. In order to achieve a "D" LOS or better in the 2025 design year, additional improvements including an additional through lane on US 17-74-76 will be needed.

During the three-year period from April 1997 to March 2000, there were 110 accidents reported on US 17-74-76 within the project limits. These accidents resulted in 97 injuries being reported with no fatalities. The accident rate within the project limits is 120.63 accidents per 100 million vehicle miles (acc/100mvm). This compares with the 1994 statewide rate of 58.40 acc/100mvm for four-lane median-divided US highways with full access control.

III. Discussion of Alternatives

This feasibility study describes the widening of US 17-74-76 / NC 133 in order to provide ramp to ramp auxiliary lanes between the NC 133 / SR 1472 and US 421 / NC 133 Interchanges, a distance of 1.5 miles (2.4 km). The project location is shown on Figure 1. Considering the wetland conditions, we evaluated both widening toward the outside shoulder and median as possible alternatives.

With both alternatives, we recommend that Bridge No. 107 be replaced with a new bridge, which would be stage constructed to the north side of the facility. This will require the realignment of a portion of eastbound US 17-74-76 / NC 133. There is also a changeable message sign on the eastbound shoulder, which informs motorist if the Cape Fear Memorial Bridge is closed or open to traffic. Based on correspondence with the Traffic Engineering and Safety Systems Branch, we recommend that this sign be replaced with a new changeable message sign mounted on an overhead structure.

Alternative 1

Under Alternative 1, the remainder of the widening will be toward the outside shoulder. Both bridges over the Brunswick River and Bridge No 108 over the Alligator Creek will need to be widened asymmetrically to the outside to accommodate the proposed improvements. It should be noted that we have concerns with widening to the outside because it will require extensive undercut excavation and increase the impacts on both wetlands and endangered species within the area. It should also be noted that this causeway has experienced significant settlement in the recent past requiring periodic repair. Therefore, widening to the outside shoulder may involve extensive subsurface stabilization not associated with the widening to the median. It is anticipated that no residences or businesses will be relocated due to the project. The total cost of the project is as follows:

Construction	$ 13,400,000
Right-of-way	$ 130,000
Total Cost	$ 13,530,000

Alternative 2
(Recommended)

Under Alternative 2, the remainder of the widening will be toward the median. Both bridges over the Brunswick River and Bridge No 108 over the Alligator Creek will need to be widened asymmetrically toward the median to accommodate the proposed improvements. Since the median width will be reduced under this alternate, we recommend that median guardrail protection be provided. In order to widen this facility towards the median and provide the proposed ramp to ramp lane, US 17-74-76 will need some reconstruction, resurfacing and restriping through the project area. This alternate is anticipated to minimize the undercut excavation as well as the adverse impacts to both wetlands and endangered species. It is anticipated that no residences or businesses will be relocated due to the project. The total cost of the project is as follows:

Construction	$ 10,800,000
Right-of-way	$ 50,000
Total Cost	$ 10,850,000

IV. Other Alternatives Considered

Given the projected traffic volumes, we anticipate that the proposed improvements will be insufficient to accommodate the projected 2025 design year traffic. Our analysis indicates that US 17-74-76 in the project area needs an additional through lane in addition to the proposed ramp to ramp lane, for a total of eight lanes between the two interchanges. It is anticipated that widening this section of US 17-74-76 to eight lanes would include both median and outside shoulder widening. In addition, improvements would be required on both the US 421-NC 133 interchange (Ramp improvements) and the NC 133-SR 1472 interchange (Convert into a Single Point Urban Diamond). It is anticipated that no residences or businesses will be relocated due to the project. The total cost of this alternative, including the interchange improvements is as follows:

Construction	$ 32,100,000
Right-of-way	$ 150,000
Total Cost	$ 32,250,000

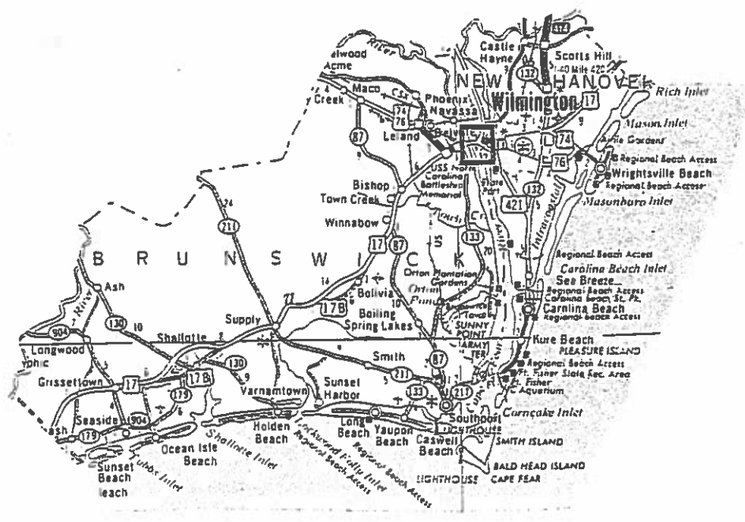
V. Additional Comments

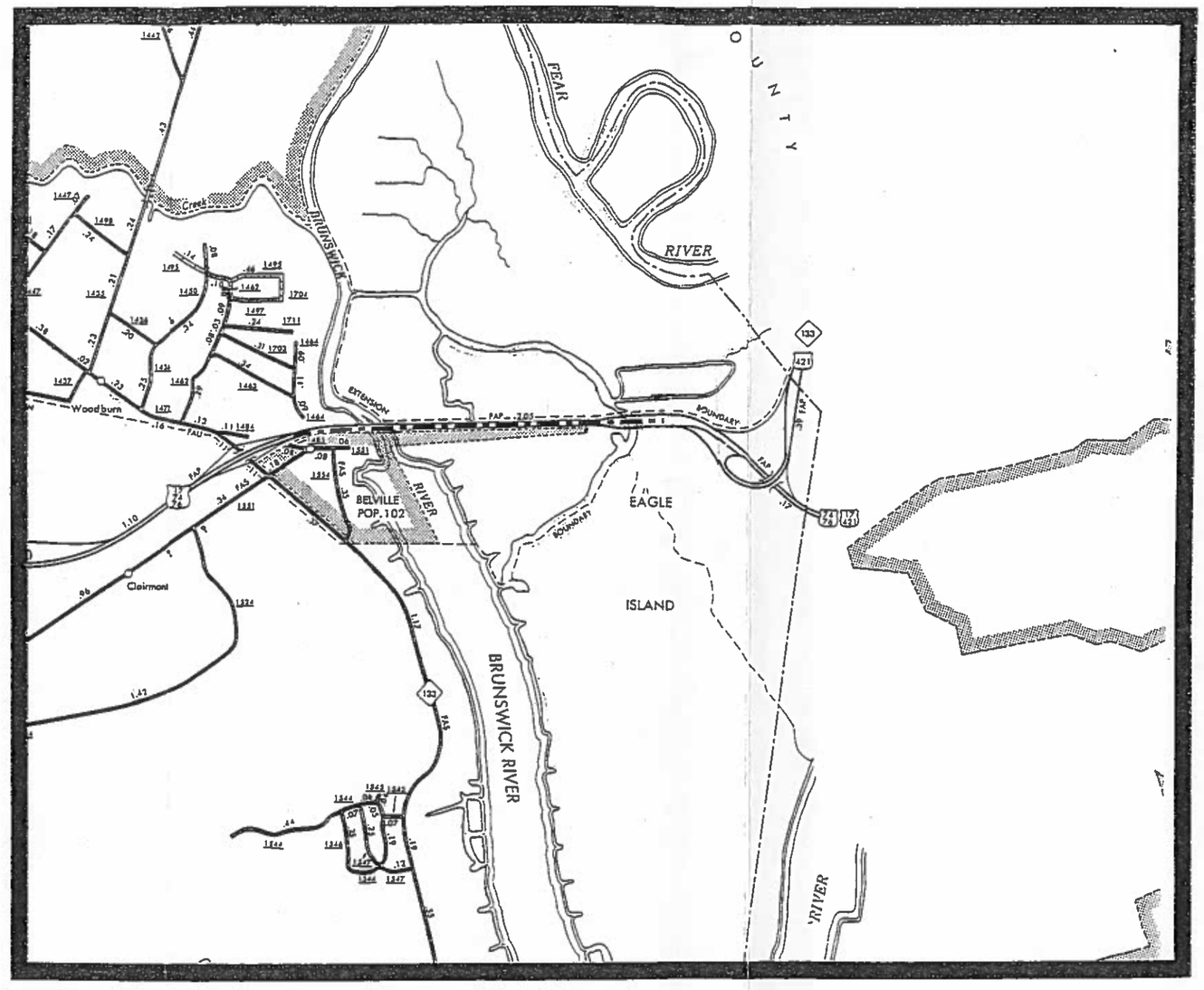
An environmental screening was not conducted for this study. However, this project is in an area of extreme environmental sensitivity. Impacts to wetlands are expected and a Corps of Engineers Section 404 Permit is anticipated. Based on maps at the Department of Environment, Health & Natural Resources - Natural Heritage Section, there are endangered species identified along the corridor.

The Brunswick River and Alligator Creek in the project corridor are classified as swamp water (SW) and tidal salt water (SC). In addition, these waterways are part of the Cape Fear River Basin.

No special accommodation for bicycles is recommended on this project.

A transportation benefit analysis was not completed for this project because the proposed improvements are beyond the capabilities of the benefit analysis package developed by the Statewide Planning Branch. However, it can be assumed that the auxiliary lanes will provide a positive benefit with the improved weave / merge area.





NC DEPARTMENT OF TRANSPORTATION
FEASIBILITY STUDIES UNIT

R-3601
Widening of US 17-74-76 / NC 133
From the NC 133 / SR 1472 Interchange
To the US 421 / NC 133 Interchange
Wilmington

DIVISION 3	BRUNSWICK COUNTY	FIGURE 1