FEASIBILITY STUDY

**NC 410 & US 701**

**from US 74 near Chadbourn**
**to the South Carolina State Line**

**Columbus County**

**R-3440**

Prepared by
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## I. GENERAL DESCRIPTION

This is a feasibility study for upgrading NC 410, from US 74 near Chadbourn to US 701 near Tabor City; and US 701 in Tabor City, from NC 410 to the South Carolina State Line, in Columbus County (See Figure 1). Five alternates were studied. The table below is a summary of the evaluation.

| | Length (miles) | Construction Cost [1] | Right-of-Way Cost | Total Cost |
|---|---|---|---|---|
| Alternate 1 | 18.6 | $110,200,000 | $ 21,100,000 | $131,300,000 |
| Alternate 2 | 19.5 | $125,100,000 | $ 19,400,000 | $144,500,000 |
| Alternate 3 | 18.6 | $ 57,700,000 | $ 7,600,000 | $ 65,300,000 |
| Alternate 4 | 20.2 | $102,000,000 | $ 15,100,000 | $117,100,000 |
| Alternate 5 | 19.5 | $102,700,000 | $ 4,100,000 | $106,800,000 |

1 = Construction cost includes cost for wetland mitigation

This project was coordinated with TIP Project R-3436, which evaluates corridors for I-74 in Columbus and Brunswick County.

## II. NEED FOR PROJECT

NC 410 is classified as a major collector on the Statewide Functional Classification System. The existing NC 410 is mainly a two-lane, 20-foot (6.1-m) wide roadway with 6-foot (1.8-m) wide shoulders.

US 701/NC 410 and US 701 Bypass are classified as minor arterials on the Statewide Functional Classification System. The existing US 701/NC 410 is a multi-laned roadway, which varies from 24 to 48 feet (7.3 to 14.6 m) wide with 8-foot (2.4-m) wide shoulders. The existing US 701 Bypass is mainly a two-lane, 24-foot (7.3-m) wide roadway with 10-foot (3.0-m) wide shoulders.

Land use in the study area is rural residential and agricultural outside the city limits. Land use within the city limits of Tabor City and Chadbourn is primarily commercial and industrial.

The south terminal of the project study area is located at the South Carolina State Line. The north terminal is located at US 74, north of Chadbourn. TIP Project Number R-2558, proposes to widen US 74, from east of NC 41 in Robeson County, to NC 410, in Columbus County. Near NC 410, the proposed typical section for US 74 is a four-lane, 60-foot (18.3-m) wide median, divided highway built on the existing right-of-way. An interchange is proposed in the future for the junction of NC 410 and US 74.

Estimated 1995 average daily traffic ADT varies from 1,600, on Segment G, to 8,200, on Segment A. In the design year 2020, the traffic volume is expected to range from 3,400 to 15,200, respectively.

The Mid-Atlantic Railroad crosses NC 410 in downtown Chadbourn. This track carries three trains per day at a speed of 5 to 15 miles per hour (8.1 to 24.2 kmh). The exposure index, a product of the design year traffic and the number of trains per day, is 36,000 at this location. This exposure index exceeds the threshold of 30,000 and warrants a grade separation.

During the period from May, 1992, through April, 1995, there were 183 accidents reported along NC 410 and US 701. This resulted in an accident rate of 335.0 accidents per 100 million vehicle miles (acc/100mvm) compared to a statewide average of 197.3 acc/100mvm for these types of facilities. Six fatalities were reported.

Structure Number 13 carries NC 410 over Beaverdam Swamp. It is located approximately 0.5 mile (0.8 km) south of the junction with SR 1004. The bridge is approximately 41 feet (12.5 m) long and has a deck width of 25 feet (7.6 m). The sufficiency rating is 59.3 out of 100.

Structure Number 371 carries US 701 Bypass over Grissett Swamp. It is located approximately 0.2 mile (0.3 km) south of the junction with NC 410/ US 701 Business. The triple 10 foot x 9 foot (3.0 m x 2.7 m) reinforced concrete box culvert has a sufficiency rating is 97.8 out of 100.

Several rivers, creeks, and swamps are crossed by NC 410 and US 701. They are mainly classified as Class B and C swamps in the stream classification system. The National Wetlands Inventory maps identify several acres of wetlands in the project corridor. The studied corridors attempt to minimize the impacts to wetlands.

Based on information from the Natural Heritage Program the following threatened/endangered species may be present in Columbus County; red-cockaded woodpecker (Picoides borealis), rough-leaved loosestrife (Lysimachia asperulaefolia), and Cooley's meadowrue (Thalictrum cooleyi).

## III. ALTERNATES STUDIED

Five alternates were studied to improve access between Chadbourn and Tabor City.

**Summary of Alternates Studied**

| | Alternate 1 | Alternate 2 | Alternate 3 | Alternate 4 | Alternate 5 |
|---|---|---|---|---|---|
| Length (mi) | 18.6 | 19.5 | 18.6 | 20.2 | 19.5 |
| Segments | A, D ,F, & G | B, E, & G | A, D, F, & G | B, D, F, & G | B, E, & G |
| Construction Cost [1] | $110,200,000 | $125,100,000 | $ 57,700,000 | $102,000,000 | $102,700,000 |
| Right-of-Way Cost | $ 21,100,000 | $ 19,400,000 | $ 7,600,000 | $ 15,100,000 | $ 4,100,000 |
| Total Cost | $131,300,000 | $144,500,000 | $ 65,300,000 | $117,100,000 | $106,800,000 |
| Residential Relocations | 143 | 5 | 27 | 125 | 5 |
| Business Relocations | 48 | 3 | 14 | 24 | 3 |
| 1995 LOS [2] | A | A | D | D | D |
| 2020 LOS [2] | B | B | E | E | E |

1 = Construction cost includes cost for wetland mitigation
2= Level of Service

Alternate One

Alternate One is composed of segments A, D, F, and G. This alternate involves widening NC 410, NC 410/US 701, and US 701 Bypass and constructing a Bypass of Chadbourn. The studied typical section is a four-lane divided roadway with a 46 to 70-foot (14.0 to 21.3-m) wide median, 10-foot (3.0-m) wide paved right shoulders (2 feet (0.6 m) of width full-depth and the remaining width surface course on ABC), and 4-foot (1.2-m) wide full-depth paved median shoulders. Right-of-way would be 250 to 300 feet ( 76.2 to 91.5 m) wide with partial control of access in Segment A and full control of access in the remaining segments. This alternate is not recommended, because it would involve a large number of relocations to convert the existing NC 410 to full control of access.

Alternate Two

Segments B, E, and G compose Alternate Two. This Alternate is entirely on new location. The studied typical section is a four-lane divided roadway with a 46 to 70-foot (14.0 to 21.3-m) wide median, 10-foot (3.0-m) wide paved right shoulders (2 feet (0.6 m) of width full-depth and the remaining width surface

course on ABC), and 4-foot (1.2-m) wide full-depth paved median shoulders. Right-of-way would be 300 feet (91.5 m) wide with full control of access. Alternate Two is a feasible solution to improving access between Chadbourn and Tabor City.

Alternate Three

Alternate Three consists of segments A, D, F, and G. This alternate involves upgrading NC 410 and US 701 Bypass and constructing a Bypass of Chadbourn. The studied typical section for Segment A is a five-lane 60-foot (18.3-m) wide travelway with 8-foot (2.4-m) shoulders, including 4-foot (1.2-m) wide paved shoulders, on a 100-foot (30.5-m) wide right-of-way with no access control. A two-lane, 24-foot (7.3-m) travelway with 8-foot (2.4-m) shoulders, including 4-foot (1.2-m) wide paved shoulders, on a 100-foot (30.5-m) wide right-of-way with no access control was studied for Segment D. Segments F and G (Chadbourn Bypass) would utilize a two-lane roadway aligned asymmetrically on a 300-foot (91.5-m) wide right-of-way with full access control, that could be widened to a four-lane divided roadway with a 46 to 70-foot (14.0 to 21.3-m) wide median, 10-foot (3.0-m) wide paved right shoulders (2 feet (0.6 m) of width full-depth and the remaining width surface course on ABC), and 4-foot (1.2-m) wide full-depth paved median shoulders. Alternate Three is feasible.

Alternate Four

Segments B, D, F, and G make up Alternate Four. This Alternate proposes phased construction of a four-lane divided highway. The studied typical section is a two-lane roadway constructed asymmetrically on a 300 foot (91.5-m) wide right-of way with full access control, that would be widened, when traffic demands, to a four-lane divided roadway with a 46 to 70-foot (14.0 to 21.3-m) wide median, 10-foot (3.0-m) wide paved right shoulders (2 feet (0.6 m) of width full-depth and the remaining width surface course on ABC), and 4-foot (1.2-m) wide full-depth paved median shoulders. This alternate is not recommended, because it would involve a large number of relocations to convert the existing NC 410 to full control of access.

Alternate Five

Segments B, E, and G compose Alternate Five. This Alternate is entirely on new location and utilizes phased construction. The studied typical section is a two-lane roadway constructed asymmetrically on a 300-foot (91.5-m) wide right-of-way with full access control, that would be widened, when traffic demands, to a four-lane divided roadway with a 46 to 70-foot (14.0 to 21.3-m) wide median, 10-foot (3.0-m) wide paved right shoulders (2 feet (0.6 m) of width full-depth and the remaining width surface course on ABC), and 4-foot (1.2-m) wide full-depth paved median shoulders. Alternate Five is a feasible solution to improving access between Chadbourn and Tabor City.

A grade separation would be constructed over the Mid-Atlantic Railroad for each Alternate. Other grade separations and interchanges would be constructed in segments with partial or full access control. Structure Numbers 13 and 371 would be reconstructed in applicable alternates. Utility conflicts are expected to be minimal in the segments on new location and moderate in the segments on existing alignment.

Segment C was eliminated because it was not significantly different from Segment B.

## IV. OTHER COMMENTS AND CONCERNS

This study is not a detailed planning/environmental investigation. A feasibility study presents studied cross-sections for improvements, general corridors of improvements, and estimated costs of construction and right-of-way. This study attempts to identify any potential environmental, permitting, or other observed issues that deserve consideration in the planning and construction stages.

No historical or architecturally significant sites are known to be impacted. Best Management Practices should be used during the design and construction of this project in order to minimize impacts to water resources and wetlands.

The following permits may be required for this project:

- State Dredge and Fill Permit
- National Pollutant Discharge Elimination System (NPDES) Permit
- Section 404 Permit
- Section 404 and Section 10 Permit Review by US Fish and Wildlife Service
- Section 7 Consultation with US Fish and Wildlife Service

## V. COORDINATION WITH TIP PROJECT NUMBER R-3436

TIP Project Number R-3436 evaluates several corridors for I-74, between US 74, near Chadbourn, and the South Carolina State Line in the vicinity of US 17 and SR 1303. Evaluation of TIP Project Number R-3440, revealed that Segments F and G could be utilized for a portion of the I-74 corridor, as well as, for improving access between Tabor City and Chadbourn. This alternate is further detailed in the feasibility study report for TIP Project Number R-3436.

## SUMMARY OF ALTERNATES

ALTERNATE 1 - SEGMENTS A, D, F, & G
(4-lane section)

ALTERNATE 2 - SEGMENTS B, E, & G
(4-lane section)

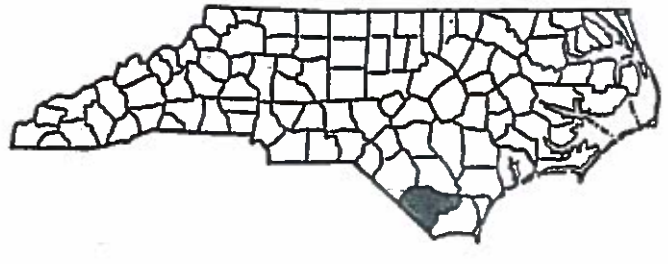
ALTERNATE 3 - SEGMENTS A, D, F, & G
(multi-lane section)

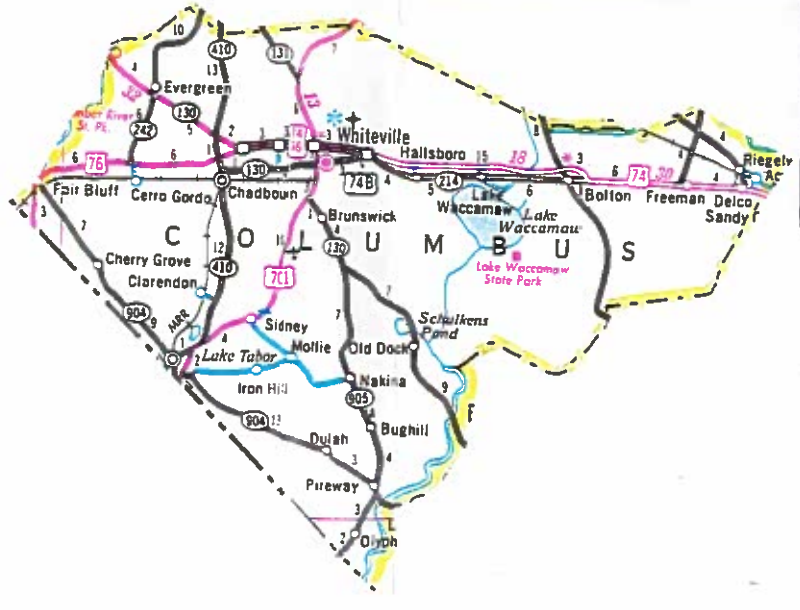
ALTERNATE 4 - SEGMENTS B, D, F, & G
(2-lane section)

ALTERNATE 5 - SEGMENTS B, E, & G
(2-lane section)

## LEGEND

- SEGMENT A
- SEGMENT B
- SEGMENT C
- SEGMENT D
- SEGMENT E
- SEGMENT F
- SEGMENT G






FEASIBILITY STUDIES UNIT

# R-3440

US 701 and NC 410
from the South Carolina State Line
to US 74
COLUMBUS COUNTY

DIVISION 6 FIGURE 1