

FEASIBILITY STUDY
SR 1009
SOUTH CHURTON STREET
HILLSBOROUGH
ORANGE COUNTY

DIVISION 7
R-2825



Feasibility Studies Unit
Program Development Branch
Division of Highways
N.C. Department of Transportation

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Date

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I. Introduction

This feasibility study describes the preliminary studies relative to the proposed widening of SR 1009 (South Churton Street) between I-40 and the Eno River in Hillsborough, Orange County. The project study area is shown in Figure 1.

II. Executive Summary

Between I-40 and I-85, SR 1009 is a developing corridor. There are plans for significant development in the area north of I-40 between SR 1009 and NC 86. Current development is creeping south from I-85 along the existing corridor. North of I-85 to the Eno River, SR 1009 is heavily developed with retail and service businesses.

The projected design year 2025 travel demand ranges from 22,100 vehicles per day (vpd) to 33,600 vpd. This study investigates the feasibility of widening SR 1009 (S. Churton Street) to a multilane facility (i.e. basic 4-lane roadway) with appropriate turning lanes at major intersections (Figure 2). The specific studied cross sections are as follows:

From I-40 to Lafayette Drive (the entrance to Cornwallis Hills Subdivision), the studied cross section is a 4-lane divided curb and gutter section with a 16-foot raised median with appropriate turn lanes at existing/planned intersections. Length is 0.8 mile.

From Lafayette Drive north to Eno River, the alternates include a 4-lane median divided curb and gutter section with a 16-foot median and a 5-lane curb and gutter cross section. Length is 1.7 miles.

Bridge No. 240 over the Southern Railroad just south of the NC 86 / US 70 Business intersection will be replaced with a new structure. The studied replacement of Bridge No. 240 involves staged construction – construct the new section west of existing, maintain traffic on existing, then remove and replace existing, maintain traffic on the new section.

Properties bounded by the Southern Railroad on the south and S. Churton Street on the west are listed on the National Register of Historic Places. This includes both the north and south sides of the NC 86/US 70 Business / S. Churton Street intersection. Tax mapping indicates the existing right of way along NC 86 is 60 feet. No work is anticipated or planned to encroach on these properties. Work along S. Churton Street in the vicinity of NC 86 and Bridge No. 240 over the Southern Railroad is planned along the west side. Intersection approach improvements on NC 86 will be contained in the existing 60-foot right of way.

The estimated costs of the alternates are as follows:

4-lane divided cross section with 16-foot raised median throughout the corridor:

I-40 to Lafayette Drive

Construction	\$2,200,000
Right of way	<u>\$1,750,000</u>
Total Cost	\$3,950,000

Lafayette Drive to Eno River*

Construction	\$12,790,000
Right of way	<u>\$ 2,520,000</u>
Total Cost	\$15,310,000

* Includes \$3,190,000 to replace I-85 structures over SR 1009. The costs to replace these structures could be part of TIP Project I-305.

Total Cost from I-40 to Eno River:

Construction	\$14,990,000
Right of way	<u>\$ 4,270,000</u>
Total Cost	\$19,260,000

This alternate is estimated to create no residential or business relocations.

4-lane divided cross section at I-40 transitioning to 5-lane undivided at Lafayette Drive continuing to NC 86:

I-40 to Lafayette Drive

Construction	\$2,200,000
Right of way	<u>\$1,750,000</u>
Total Cost	\$3,950,000

Lafayette Drive to Eno River*

Construction	\$11,890,000
Right of way	<u>\$ 2,520,000</u>
Total Cost	\$14,410,000

* Includes \$3,190,000 to replace I-85 structures over SR 1009. The costs to replace these structures could be part of TIP Project I-305.

Total Cost from I-40 to Eno River:

Construction	\$14,090,000
Right of way	<u>\$ 4,270,000</u>
Total Cost	\$18,360,000

This alternate is estimated to create no residential or business relocations.

This study is the initial step in the planning and design process for this project and is not to be considered the product of exhaustive environmental or design investigations. The purpose of the study is to describe the problem, recommend a feasible treatment including estimated costs, and identify potential problem areas that deserve consideration in the planning and design phases.

III. Purpose and Need for the Project

SR 1009 (S. Churton Street) is a major thoroughfare and "gateway" roadway from I-40 and I-85 to the Town of Hillsborough. TIP Projects I-305, I-3306 and U-3808 will impact travel demand along the S. Churton Street corridor. The existing roadway, particularly from I-85 north, does not provide an acceptable level of service (LOS). With projected design year traffic, significant congestion will be commonplace without the proposed improvements. This project is endorsed by the Town of Hillsborough and is the No. 2 priority project on their TIP Priority List.

IV. Existing Conditions

SR 1009 (S. Churton Street) is classified as a Rural Major Collector in the Statewide Classification System. On the Hillsborough Thoroughfare Plan, map dated July 23, 1996, S. Churton Street is designated as a Major Thoroughfare.

Between I-40 and I-85, SR 1009 is a developing corridor. There are plans for a significant development in the area north of I-40 between SR 1009 and NC 86. Current development is creeping south from I-85 along the existing corridor. North of I-85 to the Eno River, SR 1009 is heavily developed with all types of retail and service businesses. Examples of this development are Daniel Boone Village (a complex of antique stores, real estate businesses, and specialty shops), gas stations, fast food restaurants (Hardees, KFC, Wendy's), banks, Wal-Mart, Ford and Chevrolet automobile dealerships, tire service center, Boone Square with various retail shops including a Food Lion, restaurant, etc.

Several NCDOT Transportation Improvement Program projects will ultimately impact the traffic flow in the S. Churton Street study corridor. I-3306 proposes to add additional lanes to I-40 with construction beginning in FY 2002. I-305 proposes to widen I-85 to six lanes and reconstruct affected interchanges and structures (including the S. Churton Street/I-85 interchange). I-305 is not currently funded. U-3808 proposes to construct a new route between US 70 Business and US 70 Bypass (Elizabeth Brady Road Extension). U-3808 is currently planned for right of way acquisition in FY 2006. This route could function as a "bypass" for some traffic currently using the S. Churton Street corridor.

The current average daily traffic (ADT) within the project limits ranges from 10,200 vehicles per day (vpd) near I-40 to 18,500 vpd near NC 86. The design year 2025 estimated volumes range from 22,100 to 33,600 vpd. These volumes do not reflect the impacts of any of the projects noted above. Level of service (LOS) is a measure of congestion. LOS A is found under very light traffic conditions and LOS F is found under the most heavy traffic conditions. LOS D is an acceptable level of congestion in urban settings. The current signalized intersections in the study corridor include SR 1333 (Oakdale Road), Cardinal Drive, north ramp of I-85 interchange, SR 1192 (Mayo Street), SR 1006 (Orange Grove Road), and NC 86. Traffic estimates were provided at I-40, SR 1333, I-85, SR 1006 and NC 86.

Capacity analyses were performed for the intersections at SR 1333, SR 1006 and NC 86. TIP projects I-3808 and I-305 will provide LOS and final designs for the affected interchanges. Although congestion will continue in this corridor, the delay experienced by motorists will be significantly reduced by the implementation of the proposed widening of S. Churton Street. The

calculated LOS with design year traffic and improved cross section are shown below:

<u>Intersection</u>	<u>LOS Design Traffic</u>
SR 1333	D(45.2)
SR 1006	C(27.4)
NC 86	F(345.4)

- Notes: (1) Commercial driveways will affect the LOS.
 (2) The numbers in parentheses are seconds of delay per vehicle.

With the constraint of the existing cross section across the Eno River Bridge and its proximity to the NC 86 intersection, a bottleneck exists which causes the poor LOS at the NC 86 intersection. Even with the proposed improved cross section, only one lane exits the intersection northbound. Estimated traffic demand far exceeds the capacity of the existing 2-lane cross section north of NC 86. The impact of Elizabeth Brady Road Extension (U-3808) may lessen the future traffic demand at the S. Churton Street/NC 86 intersection.

During the period from April 1, 1996 through March 31, 1999, there were 134 accidents along SR 1009 between I-40 and the Eno River Bridge. During this period, there were no reported fatalities. There were 51 personal injury accidents. The most prevalent accident types were rear end (49 %) and left turn-same road (12 %) and left turn across traffic (12 %). The majority of the accidents occurred between I-85 and the Eno River Bridge (63 %). The improved, uniform cross section, together with appropriate turn lanes, will hopefully reduce the accident experience. The total accident rate during the indicated three-year period is 294.6 accidents per 100 million vehicle miles of travel. The comparable accident rate for all North Carolina urban secondary routes, 2-lane, undivided roadways with no access control, is 262.9 accidents per 100 million vehicle miles of travel. The accident rate on S. Churton Street is 12 percent higher than the statewide average for similar roadways.

V. Studied Alternates

The alternates studied are a 4-lane divided, curb and gutter section with a 16-foot raised median and a 5-lane curb and gutter section with a continuous center turn lane. Either alternate requires a 100-foot right of way. Bicycle accommodations and sidewalks are estimated separately and apply equally to either alternate. Specifically the alternate cross sections studied were:

From I-40 to Lafayette Drive (the entrance to Cornwallis Hills Subdivision), the studied cross section is a 4-lane divided curb and gutter section with a 16-foot raised median with appropriate turn lanes at existing/planned intersections. Length is 0.8 mile. An existing pipe culvert

(2 lines at 60 inches) approximately 0.15 miles south of Lafayette Drive will require lengthening approximately 50 feet on the east side.

From Lafayette Drive to Eno River, the alternates include both a 5-lane curb and gutter cross section and a 4-lane median divided curb and gutter section.

Bridge No. 240 over the Southern Railroad just south of the NC 86/US 70 Business intersection will be replaced with a new structure. The studied replacement of Bridge No. 240 involves staged construction – construct the new section west of existing, maintain traffic on existing, then remove and replace existing, maintain traffic on the new section. Widening must occur to the west side to avoid impacts to National Register properties.

Additional Studies:

- (1) Before S. Churton Street can be widened through the I-85 interchange area, Bridge No. 83 and Bridge No. 87 will have to be lengthened (replaced). Cost estimates were requested for the replacement of these bridges. **The replacement of these structures could be part of TIP Project I-305.**
- (2) The estimated construction cost for optional sidewalk on one side from I-40 to I-85 and on both sides from I-85 to the Eno River Bridge was requested.
- (3) The estimated construction cost for optional bicycle accommodations along both sides from I-40 to I-85 and along both sides from I-85 to the Eno River Bridge were requested. The accommodations are wide outside lanes, an extra two feet of pavement along each side.
- (4) The estimated cost for the realignment of the Orange Grove Road (SR 1006) south to the shopping center entrance to consolidate turning movements was requested. The existing tee-intersection of Orange Grove Road and S. Churton Street would be removed.

The estimated costs of the alternates are as follows:

4-lane divided cross section with 16-foot raised median throughout the corridor:

I-40 to Lafayette Drive

Construction	\$2,200,000
Right of way	<u>\$1,750,000</u>
Total Cost	\$3,950,000

Lafayette Drive to Eno River*

Construction	\$12,790,000
Right of way	<u>\$ 2,520,000</u>
Total Cost	\$15,310,000

* Includes \$3,190,000 to replace I-85 structures over SR 1009. The costs to replace these structures could be part of TIP Project I-305.

Total Cost from I-40 to Eno River:

Construction	\$14,990,000
Right of way	<u>\$ 4,270,000</u>
Total Cost	\$19,260,000

4-lane divided cross section at I-40 transitioning to 5-lane undivided at Lafayette Drive continuing to NC 86

I-40 to Lafayette Drive

Construction	\$2,200,000
Right of way	<u>\$1,750,000</u>
Total Cost	\$3,950,000

Lafayette Drive to Eno River*

Construction	\$11,890,000
Right of way	<u>\$ 2,520,000</u>
Total Cost	\$14,410,000

*Includes \$3,190,000 to replace I-85 structures over SR 1009. The costs to replace these structures could be part of TIP Project I-305.

Total Cost from I-40 to Eno River:

Construction	\$14,090,000
Right of way	<u>\$ 4,270,000</u>
Total Cost	\$18,360,000

This alternate is estimated to create no residential or business relocations.

The estimated costs of Additional Studies items are as follows:

(1) Replacement of I-85 Bridges over SR 1009:

Construction	\$ 3,100,000
Right of way	<u>\$ 90,000</u>
Total Cost	\$ 3,190,000

(2) Sidewalks:

One side from I-40 to I-85	\$ 230,000
Both sides from I-85 to the Eno River Bridge	\$ 280,000

(3) Bicycle accommodations:

Bicycle accommodations along both sides from I-40 to I-85	\$ 300,000
Bicycle accommodations along both sides from I-85 to the Eno River Bridge	\$ 200,000

Note: The requested accommodations are wide outside lanes, an extra two feet of pavement along each side. Based on discussions with our Roadway Design Unit, the bicycle policy maybe revised to reflect a wider 4 foot of additional widening for bicycle accommodations. If it is determined that the 4 foot of additional widening is more appropriate, the above mentioned cost could be doubled for estimating purposes.

(4) Realignment of SR 1006 (Orange Grove Road):

Construction	\$ 280,000
Right of way	<u>\$ 880,000</u>
Total Cost	\$1,160,000

This additional option is not anticipated to create either residential or business relocations.

VI. Recommendations

Based on the studied alternates, the 4-lane divided, with a 16-foot median, curb and gutter cross section is recommended for the entire corridor from I-40 to Eno River. The recommendation is to also close the south entrance to Daniel Boone Village shopping area to southbound left turns and redirect

them to the signalized intersection at Mayo Street. Access to the Daniel Boone Village area at the south drive would be right-in and right-out only.

The estimated cost of implementing the recommendations as outlined above is as follows:

Widen to 4-lanes divided with 16-foot median:

Construction	\$11,800,000
Right of way	<u>\$ 4,270,000</u>
Total Cost	\$16,070,000

Close Southbound Entrance to Daniel Boone Village

Right of way	\$ 40,000
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Replacement of I-85 Structures

Construction	\$ 3,100,000
Right of way	<u>\$ 90,000</u>
Total Cost	\$ 3,190,000

This cost could be included with TIP Project I-305.

Total Cost of Recommended Improvements \$19,300,000

This alternate is estimated to require no residential and/or business relocations.

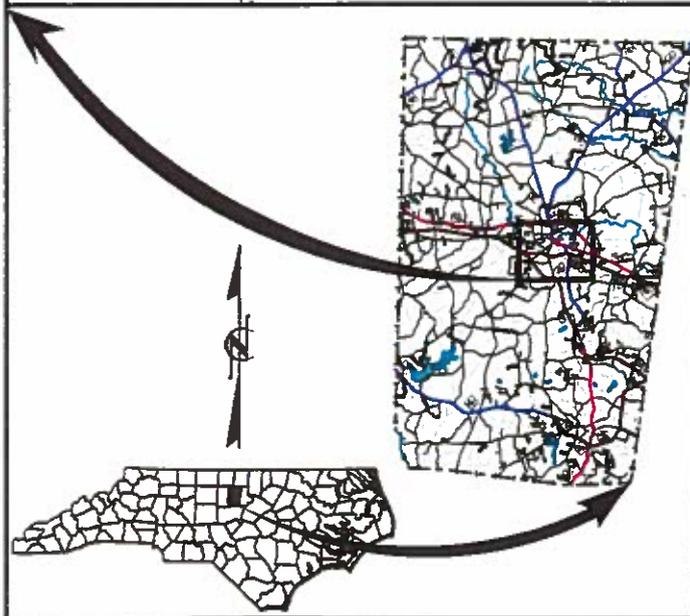
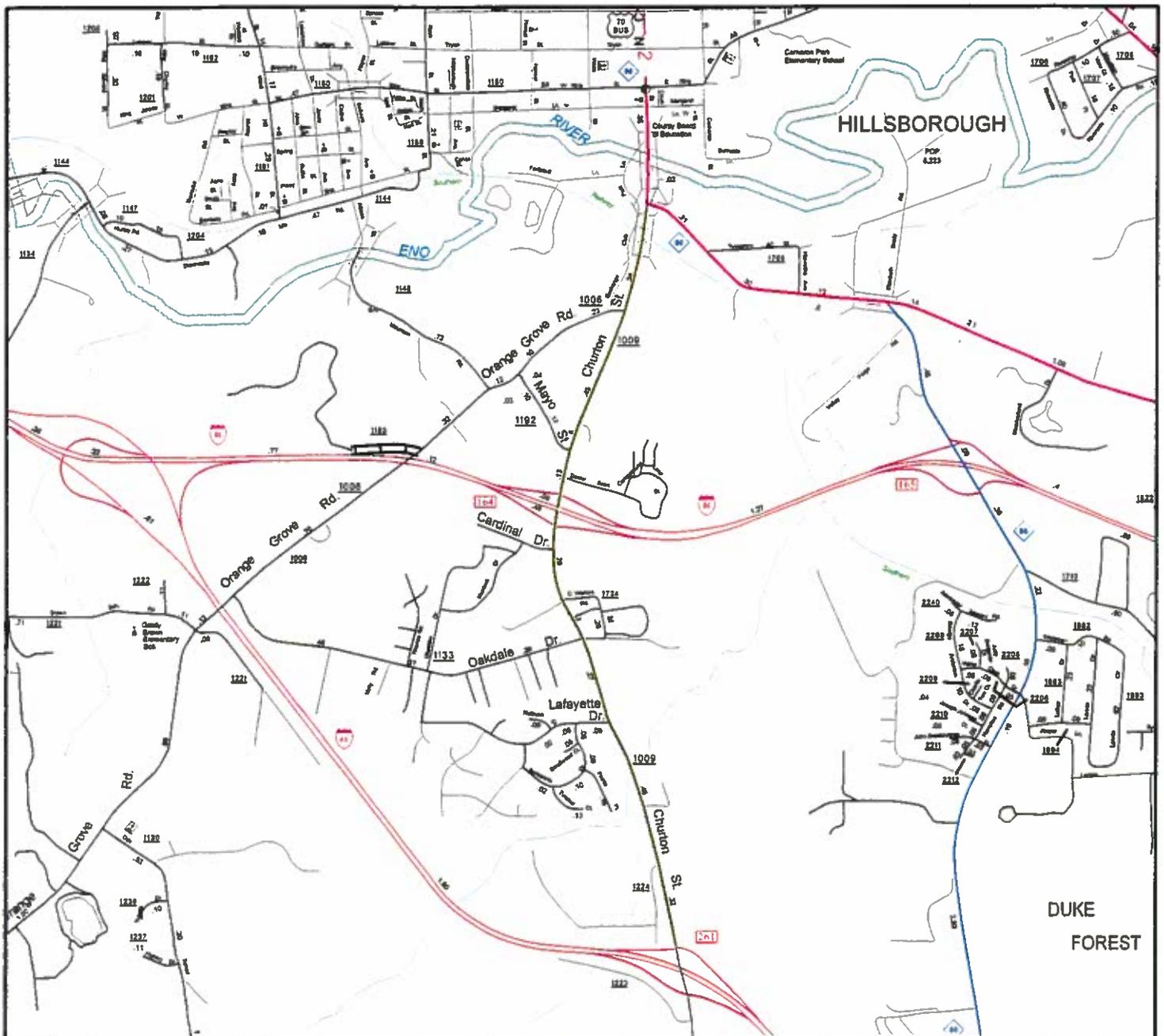
The estimated cost of providing sidewalks and wide outside lanes for bicycle accommodations is not included in the above but may be added if these elements are determined desirable at a later time. If the bicycle and pedestrian accommodations are included, the total project cost is estimated to be \$20,310,000.

VII. Other Comments

An environmental screening by a certified environmentalist was not conducted for this study. However, based on maps at the Department of Environment, Health and Natural Resources – Natural Heritage Section, no threatened or endangered species were identified in the project corridor.

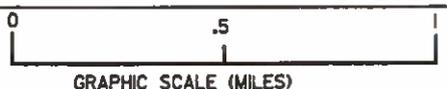
In addition, no historic properties are anticipated to be impacted by this project as proposed. There are National Register properties north of the Southern Railroad and east of S. Churton Street.

A culvert at Cates Creek, just south of Lafayette Drive will require lengthening. No stream realignments are anticipated.



**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH**

VICINITY MAP
CHURTON STREET
HILLSBOROUGH
ORANGE COUNTY
R-2825



GRAPHIC SCALE (MILES)

FIGURE 1

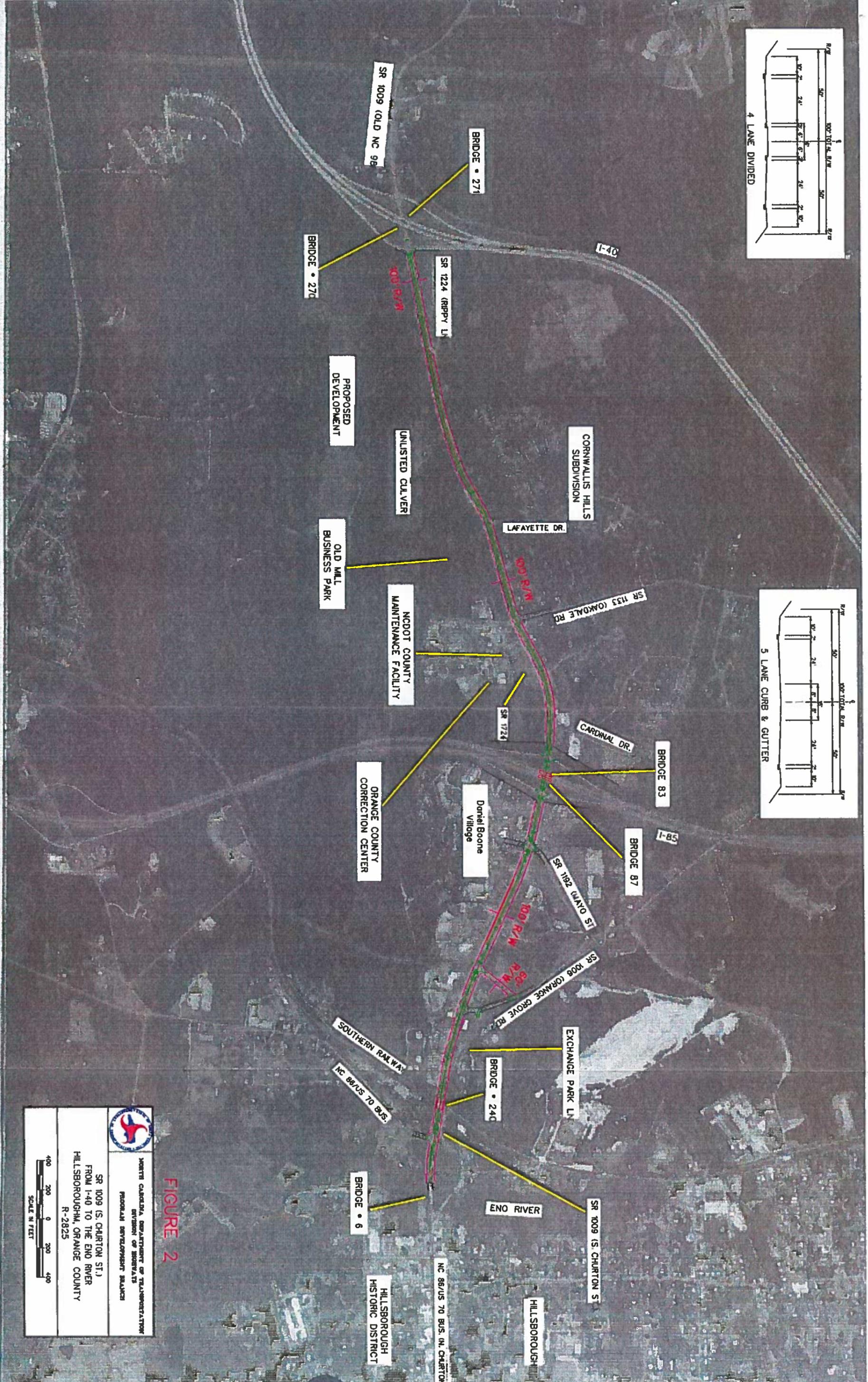
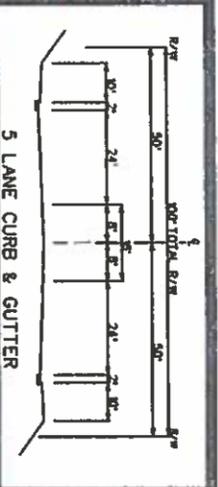
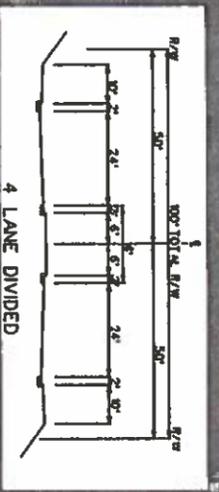


FIGURE 2


 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF STATEWAYS
 PROGRAM DEVELOPMENT BRANCH

SR 1009 (S. CHURTON ST.)
 FROM I-40 TO THE END RIVER
 HILLSBOROUGH, ORANGE COUNTY
 R-2825


 SCALE IN FEET