Feasibility Study

Upgrade US 74 to Freeway
From Bypass of Monroe (R-2559)
To Bypass of Rockingham

Union and Anson Counties

Division 10
R-4441

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

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2/19/03
Date

R-4441

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To Bypass of Rockingham

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I. Introduction

This feasibility study describes the preliminary studies relative to the proposed freeway upgrading of US 74 from the bypass of Monroe (R-2559) in Union County eastward to the bypass of Rockingham in Richmond County, a distance of approximately 34 miles. The project study area is shown in Figure 1.

II. Executive Summary

The US 74 highway is classified as a principal arterial on the Statewide Functional Classification System. It is a strategic east-west intrastate corridor linking Asheville (10th largest city in North Carolina) and Charlotte (State's largest city) to Wilmington (State's largest seaport and 9th largest city). In its journey from the mountains (Asheville) to the sea (Wilmington), US 74 passes through 15 of the top 100 populated municipalities in the State. US 74 is a tourist route that serves and connects the mountain and coastal resort areas. It is a major trucking route and a vital travel link for commerce across North Carolina.

This study investigates the feasibility of upgrading US 74 to a four-lane freeway from west of Marshville (at the east terminus of the bypass of Monroe [R-2559]) to the existing bypass of Rockingham (see Figures 2.01 through 2.11), a distance of approximately 34 miles. The project includes proposed bypasses for the communities of Marshville and Wadesboro. The specific studied cross section is a four-lane freeway with a 46-foot grass median where existing sections of US 74 are upgraded and a 70-foot grass median for sections on new location. Service roads will be provided as needed along the upgraded sections of existing US 74. The projected design year 2025 travel demand ranges from 46,100 vehicles per day (vpd) in the Town of Wadesboro to a low of 27,200 vpd at the Anson-Richmond County Line.

The project has been separated into four sections. The sections are as follows:

Section 1 is a new 4.9-mile US 74 bypass south of Marshville. This section is a four-lane freeway on new location with a 70-foot grass median. Section 1 begins at the east end of the bypass of Monroe (R-2559) and ends just east of the intersection of US 74 with SR 1754 (see Figure 1). Interchanges are proposed at US 74 (east and west of Marshville) and SR 1005. Other intersecting roadways will be either grade separated or terminated as shown in Figures 2.01 and 2.02.

Section 2 is a 9.0-mile upgrade of existing US 74 to a four-lane freeway with a 46-foot grass median. This section begins just west of SR 1733 at the eastern terminus of the proposed Marshville bypass and ends at the beginning of the proposed northern bypass of Wadesboro (See Figure 1). Two interchanges are proposed along this section of US 74, one at SR 1240 serving the community of Peachland and one at SR 1250 serving the community of Polkton. All other roadways and driveways with direct access to existing US 74 will be either grade separated or terminated as shown in Figures 2.02 through 2.05. This feasibility study includes a service road system on the north and south sides of US 74 to provide access to all secondary roads and parcels of land that lost direct access to US 74. The service road system will utilize and connect the existing secondary roads to the interchanges serving Peachland and Polkton. A total of 11.4 miles of two-lane roadway will be required to implement the service road system along Section 2.

Section 3 is a new 10.6-mile US 74 bypass north of Wadesboro(R-2411). This section is a four-lane freeway on new location with a 70-foot grass median. Section 3 begins west of Wadesboro on US 74 just east SR 1249 and ends east of Wadesboro on US 74 just west of SR 1733 (See Figure 1). Five interchanges will serve travel to and from the Town of Wadesboro. The interchanges are at the west and east termini of the bypass with existing US 74, at NC 742, US 52, and NC 109. Other intersecting roadways will be either grade separated or terminated as shown in Figures 2.05 through 2.09.

Section 4 is a 9.4-mile upgrade of existing US 74 to a four-lane freeway with a 46-foot grass median. Section 4 begins just west of Lilesville and ends just east of the Pee Dee River at the beginning of the US 74 bypass of Rockingham in Richmond County (See Figure 1). Two interchanges will be constructed on this segment of US 74, one at SR 1801 serving Lilesville and one at NC 145. All other roadways and driveways with direct access to existing US 74 will be either grade separated or terminated. This feasibility study includes a service road system on the north and south sides of US 74 to provide access to all secondary roads and parcels of land that lost direct access to US 74. The service road system will utilize and connect the existing secondary roads to the new interchanges as shown in Figures 2.09 through 2.11. Access for SR 1140 at US 74 in Richmond County will be terminated and it will be grade-separated with US 74 to provide access to the wildlife management area (boat ramps) for the Pee Dee River (See Figure 2.11). A total of 5.3 miles of two-lane roadway will be required to implement the service road system along Section 4.

The estimated costs of the sections are as follows:

Section 1: A 4.9-mile four-lane freeway south of Marshville on new location with a 70-foot grass median.

Construction.....	$ 75,500,000
Right of way.....	$ 6,500,000
Total Cost.....	$ 82,000,000

Relocations for this section are estimated at 6 residences and 0 businesses.

Section 2: A 9-mile upgrade of existing US 74 to a four-lane freeway with a 46-foot grass median from the Marshville Bypass to the Wadesboro Bypass through the Towns of Peachland and Polkton.

Construction.....	$ 80,100,000
Right of way.....	$ 7,000,000
Total Cost.....	$ 87,100,000

Relocations for this section are estimated at 9 residences and 12 businesses.

Section 3: A 10.6-mile four-lane freeway north of Wadesboro (R-2411) on new location with a 70-foot grass median.

Construction.....	$ 142,500,000
Right of way.....	$ 4,500,000
Total Cost.....	$ 147,000,000

Relocations for this section are estimated at 12 residences and 1 business.

Section 4: A 9.4-mile upgrade of existing US 74 to a four-lane freeway with a 46-foot grass median from the Wadesboro Bypass to the Pee Dee River through the Town of Lilesville.

Construction.....	$ 78,900,000
Right of way.....	$ 4,000,000
Total Cost.....	$ 82,900,000

Relocations for this section are estimated at 17 residences and 1 business.

The total estimated cost of constructing the recommended improvements is:

Construction.....	$ 377,000,000
Right of way.....	$ 22,000,000
Total Cost.....	$ 399,000,000

Relocations for this section are estimated at 44 residences and 14 business.

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. Existing Conditions

The section of US 74 addressed in this feasibility study is the only portion of US 74 from Asheville to Whiteville that currently does not have a planning study and/or funded project to upgrade it to a freeway in the current 2002-2008 TIP. US 74 is an existing freeway from Asheville to west of Shelby and around the urban areas of Kings Mountain, Rockingham-Hamlet, Laurinburg, and Maxton. There are planning studies and/or funded projects in the TIP for bypasses around Shelby, Gastonia, and Monroe. R-3329 will be a freeway route that connects the US 74 bypass of Monroe to the Charlotte outer loop (I-485). All non-freeway segments of US 74 from west of Rockingham to just west of Whiteville will be upgraded to freeway standards to serve as the future I-74 corridor (See Figure 3, Interstate 73 and 74 Corridors).

The existing travel demand (2000 ADT) varies from 22,000 vpd in Wadesboro and 20,000 vpd in Marshville to a low of 13,000 vpd at the Anson-Richmond County Line. The projected design year 2025 travel demand ranges from 46,100 vpd in Wadesboro and 41,900 vpd in the Town of Marshville to a low of 27,200 vpd at the Anson-Richmond County Line (based on an extrapolation of the 1970 to 2000 travel growth trend). Freeway travel is safer and more convenient than travel on routes with no control of access. As sections of US 74 are upgraded to freeway standards, and as I-74 is put into service across North Carolina, there is a high probability that travel across North Carolina from the mountains to sea using alternate routes will be attracted to the US 74 corridor. (Research materials suggest that US 74 as a freeway and interstate route can expect travel increases that average one percent annually greater than as a non-freeway route.) Using a four percent annual growth rate (high growth assumption), the projected 2025 travel demand would range from 58,700 vpd in Wadesboro and 53,700 vpd in the Town of Marshville to a low of 34,700 vpd at the Anson-Richmond County Line. See Figure 4 for historic and projected travel trends.

Accident data for the three-year period from May 1, 1999 to April 30, 2002 was provided for US 74 from SR 1754 (west of Marshville) to the Union-Anson County Line and from the Union-Anson County Line to the Pee Dee River (Anson-Richmond County Line). The 6.6-mile section in Union County experienced a total of 125 crashes with an accident crash rate of 99.14 accidents per 100 million vehicle miles of travel (MVMT) and the 25.4-mile section in Anson County experienced a total of 414 crashes with an accident crash rate of 90.27 accidents per 100 million vehicle miles of travel (MVMT) for this three-year period.

US 74 has a variable roadway section from four-lanes undivided to four-lanes divided with a 46-foot median. The North Carolina statewide crash rate (1999-2001) for rural

four-lane divided United States (US) routes with no control of access was 137.85 accidents per 100 MVMT and for rural four-lane undivided US routes was 175.01 accidents per 100 MVMT. While the existing crash rate for both sections of US 74 are lower than the statewide average for either the divided or undivided section, it is still considerably higher than the average crash rate of 63.5 accidents per 100 MVMT for rural United States routes with full control of access. In addition, a considerable number of the 539 accidents (May 1, 1999 to April 30, 2002) occurred along US 74 (mainly four-lane undivided roadway) through the urban areas of Marshville (72 accidents on a 2.2-mile section); Polkton (48 accidents on a 1.6-mile section) and Wadesboro (106 accidents on a 2.7-mile section). Upgrading US 74 to a freeway from the Monroe Bypass to the Pee Dee River with bypasses for the Towns of Marshville and Wadesboro would have a substantial safety benefit.

Capacity Considerations

It is desirable to provide a 50 mph operating speed during the peak hour of travel for all roadways classified as principal arterials or designated as part of the North Carolina Intrastate System, US 74 meets both of these criteria (NCDOT Board of Transportation Policy). US 74 through the urban areas already has a posted speed limit of 45 mph. The 2000 ADT through Marshville and Wadesboro are 20,000 vpd and 22,000 vpd, respectively. The 2025 projected volumes along US 74 through Marshville and Wadesboro are expected to range from 41,900 vpd (trend line growth assumption) to 53,400 vpd (high growth assumption) and from 46,100 vpd (trend line growth) to 58,700 vpd (high growth), respectively.

Detailed traffic volumes along US 74 with turning movements at major intersections were not available for this study; consequently, a comprehensive capacity analysis using Synchro, SimTraffic, and/or the HCS2000 Signalized Intersection Module could not be developed. Using the HCS2000 (Urban Streets Release 4.1C) Arterial Planning Module, it is estimated for the 2000 ADT that the PM peak traffic conditions are LOS A with an average travel speed of 43.2 mph in Marshville and LOS A with 43.1 mph in Wadesboro for the current US 74 roadway. Under the low growth assumptions for the 2025 PM peak traffic conditions, the LOS and average travel speed are expected to deteriorate to LOS F with a 11.2 mph average travel speed in Marshville and a LOS F with 8.3 mph in Wadesboro. For the high growth assumptions, the LOS would also be LOS F but the average speeds would drop to 5.7 mph and 4.6 mph in Marshville and Wadesboro, respectively. (This significant drop in LOS and speeds are caused by the combined effects of the growth in traffic volumes and the increased need to signalize additional intersections.)

For the low growth assumption and assuming all of the projected 2025 ADT (41,900 vpd) in Marshville would use the proposed US 74 Bypass (four-lane freeway), the average travel speed in the PM peak would exceed 60 mph. Likewise, the average travel speed for the PM peak for the Wadesboro bypass with the low growth assumption (46,100 vpd) would exceed 58 mph. For the high growth assumption and assuming all of the traffic would shift to the new bypass, it would be desirable to construct the bypasses as a six-lane freeway. However, it is estimated that in Marshville only 70-80 percent of the projected travel would shift to the new bypass

and in Wadesboro only 60-70 percent of the traffic would shift to the bypass. Therefore, under these new assumptions, the upgrading of US 74 to a four-lane freeway with bypasses for Marshville and Wadesboro would provide future travel speeds greater than 60 mph for either the low or high growth assumptions. .

IV. Studied Alternates

Ko and Associates assembled a team of four engineers to develop a schematic for upgrading US 74 to a freeway. The team was made up of two transportation planning engineers and two roadway design engineers. With the aid of aerial photography, USGS quad maps, and available GIS environmental data, a preliminary alternative was developed during a field trip to the area. Efforts were made to avoid or minimize all known environmental impacts, avoid historic properties, and reduce or minimize impacts to residences and businesses while at the same time maximizing the use of the existing US 74 roadway.

The initial alternative developed a southern bypass for the communities of Marshville and Polkton and a northern bypass for Wadesboro. The Polkton bypass, while developed to minimize impacts to development along the existing US 74 corridor, created concerns about wetland and floodplain impacts to the area surrounding Brown Creek. The Polkton bypass was deleted in favor of upgrading existing US 74 to a freeway with a proposed interchange at SR 1250 and a service road system to serve the community of Polkton. A bypass of Polkton might be considered during later planning and design stages as additional information becomes available. Further discussion by the design team about maximizing the use of the existing corridor resulted in shorter bypasses for Marshville and Wadesboro. See Figures 1 and 2.01 through 2.11 for the recommended alternative. This alternative is not to be considered the product of exhaustive environmental or design investigations but to represent a feasible and practicable alternative.

V. Recommendations

It is recommended that US 74 be upgrade to a freeway from the eastern end of the US 74 bypass of Monroe (R-2559) to the existing US 74 bypass of Rockingham in Richmond County. Bypasses have been recommended for the Towns of Marshville and Wadesboro (R-2411) to minimize impacts to existing development located along US 74 in these two communities.

The estimated cost of constructing the recommended improvements is:

Construction	$ 377,000,000
Right of way	$ 22,000,000
Total Cost	$ 399,000,000

It is estimated 44 residences and 14 businesses will be relocated.

VI. Other Comments

The recommended alternate has maximized the use of the existing US 74 corridor, with no known impacts to historic properties. The recommended alternate has been selected to minimize involvement with the wetlands and floodplains by maximizing the use of the existing major stream and river crossings along US 74. Based on the listings for the Natural Heritage Program by the Department of Environment and Natural Resources, threatened or endangered species and plant life are identified in Union and Anson Counties. An environmental screening by a certified environmentalist was not conducted for this study. Before this project is implemented an in-depth environmental screening will be provided for the project corridor.

MONROE BYPASS (R-2559)

205

74

CSX RAILROAD

MARSHVILLE

UNION COUNTY

ANSON COUNTY

PEACHLAND

POLKTON

218

742

SECTION 1

SECTION 2

SECTION 3

PROPOSED UPGRADE OF EXISTING

PROPOSED NEW LOCATION

PROPOSED GRADE SEPARATION

PROPOSED INTERCHANGE

0 1 2 3

SCALE : MILES

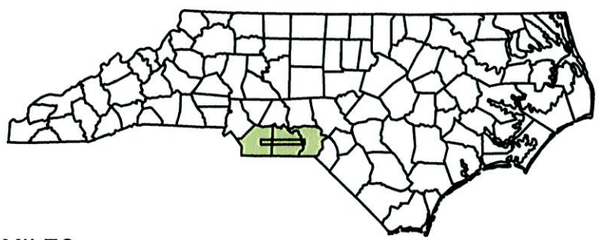


FIGURE 1
PAGE 1 of 2

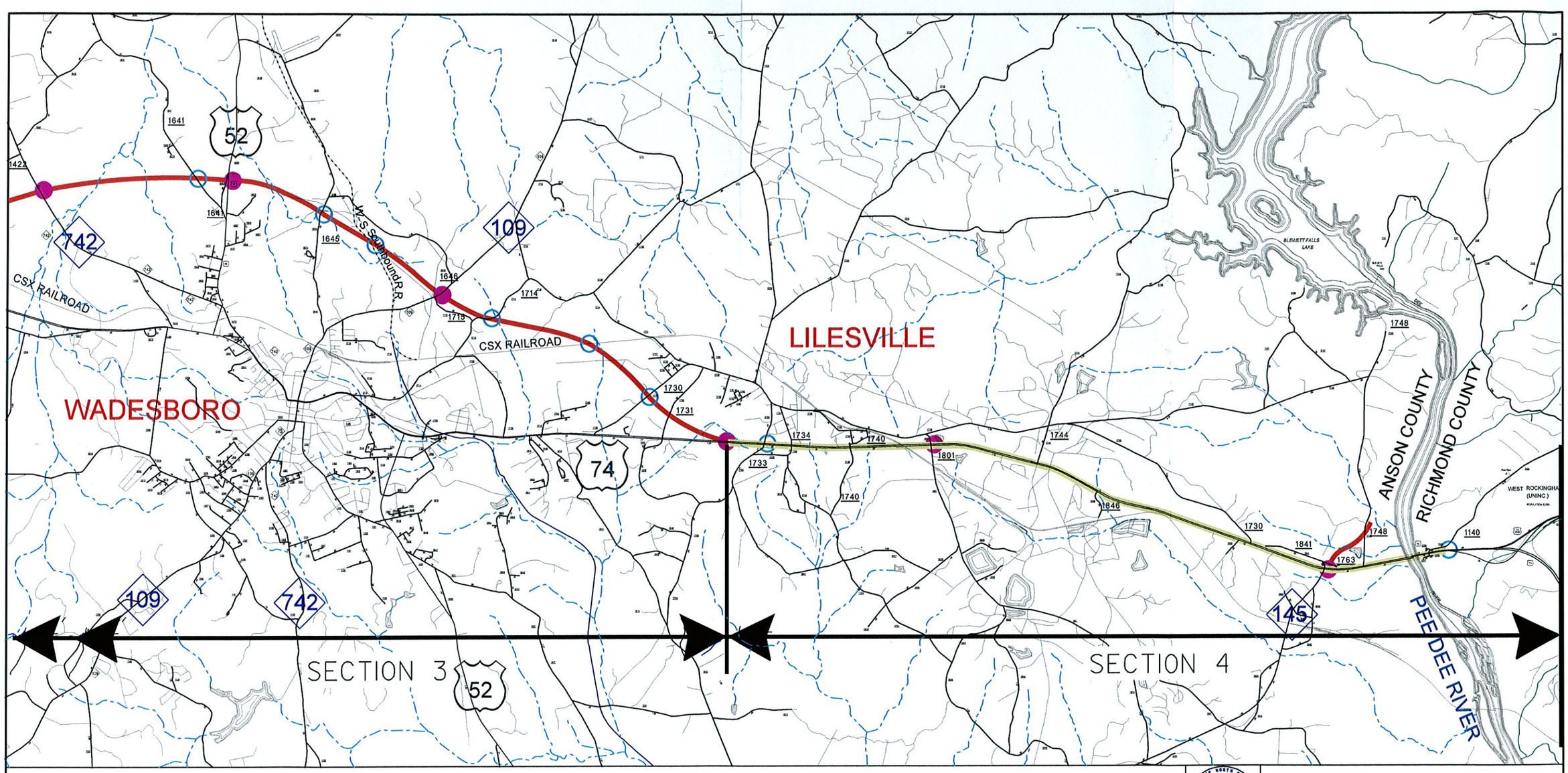
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROGRAM DEVELOPMENT BRANCH

R4441
FEASIBILITY STUDY

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS

UNION, ANSON, AND RICHMOND COUNTIES



PROPOSED UPGRADE OF EXISTING

PROPOSED NEW LOCATION

PROPOSED GRADE SEPARATION

PROPOSED INTERCHANGE

0 1 2 3

SCALE : MILES

FIGURE I
PAGE 2 of 2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

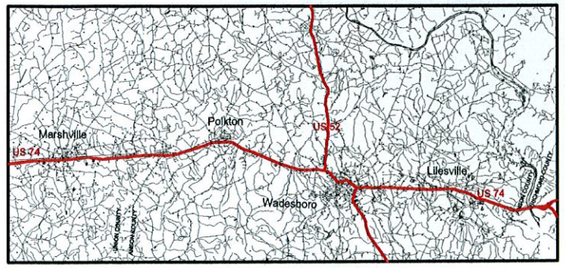
PROGRAM DEVELOPMENT BRANCH

R4441
FEASIBILITY STUDY

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS

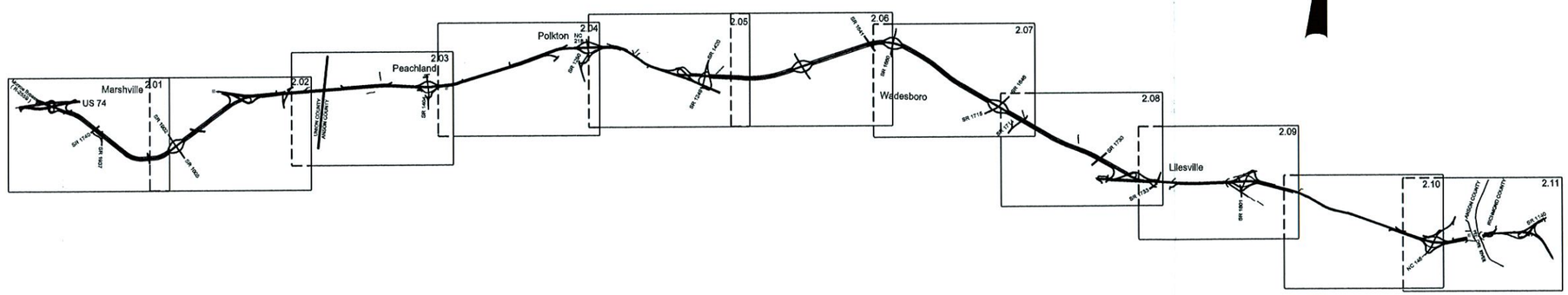
UNION, ANSON, AND RICHMOND COUNTIES

PROJECT: R-4441



VICINITY MAP

UPGRADE US 74 TO FREEWAY STANDARDS FROM MONROE BYPASS (R-2559) TO ROCKINGHAM BYPASS UNION, ANSON, AND RICHMOND COUNTIES



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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for
North Carolina Department of Transportation

FIGURE 2– Overview

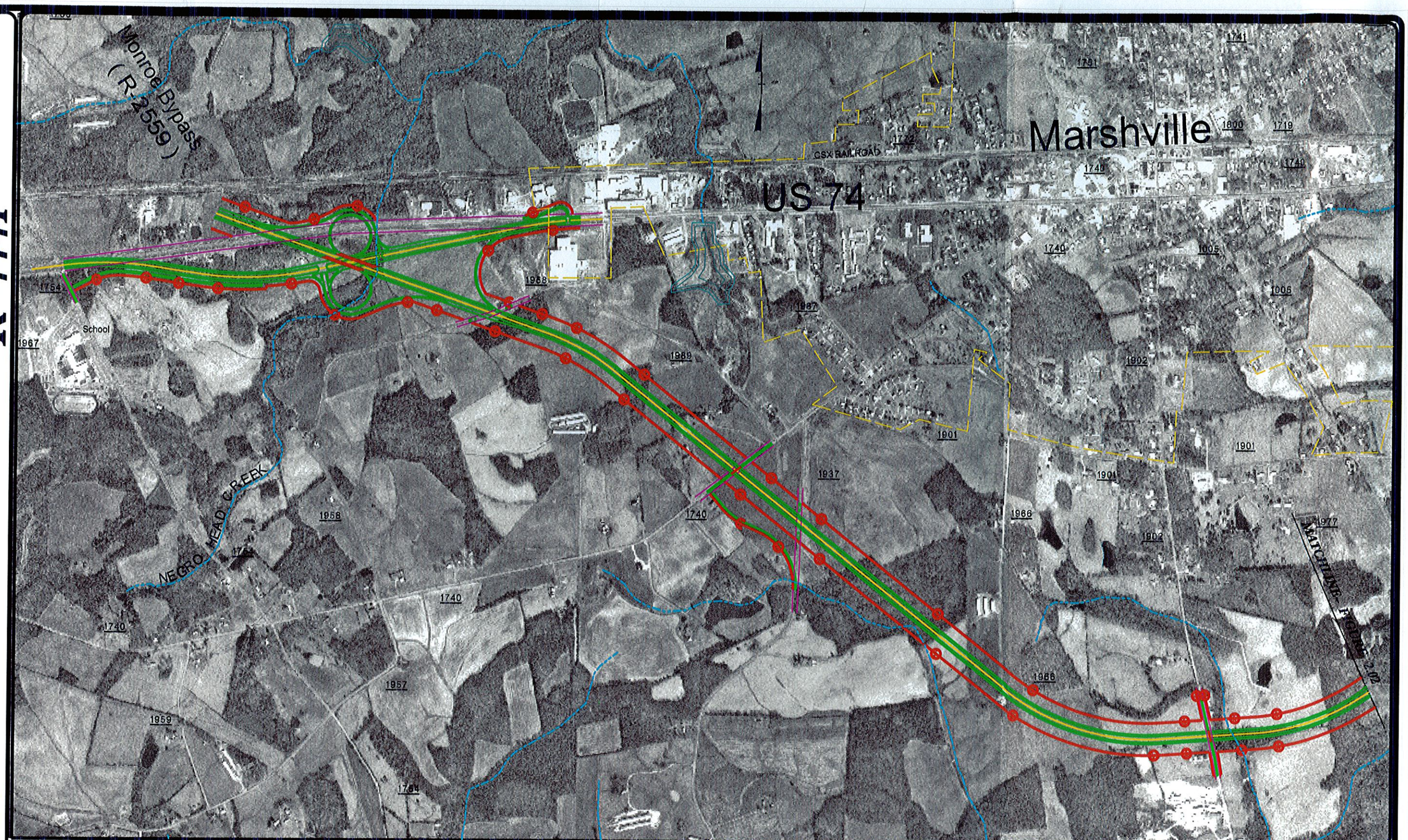
UPGRADE US 74 TO FREEWAY STANDARDS FROM MONROE BYPASS (R-2559) TO ROCKINGHAM BYPASS UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT LENGTH

= 33.9 MILES

PROJECT: R-4441



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LEGEND

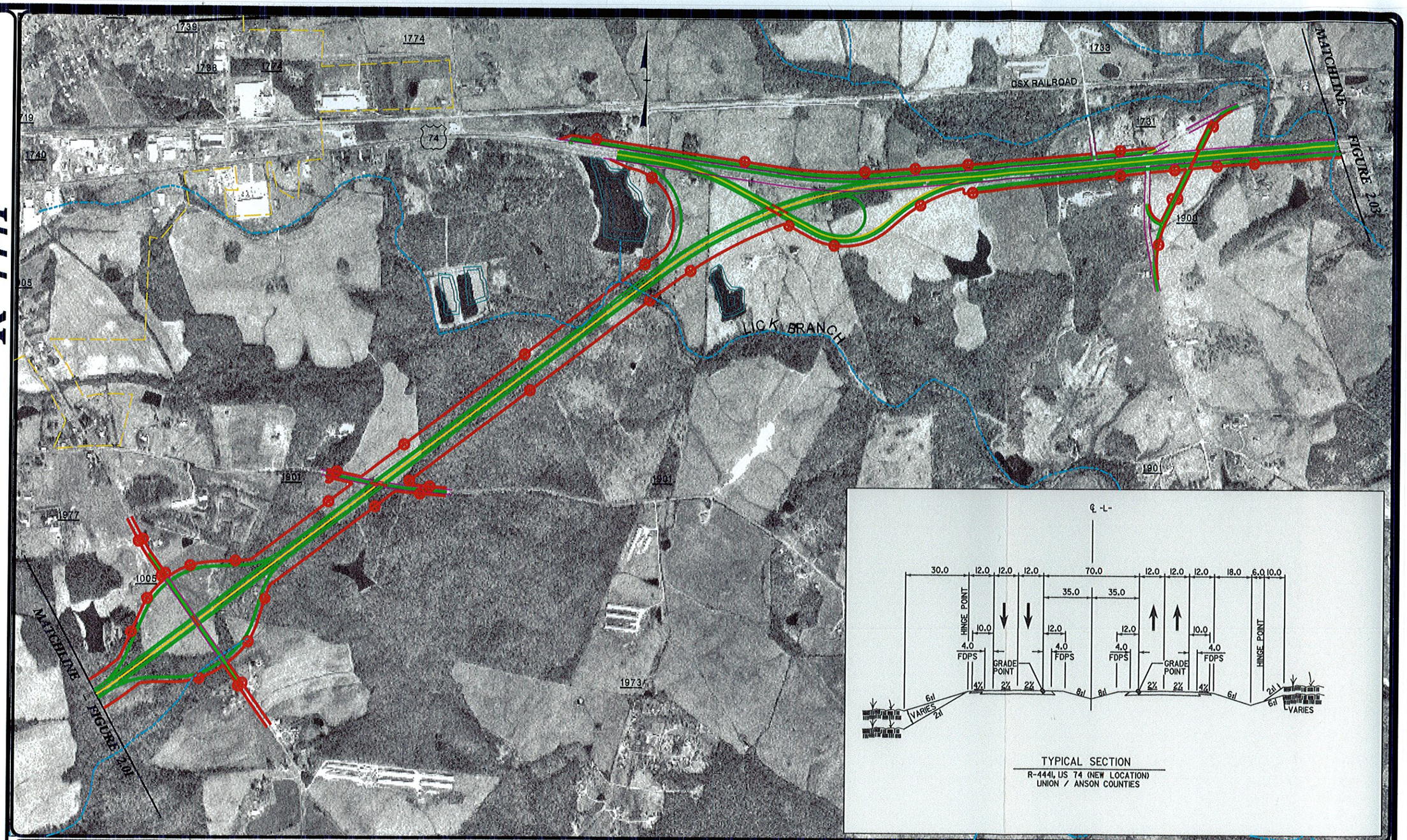
- PROPOSED ROADWAY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- POND
- STREAMS & CREEKS
- EXISTING ROADWAY

FIGURE 2.01

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4441



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LEGEND

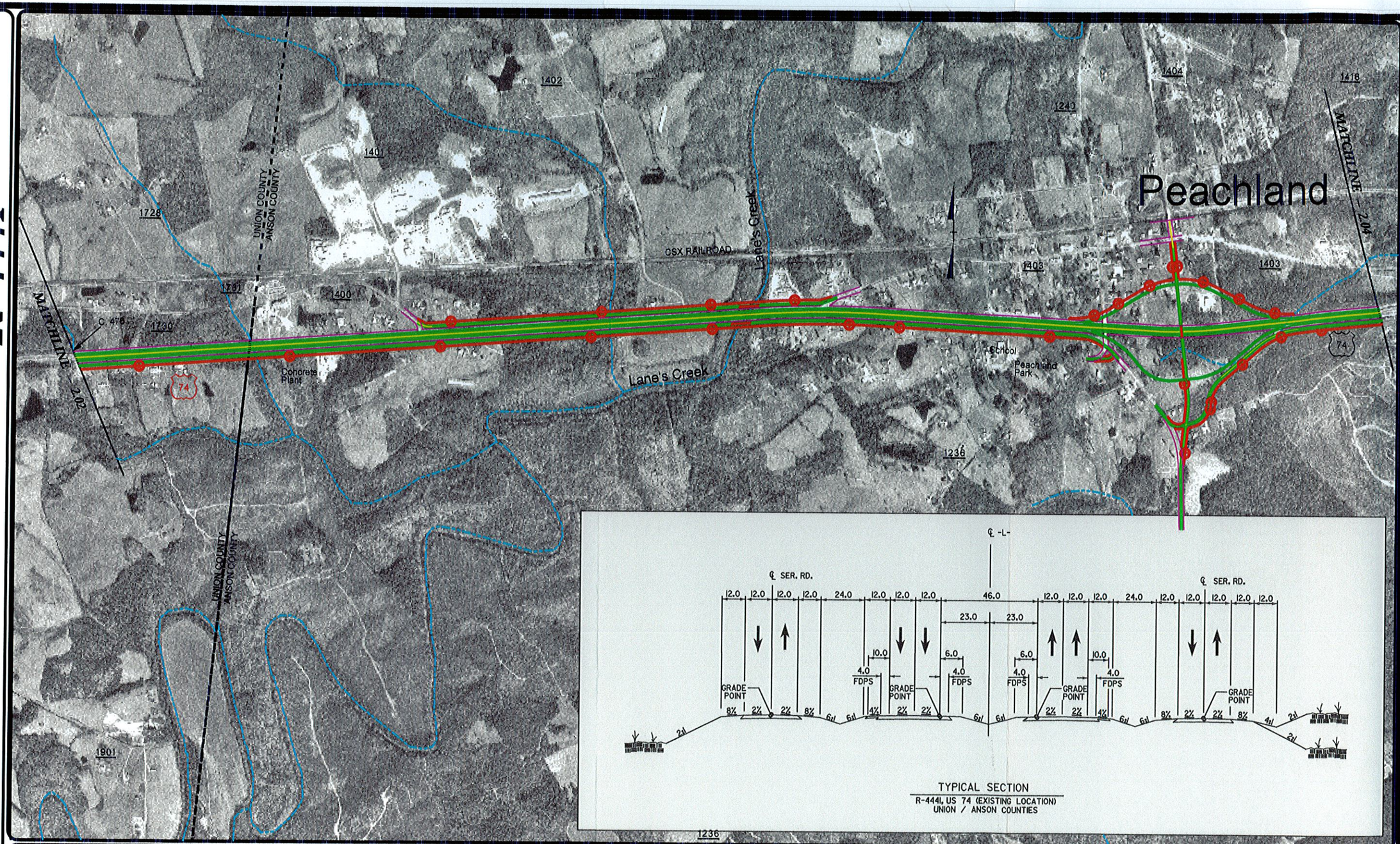
- PROPOSED ROADWAY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- POND
- STREAMS & CREEKS
- EXISTING ROADWAY

FIGURE 2.02

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4441



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LEGEND

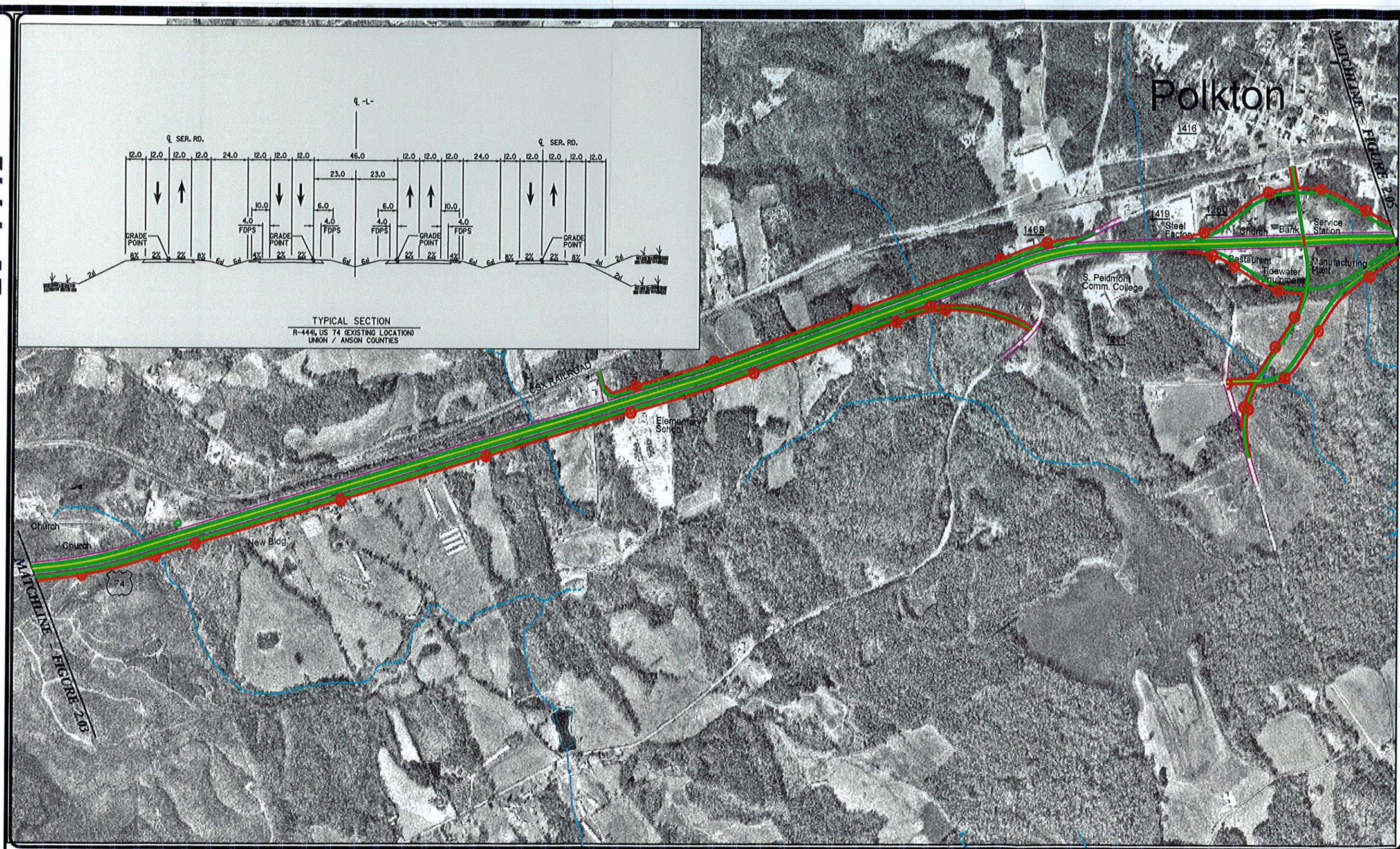
- PROPOSED ROADWAY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- POND
- STREAMS & CREEKS
- EXISTING ROADWAY

FIGURE 2.03

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4441



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LEGEND

- PROPOSED ROADWAY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- POND
- STREAMS & CREEKS
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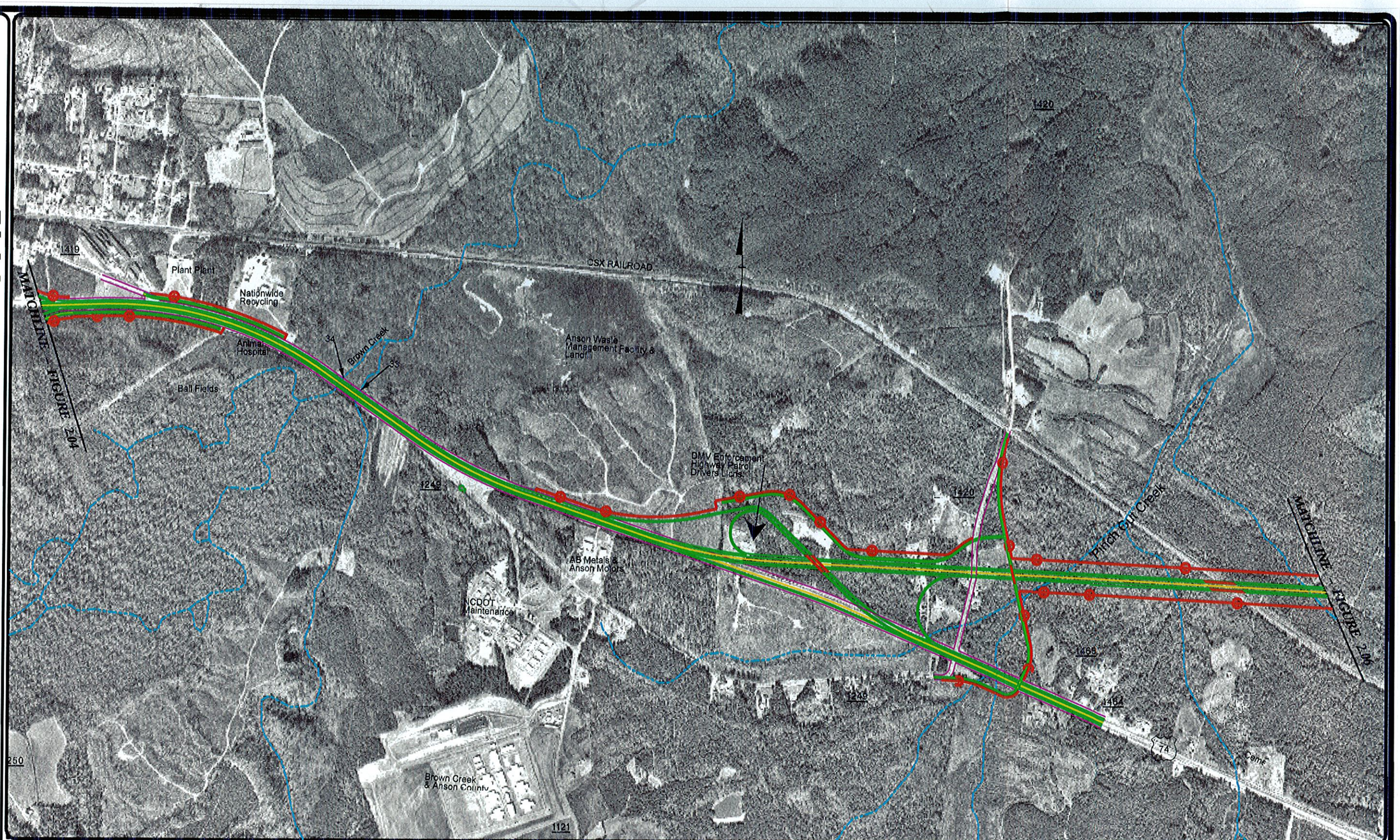
FIGURE 2.04

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4441



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LEGEND

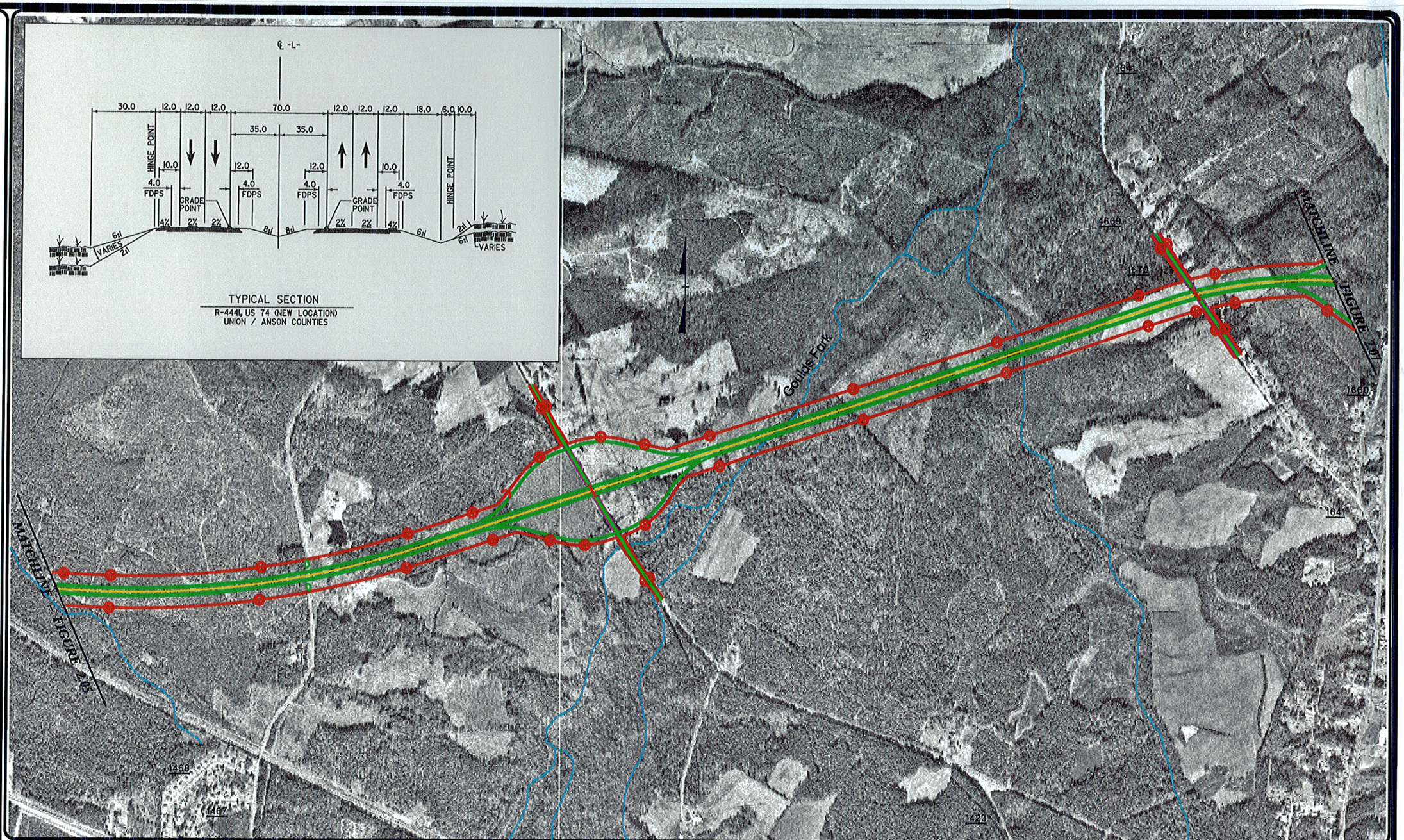
- PROPOSED ROADWAY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- POND
- STREAMS & CREEKS
- EXISTING ROADWAY

FIGURE 2.05

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4441



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LEGEND

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- PROPOSED RIGHT-OF-WAY
- POND
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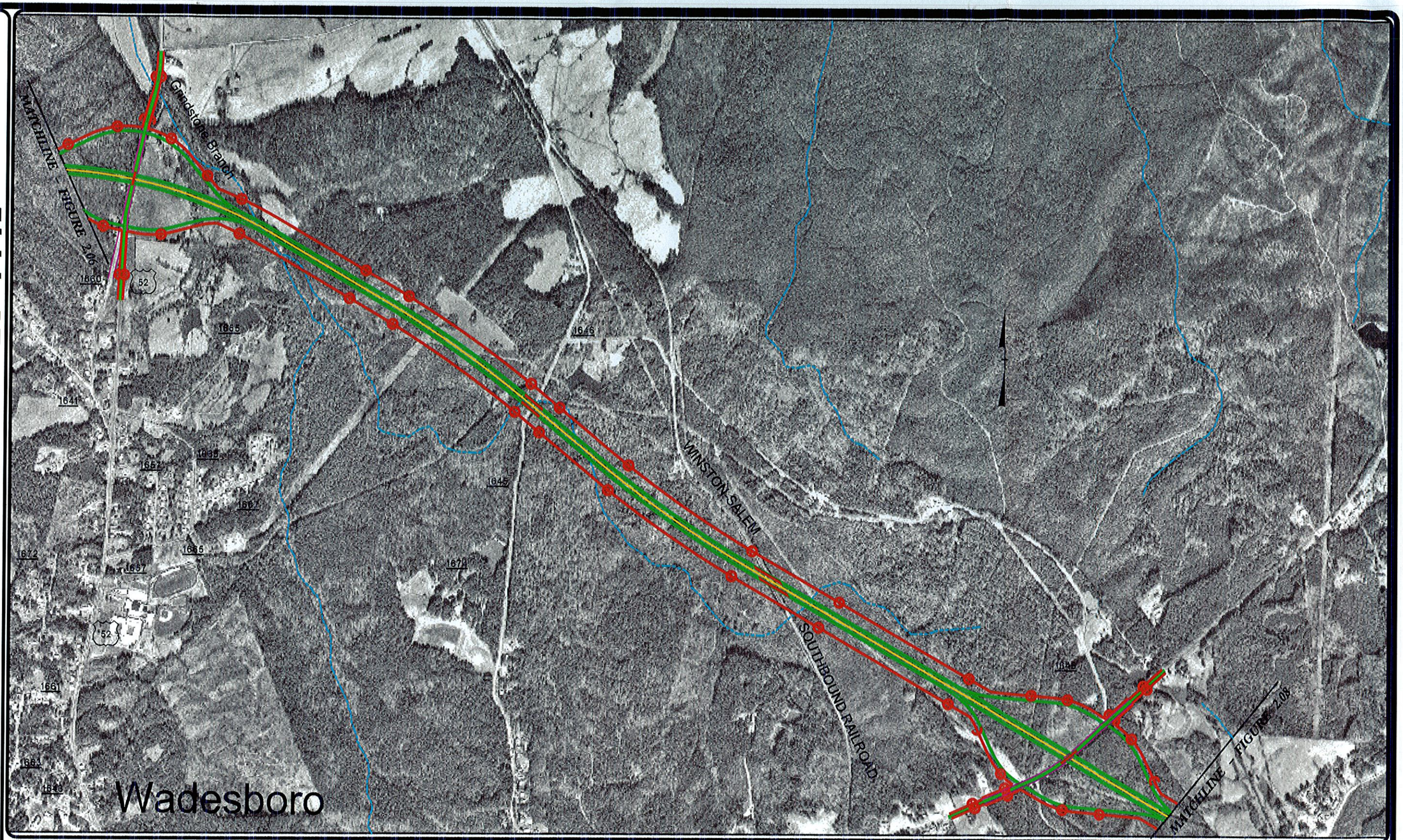
- EXISTING ROADWAY

FIGURE 2.06

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4441



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LEGEND

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FIGURE 2.07

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4111

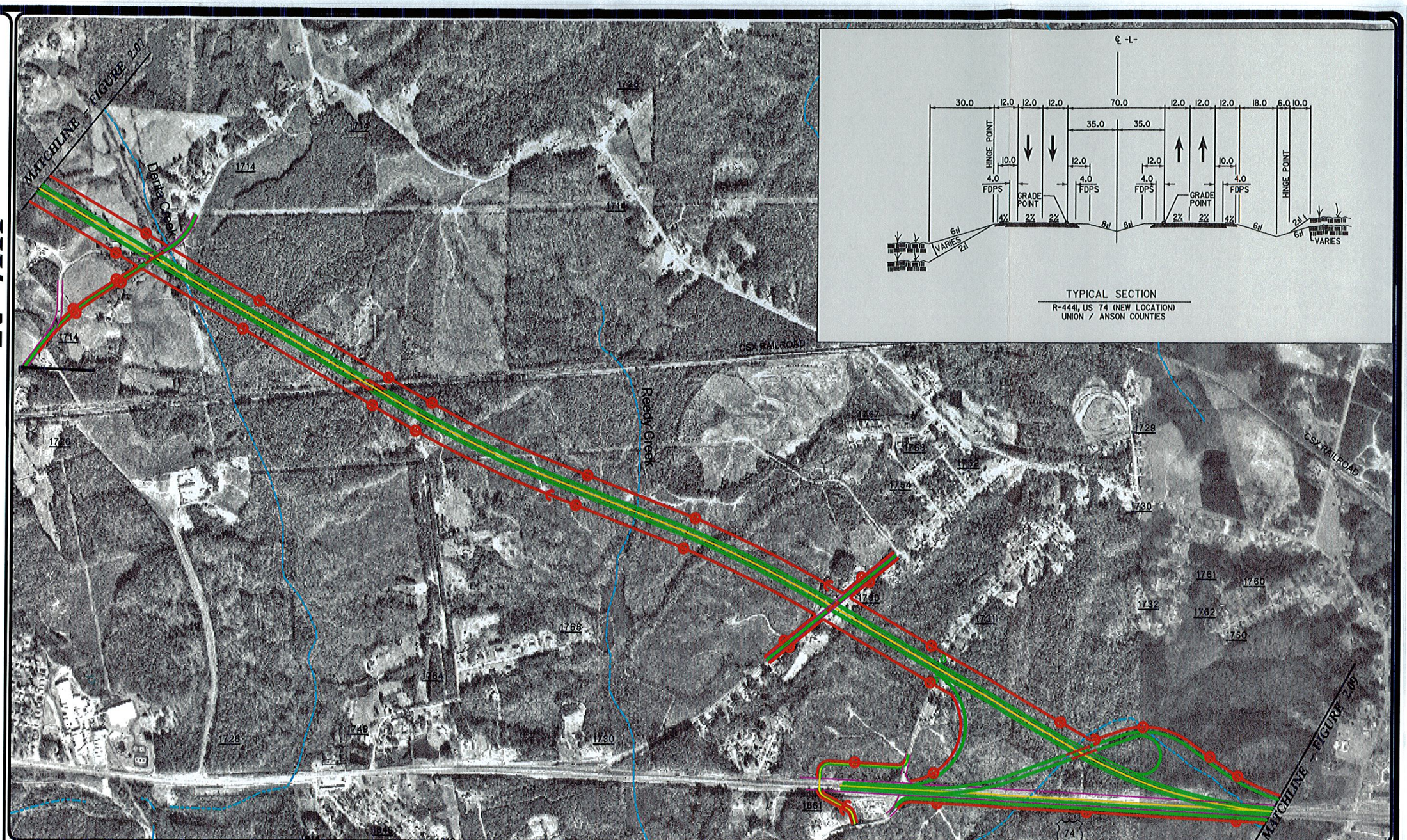

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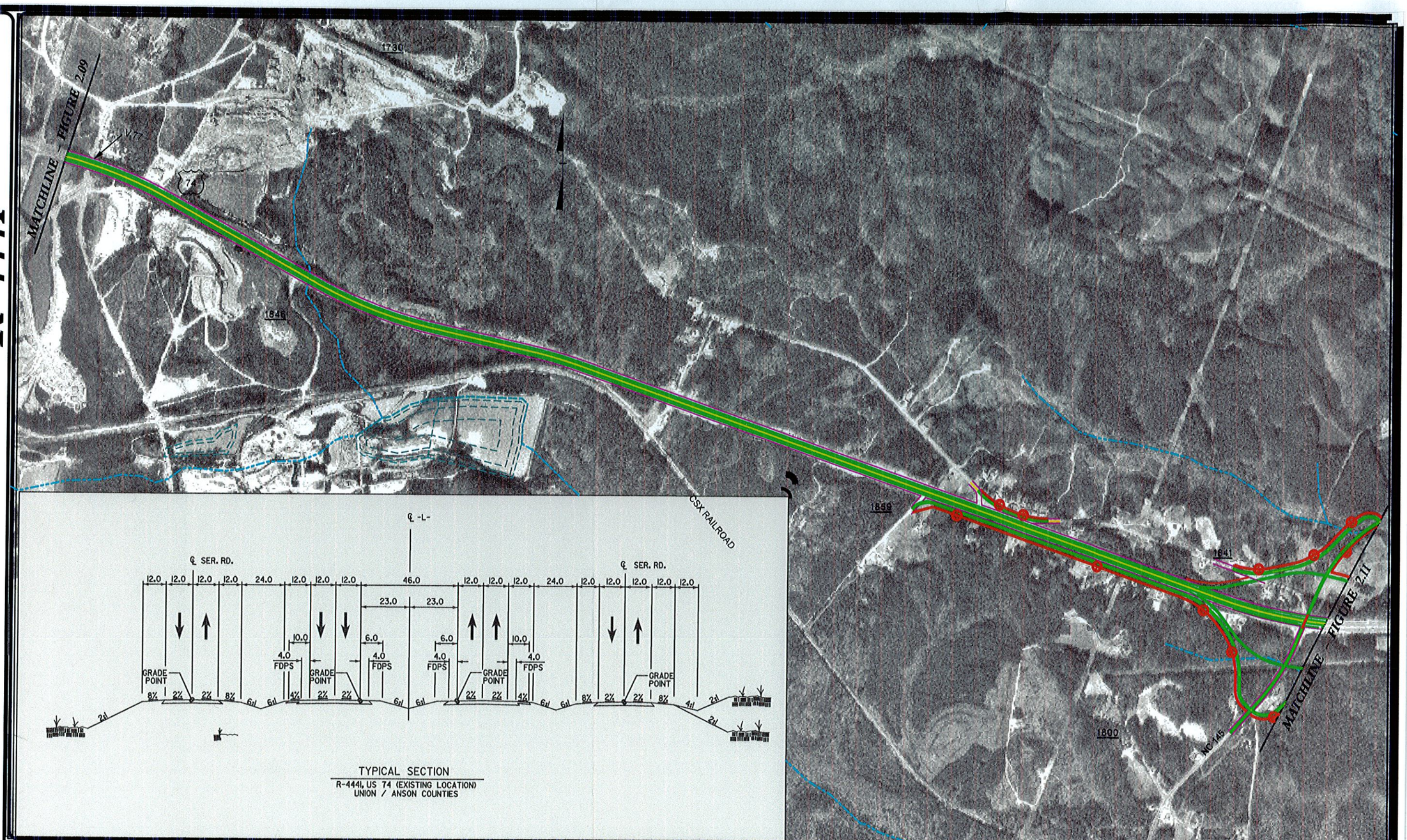
FIGURE 2.08

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4441



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROGRAM DEVELOPMENT BRANCH

Prepared in the Office of:
KO & ASSOCIATES, P.C.
1011 Schaub Dr. Suite 202, Raleigh, NC 27606 919-851-6066
for
North Carolina Department of Transportation

LEGEND

- PROPOSED ROADWAY
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- POND
- STREAMS & CREEKS
- EXISTING ROADWAY

FIGURE 2.10

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
UNION, ANSON, AND RICHMOND COUNTIES

TIP NO. R-4441

PROJECT: R-4441

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FIGURE 2.11

UPGRADE US 74 TO FREEWAY STANDARDS
FROM MONROE BYPASS (R-2559) TO
ROCKINGHAM BYPASS
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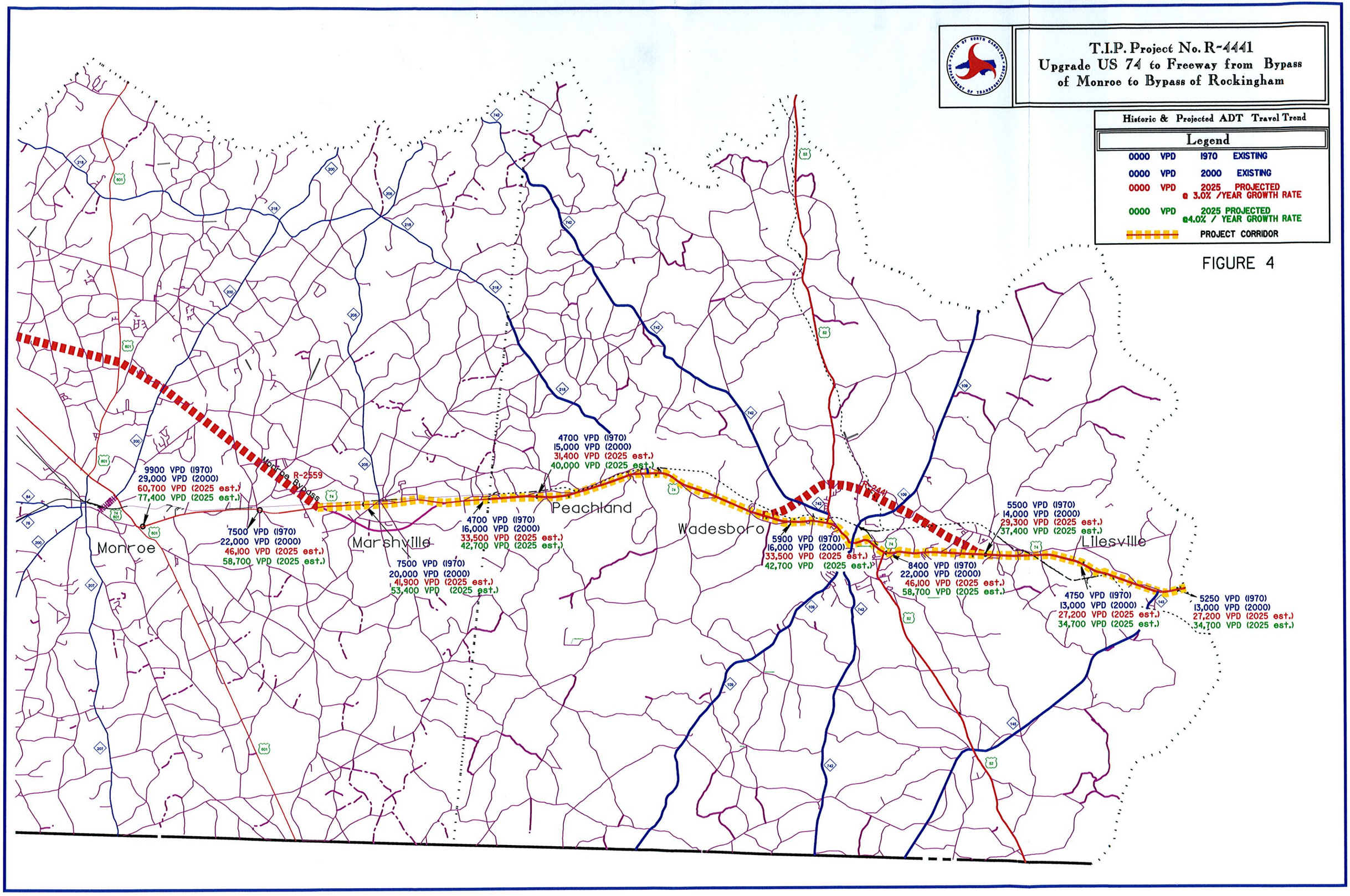
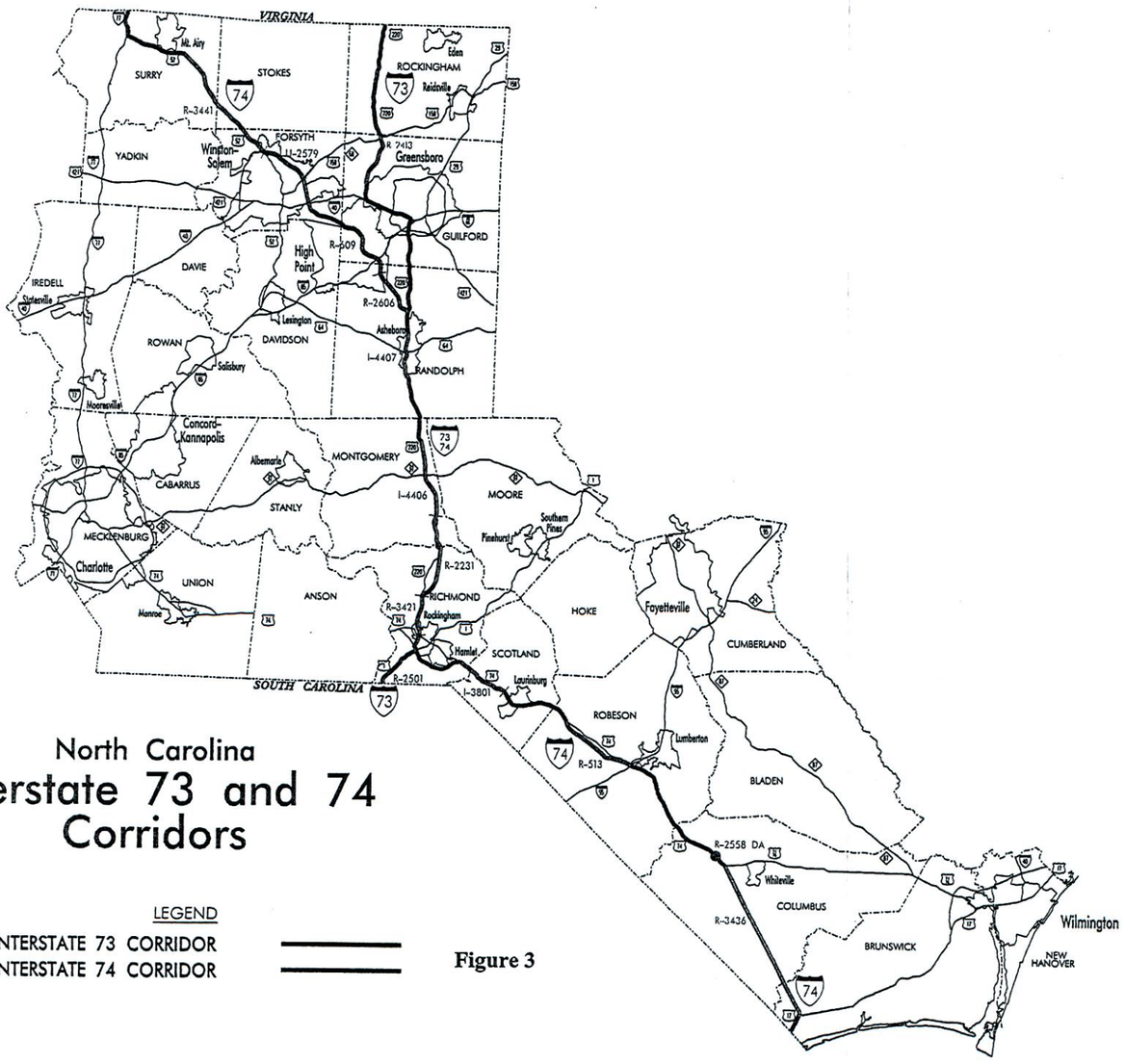
TIP NO. R-4441


T.I.P. Project No. R-4441
Upgrade US 74 to Freeway from Bypass of Monroe to Bypass of Rockingham
Historic & Projected ADT Travel Trend
Legend
0000 VPD 1970 EXISTING
0000 VPD 2000 EXISTING
0000 VPD 2025 PROJECTED @ 3.0% /YEAR GROWTH RATE
0000 VPD 2025 PROJECTED @4.0% / YEAR GROWTH RATE
PROJECT CORRIDOR
FIGURE 4
Monroe
Marshville
Peachland
Wadesboro
Lilesville
Monroe Bypass
R-2559
9900 VPD (1970)
29,000 VPD (2000)
60,700 VPD (2025 est.)
77,400 VPD (2025 est.)
7500 VPD (1970)
22,000 VPD (2000)
46,100 VPD (2025 est.)
58,700 VPD (2025 est.)
7500 VPD (1970)
20,000 VPD (2000)
41,900 VPD (2025 est.)
53,400 VPD (2025 est.)
4700 VPD (1970)
15,000 VPD (2000)
31,400 VPD (2025 est.)
40,000 VPD (2025 est.)
4700 VPD (1970)
16,000 VPD (2000)
33,500 VPD (2025 est.)
42,700 VPD (2025 est.)
5900 VPD (1970)
16,000 VPD (2000)
33,500 VPD (2025 est.)
42,700 VPD (2025 est.)
8400 VPD (1970)
22,000 VPD (2000)
46,100 VPD (2025 est.)
58,700 VPD (2025 est.)
5500 VPD (1970)
14,000 VPD (2000)
29,300 VPD (2025 est.)
37,400 VPD (2025 est.)
4750 VPD (1970)
13,000 VPD (2000)
27,200 VPD (2025 est.)
34,700 VPD (2025 est.)
5250 VPD (1970)
13,000 VPD (2000)
27,200 VPD (2025 est.)
34,700 VPD (2025 est.)



North Carolina
nterstate 73 and 74 Corridors

LEGEND

INTERSTATE 73 CORRIDOR

INTERSTATE 74 CORRIDOR

Figure 3

January 200