



# FS-0507A

## FEASIBILITY STUDY

Future I-73 Connector  
From I-40 to the US 220-NC 68 Connector (R-2413)  
Greensboro, Guilford County  
Division 7



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## Future I-73 Connector From I-40 to the US 220-NC 68 Connector (R-2413) Greensboro, Guilford County Division 7

### I. General Description

This feasibility study evaluates the routing of future Interstate 73 in western Greensboro from I-40 northward to the proposed US 220-NC 68 Connector (R-2413) where it joins existing US 220 near the Haw River. Four alternative routes for the future interstate are included. Alternative lengths vary from 2.5 to 7.5 miles. The lengths do not include portions along existing or proposed highways that do not require improvements. Entire study corridor lengths from I-40 to the Haw River range from 13.9 to 15.1 miles. Please see the attached **Figure 1, Project Location Map**.

The proposed typical section for the I-73 connector is a four-lane divided interstate freeway with a 70' median, full-depth paved shoulders, full control-of-access and service roads where required within a minimum state-maintained right-of-way of 350 feet. Some segments will require a six-lane section. All segments require wider 12' paved shoulders because of anticipated heavy truck traffic.

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 issues that may warrant more detailed study in the subsequent planning and design phases.

According to the Work Zone Safety and Mobility Policy this will be a significant project because of traffic control issues and transportation network impacts. Future analysis is needed in the subsequent stages of the project to ensure that work zone impacts are identified and traffic management strategies are initiated.

### II. Background

Improvements studied in this report are generated by the need to accommodate future Interstate 73 in Greensboro. The National Highway System's "High Priority Corridor 5" (also referred to as the "I-73/74 North-South Corridor") is defined by federal law as traveling from Georgetown, South Carolina to Sault Ste. Marie, Michigan. South Carolina and North Carolina have built sections of the corridor and Virginia has plans for building part of the corridor. SEC. 1105. HIGH PRIORITY CORRIDORS

ON NATIONAL HIGHWAY SYSTEM from the Federal Highway Administration (FHWA) describes the I-73 route within NC as following: US 220 from the Virginia State line to NC State Route 68 in the vicinity of Greensboro; Route 68 to I-40; I-40 to US 220; US 220 in Greensboro to US 1 near Rockingham; and US 1 to the South Carolina State line. I-73 and I-74 run concurrently on US 220 through Asheboro. Additional route descriptions and mapping can be found on the FHWA website [www.fhwa.dot.gov/hep10/nhs/hipricorridors/](http://www.fhwa.dot.gov/hep10/nhs/hipricorridors/).

The NCDOT has identified this future interstate corridor as a Strategic Highway Corridor (SHC). The potential interstate corridor can be found on **Figure 2, SHC Vision Plan for the Triad Area**, as adopted in September 2004. The route generally follows US 220 from the Virginia State line to the proposed US 220-NC 68 Connector (R-2413); the US 220-NC 68 Connector to NC 68; east on new location from NC 68 to the Bryan Blvd. relocation (U-2815); Bryan Blvd. to the I-840 Western Loop (U-2524); south on I-840 to I-40; I-40 east to US 220; and US 220 south to Asheboro and beyond. (This route most closely matches Study Alternatives 1 and 4.) The new location segment also has potential connections westward from the Piedmont Triad International (PTI) Airport to Winston-Salem.

This future interstate corridor will also provide a critical connection to the greater Greensboro area from the north and the south. The Greensboro Urban Area Metropolitan Planning Organization (GUAMPO) has adopted plans to accommodate the potential routing of future Interstate 73 in western Greensboro. The GUAMPO Long Range Transportation Plan (LRTP) can be found on <http://www.greensboro-nc.gov/departments/GDOT/divisions/planning/longrange/>. Freeway routes shown in the plans correspond closely to the potential interstate route on the NCDOT SHC Vision Plan described above. The plans also include future freeway connections to Winston-Salem.

Potential routing plans were also developed in a Piedmont Triad International Airport Area Transportation Study completed in May 2004 by the NCDOT Transportation Planning Branch in cooperation with GUAMPO and other local organizations. The recommended alternative from that study follows the NCDOT SHC Vision Plan as described above. Their recommended alternative includes cutting off Bryan Blvd from the south for future I-73 to connect in to existing Bryan Blvd. The airport study also included a future east-west airport connector and other possible future system connections. A copy of the **Piedmont Triad Airport Study Recommended Alternative** is included in **Figure 3** of this document.

PTI Airport is experiencing significant growth and change. The main airport entryway is being relocated to the new Bryan Blvd./ Old Oak Ridge Road interchange in conjunction with the Bryan Blvd. relocation, the 3<sup>rd</sup> runway construction, and the FedEx Hub construction. Two of the FS-0507A study alternatives, Alternatives 1 and 4, connect directly to Bryan Blvd. near the airport's new entryway. One of the study alternatives, Alternative 1, utilizes a ½-mile long property (presently

Pleasant Ridge Golf Course) located between NC 68 and the Bryan Blvd./Old Oak Ridge Road interchange which the airport is preserving for possible use by the future interstate.

Land use within the study area varies from residential and agricultural land north of the city to a mix of urban industrial, commercial, and office use within the city. A large tract of land between these areas is PTI Airport property. There is also potential institutional land use in the study area; the Guilford Technical Community College (GTCC) is considering locating a new campus northwest of NC 68 and Leaborne Road (see Figures 12 to 15).

Federal, State, and Local plans classify the potential interstate route as future freeway and/or interstate. Adjoining routes I-40, U-2524 (I-840 Western Loop), U-2815 (Bryan Blvd. Relocation), and R-2413 (US 220-NC 68 Connector) are also classified as freeway/interstate routes. I-40 is a ten-lane interstate freeway within the study area. Other adjoining potential interstate routes are four- and six-lane freeways.

State and Local plans classify existing highway US 220 as a principal arterial and a major thoroughfare, respectively. State highway classifications are shown on the NCDOT functional classification maps. Local classifications are taken from the GUAMPO Thoroughfare Plan.

Other routes are classified as follows: NC 68 is classified as a minor arterial by the NCDOT and a freeway by GUAMPO. NC 150 is classified as a major collector by NCDOT and a major thoroughfare by GUAMPO. Pleasant Ridge Road (SR 2133) is classified as a minor collector by NCDOT and as a major thoroughfare by GUAMPO. West Market Street is classified as a major collector by NCDOT and a major thoroughfare by GUAMPO.

There is a Norfolk Southern Railway which parallels West Market Street and crosses the potential interstate corridor. However, improvements considered in this study do not affect the railroad.

There are several NCDOT projects and studies listed in the Draft 2009-2015 Transportation Improvement Program (TIP) that are within or adjacent to the study area. Adjacent TIP projects and their relationship to the future interstate corridor can be seen on **Figure 1**.

TIP projects R-2309, R-2413, U-2524, and U-2815C directly affect alternatives considered in this study. TIP project R-2309 proposes widening existing two-lane US 220 to a multi-lane curb-and-gutter facility with a narrow raised grass median from Horse Pen Creek Road (SR 2182) to the US 220-NC 68 Connector (R-2413). This portion of US 220 is part of a possible route for I-73. The R-2309 project does not propose full control of access and has many at-grade intersections. Proposed right-of-way varies from 120' to 200' wide. Right-of-way acquisition is expected to begin in 2008 and construction in 2010.

TIP project R-2413 is the US 220-NC 68 Connector and is also part of a possible route for I-73. It proposes a four-lane divided connector on new location with a 46' median from NC 68 and Pleasant Ridge Road (SR 2133) to US 220 near the Haw River. This facility is to be constructed to interstate standards. Right-of-way acquisition is expected to begin in 2010 and construction in 2013. The 1992 Hearing Map design of the NC 68/Pleasant Ridge Road (SR 2133) interchange is currently being reevaluated to update the design, coordinate with future I-73, and coordinate with possible western connectors (see I-4924, FS-0707A and FS-0707B below).

TIP project U-2524 is the proposed Greensboro Western Urban Loop (future I-840) and includes a new location freeway from south of I-40 to north of Bryan Blvd. (SR 2176). Portions of this project are included in the potential route for I-73. The portion from I-40 to Bryan Blvd. was opened to traffic on December 18<sup>th</sup>, 2007. The southwest portion from I-85 to I-40 and Bryan Blvd has been completed and was opened to traffic this spring. Completion of the portion north of Bryan Blvd is anticipated sometime after 2015.

TIP project U-2815C proposes relocating Bryan Blvd from Inman Road to NC 68. This project is under construction by the airport authority and is in conjunction with the construction of a 3<sup>rd</sup> runway and a FedEx hub. Anticipated completion is mid 2008.

Future TIP project I-4924 and feasibility studies FS-0707A and FS-0707B will be directly affected by the results of this study. Please also refer to **Figure 3** in the back of this document. I-4924 is described as an I-73/74 Connector from the Winston-Salem Beltway north of Kernersville to NC 68 west of Greensboro. (It is also sometimes referred to as the Airport Connector.) The project is programmed for planning and environmental study only and is a candidate future NC Turnpike Authority project.

Proposed feasibility study FS-0707A will consider a new route from Sandy Ridge Road (SR 1850) at W. Market Street (SR 1008) to NC 68 near PTI Airport. The project may connect to the **Alternative 1 or 4** I-73 route described in this document from the west.

Proposed feasibility study FS-0707B will consider a new route for a north-south freeway connector from US 311 (future I-74) in High Point to NC 68 near PTI airport. The northern terminus of the project would connect to the **Alternative 1 or 4** I-73 route described in this document .

TIP projects R-2611, U-4015, and U-5003 are part of this study's adjacent roadway network. R-2611 proposes widening West Market Street (SR 1008) to multi-lanes from NC 68 westward. U-4015 proposes widening Gallimore Dairy Road (SR 1556) to multi-lanes from NC 68 to I-40 and

I-40 to W. Market Street. The part near I-40 is complete and the remaining part is unfunded. U-5003 proposes widening and grade separating Pegg Road (SR 1840)/Thatcher Road (SR 1842) over I-40. These projects will improve the roadway network in the study area but do not directly affect the improvements recommended in this study.

### III. Traffic & Safety

Base year 2007 and design year 2035 traffic forecasts for the Annual Average Daily Traffic (AADT) used in this study were provided by the NCDOT Transportation Planning Branch and are based on the recently updated Piedmont Triad Regional Traffic Model. Please refer to the **Traffic Forecast Diagrams, Figures 4 to 11**, located in the back of this document. The base year AADT along the No Build corridor ranges from 18,000 to 114,000 vehicles per day (vpd). The estimated design year AADT along the No Build corridor ranges from 23,000 to 150,600 vpd. The volumes are the highest along I-40 and the lowest along the proposed US 220-NC 68 Connector (R-2413) project. The percentage of truck traffic is 14% (5% Duals and 9% TTST's) for both base year and design year traffic along the future interstate corridor.

The No Build alternative routes I-73 west along existing I-40 from the Western Loop to NC 68, then north along NC 68 to the US 220-NC 68 Connector, and along the US 220-NC 68 Connector to US 220 near the Haw River. Please also refer to traffic diagram Figures 4 and 5. The following table shows the No Build Alternative levels of service based on capacity analyses of current conditions:

NO BUILD ALTERNATIVE – LEVELS OF SERVICE					
Freeway Segment	No. Lanes	2007 ADT	2007 LOS	2035 ADT	2035 LOS
Along I-40 From I-840 to Gallimore Dairy Road	10	114,000	C	150,600	D
Along I-40 From Gallimore Dairy Road to NC 68	10	108,500	C	143,400	D
Along NC 68 From I-40 to W. Market Street	4	34,500	C	63,000	E
Along NC 68 From W. Market Street To US 220-NC 68 Connector (R-2413)	4	30,000	B	51,500	D
Along US 220-NC 68 Connector (R-2413) From old NC 68 interchange northward	4	18,000	A	23,000	B

Although there are no crash data to evaluate the future highway segments, interstate highways are generally safer and have lower crash and fatality rates than other types of highways that are non-controlled access facilities. The proposed improvements of the studied alternatives, therefore, provide the safest type of facility for the new highway segments. Routing the future interstate along existing corridors will, however, increase the traffic and thus the potential for crashes along those corridors.

#### IV. Description of Alternatives

Improvements studied are generated by the need to accommodate future Interstate 73 in western Greensboro. Four alternatives are considered and described below:

**Alternative 1** routes future I-73 from I-40 north along I-840 (U-2524) for 3.5 miles, west along Bryan Boulevard (U-2815) for 1.5 miles, west-northwest on new location (as the proposed I-73 Connector) for 2.4 miles, and finally north along the US 220-NC 68 Connector (R-2413) to US 220 for 7.7 miles. Approximately 3 miles of construction is needed for this alternative. The complete study alternative is 15.1 miles long from I-40 to US 220. Please refer to **Figure 12**. The proposed typical section is a four-lane divided freeway with a 70' median, 4' full-depth median paved shoulders, and 12' full-depth outside paved shoulders within a 350' right-of-way.

The portion of Alternative 1 along the proposed Greensboro Western Loop (U-2524) is open to traffic. The portion along the Bryan Boulevard Relocation project (U-2815C) is anticipated to be completed in 2008. Construction of the US 220-NC 68 Connector (R-2413 sections A and B) is anticipated to begin in year 2013. These projects are to be constructed to interstate standards.

The following table shows the anticipated Alternative 1 freeway segment levels of service in 2035:

<b>ALTERNATIVE 1 – LEVELS OF SERVICE</b>			
<b>Segment</b>	<b>2035 ADT</b>	<b>Total No. Lanes</b>	<b>2035 LOS</b>
Along Western Loop (U-2524B) From I-40 to Bryan Blvd	88,000	6 (existing)	D
Along Bryan Blvd (U-2815C) From Loop to Old Oak Ridge Road interchange	78,000	6 (existing)	D
New Segment From Old Oak Ridge Road interchange to NC 68	68,000	6	C
New Segment From NC 68 to US 220-NC 68 Connector (R-2413)	49,000	4	C
Along US 220-NC 68 Connector (R-2413) From old NC 68 interchange northward	36,000	4 (existing)	C

Alternative 1 improvements tie into the western Old Oak Ridge Road interchange ramps (proposed under the U-2815 project) and proceed west on new location towards NC 68. No improvements are needed along the retained portions of I-840, Bryan Blvd., or the future US 220-NC 68 Connector. A six-lane section is needed between the Old Oak Ridge Road and NC 68 interchanges. Alternative 1 improvements include removing Pleasant Ridge Road from the freeway-to-freeway interchange needed for NC 68, the US 220-NC 68 Connector, I-73, and a future western connector. Pleasant Ridge Road can be relocated around the freeway-to-freeway interchange to the north and grade separated over the future interstate. The interchange configuration is designed to accommodate a future freeway link to the west, the “I-73/74 Airport Connector”, and is represented on the map. Access to NC 68 is provided in conjunction with the proposed US 220-NC 68 Connector



(R-2413) improvements. The relocation of Pleasant Ridge Road will facilitate maintenance of traffic during construction.

It is anticipated that **Alternative 1** will require the relocation of eight (8) residences and four (4) businesses. It is estimated that the scope of ITS deployment for Alternative 1 will include 4 CCTV's, 2 DMS's, 8 detection devices and 28,000 feet of fiber optic cable and will cost \$ 2,100,000. The total cost, including ITS, construction, right-of-way, and utility relocations, is estimated to be \$ 121,500,000.

<b>Construction</b>	<b>Right-of-Way</b>	<b>Utility Relocations</b>	<b>ITS</b>	<b>Total</b>
\$ 70,000,000	\$ 49,000,000	\$ 400,000	\$ 2,100,000	\$ 121,500,000

**Alternative 2** routes future I-73 west along I-40 for 2.5 miles, north along NC 68 for 3.0 miles, and finally north along the US 220-NC 68 Connector (R-2413) to US 220 for 9.3 miles. Approximately 3.5 miles of construction are needed for this alternative. The complete study alternative is 14.8 miles long from I-40 to US 220. Please refer to **Figure 13**. The proposed typical section is a four-lane divided freeway with a 46' (existing) median, 4' full-depth median paved shoulders, and 12' full-depth outside paved shoulders within existing right-of-way.

The following table shows the anticipated Alternative 2 freeway segment levels of service in 2035:

<b>ALTERNATIVE 2 – LEVELS OF SERVICE</b>			
<b>Segment</b>	<b>2035 ADT</b>	<b>Total No. Lanes</b>	<b>2035 LOS</b>
Along I-40 From I-840 to Gallimore Dairy Road	150,100	10 (existing)	D
Along I-40 From Gallimore Dairy Road to NC 68	143,400	10 (existing)	D
Widened NC 68 From I-40 to W. Market Street	63,000	6 (widened from 4)	C
Along NC 68 From W. Market Street To US 220-NC 68 Connector (R-2413)	51,500	4 (existing)	D
Along US 220-NC 68 Connector (R-2413) From old NC 68 interchange northward	23,000	4 (existing)	B

I-40 and NC 68 (south of Pleasant Ridge Road) levels of service will improve slightly with the inclusion of a future western airport connector; i.e. more traffic is predicted to travel along Bryan Blvd to the Western Loop instead of down NC 68 to I-40 with a western airport connector in place.

Alternative 2 improvements include reconstructing the I-40/NC 68 interchange to a freeway-to-freeway configuration, relocating the interchange ramps at W. Market Street to meet interstate standards, and installing interstate standard paved shoulders and median guiderail along NC 68. Based on the current traffic forecasts and I-40 improvements currently under construction, Alternative 2 improvements for the new NC 68/I-40 interchange ramps can be accomplished west of the Gallimore



Dairy Road bridge. No improvements are needed along the portions of I-40 east of Gallimore Dairy Road or along the future US 220-NC 68 Connector.

Alternative 2 improvements include increasing the radii of the loop-ramps and providing proper ramp terminal spacing at the W. Market Street interchange. Improvements also include installation of interstate standard paved shoulders, median cable guiderail and full control-of-access along NC 68 from I-40 to project R-2413. NC 68 will need to be widened from four to six lanes from I-40 to W. Market Street. Access control needed for the new I-40/NC 68 interchange will affect several existing at-grade intersections, require several access road relocations and affect at least one planned development site along NC 68.

It is anticipated that **Alternative 2** will require the relocation of no (0) residences and thirty-three (33) businesses. It is estimated that the scope of ITS deployment for Alternative 2 will include 4 CCTV's, 2 DMS's, 8 detection devices and 33,000 feet of fiber optic cable and will cost \$ 2,400,000. The total cost, including ITS, construction, right-of-way, and utility relocations, is estimated to be \$ 160,900,000.

Construction	Right-of-Way	Utility Relocations	ITS	Total
\$ 54,300,000	\$ 103,500,000	\$ 700,000	\$ 2,400,000	\$ 160,900,000

**Alternative 3** routes future I-73 from I-40 north along I-840 (U-2524) for 6.7 miles and north along US 220 (R-2309) for 7.3 miles. Approximately 7.5 miles of construction is needed for this alternative. The complete study alternative is 14.0 miles long from I-40 to the Haw River. Please refer to **Figure 14**.

Alternative 3 improvements include significant reconstruction of the US 220 corridor from the Western Loop north to where the US 220-NC 68 Connector (R-2413) joins existing US 220. Project R-2309 proposes widening this same segment of US 220 from a two-lane roadway to a four-lane divided roadway with a narrow raised grass median on right-of-way varying from 120' to 200' wide. The R-2309 project does not propose full control of access and has many at-grade intersections along the corridor. Upgrading the corridor to an interstate would include maintaining one side of the four-lane roadway as a service road and constructing the new interstate parallel to that roadway.

The proposed Alternative 3 typical section along the US 220 corridor is a four-lane divided freeway with a 70' median, 4' full-depth median paved shoulders, 12' full-depth outside paved shoulders within a 350' right-of-way. Future I-73 would be constructed on alternating sides of the R-2309 multi-lane improvements in order to minimize impacts to existing development and maintain two lanes as a service road. Service Roads would be needed along both sides of the interstate for the whole length of construction along US 220 (R-2309).

Alternative 3 improvements include new bridges over Lakes Brandt and Higgins, reconstructing two interchanges, constructing two new interchanges and two new grade separations. The interchange at the north end with the US 220-NC 68 Connector (R-2413) would be reconstructed to make I-73 the through movement. Reconstruction of the proposed Western Loop (I-840) interchange at US 220 from a SPUI to a freeway-to-freeway interchange would require substantial reconstruction and extensive bridging over wetlands.

Alternative 3 would result in significant human and natural environmental impacts and would be the most expensive alternative to construct. It was determined that neither traffic capacity analyses nor cost estimates were necessary to further evaluate this alternative. Additional information on the impact of Alternative 3 is discussed in the subsequent sections of the document.

**Alternative 4** routes future I-73 from I-40 north along I-840 (U-2524) for 3.5 miles, west along Bryan Boulevard (U-2815) for 1.5 miles, northwest on new location (as the proposed I-73 Connector) for 2.5 miles, and finally north along the US 220-NC 68 Connector (R-2413) to US 220 for 6.4 miles. Approximately 2.5 miles of construction is needed for this alternative. The complete study alternative is 13.9 miles long from I-40 to US 220. Please refer to **Figure 15**.

The following table shows the anticipated Alternative 4 freeway segment levels of service in 2035:

<b>ALTERNATIVE 4 – LEVELS OF SERVICE</b>			
<b>Segment</b>	<b>2035 ADT</b>	<b>Total No. Lanes</b>	<b>2035 LOS</b>
Along Western Loop (U-2524B) From I-40 to Bryan Blvd	74,000	6 (existing)	C
Along Bryan Blvd (U-2815C) From W. Loop to Old Oak Ridge Road interchange	57,000	6 (existing)	C
New Segment From Old Oak Ridge Road interchange to (R-2413)	42,000	4	C
Along US 220-NC 68 Connector (R-2413) Northward	24,000	4 (existing)	B

Alternative 4 is similar to Alternative 1 but travels more northwest on new location bypassing the proposed US 220-NC 68 Connector interchange with Pleasant Ridge Road and NC 68. Alternative 4 includes a combination of four proposed interchanges – a partial-clover interchange at Pleasant Ridge Road, a pair of 3-leg interchanges at the junction of R-2413 and I-73, and a partial cloverleaf interchange with a future I-73/74 Airport Connector. Additional construction along NC 68 would be needed with the inclusion of the future western Airport Connector interchange. The western connection can intersect NC 68 at grade in the interim. The combination of these four interchanges provides full movement to and from NC 68, Pleasant Ridge Road, a future Airport Connector, and I-73. No improvements are needed along the retained portions of I-840, Bryan Blvd., or the retained portion of the proposed US 220-NC 68

Connector (R-2413). Traffic directions and highway signing associated with this alternative would be challenging.

It is anticipated that **Alternative 4** will require the relocation of forty (40) residences and one (1) business. It is estimated that an ITS deployment for Alternative 4 will include 4 CCTV's, 2 DMS's, 8 detection devices and 28,000 feet of fiber optic cable and will cost \$ 2,100,000. The total cost, including ITS, construction, right-of-way, and utility relocations, is estimated to be \$ 107,900,000.

<b>Construction</b>	<b>Right-of-Way</b>	<b>Utility Relocations</b>	<b>ITS</b>	<b>Total</b>
\$ 83,500,000	\$ 22,100,000	\$ 200,000	\$ 2,100,000	\$ 107,900,000

## V. Human and Natural Environment Issues

Since the major portion of Alternatives 1, 2, and 4 would travel along existing freeways, there would not be many natural or human environment impacts associated with their proposed improvements. There are no known wetland impacts or community issues associated with Alternative 1. Alternative 1 is within the Lake Brandt protected watershed but not within the critical watershed.

Several culverts would be constructed or extended with Alternative 2 improvements, but they would be in areas where the streams are already disturbed and within existing right-of-way. There are no known wetland impacts or community issues associated with Alternative 2. Alternative 2 is within the Lake Brandt protected watershed but not within the critical watershed.

Alternative 4 would fragment a portion of the residential community northeast of Pleasant Ridge Road and NC 68; local access would be constrained and the community surrounded on three sides by freeways. Alternative 4 would have some wetland and stream impacts and require several box culverts. Alternative 4 is within the Lake Brandt protected watershed but not within the critical watershed.

There would be significant human and natural environment impacts along the US 220 corridor associated with Alternative 3 improvements. Alternative 3 crosses the Lake Brandt/Higgins critical watershed, a historic district near the NC 150 West intersection, and endangered species habitats around the lakes (such as a Bald Eagle habitat). Each of these would be impacted by the conversion of US 220 to an interstate corridor. Accessibility to Greensboro Academy, the Center for Creative Leadership, Burr-Mill Park, two golf courses, several churches, the Summerfield Family Medical Practice, and all the residential neighborhoods would also be impacted. The reconstruction of the Greensboro Western Loop interchange with US 220 would incur additional wetland impacts. Please also refer to **Figure 16, Environmental Features Map** located in the back of this document.

## VI. Project Costs and Recommendations

**Alternative 3** can be eliminated from further consideration because of its extensive impacts on the human and natural environments and its foreseen high costs. Alternative 3 would require significant reconstruction of 7 miles of the US 220 corridor to provide a full controlled-access freeway. Many direct and indirect impacts would be incurred on the human and natural environments. High costs would be incurred from new bridges over Lakes Brandt and Higgins and over wetlands at the I-840 interchange. Alternative 3 would certainly be the most expensive and have the most impacts of the alternatives included in this study. This study does not recommend Alternative 3 for the future route of I-73 in Greensboro.

The remaining three routes, **Alternatives 1, 2 and 4**, are viable alternatives for future I-73 through Greensboro. Each requires relatively short lengths of construction, 2.5 to 3.5 miles, to connect this 15-mile segment of future I-73. Each is anticipated to achieve acceptable levels of service in design year 2035. Each is anticipated to have relatively few environmental impacts. The differences in these three alternatives lie in how they fit with the human environment, the highway system, and how much they cost.

The following table shows the anticipated costs associated with these three study alternatives:

<b>Alternative</b>	<b>Construction Cost</b>	<b>Right-of-Way Cost</b>	<b>Utility Relocation Cost</b>	<b>ITS Cost</b>	<b>Total Cost</b>
<b>1</b>	\$ 70,000,000	\$ 49,000,000	\$ 400,000	\$ 2,100,000	\$ 121,500,000
<b>2</b>	\$ 54,300,000	\$ 103,500,000	\$ 700,000	\$ 2,400,000	\$ 160,900,000
<b>4</b>	\$ 83,500,000	\$ 22,100,000	\$ 200,000	\$ 2,100,000	\$ 107,900,000

**Alternative 1** best corresponds to plans and legislation adopted by the FHWA, the NCDOT, and GUAMPO. It also agrees with plans developed in the 2004 Triad International Airport Area Transportation Study. Alternative 1 provides the best overall system linkage with surrounding highways. The alternative is the most accommodating design for a future I-73/74 Airport Connector. It connects to the PTI Airport’s proposed entryway and utilizes the property preserved by the airport. Alternative 1 best coordinates with and utilizes improvements proposed by the US 220-NC 68 Connector project.

**Alternative 2** costs more than Alternatives 1 and 4 and does not provide the best fit for the surrounding human environment, highway system, or airport development. Several business towers and other commercial developments would be displaced by the Alternative 2 interchange at I-40/NC 68. Additional development along NC 68 is being planned that would be impacted by Alternative 2 improvements. Maintenance of traffic during construction would be challenging. Alternative 2 does not provide good system linkage with future east-west routes or the new PTI Airport entrance at the Old Oak Ridge Road interchange. Alternative 2 will require relocation of the W. Market Street interchange ramps



and Brigham Road. Alternative 2 routes future interstate traffic along NC 68, which is not an interstate facility, and along I-40, which is already a 10-lane section; Alternatives 1 and 4 would help alleviate anticipated congestion in this area whereas Alternative 2 would increase traffic strain.

**Alternative 4** is a viable alternative as it provides a more direct route for I-73. However, it does not correlate as well as Alternative 1 with a future freeway route to the west as shown in GUAMPO transportation plans. Alternative 4 does not utilize portions of the R-2413 project designed to accommodate future I-73. Alternative 4 would require the largest area of new right-of-way and have many more residential impacts than the other two alternatives. Alternative 4 isolates a portion of the residential community between NC 68 and I-73. Construction limits would extend further north on NC 68 than Alternative 1 or TIP project R-2413. Alternative 4 would be more challenging to sign and navigate than the other alternatives. Alternative 4 is anticipated to have more environmental impacts than Alternatives 1 or 2. No wetland impacts are anticipated with the other alternatives. Alternative 4 does not coordinate as well as Alternative 1 with airport development, nor does it utilize the ½-mile corridor currently preserved on airport property. Alternative 4 would, however, provide a viable route for future I-73.

The recommendation of this study is, therefore, that Alternatives 1 and 4 be considered for the future routing of I-73 through Greensboro. Alternative 4 is a viable alternative for consideration in the future planning stages of the project. The total project cost associated with **Alternative 4** is \$ 107,900,000. Alternative 1 is the best overall alternative considered in this study. The total project cost associated with **Alternative 1** is \$ 121,500,000.

## VII. Additional Comments

It should be noted that a Feasibility Study is a preliminary document that is the initial step in the planning and design process for a candidate project. It is not the product of comprehensive environmental or design investigations. Once a candidate project is identified for funding in the TIP, the Feasibility Study is followed by a rigorous planning and design process that meets the requirements of the National Environmental Policy Act, where either an Environmental Impact Statement or an Environmental Assessment is done. An environmental screening was conducted for this study to determine possible occurrences of threatened or endangered species, stream and wetland impacts, and impacts to human development.

Coordination with adjacent projects and planned development will be critical to a successful corridor alignment and should be maintained throughout the subsequent stages of this project.

GUAMPO and the Greensboro DOT support the recommendation of Alternative 1 as a viable future I-73 Connector. As received in a letter dated April 25, 2008, “In the opinion of the Planning department based on the currently available information, it appears that Alternate 1 is the most reasonable alternative route that is both relatively financially feasible (unlike Alt. 2) with minimal

disruption to anticipated land use patterns west of the airport (unlike Alt. 4) by utilizing the most existing, higher capacity roadway infrastructure”.

### VIII. Additional Studies

Two additional cost estimates were performed in order to provide a network of local roads around the Alternative 1 system interchange. Two additional proposed roads, Ring Road NE and Ring Road SW, have been included to provide better access to development south of Pleasant Ridge Road and east of NC 68 near the airport. The roads are not necessary for the function of Alternative 1 but would, in conjunction with existing Bryan Blvd. and the Pleasant Ridge Road relocation, provide a local roadway network surrounding the interchange. Please refer to **Figure 12**.

Ring Road NE connects to the remaining portion of existing Bryan Blvd. south of Alternative 1, travels north across Caindale Drive, bridges over future I-73, and terminates at Pleasant Ridge Road. The typical section is a four-lane undivided roadway with 4’ paved shoulders on 150’ of right-of-way. Approximately 1.1 miles of construction is needed. Two box culverts are needed.

It is anticipated that **Alternative 1 Ring Road NE** will not require the relocation of any residences or businesses. The total cost, including construction, right-of-way, and utility relocations, is estimated to be \$ 11,200,000.

Construction	Right-of-Way	Utility Relocations	Total
\$ 9,800,000	\$ 1,300,000	\$ 100,000	\$ 11,200,000

Ring Road SW connects to existing Bryan Blvd. at NC 68, travels west-northwest on new location to Brigham Road, travels north along existing Brigham Road, and terminates at Pleasant Ridge Road. The new location typical section is a four-lane divided roadway with a 23’ narrow raised grass median and 4’ outside paved shoulders on 150’ of right-of-way. Approximately 2,000 feet of new location construction is needed. The existing Bryan Blvd. interchange with NC 68 would be reconstructed into a partial-clover interchange with its ramps in the southern quadrants. Additional right-of-way (100’ total) and improved paved shoulders along 0.5 mile of Brigham Road are included as well.

It is anticipated that **Alternative 1 Ring Road SW** will not require the relocation of any residences or businesses. The total cost, including construction, right-of-way, and utility relocations, is estimated to be \$ 9,900,000.

Construction	Right-of-Way	Utility Relocations	Total
\$ 8,500,000	\$ 1,200,000	\$ 200,000	\$ 9,900,000

If included with Alternative 1, it is anticipated that **Alternative 1** plus the **Ring Roads** would require the relocation of eight (8) residences and four (4) businesses and cost \$ 142,600,000.

## **IX. Figures**

**Figure 1 - Project Location Map (with Adjacent Projects)**

**Figure 2 - NCDOT Strategic Highway Corridors Vision Plan for the Triad Area**

**Figure 3 - Piedmont Triad Airport Study Recommended Alternative**

**Figures 4 thru 11 - Traffic Forecast Diagrams**

**Figure 12 - Alternative 1 Map (with “Ring Roads”)**

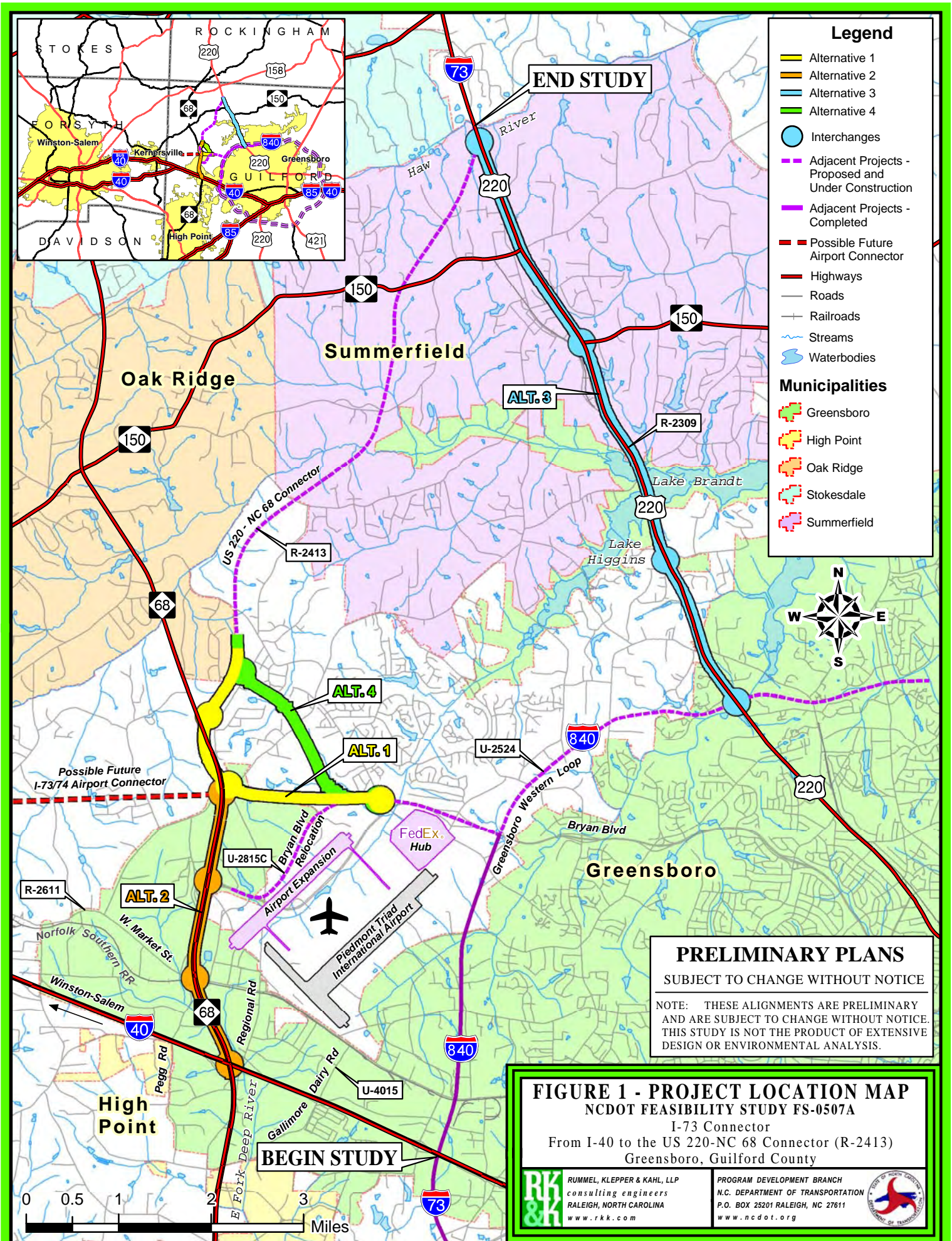
**Figure 13 - Alternative 2 Map**

**Figure 14 - Alternative 3 Map**

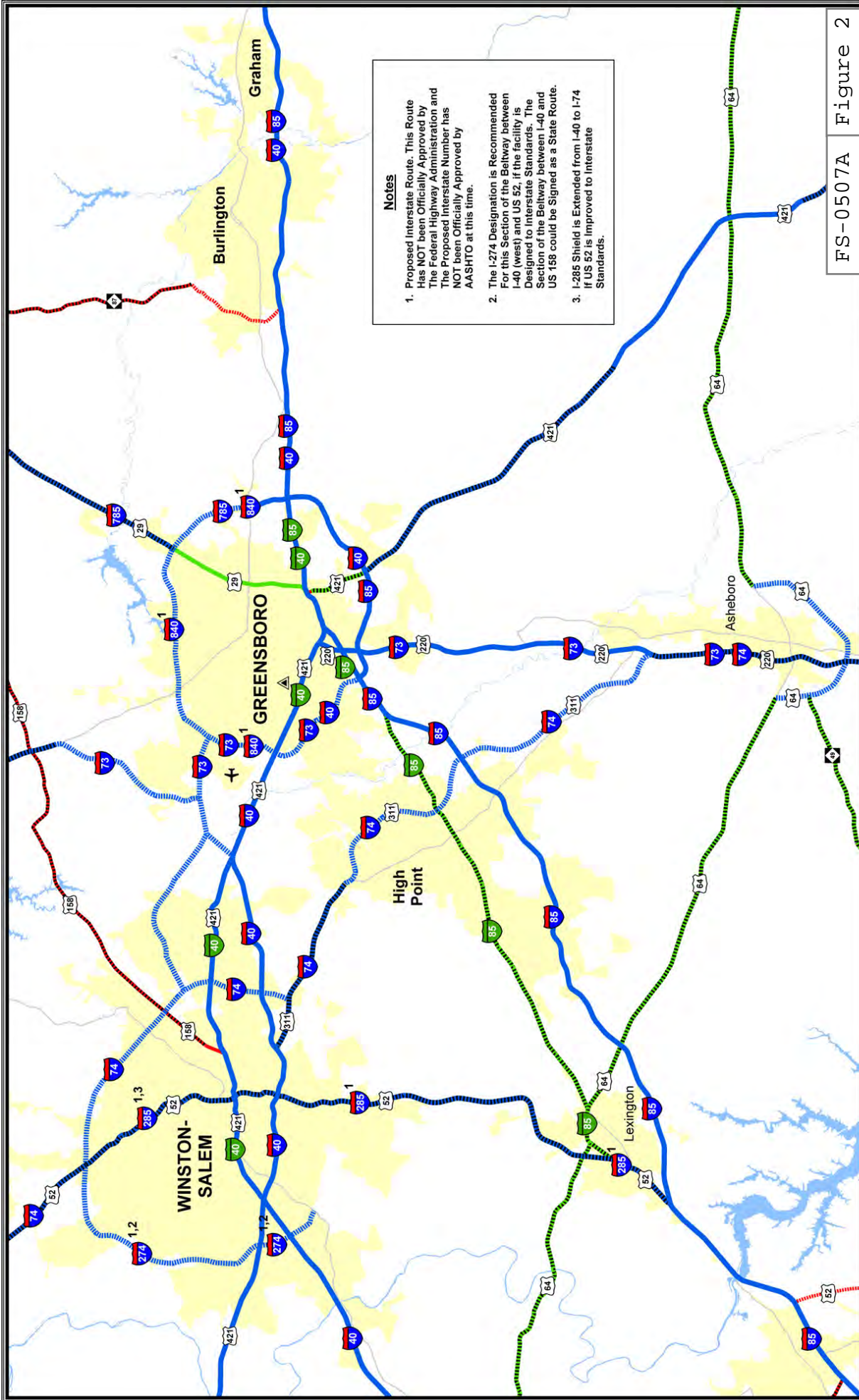
**Figure 15 - Alternative 4 Map**

**Figure 16 - Environmental Features Map**









**Notes**

1. Proposed Interstate Route. This Route Has NOT been Officially Approved by The Federal Highway Administration and The Proposed Interstate Number has NOT been Officially Approved by AASHTO at this time.
2. The I-274 Designation is Recommended For this Section of the Beltway between I-40 (west) and US 52, if the facility is Designed to Interstate Standards. The Section of the Beltway between I-40 and US 158 could be Signed as a State Route.
3. I-285 Shield is Extended from I-40 to I-74 if US 52 is Improved to Interstate Standards.

FS-0507A Figure 2

- Legend**
- |                       |                      |
|-----------------------|----------------------|
| <b>Freeways</b>       | <b>Thoroughfares</b> |
| Existing              | Existing             |
| Needs Upgrade         | Needs Upgrade        |
| Recommended           | Recommended          |
| <b>US/Other Route</b> | State Port           |
| State Port            | Major Airport        |
| Major Airport         | Intermodal Connector |
| Intermodal Connector  | Coast Guard Station  |
| Coast Guard Station   | Major Military Base  |
| Major Military Base   | Urban Area           |
| Urban Area            | Water Features       |
| Water Features        |                      |

Prepared by:  
 The North Carolina Department of Transportation  
 Transportation Planning Branch  
 Base Map Date: March 29, 2004

**Vision Plan  
 Triad Area**  
 Adopted by The North Carolina  
 Board of Transportation  
 Plan Date: September 2, 2004

**Strategic  
 Highway  
 Corridors**  
 north carolina department of transportation



# Piedmont Triad Airport Study Recommended Alternative Color Aerial Maps dated May, 2002

- Proposed Interchange
- Proposed Grade Separation
- Proposed New Location Roadway
- Proposed TIP Project

**Map Layers**

- Groundwater Recharge
- Wetlands
- Hazardous Disp. Site
- Nat. Pollutant Disch
- Railroads - Guilford
- Historic Sites
- Major Water
- Streams

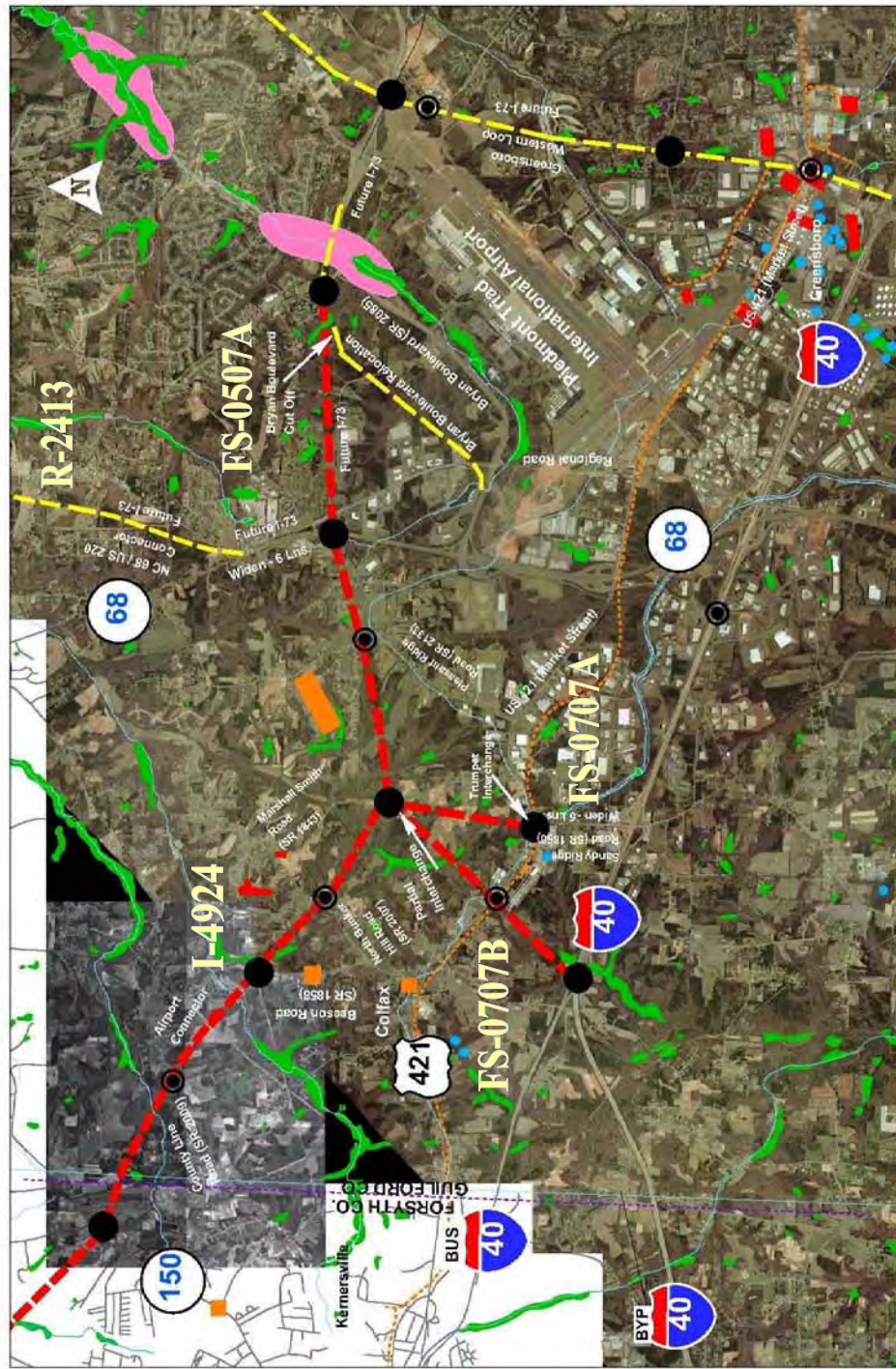
0 .4 .8 1.2  
Miles

Prepared by:  
Transportation Planning Branch  
Environment, Planning, and Local Government Affairs  
North Carolina Department of Transportation

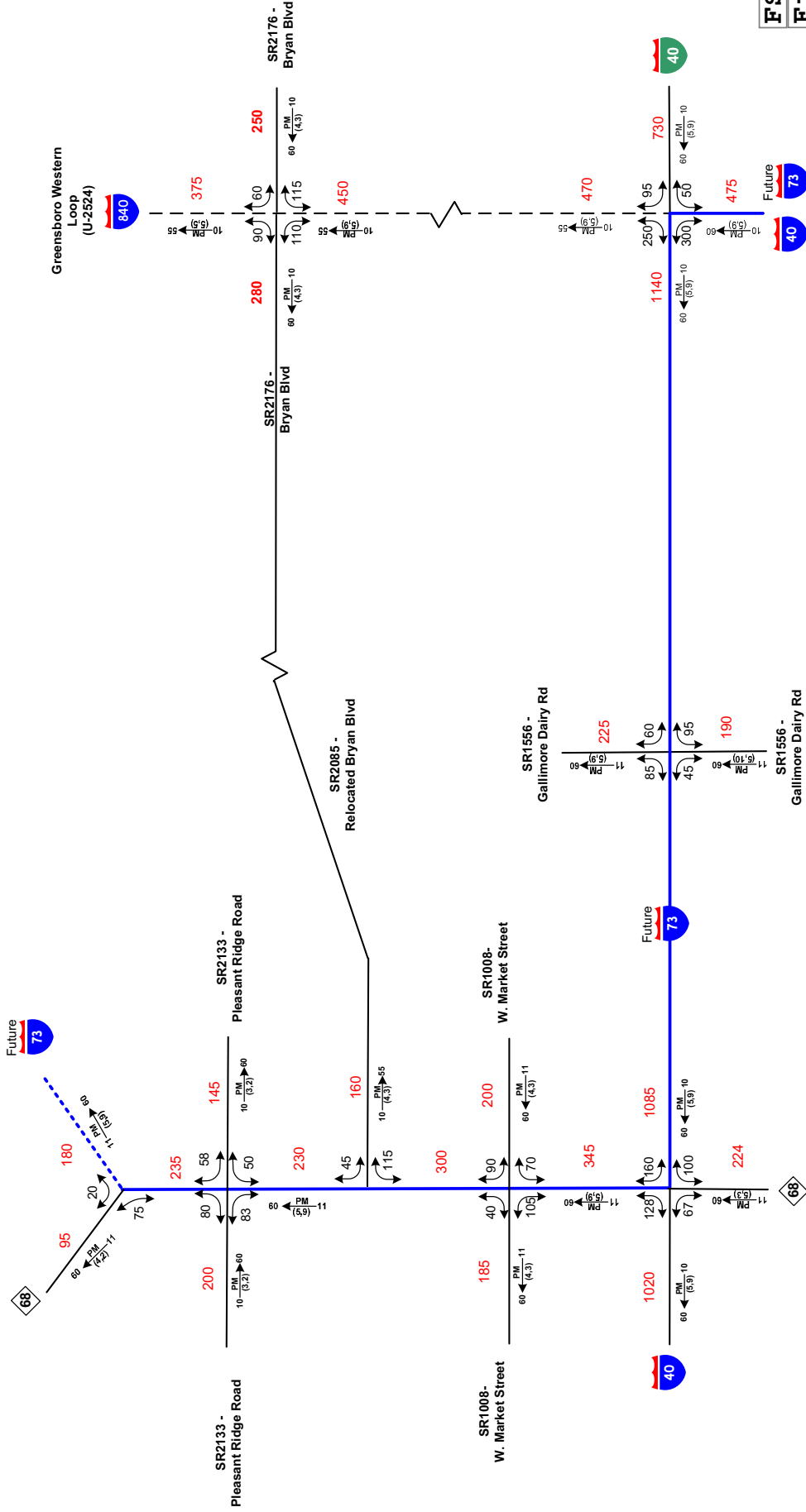
In Cooperation with:  
Piedmont Authority for Regional Transportation  
Greensboro Urban Area MPO  
High Point Urban Area MPO  
Winston Salem Area MPO  
Guilford County Planning Department  
Piedmont Triad International Airport  
Federal Highway Administration  
U.S. Department of Transportation

May, 2004

Scott W. Walston, P.E.  
Transportation Planning Branch Project Engineer

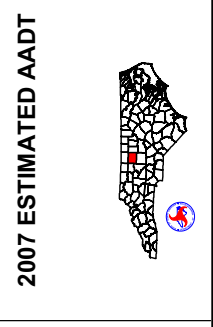


**FS-0507A** **Figure 3**



**FS-0507A**  
**Figure 4**

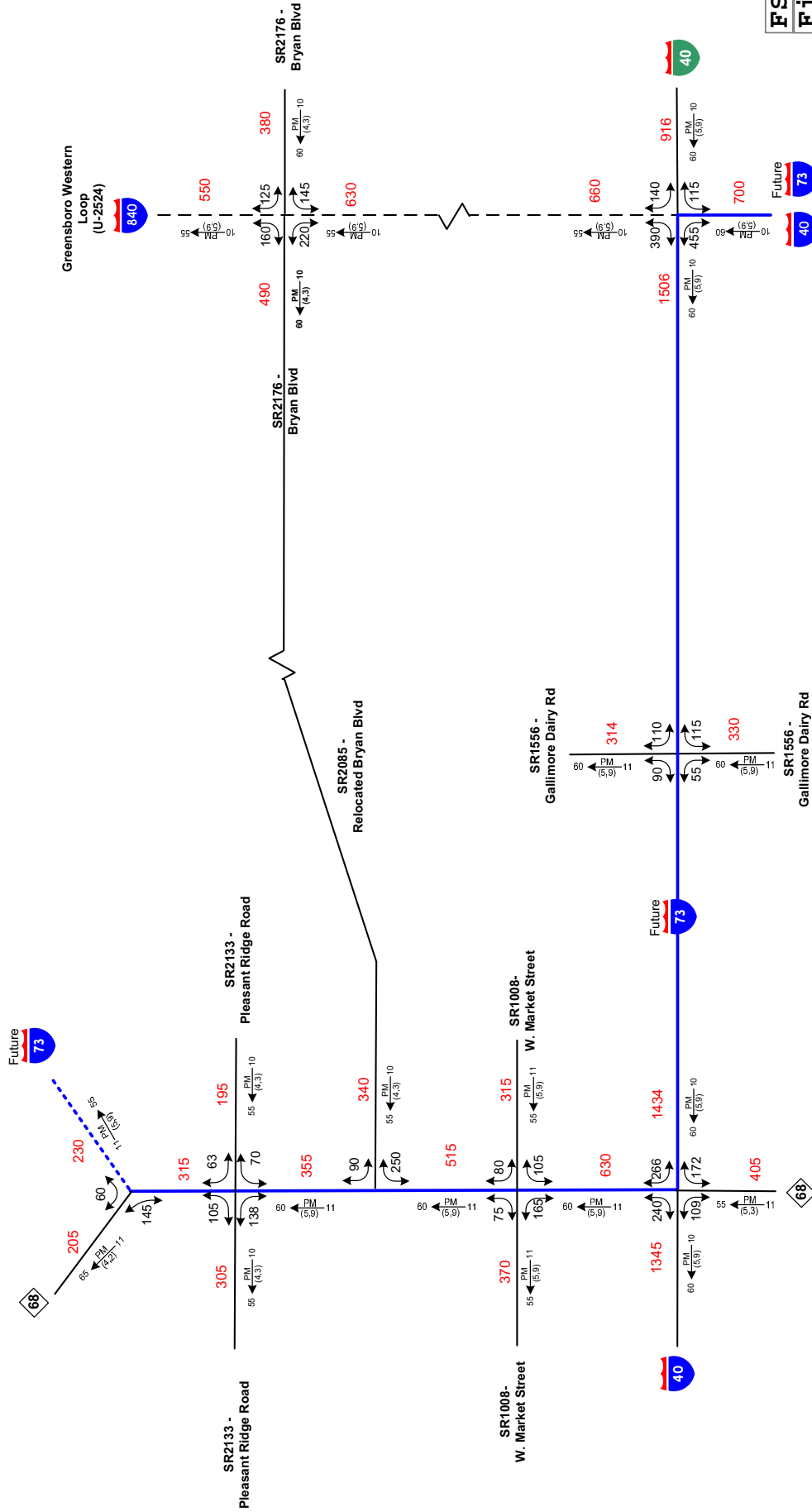
<b>LOCATION:</b> I-73 from Greensboro Western Loop to NC68 Connector	
<b>PROJECT:</b> CONSTRUCT a freeway	
<b>TIP:</b> FS-0507A	<b>WBS:</b> 34418.1.4
<b>DATE:</b> 08-20-2007	<b>COUNTY:</b> Guilford
<b>DIV.:</b> 7	<b>Prepared by:</b> E. Talanker



**LEGEND**

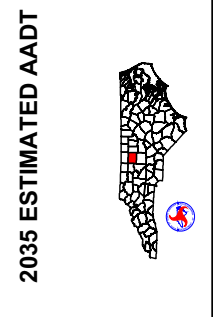
- ### No. of Vehicles Per Day (vpd) in 100s
- 1- Less than 100 vpd
- ### Turning volume (vpd)
- DHV Design Hourly Volume (%) = K30
- PM Peak Period
- D Peak Hour Directional Split (%)
- (d, t) Duals, TT-STs (%)

**NO BUILD**  
Future I-73 follows NC68 from I-40, Airport Connector to NC68 is not in place, connector to Winston-Salem is not in place



**FS-0507A**  
**Figure 5**

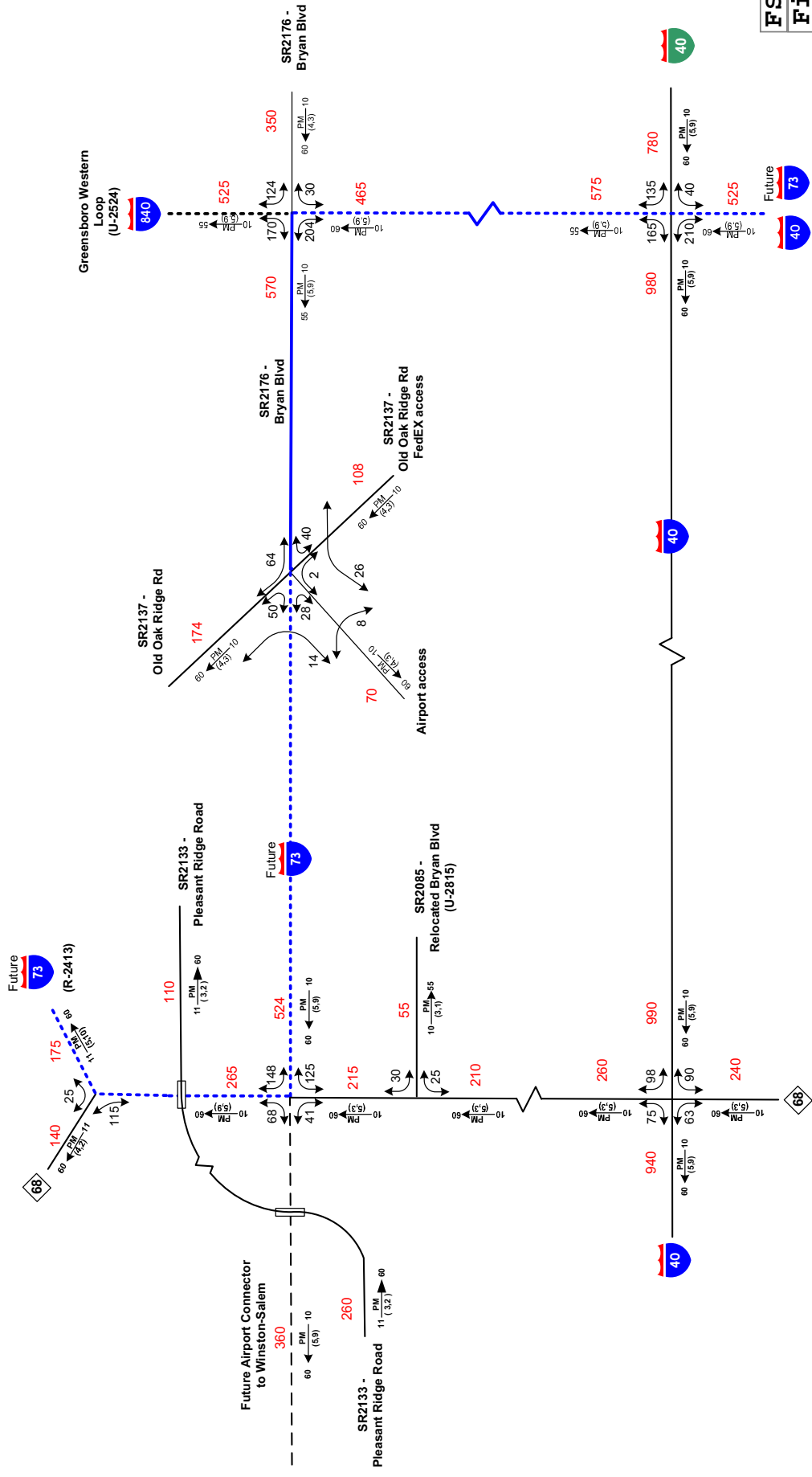
<b>LOCATION:</b> I-73 from Greensboro Western Loop to NC68 Connector	
<b>PROJECT:</b> Construct a freeway	
<b>TIP:</b> FS-0507A	<b>WBS:</b> 34418.1.4
<b>DATE:</b> 08-20-2007	<b>COUNTY:</b> Guilford
<b>DIV.:</b> 7	<b>Prepared by:</b> E. Talanker



**NO BUILD**  
Future I-73 follows NC68 from I-40, Airport Connector to NC68 is not in place, connector to Winston-Salem is not in place

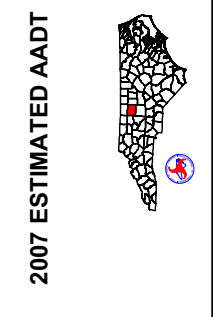
**NO BUILD**  
Future I-73 follows NC68 from I-40, Airport Connector to NC68 is not in place, connector to Winston-Salem is not in place





**FS-0507A  
Figure 6**

<b>LOCATION:</b> I-73 from Greensboro Western Loop to NC68 Connector	
<b>PROJECT:</b> Construct a freeway	
<b>TIP:</b> FS-0507A	<b>WBS:</b> 34418.1.4
<b>DATE:</b> 08-20-2007	<b>COUNTY:</b> Guilford
<b>DIV.:</b> 7	<b>Prepared by:</b> E. Talanker



**2007 ESTIMATED AADT**

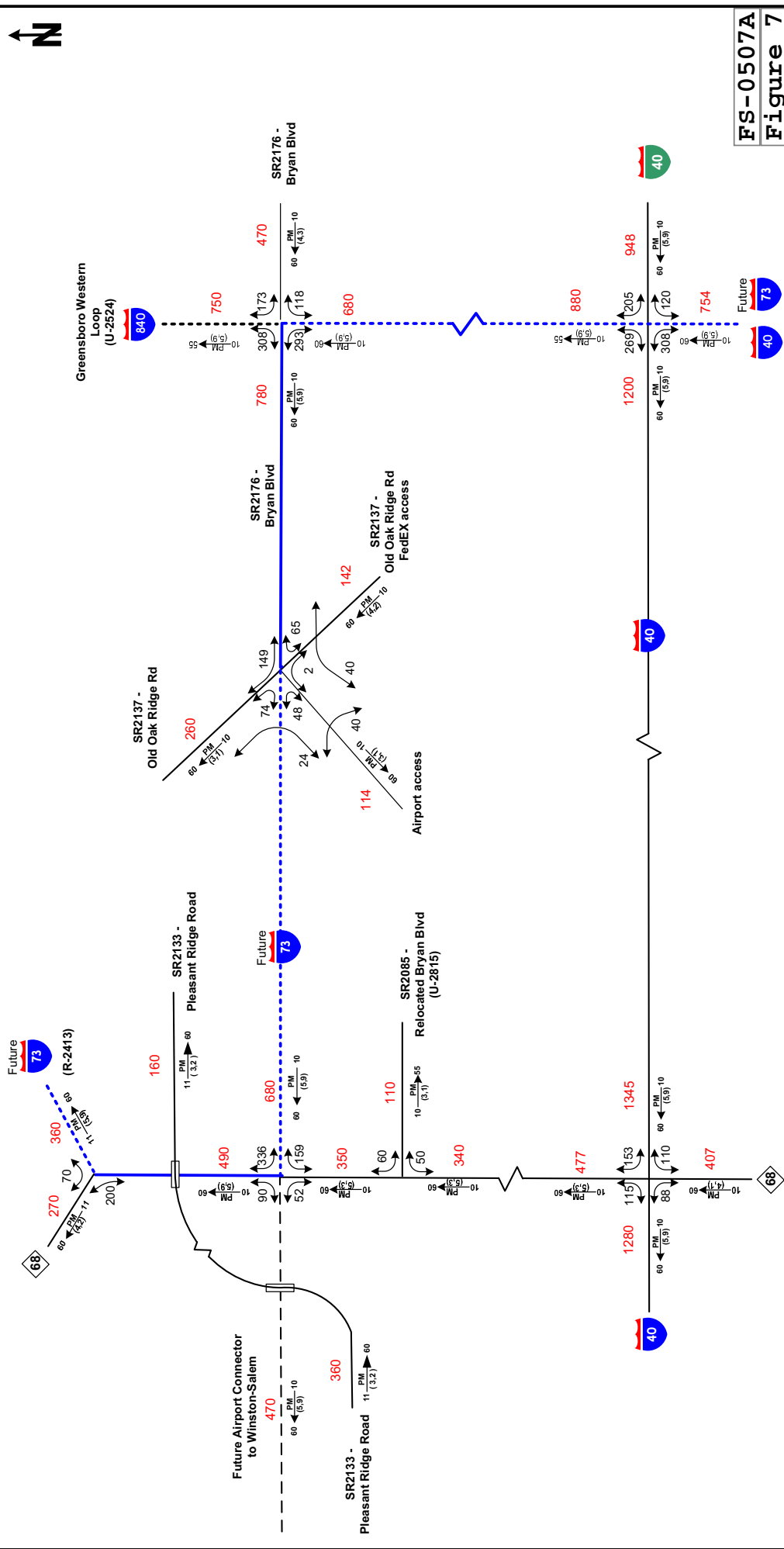
DHV — PM (d.t) — D

**LEGEND**

- ### No. of Vehicles Per Day (vpd) in 100s
- 1- Less than 100 vpd
- ### Turning volume (vpd)
- DHV Design Hourly Volume (%) = K30
- PM Peak Period
- D Peak Hour Directional Split (%)
- ↑ Indicates Direction of D
- (d.t) Duals, TT-STs (%)

**Alternative 1**

**Future I-73 follows Greensboro Western Loop and Airport Connector to Winston-Salem in place**



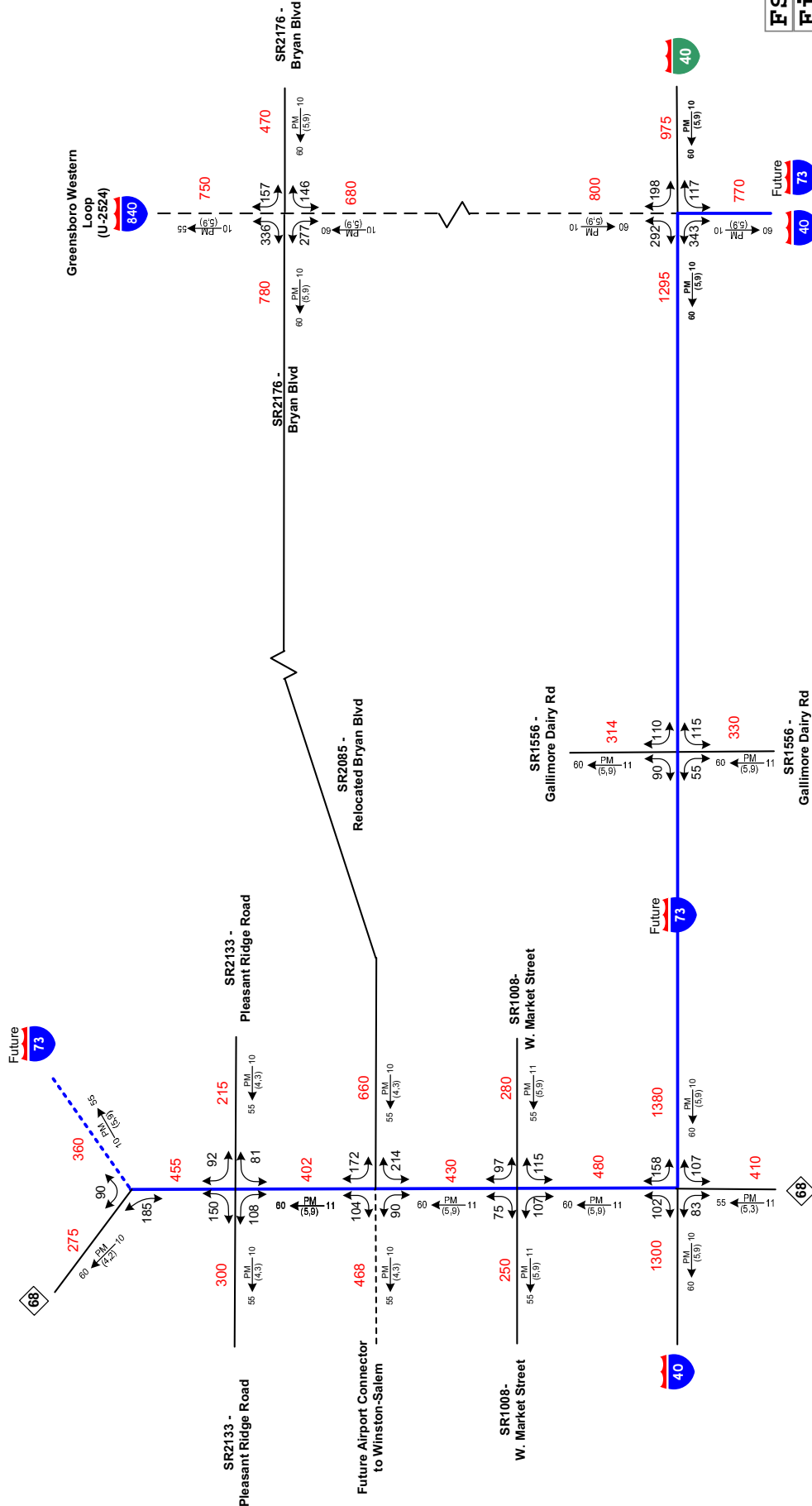
**FS-0507A**  
**Figure 7**

<p><b>Alternative 1</b> Future I-73 follows Greensboro Western Loop and Airport Connector to Winston-Salem in place</p>	<p><b>2035 ESTIMATED AADT</b></p>	<p><b>LOCATION:</b> I-73 from Greensboro Western Loop to NC68 Connector</p>
		<p><b>PROJECT:</b> Construct a freeway</p>
	<p><b>TIP:</b> FS-0507A</p>	<p><b>WBS:</b> 34418.1.4</p>
	<p><b>DATE:</b> 10-05-2007</p>	<p><b>COUNTY:</b> Guilford</p>
		<p><b>Prepared by:</b> E. Talanker</p>

**LEGEND**

- ### No. of Vehicles Per Day (vpd) in 1000s
- 1- Less than 100 vpd
- ### Turning volume (vpd)
- DHV Design Hourly Volume (%) = K30
- PM Peak Period
- D Peak Hour Directional Split (%)
- (d.t) Indicates Direction of D
- (d.t) Duals, TT-STs (%)





**FS-0507A**  
**Figure 9**

<b>LOCATION:</b> I-73 from Greensboro Western Loop to NC68 Connector	
<b>PROJECT:</b> Construct a freeway	
<b>TIP:</b> FS-0507A	<b>WBS:</b> 34418.1.4
<b>DATE:</b> 08-20-2007	<b>COUNTY:</b> Guilford
<b>DIV.:</b> 7	<b>Prepared by:</b> E. Talanker

**2035 ESTIMATED AADT**

**LEGEND**

### No. of Vehicles Per Day (vpd) in 1000s  
 1- Less than 100 vpd

### Turning volume (vpd)  
 DHV Design Hourly Volume (%) = K30  
 PM Peak Period  
 D Peak Hour Directional Split (%)  
 (d, t) Indicates Direction of D  
 (d, t) Duals, TT-STs (%)

**Alternative 2**  
**BUILD**  
 Future I-73 follows NC68 from I-40, Airport Connector to NC68 is not in place, connector to Winston-Salem is not in place



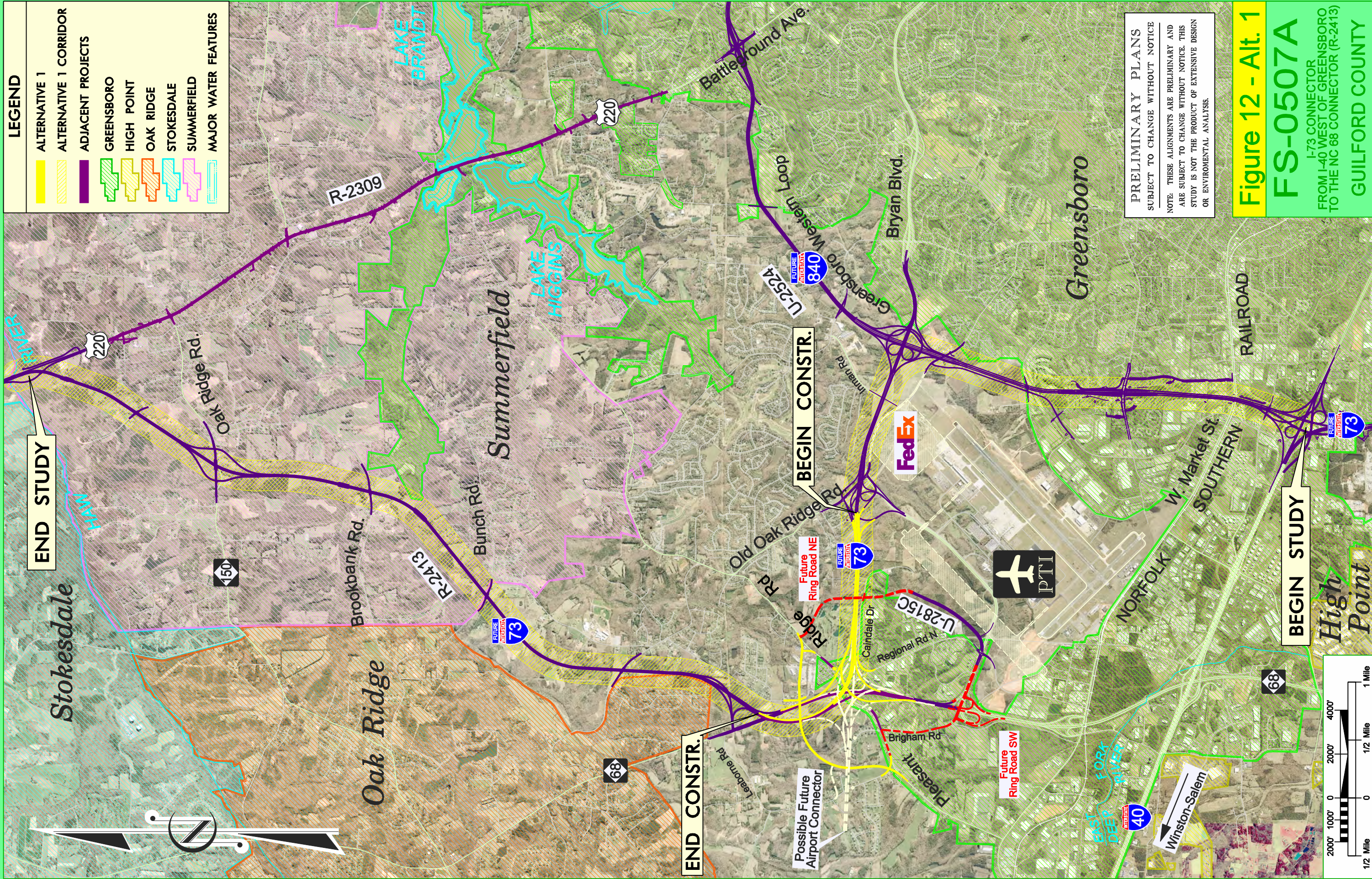






**LEGEND**

- ALTERNATIVE 1
- ALTERNATIVE 1 CORRIDOR
- ADJACENT PROJECTS
- GREENSBORO
- HIGH POINT
- OAK RIDGE
- STOKESDALE
- SUMMERFIELD
- MAJOR WATER FEATURES



END STUDY

BEGIN STUDY

END CONSTR.

BEGIN CONSTR.

Figure 12 - Alt. 1

FS-0507A

I-73 CONNECTOR FROM I-40 WEST OF GREENSBORO TO THE NC 68 CONNECTOR (R-2413)

GUILFORD COUNTY

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 consulting engineers  
 RALEIGH, NORTH CAROLINA  
 www.rkk.com

NCDOT FEASIBILITY STUDY  
**ALTERNATIVES**

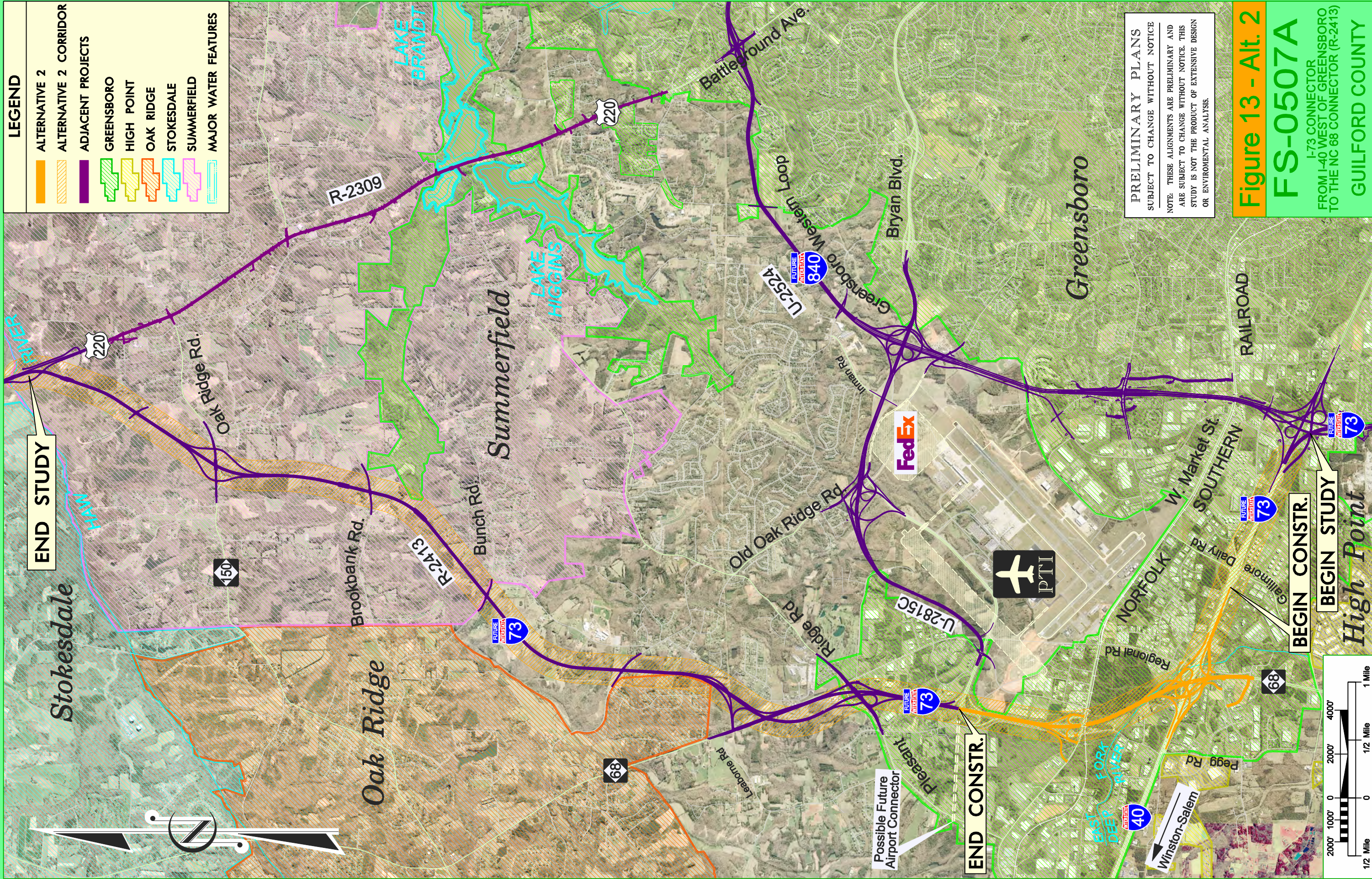
PROGRAM DEVELOPMENT BRANCH  
 N.C. DEPARTMENT OF TRANSPORTATION  
 P.O. BOX 25201 RALEIGH, NC 27611  
 www.ncdot.org

MAY 20, 2008



**LEGEND**

- ALTERNATIVE 2
- ALTERNATIVE 2 CORRIDOR
- ADJACENT PROJECTS
- GREENSBORO
- HIGH POINT
- OAK RIDGE
- STOKESDALE
- SUMMERFIELD
- MAJOR WATER FEATURES



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**Figure 13 - Alt. 2**

**FS-0507A**

I-73 CONNECTOR  
 FROM I-40 WEST OF GREENSBORO  
 TO THE NC 68 CONNECTOR (R-2413)

**GUILFORD COUNTY**

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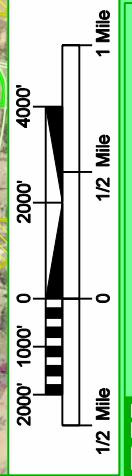
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Possible Future Airport Connector



NCDOT FEASIBILITY STUDY  
**ALTERNATIVES**

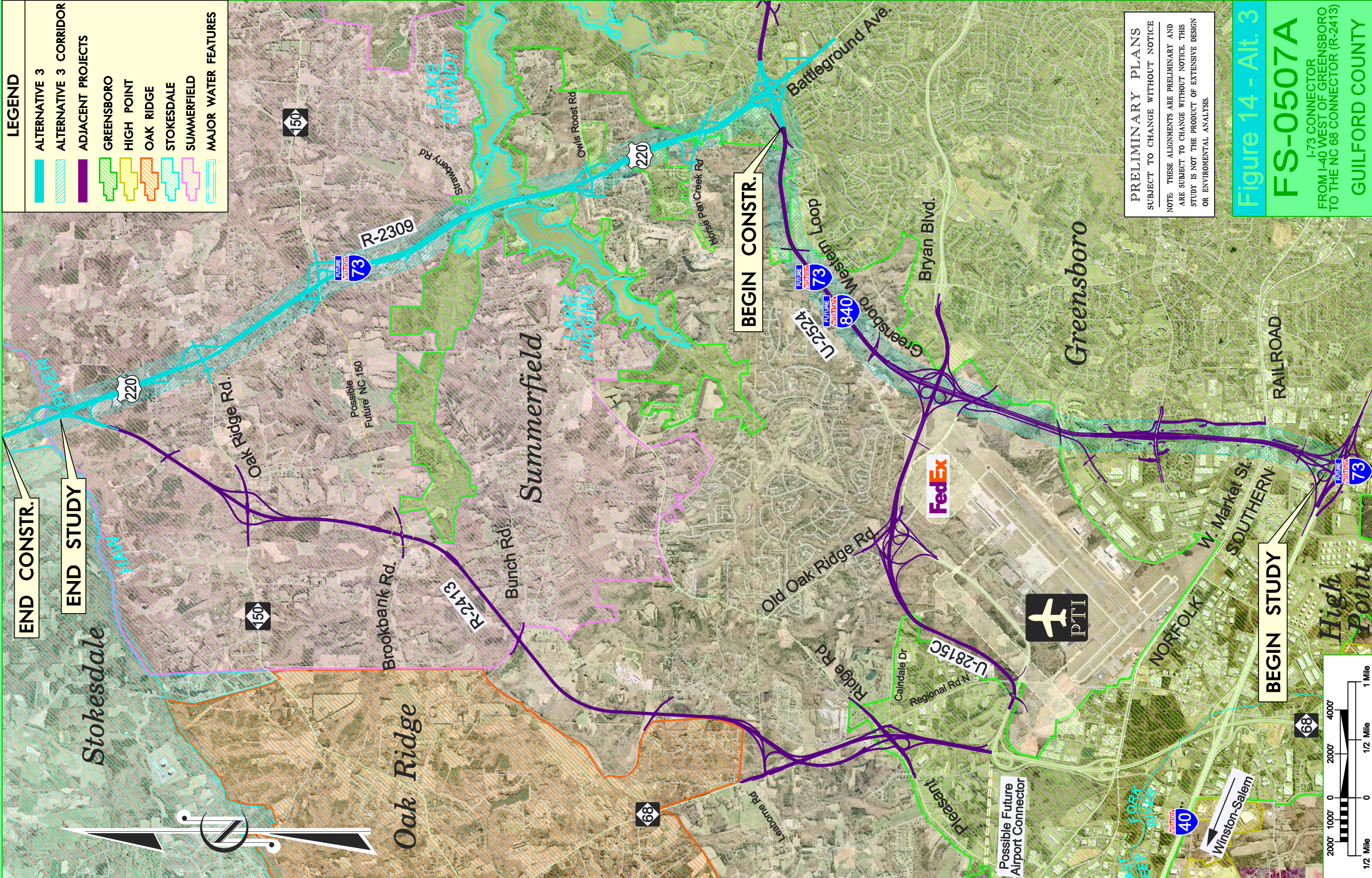
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 consulting engineers  
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**LEGEND**

- ALTERNATIVE 3
- ALTERNATIVE 3 CORRIDOR
- ADJACENT PROJECTS
- GREENSBORO
- HIGH POINT
- OAK RIDGE
- STOKESDALE
- SUMMERFIELD
- MAJOR WATER FEATURES



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**Figure 14 - Alt. 3**

**FS-0507A**

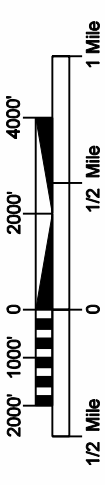
I-73 CONNECTOR  
 FROM I-40 WEST OF GREENSBORO  
 TO THE NC 68 CONNECTOR (R-2413)

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**NCDOT FEASIBILITY STUDY**  
**ALTERNATIVES**

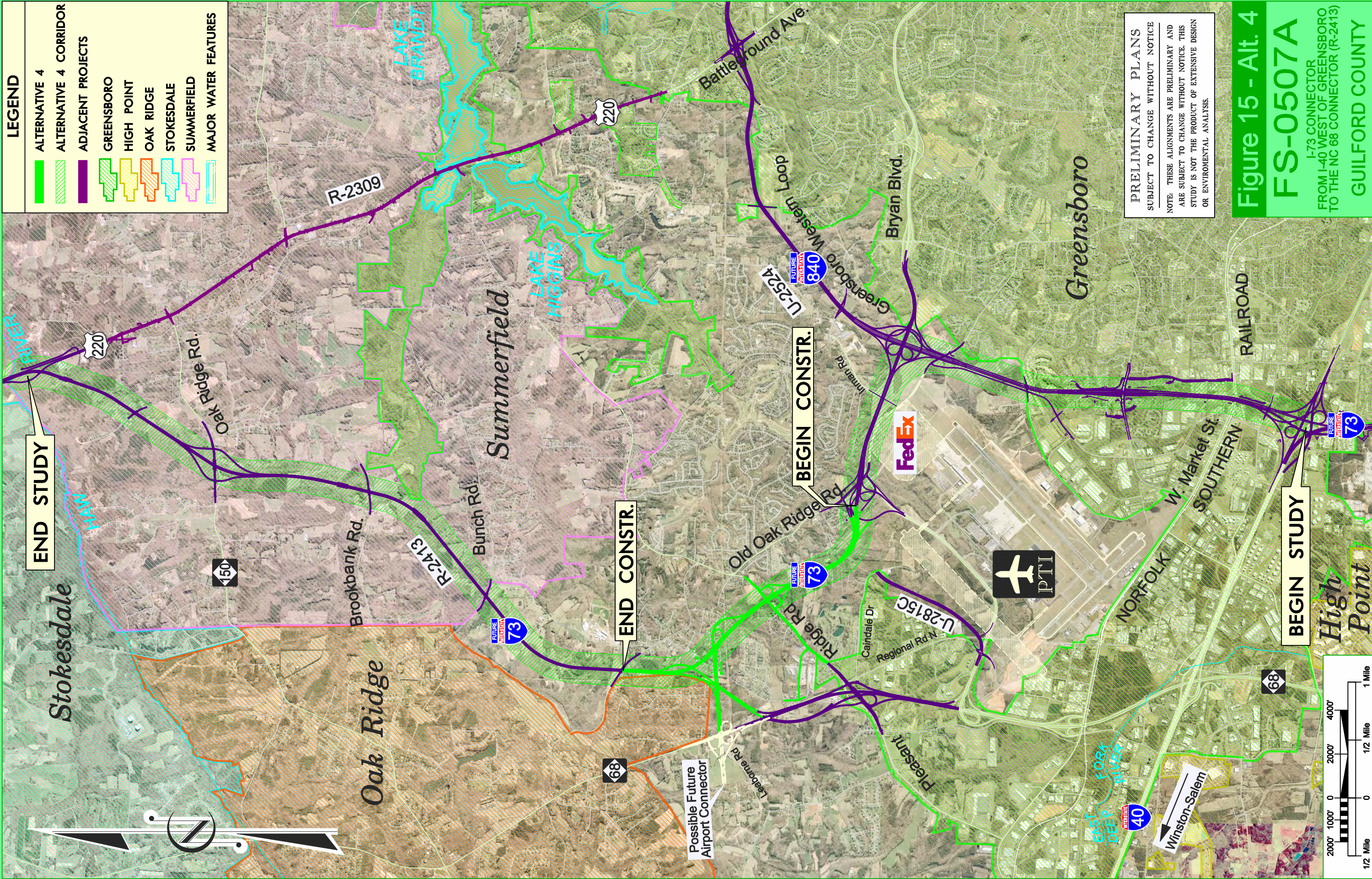
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 WWW.RKK.COM





**LEGEND**

- ALTERNATIVE 4
- ALTERNATIVE 4 CORRIDOR
- ADJACENT PROJECTS
- GREENSBORO
- HIGH POINT
- OAK RIDGE
- STOKESDALE
- SUMMERFIELD
- MAJOR WATER FEATURES



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**Figure 15 - Alt. 4**

**FS-0507A**

I-73 CONNECTOR  
 FROM I-40 WEST OF GREENSBORO  
 TO THE NC 68 CONNECTOR (R-2413)

**GUILFORD COUNTY**

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**BEGIN CONSTR.**

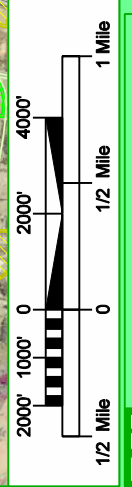
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**BEGIN STUDY**

*High Point*

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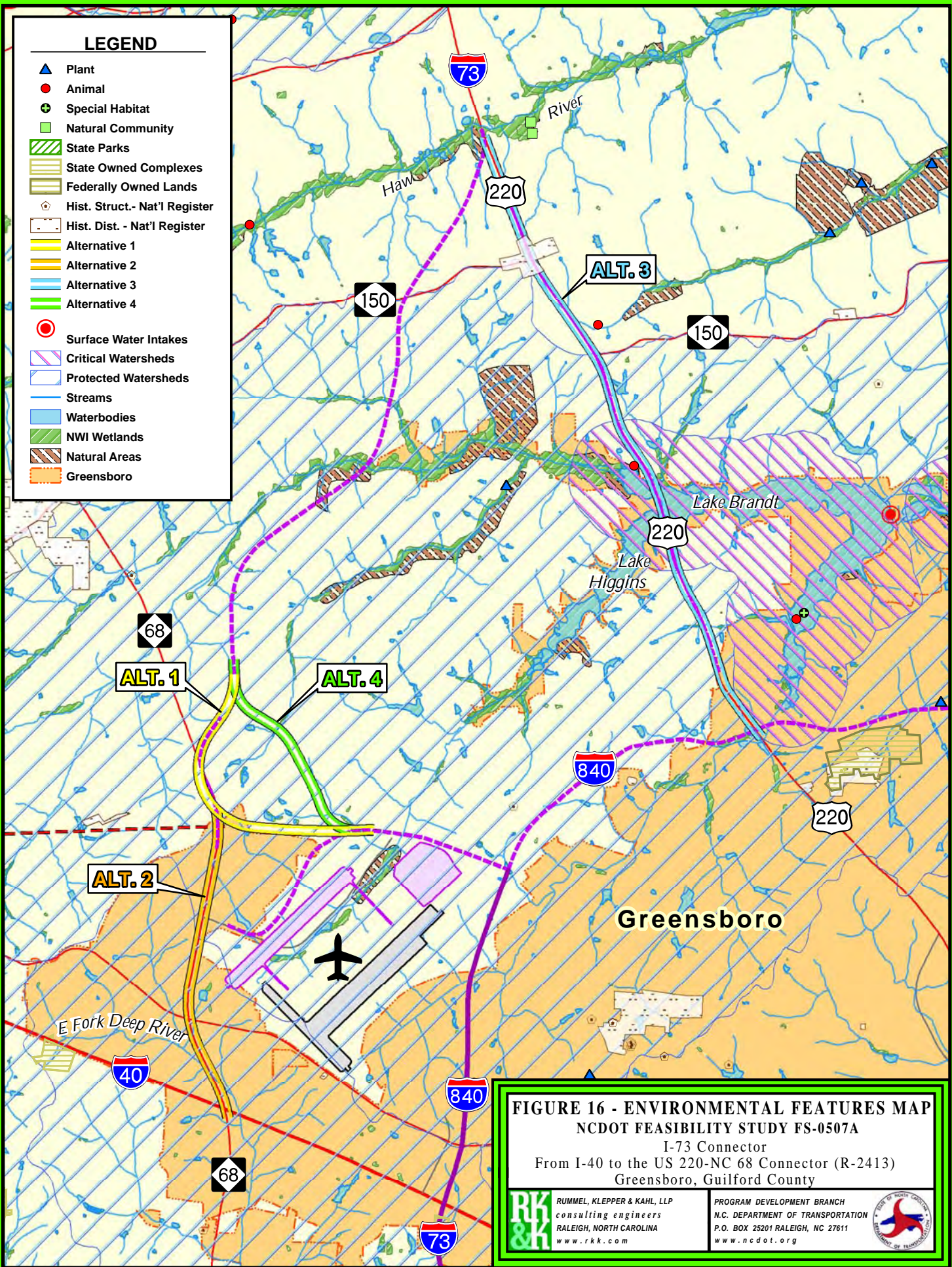


MAY 20, 2008



**LEGEND**

-  Plant
-  Animal
-  Special Habitat
-  Natural Community
-  State Parks
-  State Owned Complexes
-  Federally Owned Lands
-  Hist. Struct. - Nat'l Register
-  Hist. Dist. - Nat'l Register
-  Alternative 1
-  Alternative 2
-  Alternative 3
-  Alternative 4
-  Surface Water Intakes
-  Critical Watersheds
-  Protected Watersheds
-  Streams
-  Waterbodies
-  NWI Wetlands
-  Natural Areas
-  Greensboro



**FIGURE 16 - ENVIRONMENTAL FEATURES MAP**  
**NCDOT FEASIBILITY STUDY FS-0507A**

I-73 Connector  
 From I-40 to the US 220-NC 68 Connector (R-2413)  
 Greensboro, Guilford County

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