

PROPOSED SR 1409 (MILITARY CUTOFF ROAD) EXTENSION AND
PROPOSED US 17 HAMPSTEAD BYPASS
NEW HANOVER AND PENDER COUNTIES
STATE PROJECT 40191.1.2
NCDOT TIP PROJECTS U-4751 AND R-3300
CORPS ACTION ID 2007 1386

ADMINISTRATIVE ACTION
DRAFT ENVIRONMENTAL IMPACT STATEMENT
July 2011



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of Engineers**
Wilmington District

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Documentation Prepared by
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PROJECT COMMITMENTS

PROPOSED MILITARY CUTOFF ROAD EXTENSION AND PROPOSED US 17 HAMPSTEAD BYPASS

New Hanover and Pender Counties

State Project 40191.1.2

TIP Projects U-4751 and R-3300

PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH- PROJECT DEVELOPMENT UNIT

Additional coordination with the US Fish and Wildlife Service regarding the project's potential effects on red-cockaded woodpecker, Cooley's meadowrue, golden sedge, and rough-leaved loosestrife will be conducted prior to completion of the final environmental document for this project.

PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH- HUMAN ENVIRONMENT UNIT

An archaeological survey will be conducted for the project after the selection of the preferred alternative.

ROADWAY DESIGN UNIT, HYDRAULIC DESIGN UNIT, ROADSIDE ENVIRONMENTAL UNIT AND DIVISION 3

Four streams within one mile downstream of the study area have been designated HQW by the North Carolina Division of Water Quality (DWQ). Futch Creek, Old Topsail Creek, Pages Creek, and an unnamed tributary to the Atlantic Intracoastal Waterway receive water from streams in the study area. In addition, Howe Creek has been designated an ORW by DWQ. All tributaries of these streams within the study area are identified in Section 3.5.3.2.1 and are designated as HQW or ORW due to the classification of their receiving waters. Design Standards in Sensitive Watersheds will be implemented for these streams during project construction.

ROADWAY DESIGN UNIT AND DIVISION 3

All Hampstead Bypass alternatives include improvements along existing US 17 in the vicinity of Holly Shelter Game Land. There is potentially suitable and future potentially suitable red-cockaded woodpecker foraging habitat adjacent to both the east and west sides of existing US 17 in this area. Roadway widening improvements associated with Hampstead Bypass along existing US 17 in this area will not exceed a width of 200 feet in

order to maintain connectivity between red-cockaded woodpecker foraging habitat partitions.

ROADWAY DESIGN UNIT AND PROGRAM DEVELOPMENT BRANCH

NCDOT will coordinate with local officials as the project progresses regarding the status of local greenway plans and proposed walking trails.

The Wilmington Metropolitan Planning Organization (MPO) has requested the inclusion of a multi-use path along proposed Military Cutoff Road Extension. The multi-use path would tie into an existing multi-use path along Military Cutoff Road. The construction of a multi-use path as part of the proposed project will be dependent upon a cost-sharing and maintenance agreement between NCDOT and the Wilmington MPO. The NCDOT will continue to coordinate with the Wilmington MPO on the inclusion of the multi-use path along Military Cutoff Road Extension.

HYDRAULIC DESIGN UNIT

The Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP), the delegated state agency for administering FEMA's National Flood Insurance Program, to determine the status of the project with regard to applicability of NCDOT's Memorandum of Agreement with FMP (dated 6/5/08), or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

STRUCTURE DESIGN UNIT

Bicycle safe bridge railing will be provided on the NC 210 bridge over the Hampstead Bypass.

DIVISION 3

This project involves construction activities on or adjacent to FEMA-regulated stream(s). Therefore, the Division shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structure(s) and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

GEOTECHNICAL UNIT

Military Cutoff Road Extension Alternatives M1 and M2 may impact five properties that either have or formerly had underground storage tanks. Preliminary site assessments to identify the nature and extent of any contamination will be performed at any potential hazardous materials sites along the preferred alternative prior to right of way acquisition.

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S.4 DETAILED STUDY ALTERNATIVES

Alternatives considered for the proposed project include the No-Build Alternative, the Transportation System Management Alternative, the Travel Demand Management Alternative, the Mass Transit Alternative, and the build alternatives.

Preliminary build alternatives were established through an evaluation of suitability mapping based on available socioeconomic, cultural, and environmental resource data. Preliminary build alternatives that met the purpose of and need for the proposed project and with the least impacts to the human and natural environments were identified as detailed study alternatives. The detailed study alternatives selection process incorporated recommendations made by federal and state environmental regulatory and resource agencies and comments received from two citizens informational workshops held in April 2007.

Project alternatives were further refined as more comprehensive information was obtained through detailed field studies and environmental analysis. There are two current detailed study alternatives for Military Cutoff Road Extension (U-4751) and four current detailed study alternatives for Hampstead Bypass (R-3300). Military Cutoff Road Extension Detailed Study Alternatives M1 and M2 are new location alternatives in New Hanover County extending Military Cutoff Road from Market Street to the US 17 Wilmington Bypass. Hampstead Bypass Detailed Study Alternatives E-H, O, and R are new location alternatives extending from the US 17 Wilmington Bypass in New Hanover County to existing US 17 north of Hampstead near Sloop Point Loop Road in Pender County. Detailed study alternative U extends along existing US 17 from the tie-in of proposed Military Cutoff Road Extension (Alternatives M1 or M2) to approximately two miles north of the New Hanover/Pender County line, then extends on new location to existing US 17 north of Hampstead near Sloop Point Loop Road in Pender County. Current Detailed Study Alternatives are shown on Figure S-1.

S.5 SUMMARY OF IMPACTS

A comparison of the current Detailed Study Alternatives is shown in Table S-1.

Table S-1. Summary Comparison of Current Detailed Study Alternatives

FEATURE ¹	Current Detailed Study Alternative				
	M1+ E-H	M2+O	M1+R	M1+U	M2+U
Length (miles)	17.5	16.6	17.1	18.0	16.8
Delineated Wetland Impacts (acres)	246.1	384.4	297.4	218.4	283.8
Delineated Stream Impacts (linear feet)	24,531	13,842	24,571	15,450	8,786
Residential Displacements	61	60	59	93	95
Business Displacements ²	84	84	84	106	106
Red-cockaded Woodpecker Future Potentially Suitable / Potentially Suitable Habitat (acres)	8.67/ 7.39	8.67/ 7.39	8.67/ 7.39	8.67/ 7.39	8.67/ 7.39
May affect, Likely to Adversely Affect federally protected species ³	RCW, RLL	RCW, CM, RLL, GS	RCW, CM, RLL, GS	RCW, RLL	RCW, RLL
Natural Heritage Program SNHA, Managed Areas and Wetland Mitigations Sites (acres)	4.43	42.94	5.01	3.24	34.40
Prime Farmlands/Farmlands of Statewide Importance (acres)	67.5	58.1	58.1	49.9	49.9
Forest (acres)	518	512	472	406	455
Historic Properties (no.)	1	1	1	4	4
Noise Receptor Impacts	257	236	248	310	304
High Quality Waters (HQW, ORW, WS Protected or Critical Areas) (acres)	9.6	9.6	9.6	12.4	12.4
Total Cost (in millions)	\$362.0	\$359.3	\$356.2	\$404.8	\$398.4

¹Impact calculations are based on preliminary design slope stake limits plus an additional 25 feet.

²Includes non-profit displacements.

³RCW- red-cockaded woodpecker, RLL- rough-leaved loosestrife, GS- golden sedge, CM- Cooley's meadowrue

S.6 UNRESOLVED ISSUES

Unresolved issues to be addressed prior to the publication of the Final Environmental Impact Statement include:

- Selection of the least environmentally damaging practicable alternative (LEDPA) and development of avoidance and minimization efforts within the corridor of the preferred alternative.
- Completion of archaeological surveys for the preferred alternative corridor.
- Additional coordination with the US Fish and Wildlife Service to determine the effects of the project on red-cockaded woodpecker, Cooley's meadowrue, golden sedge, and rough-leaved loosestrife.

S.7 ACTIONS REQUIRED BY OTHER STATE AND FEDERAL AGENCIES

All of the proposed detailed study alternatives would require environmental regulatory permits from the US Army Corps of Engineers (USACE) and the NC Division of Water Quality (DWQ).

- A Section 404 Permit from the USACE is required for any activity occurring in water or wetlands that would discharge dredged or fill material into Waters of the United States and adjacent wetlands. An individual Section 404 permit will be required. The USACE will determine final permit requirements.
- A Section 401 Water Quality Certification from the DWQ is required for activities that may result in discharge to Waters of the United States to certify that the discharge will be conducted in compliance with applicable state water quality standards. The Section 401 Water Quality Certification will be required prior to issuance of the Section 404 permit.

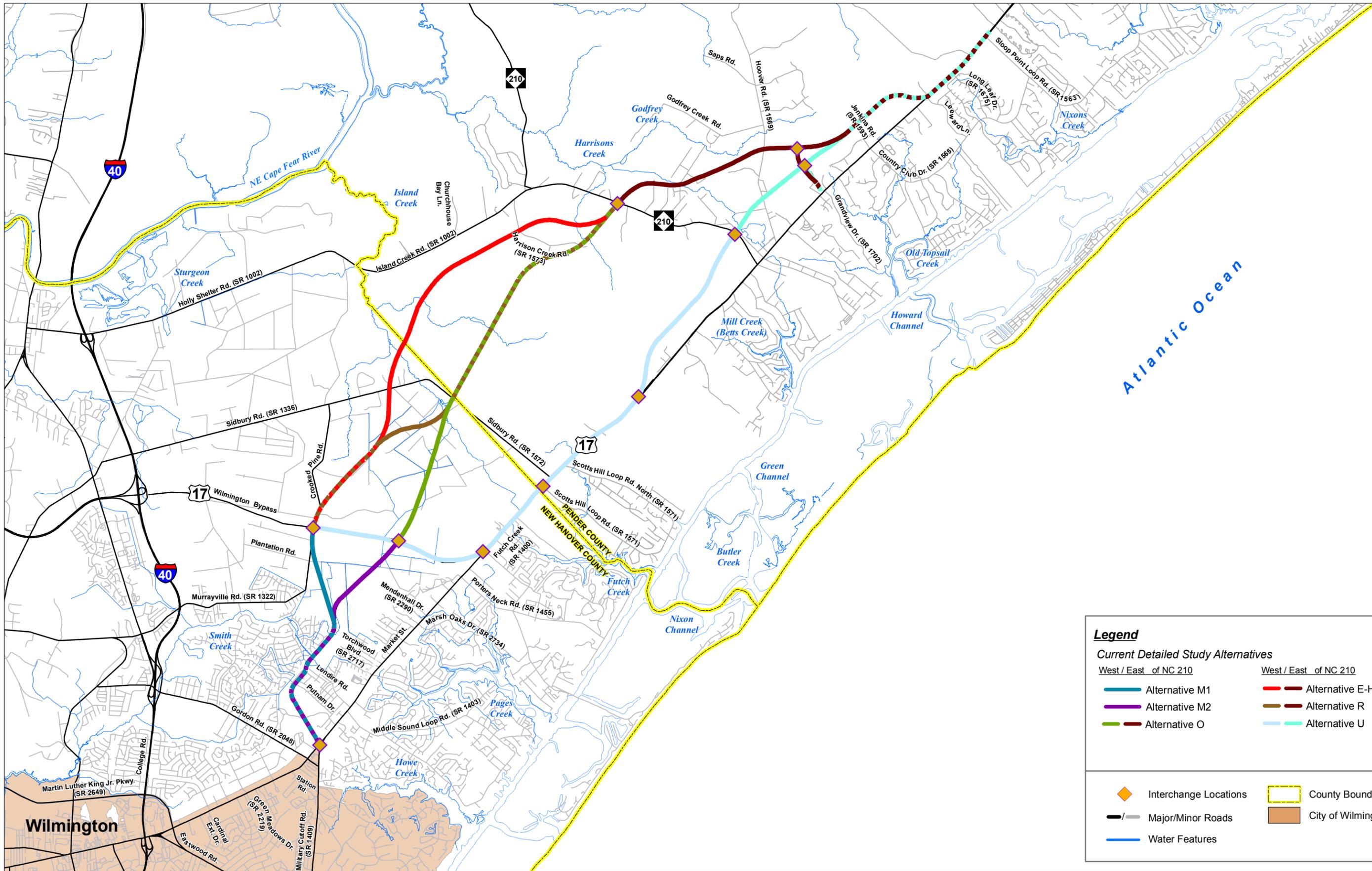
The proposed project will require a Coastal Area Management Act (CAMA) consistency determination from the North Carolina Division of Coastal Management.

Consultation with the US Fish and Wildlife Service (USFWS) regarding the effects of the proposed project on the federally-protected red-cockaded woodpecker, Cooley's meadowrue, golden sedge, and rough-leaved loosestrife is required.

The USACE will serve as the lead federal agency with respect to compliance with Section 7 of the Endangered Species Act. It is anticipated that the USACE will request of the USFWS that formal consultation for red-cockaded woodpecker and rough-leaved loosestrife be initiated in accordance with Section 7 of the Endangered Species Act after

the least environmentally damaging practicable alternative for the proposed project has been identified.

If Alternative M2+O or Alternative M1+R is selected as the least environmentally damaging practicable alternative for the proposed project, it is anticipated that the USACE will request of the USFWS that formal consultation for Cooley's meadowrue and golden sedge be initiated in accordance with Section 7 of the Endangered Species Act.



Legend

Current Detailed Study Alternatives

West / East of NC 210		West / East of NC 210	
	Alternative M1		Alternative E-H
	Alternative M2		Alternative R
	Alternative O		Alternative U

	Interchange Locations		County Boundary
	Major/Minor Roads		City of Wilmington
	Water Features		

Prepared by:

Prepared for:



Current Detailed Study Alternatives
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

0 3,500 7,000 14,000 Feet

Data Sources: NCDOT and Mulkey GIS
 Figure Prepared: 10/21/10

Figure No.
S-1

1.0 PURPOSE OF AND NEED FOR PROJECT

State Transportation Improvement Program (STIP) projects U-4751 and R-3300 involve the construction of Military Cutoff Road Extension in New Hanover County and the US 17 Hampstead Bypass in New Hanover and Pender Counties, respectively. These projects are included in the 2009-2015 STIP. This draft environmental impact statement (DEIS) is being prepared for both projects in accordance with the National Environmental Policy Act of 1969, as amended (42 United States Code 4321-4327), as codified in Title 40 of the Code of Federal Regulations Parts 1500-1508 and the North Carolina Environmental Policy Act of 1971, as amended (North Carolina General Statutes Article I Chapter 113A), as codified in the North Carolina Administrative Code, Title 1, Chapter 25.

1.1 PROPOSED ACTION

For project U-4751, the North Carolina Department of Transportation (NCDOT) proposes to extend Military Cutoff Road as a six-lane divided roadway on new location from its current terminus at US 17 (Market Street) in Wilmington north to an interchange with the US 17 Wilmington Bypass (John Jay Burney Jr. Freeway). Limited and full control of access is proposed. For project R-3300, NCDOT proposes to construct the US 17 Hampstead Bypass as a freeway mostly on new location. The US 17 Hampstead Bypass may connect to the proposed Military Cutoff Road Extension at the existing US 17 Wilmington Bypass and extend to existing US 17 north of Hampstead. Full control of access is proposed for the US 17 Hampstead Bypass.

The project vicinity and study area are shown in Figure 1. The study area boundaries roughly follow I-40 to the west, the Northeast Cape Fear River to the north, Holly Shelter Game Land to the east and existing US 17 to the south.

1.1.1 PROJECT SETTING

1.1.1.1 DESCRIPTION OF PROJECT AREA

The proposed projects are located in the outer Coastal Plain and cross portions of northern New Hanover County and southern Pender County. This part of the Cape Fear River basin is the only coastal area in North Carolina that is accessible by interstate highway, making it a popular destination because of its proximity to the Atlantic Ocean, beaches, and estuarine waters. In the project vicinity, the City of Wilmington is home to one of the state's largest historic districts and the USS North Carolina battleship and memorial. Wilmington and nearby communities of Hampstead, Topsail Island, Wrightsville Beach, Kure Beach, and Carolina Beach offer numerous options for dining, shopping, recreation, and entertainment. The Hampstead area is home to four golf courses that are centered in large residential developments. Proximity to numerous coastal communities makes this area a popular second-home and retirement destination.

The southern extent of the study area is characterized primarily by a mix of commercial and residential development; the northern extent includes preserved land, undeveloped forests, open fields, and wetlands. Natural areas preserved for recreation and education uses include the North Carolina Wildlife Resources Commission Holly Shelter Game Land and the North Carolina State University blueberry research station. Open fields are primarily managed agricultural areas used for blueberries, row crops, and tobacco production, or are left fallow.

1.1.1.2 EXISTING TRANSPORTATION FACILITIES

US 17 serves as a major connector between New Hanover, Pender, and Onslow Counties. In the study area, US 17 connects with I-40 and US 17 Business (Market Street) at interchanges and with NC 210 at a signalized intersection (see Figure 1). From I-40 to Market Street, US 17 is also known as the Wilmington Bypass. The US 17 Wilmington Bypass is a four-lane freeway with a posted speed limit of 65 miles per hour (mph). The US 17 Wilmington Bypass opened to traffic in 2006. From its interchange at Market Street to Sloop Point Loop Road, US 17 is a four or five-lane, two-way, north-south route classified as an urban principal arterial in the Statewide Functional Classification System. US 17 between the Wilmington Bypass and Sloop Point Loop Road was widened from two to four and five lanes between 1996 and 1999 and intersections along US 17 between the Wilmington Bypass and the northern intersection of SR 1571 (Scotts Hill Loop Road) were upgraded to “superstreet” intersections (no left turns onto US 17) in 2006. The posted speed limit varies from 45 to 55 mph. US 17 is a part of NC Bike Route 3 in the vicinity of Hampstead.

In the study area, US 17 Business (Market Street) extends from US 117/NC 132 (College Road) to the US 17 Wilmington Bypass. Land use along Market Street includes commercial, retail, and single-family and multi-family residential development. Market Street is a four or five-lane roadway in the study area. The posted speed limit varies from 45 to 55 mph.

In the study area, Military Cutoff Road is a four-lane divided or five-lane, north-south route with a posted speed limit of 45 mph. Military Cutoff Road is classified as an urban principal arterial in the Statewide Functional Classification System. Military Cutoff Road connects with Gordon Road and Market Street at signalized intersections. Gordon Road, an east-west urban minor arterial, connects with I-40 at an interchange.

Interstate 40 is a major east-west freeway that crosses eight states, beginning in Barstow, California and ending in Wilmington, North Carolina. It links several large cities in the state, including Asheville, Winston-Salem, Greensboro, Durham, and Raleigh. NC 210 is a two-lane, east-west major arterial serving as a connector between Cumberland, Bladen, and Pender Counties. In the study area, NC 210 connects with US 17 in Hampstead and I-40 via Holly Shelter Road. NC 210 provides access to the Topsail Island beaches.

1.1.2 HISTORY OF PROJECT

Feasibility studies were conducted for both Military Cutoff Extension and the Hampstead Bypass. The Hampstead Bypass Feasibility Study was completed in draft form in February 1999, but was never published as final. In early 2004, the feasibility study was reinstated. A Feasibility Study for the Military Cutoff Extension was completed in June of 2004. The proposed project is included in local thoroughfare plans and shown in the *2009-2015 STIP*, with both U-4751 and R-3300 shown as Strategic Highway Corridor projects. Project development studies for the proposed project began in 2005.

1.1.3 DECISION TO COMBINE PROJECTS IN ONE ENVIRONMENTAL DOCUMENT

During project development it was recognized that projects U-4751 and R-3300 may share a common terminus. Because they may be adjoining new location projects and together they would have a cumulative impact on the human and natural environment, it was decided that the two projects should be addressed in a single document. This combined document provides a way to communicate all direct and indirect impacts the projects would have on the environment, as well as the cumulative impact resulting from the incremental impacts of the two projects when added to other past, present, and reasonably foreseeable future actions.

1.2 PURPOSE OF PROPOSED ACTION

The purpose of the project is to improve the traffic carrying capacity and safety of the US 17 and Market Street corridor in the study area. The project is expected to provide the following benefits:

- **Improve traffic flow and level of service on US 17 and Market Street in the study area.**

The proposed projects will increase the capacity of the US 17 corridor and improve level of service, benefiting both local and through traffic. The proposed project will provide a new route for travelers with destinations in northern New Hanover County and area beaches. The project will remove much of the through traffic from the existing roadway, allowing it to better serve local land use.

- **Enhance safety along US 17 and Market Street in the study area.**

Separating through traffic from the local traffic that is using the existing roadway to access schools, shopping and residential areas will enhance safety.

1.3 NEED FOR PROPOSED ACTION

The following summary and supporting technical data for existing and forecasted conditions in the study area detail the need for improvements along the US 17 corridor in New Hanover and Pender Counties.

1.3.1 SUMMARY OF NEED FOR PROPOSED ACTION

Needs to be addressed by the proposed projects are:

- **Traffic Carrying Capacity**

Traffic volumes on US 17 in the project vicinity are expected to increase substantially over the next 25 years. Average daily traffic volumes along existing roads in the study area will more than double in some locations by 2035 from the 2008 base conditions. Roadway capacity analyses show that most of the arterials and intersections in the study area would either approach or exceed the roadway capacity limits during at least one peak hour of the day in 2035.

- **Safety Issues**

A total of 87 crashes occurred on Military Cutoff Road between Station Road and US 17 Business (Market Street) between January 1, 2007 and December 31, 2009. The total crash rate for Military Cutoff Road in this area is above the 2005-2007 statewide crash rate for urban Secondary Routes.

A total of 612 crashes including three fatal crashes occurred on Market Street between Station Road and the US 17 Wilmington Bypass interchange at Market Street between January 1, 2007 and December 31, 2009. The total crash rate for Market Street in this area is above the 2005-2007 statewide crash rate for urban United States routes.

A total of 489 crashes including two fatal crashes occurred on US 17 between the US 17 Wilmington Bypass interchange at Market Street and Sloop Point Loop Road between January 1, 2007 and December 31, 2009. The total crash rate for US 17 in this area is below the 2005-2007 statewide crash rate for rural United States routes.

- **Transportation Demand**

US Census Bureau statistics indicate New Hanover County grew by 33.3 percent from 1990 to 2000 and 22.3 percent between 2000 and 2010. Pender County grew by 42.4 percent between 1990 and 2000 and 32.9 percent between 2000 and 2010. Both counties are expected to continue to experience high growth rates through the year 2030. This growth in population, tourism and supporting services has resulted in an increase in mixed-purpose traffic on US 17.

1.3.2 TRAFFIC OPERATIONS ANALYSES

1.3.2.1 ANALYSIS METHODOLOGY

The objective of the traffic operations analysis is to evaluate the existing and future travel conditions and to assess the effectiveness of the proposed Military Cutoff Road Extension and Hampstead Bypass in improving traffic flow in the study area. This study analyzed freeway mainline, weaving and merge/diverge, arterial and intersection capacities for two conditions: 2008 Existing Conditions and 2035 No-Build Conditions. The capacity analysis was performed using the 2000 Highway Capacity Manual methodologies. The AM and PM peak hour traffic volumes from the traffic forecast prepared for the project were used in the capacity analysis.

Traffic forecasts for the base year (2008) and horizon year (2035) were prepared for the project in June 2008 using output from the Wilmington Metropolitan Planning Organization's (MPO) Travel Demand Model. The Travel Demand Model uses various socioeconomic data to forecast growth in order to predict demands on a transportation network. Regional growth expectations help to determine projected traffic in a horizon year. Assumptions about future development activity and changes in distribution of population and employment in the forecast study area are implicit in the model. Expectations regarding specific developments can be a factor in the development of the forecast. It is anticipated that there will be periods where housing and employment market trends will fluctuate up and down through the horizon year. The future year Build scenario assumes completion of all projects in the fiscally constrained Wilmington MPO Comprehensive Transportation Plan adopted in March 2005.

Results of the traffic capacity analyses for the project are presented in this document in terms of level of service. Level of service (LOS) is a qualitative measure that characterizes the operational conditions within a traffic stream and the perception of traffic service by motorists and passengers. The Transportation Research Board's Highway Capacity Manual generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels are used, ranging from A to F. For roadways, LOS A indicates no congestion while LOS F represents more traffic demand than road capacity and extreme delays. The engineering profession generally accepts LOS D as a minimally acceptable operating condition for signalized intersections.

Freeway capacity analyses for the freeway mainline, merge/diverge junctions, and weaving segments were performed using the methodologies described in the 2000 Highway Capacity Manual. In this methodology, the level of service is determined by calculating the density of passenger cars per mile per lane.

The arterial capacity analyses were performed using Synchro software program and in accordance with the 2000 Highway Capacity Manual, which bases LOS on average through-vehicle travel speeds. The average through-vehicle speed is calculated by dividing the length of the segment by the sum of the travel time on that segment plus

control delay. The control delay includes the total delay for a vehicle approaching and entering a signalized intersection, delays of initial deceleration, move-up time in the queue, stop and re-acceleration.

The intersection capacity analyses were performed using Synchro software in accordance with NCDOT Signalized Intersection Capacity Analysis Guidelines. Traffic flow at an intersection is affected by the volume of traffic and by the intersection geometry. At intersections with signals, LOS A represents no congestion, LOS E represents long delays, and LOS F represents excessive delays with vehicles having to wait several signal cycles to clear an intersection.

1.3.2.2 2008 TRAFFIC VOLUMES

The 2008 ADT along Military Cutoff Road from south of Station Road to US 17 Business (Market Street) varies between 15,000 vehicles per day (vpd) and 34,000 vpd. Truck traffic makes up approximately three percent of the total traffic along Military Cutoff Road. The 2008 ADT along Market Street between US 117/NC 132 (College Road) and the US 17 Wilmington Bypass varies between 30,000 and 52,900 vpd. Truck traffic makes up approximately six percent of the total traffic along this section. The 2008 ADT along US 17 between I-40 and Sloop Point Loop Road ranges between 15,000 vpd and 38,600 vpd. Truck traffic makes up approximately eight percent of the total traffic along this section. Figure 2 shows 2008 ADT.

1.3.2.3 2008 LEVEL OF SERVICE

Under the 2008 existing conditions, capacity analyses indicate that traffic demand along several segments of US 17 Business and Military Cutoff Road either approaches or exceeds (LOS E or F) the roadway capacity during at least one peak hour of the day. The intersection capacity analysis indicates that traffic demand at 24 out of 29 study intersections either approaches or exceeds the roadway capacity during at least one peak hour of the day. Figure 3 shows the 2008 levels of service for the existing facilities.

1.3.2.4 2035 NO-BUILD TRAFFIC PROJECTIONS

Projected 2035 ADT for Military Cutoff Road from south of Station Road to Market Street varies between 26,000 vpd and 46,000 vpd. Truck traffic is projected to make up approximately three percent of the total traffic along Military Cutoff Road .in 2035. The 2035 ADT along Market Street between College Road and US 17 Wilmington Bypass is expected to range between 48,200 and 71,000 vpd. Truck traffic is expected to make up approximately six percent of the total traffic along this section. Projected 2035 ADT for US 17 from I-40 to Sloop Point Loop Road varies between 62,800 vpd and 115,000 vpd. Truck traffic is expected to make up approximately eight percent of the total traffic along this section. Figure 4 shows 2035 ADT projections.

1.3.2.5 YEAR 2035 NO-BUILD CAPACITY ANALYSIS

Under the 2035 No-Build conditions, the US 17 interchanges at I-40 and US 17 Business will operate at or beyond capacity (LOS E or F). Freeway and arterial capacity analyses indicate that traffic demand at all of the segments along US 17, Market Street and Military Cutoff Road will approach or exceed capacity during at least one peak hour of the day. The intersection capacity analysis indicates that traffic demand at 28 out of the 29 intersections studied will either approach or exceed capacity during at least one peak hour of the day. These capacity deficiencies indicate a need for roadway improvements in the study area to serve the anticipated future traffic demand. Figure 5 shows the 2035 level of service for the existing facilities.

1.3.3 ACCIDENT ANALYSIS

Traffic accident data was analyzed for the three year period between January 1, 2007 and December 31, 2009 for US 17, US 17 Business (Market Street) and Military Cutoff Road Extension. The data is summarized in Tables 1-1 through 1-3 below. For each roadway segment, the crash rate for the total number of crashes and crashes by type are shown. These rates are compared to statewide and critical crash rates. The critical crash rate is a way to mathematically evaluate the significance of the crash rate for a section of roadway. Critical crash rate values vary as the AADT changes. The critical crash rate can be used to identify high accident locations. Locations with a crash rate higher than the critical rate may have potential highway safety deficiencies.

Rear-end collisions were the most common type of accident, accounting for between 40 percent and 51 percent of all accidents reported. Approximately one-third of all crashes involved injuries.

Table 1-1. Crash Rates - Military Cutoff Rd. from Station Rd. to US 17 Bus. (Market Street)

Crash Type	Crashes	Crash Rate ¹	Statewide Rate ²	Critical Rate ³
Total	87	608.97	404.22	495.21
Fatal	0	0.00	1.11	9.19
Non-Fatal Injury	31	216.99	126.46	178.89

¹ Crashes per 100 million vehicle miles

² 2005-2007 statewide crash rate for urban Secondary Routes (SR) in North Carolina

³ Based on the statewide crash rate (95% level of confidence)

Table 1-2. Crash Rates - US 17 Bus. (Market St.) from Station Rd. to US 17 Wilmington Bypass

Crash Type	Crashes	Crash Rate ¹	Statewide Rate ²	Critical Rate ³
Total	612	399.31	318.41	342.45
Fatal	3	1.96	1.07	2.77
Non-Fatal Injury	200	130.49	103.55	117.40

¹ Crashes per 100 million vehicle miles

² 2005-2007 statewide crash rate for urban United States (US) routes in North Carolina

³ Based on the statewide crash rate (95% level of confidence)

Table 1-3. Crash Rates - US 17 from US 17 Wilmington Bypass to Sloop Point Loop Rd.

Crash Type	Crashes	Crash Rate ¹	Statewide Rate ²	Critical Rate ³
Total	489	137.78	318.41	334.13
Fatal	2	0.56	1.07	2.11
Non-Fatal Injury	168	47.34	103.55	112.58

¹ Crashes per 100 million vehicle miles driven

² 2005-2007 statewide crash rate for urban United States (US) routes in North Carolina

³ Based on the statewide crash rate (95% level of confidence)

1.3.4 TRANSPORTATION DEMAND

Increases in population can be expected to result in increased demand on roadways. According to US Census Bureau statistics, New Hanover County grew by 33.3 percent from 1990 to 2000. US Census Bureau statistics indicate Pender County grew by 42.4 percent during the 1990 to 2000 period and the City of Wilmington grew by 35.3 percent. Both counties are expected to continue to experience high growth rates through the year 2030 (Table 1-4).

Table 1-4. Population Growth Trends

County	Growth Projection		
	2000 - 2010	2010 - 2020	2020 - 2030
New Hanover	22.3 %	10.4 %	9.5 %
Pender	32.9 %	27.3 %	21.4 %

Source: Office of State Budget and Management <http://www.osbm.state.nc.us/ncosbm>

According to “The 2008 Economic Impact of Travel on North Carolina Counties”, a study prepared for the North Carolina Division of Tourism, Film and Sports Development by the US Travel Association, New Hanover County ranks eighth among North Carolina's 100 counties in tourism expenditures. This ranking reflects the large number of annual visitors to the area, which creates increased demands on local roads and the need for goods and services.

1.3.5 NC STRATEGIC HIGHWAY CORRIDORS/INTRASTATE SYSTEM

The Strategic Highway Corridors (SHC) initiative is a major implementation step of the North Carolina Long-Range Multimodal Statewide Transportation Plan adopted by the Board of Transportation in September 2004. Under this initiative, the NCDOT is focusing on improving, protecting, and planning for critical highway facilities in the State. Corridors were selected based on meeting one or more of the following criteria:

- *Mobility*: Whether a corridor currently serves or has the potential to expeditiously move large volumes of traffic.
- *Connectivity*: Whether a corridor provides a vital connection between Activity Centers.
- *Interstate Reliever*: Whether a corridor currently serves or has the potential to serve as a reliever route to an existing interstate facility.

The following elements were also considered during Strategic Highway Corridor selection:

- *Hurricane Evacuation Route*: Whether a corridor is considered a major route on the NC Emergency Management's Coastal Evacuation Route Map.
- *Cited in a Prominent Report*: Certain reports list the need for improvements along major corridors in the State, mainly to improve economic conditions in a particular area.
- *Part of a Major Highway System*: Whether a corridor is part of a national, statewide, economic, or military highway system.

The proposed Military Cutoff Road Extension and US 17 within the study area are part of SHC No. 52 between Wilmington and Norfolk, Virginia. In the SHC Vision Plan, US 17 (from I-140 to the Virginia state line) is designated as a freeway facility. The functional purpose of the freeway facility is high mobility and low access. Proposed Military Cutoff Road Extension is designated as a boulevard in the SHC Vision Plan. The functional purpose of the boulevard facility is moderate mobility and low to moderate access.

2.0 DESCRIPTION OF ALTERNATIVES CONSIDERED

Alternatives considered for the proposed project include the No-Build Alternative (Section 2.1), the Transportation System Management Alternative (Section 2.2.1), the Travel Demand Management Alternative (Section 2.2.2), the Mass Transit Alternative (Section 2.2.3), and the build alternatives, including the Improve Existing Alternative (Alternative Z).

Preliminary build alternatives (Section 2.2.4) were established through an evaluation of suitability mapping based on available socioeconomic, cultural, and environmental resource data. Preliminary build alternatives that met the purpose of and need for the proposed project and with the least impacts to the human and natural environments were identified as detailed study alternatives (Section 2.3). The detailed study alternatives selection process incorporated recommendations made by federal and state environmental regulatory and resource agencies and comments received from two citizens informational workshops held in April 2007.

Project alternatives were further refined as more comprehensive information was obtained through detailed field studies and environmental analysis. There are two current detailed study alternatives for Military Cutoff Road Extension (U-4751) and four current detailed study alternatives for Hampstead Bypass (R-3300). Current detailed study alternatives are discussed in Section 2.4.

2.1 NO-BUILD (NO ACTION) ALTERNATIVE

The No-Build Alternative would not provide any substantial improvements to US 17 or Market Street (US 17 Business) within the study area through the year 2035. Only typical maintenance activities such as patching, resurfacing, regrading shoulders and maintaining ditches would occur.

The No-Build Alternative would not affect the human or natural environments. There would be no impacts to streams, wetlands, historic resources, protected species, or other cultural or natural resources. The No-Build Alternative would not result in any residential or business relocations, nor would there be any right of way or construction costs.

For the purposes of the USACE review, and consistent with Appendix B of its regulations at 33 CFR part 325, USACE considers the No Action alternative to be the alternative that does not require a USACE permit for its construction. Based on the information available concerning the location and extent of the streams and wetlands in the project area, it is believed that to construct the proposed highway facility while completely avoiding impacts to jurisdictional waters and wetlands, and thus precluding the need for a USACE permit, would not be practicable and thus does not satisfy the purpose and need for the project.

As discussed in Section 1.3.2, traffic capacity analyses indicate that by 2035, all of the roadway segments along Market Street and US 17 analyzed for the project would approach or exceed the roadway capacity limits during at least one peak hour of the day. The No-Build Alternative would not add new lanes or provide alternative routes or means of travel to existing roadways. Therefore, the traffic carrying capacity of Market Street and US 17 would not improve and an increase in the number of accidents could be expected. Therefore, the No-Build Alternative does not meet the purpose of and need for the proposed project and has been removed from further consideration.

2.2 PRELIMINARY STUDY ALTERNATIVES

2.2.1 TRANSPORTATION SYSTEMS MANAGEMENT (TSM) ALTERNATIVE

Transportation Systems Management (TSM) improvements involve increasing the available capacity of a roadway within the existing right of way with minimum capital expenditures and without reconstructing or adding additional through lanes to the existing road. There are two types of TSM roadway improvements: operational and physical improvements. Physical improvements are usually more capital intensive while operational changes are largely administrative in nature.

Items such as the addition of turn lanes, striping, signing, signalization, and minor realignments are examples of TSM physical improvements. Physical TSM improvements are most effective in addressing site-specific capacity and safety issues. It is expected that TSM physical improvements would improve traffic flow in some areas along Market Street and US 17, but the roadways would not show an appreciable increase in capacity.

Examples of TSM operational improvements include traffic law enforcement, speed restrictions, access control, and signal timing changes. These types of improvements are best suited for areas with capacity or safety deficiencies in specific locations. A current TIP Project (U-4902B) involves access management improvements to Market Street. It is expected that TSM operational improvements would improve traffic flow along Market Street. However, it is expected that Market Street and US 17 would not show an appreciable increase in capacity in design year 2035 with TSM operational improvements.

TSM improvements would not add new lanes or provide alternative routes or means of travel to existing roadways. Therefore, the traffic carrying capacity of Market Street and US 17 would not improve and an increase in the number of accidents could be expected. Therefore, the TSM Alternative does not meet the purpose of and need for the proposed project and has been eliminated from further consideration.

2.2.2 TRAVEL DEMAND MANAGEMENT (TDM) ALTERNATIVE

Travel Demand Management (TDM) is an innovative approach to mitigating traffic congestion. Examples of TDM alternatives include ridesharing, park & ride, flexible

work schedules, and telecommuting programs. Ridesharing provides a vehicle option for people who normally travel via public transportation and non-motorized modes, but at times need to make special trips (e.g. grocery shopping, trips to rural areas, trips from a transit station to a final destination). Employers who provide flexible work schedules allow employees to choose their arrival and departure times, which may reduce peak travel demand by allowing employees to avoid the most congested travel times or more easily coordinate carpools and vanpools. Telecommuting allows employees to work from home. Because telecommuters are not traveling between home and work, travel demand may be reduced, particularly during peak hours.

TDM improvements would not add new lanes or provide alternative routes or means of travel to existing roadways. Therefore, the traffic carrying capacity of Market Street and US 17 would not improve and an increase in the number of accidents could be expected. Therefore, the TDM Alternative does not meet the purpose of and need for the proposed project and has been eliminated from further consideration.

2.2.3 MASS TRANSIT ALTERNATIVES

Mass transit alternatives include bus services, rail services, and express lanes. The study area is not currently served by passenger rail service. There is one inactive railroad in the study area and one active railroad in the project vicinity. The inactive line extends from Craven County to northern Brunswick County and parallels US 17 in the study area. The active line is operated by CSX and extends from the North Carolina-Virginia state line in Northampton County southward to Wilmington, offering freight services only.

The Cape Fear Public Transportation Authority (Wave Transit) provides transit services in Wilmington, most of New Hanover County, and portions of Brunswick County. Through Wave Transit a variety of public transportation options are available, including fixed bus routes, paratransit vans, the Front Street free trolley (serving downtown Wilmington), Seahawk shuttle [serving the University of North Carolina Wilmington (UNC-W) campus], Castle Hayne shuttle, Brunswick Connector, and Columbus Connector. Wave Transit Eastwood Road/Mayfair Route travels along a short section of Military Cutoff Road south of the study area. Intercity bus services are provided by Greyhound Bus Lines and Carolina Trailways. A new multimodal transportation center was recently constructed in downtown Wilmington. Pender County does not currently have public transit operations in place.

Current roadway access and land use along Market Street and US 17 is not conducive to converting lanes on Market Street and US 17 to express lanes.

The Mass Transit Alternative would only minimally address the current traffic flow problems in the area. In addition, it would not be a reasonable alternative because of potential lack of demand, dispersed residential areas and employment centers, and diversity of trip origins and destinations. The Mass Transit Alternative does not meet the purpose of and need for the proposed project and has been eliminated from further consideration.

2.2.4 PRELIMINARY BUILD ALTERNATIVES

The NEPA/Section 404 merger team reviewed preliminary build alternatives at three meetings between February 2007 and August 2007. During these meetings, the merger team eliminated alternatives from further consideration, added alternatives for evaluation, and combined some alternatives. In total, 23 preliminary build alternatives were developed for Hampstead Bypass and two preliminary build alternatives were developed for Military Cutoff Road Extension. Preliminary build alternatives are described below and shown in Figure 6. A comparison of the preliminary build alternatives in relation to environmental features is shown in Table 2-1.

2.2.4.1 HAMPSTEAD BYPASS ALTERNATIVES

Alternative A

Alternative A begins in New Hanover County at the I-40 interchange with SR 1002 (Holly Shelter Road). It extends northeast across undeveloped property just north of Holly Shelter Road. Alternative A crosses over to the south side of Holly Shelter Road at the curve where it transitions to Island Creek Road. The alternative follows closely along the south side of Island Creek Road adjacent to mostly undeveloped property. Alternative A crosses a transmission line easement and turns southeast to an interchange with NC 210 southeast of the intersection of NC 210 and Island Creek Road.

Alternative A then extends from NC 210 to the northeast through undeveloped forested property, crossing a large power line easement near Godfrey Creek Road. North of Godfrey Creek Road, Alternative A extends through more forested land, crosses Saps Road and SR 1569 (Hoover Road) and then turns east. The alternative then extends to the north of Castle Bay, an existing residential golf course community off of Hoover Road. It continues east to a proposed interchange with US 17 near SR 1675 (Long Leaf Drive), then extends along existing US 17 to end at a signalized intersection at SR 1563 (Sloop Point Loop Road).

Alternative A was eliminated from further study because it would require US 17 traffic to travel out of direction and it is not expected Alternative A would improve the traffic carrying capacity and safety of the US 17 and Market Street corridor in the study area. Therefore, Alternative A would not meet the purpose of and need for the proposed project. Alternative A was not shown at the April 2007 citizens informational workshops.

Alternative B

Alternative B begins in New Hanover County at the I-40 interchange with Holly Shelter Road. It has the same alignment as Alternative A from I-40 to NC 210.

From NC 210, Alternative B extends east across several minor roads through undeveloped forested areas. Alternative B continues northeast, crossing Hoover Road north of South Topsail Elementary School. The alternative continues to a proposed

Table 2-1. Comparison of Preliminary Corridor Alternatives.

Preliminary Corridor Alternatives																									
Alternative	A	B	C	D	E	F	G	H	I	J	K	L	N	O	P	Q	R	S	T	U	V	W	M1	M2	Z
Segment West of NC 210																									
Segment East of NC 210																									
FEATURE	Preliminary Corridor Alternative impacts are reported below based on the type of information and level of detail available at the point in the project development process the alternative was either dropped from further consideration or carried forward for detailed study.																								
Length (miles)	15.75	15.19	15.65	14.79	14.18	14.59	14.85	14.24	14.65	13.80	13.23	13.69	13.62	13.01	13.42	14.20	13.59	14.00	10.61	10.65	12.51	12.55	3.38	3.47	17.34
Wetland Impacts (acres) ¹	304.1	261.2	218.3	427.9	368.5	330.29	459.4	400.1	361.86	386.87	343.9	301.0	465.9	406.5	368.2	440.6	381.2	342.9	157.7	221.2	438.0	501.5	135.8	146.5	40.7
Stream Impacts: <i>No. Crossings</i> / Linear Feet	9*	7*	10*	5,688	6,130	7,754	5,894	6,335	7,960	9	7	10	10,166	10,608	12,232	6,145	6,586	8,211	2,261	643	8,849	7,232	2,299	2,233	1,331
Residential Displacements¹	34	46	67	30	40	64	29	39	63	18	30	51	31	41	65	39	49	73	79	53	89	63	86	86	5
Business Displacements ¹	17	18	21	17	20	29	16	19	28	18	19	22	15	18	27	14	17	26	41	34	40	33	29	29	31
Federal/State Threatened and Endangered Species Occurrences	Y	Y	Y	0	0	0	0	0	0	Y	Y	Y	0	0	0	1	1	1	Y	1	Y	Y	0	0	1
RCW Occurrences within 0.5 mile (no. of those occurrences in Holly Shelter Game Land)				8(2)	8(2)	2(2)	8(2)	8(2)	2(2)				9(2)	9(2)	3(2)	8(2)	8(2)	2(2)		8(2)			0	0	2(2)
Natural Heritage Program SNHA, Managed Areas and Wetland Mitigations Sites (acres)	Y	Y	N	69.42	43.07	6.78	69.42	43.07	6.78	Y	Y	Y	89.42	63.07	26.78	69.42	43.07	6.78	N	36.29	Y	Y	0	0	0
100 Year Floodplain Impacts (acres) ¹	61.63	55.26	37.29	41.50	46.27	35.79	51.94	56.71	46.23	40.25	33.88	15.91	33.84	38.61	28.13	34.40	39.17	28.69	22.22	42.68	22.22	42.68	0	0	0
Recorded Historic Properties ²	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	3	3	0	0	0
Recorded Archaeological Sites²	23	29	36	0	0	0	0	0	0	26	32	39	0	0	0	0	0	0	47	1	35	29	0	0	0
Wildlife Refuge/Game Lands ¹	N	N	N	0	0	0	0	0	0	N	N	N	0	0	0	0	0	0	N	0	N	N	0	0	0
Recreational Areas/Parks ¹	N	N	N	0	0	0	0	0	0	N	N	N	0	0	0	0	0	0	N	0	N	N	1	1	0
Acres in High Quality Waters (HQW, ORW, WS Protected or Critical Areas)	Y	Y	Y	0	0	8.92	0	0	8.92	Y	Y	Y	0	0	8.92	0	0	8.92	Y	29.29	Y	Y	1.31	1.31	38.6
Cemeteries ¹	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	3
Potential Underground Storage Tank / Hazmat Sites	60	59	64	0	0	0	0	0	0	14	15	18	0	0	0	0	0	0	19	3	18	17	19	19	140

Notes: Impact calculations are based on preliminary corridor alignments: ¹ Within 300-foot corridor on new location alternatives and within 150-foot corridor along existing US 17; ² Within one mile of corridor centerline.

* Includes streams and ponds.

interchange with US 17 near Long Leaf Drive and then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative B was eliminated from further study because it would require US 17 traffic to travel out of direction and it is not expected Alternative B would improve the traffic carrying capacity and safety of the US 17 and Market Street corridor in the study area. Therefore, Alternative B would not meet the purpose of and need for the proposed project. Alternative B was not shown at the April 2007 citizens informational workshops.

Alternative C

Alternative C begins in New Hanover County at the I-40 interchange with Holly Shelter Road. It has the same alignment as Alternatives A and B from I-40 to NC 210.

From NC 210, Alternative C extends northeast across several minor roads through undeveloped forested areas. Alternative C crosses Hoover Road north of South Topsail Elementary School. At Hoover Road, Alternative C turns east, continues across undeveloped land to a proposed interchange with US 17 near Grandview Drive. Alternative C extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative C was eliminated from further study because it would require US 17 traffic to travel out of direction and it is not expected Alternative C would improve the traffic carrying capacity and safety of the US 17 and Market Street corridor in the study area. Therefore, Alternative C would not meet the purpose of and need for the proposed project. Alternative C was not shown at the April 2007 citizens informational workshops.

Alternative D

Alternative D begins in New Hanover County at an interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. The alternative extends northeast across SR 1572 (Sidbury Road). Alternative D extends into Pender County, crossing a transmission line easement near Churchhouse Bay Lane. Alternative D includes a proposed interchange at NC 210 southeast of the NC 210 and Island Creek Road intersection.

From its interchange at NC 210, Alternative D continues to the northeast, crossing a large power line easement near Godfrey Creek Road. North of Godfrey Creek Road, Alternative D extends through forested land, crosses Saps Road and Hoover Road and turns east. Alternative D extends to the north of Castle Bay, an existing residential golf course community off of Hoover Road, and ties into existing US 17 near Long Leaf Drive with a proposed interchange. Alternative D then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road. Alternative D was shown at the April 2007 citizens informational workshops. Because of their close proximity, the study corridors for Alternatives D and G were combined following the workshops. The resultant alternative, Alternative D-G, was selected to be studied in detail.

Alternative E

Alternative E begins in New Hanover County at an interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. The alternative follows the same alignment as Alternative D from the Wilmington Bypass to NC 210.

From its interchange at NC 210, Alternative E extends east and crosses Hoover Road north of South Topsail Elementary School. The alternative continues northeast and ties to existing US 17 at a proposed interchange near Long Leaf Drive. Alternative E then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative E was shown at the April 2007 citizens informational workshops. Because of their close proximity, the study corridors for Alternatives E and H were combined following the workshops. The resultant alternative, Alternative E-H, was selected to be studied in detail.

Alternative F

Alternative F begins in New Hanover County at an interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. The alternative follows the same alignment as Alternatives D and E from the Wilmington Bypass to NC 210.

From its interchange at NC 210, Alternative F extends east across several minor roads and crosses Hoover Road north of South Topsail Elementary School. At Hoover Road, Alternative F turns south and ties into existing US 17 with an interchange near Grandview Drive south of the Topsail School complex. Alternative F then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative F was shown at the April 2007 citizens informational workshops. Because of their close proximity, the study corridors for Alternatives F and I were combined following the workshops. The resultant alternative, Alternative F-I, was selected to be studied in detail.

Alternative G

Alternative G begins in New Hanover County at an interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. The alternative travels northeast across Sidbury Road. Alternative G continues north and turns east to parallel the south side of the transmission line easement as it enters Pender County. After crossing into Pender County, Alternative G continues northeast to a proposed interchange with NC 210.

From the interchange at NC 210, Alternative G continues to the northeast, crossing a large power line easement near Godfrey Creek Road. North of Godfrey Creek Road, Alternative G extends through forested land, crosses Saps Road and Hoover Road and

turns east. Alternative G extends to the north of Castle Bay and ties into existing US 17 near Long Leaf Drive with a proposed interchange. Alternative G then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative G was shown at the April 2007 citizens informational workshops. Because of their close proximity, the study corridors for Alternatives D and G were combined following the workshops. The resultant alternative, Alternative D-G, was selected to be studied in detail.

Alternative H

Alternative H begins in New Hanover County at an interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. The alternative follows the same alignment as Alternative G between the Wilmington Bypass and NC 210.

From its interchange at NC 210, Alternative H extends east across several minor roads and crosses Hoover Road north of South Topsail Elementary School. The alternative continues northeast and ties to existing US 17 at a proposed interchange near Long Leaf Drive. Alternative H then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative H was shown at the April 2007 citizens informational workshops. Because of their close proximity, the study corridors for Alternatives E and H were combined following the workshops. The resultant alternative, Alternative E-H, was selected to be studied in detail.

Alternative I

Alternative I begins in New Hanover County at an interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. The alternative follows the same alignment as Alternatives G and H between the Wilmington Bypass and NC 210.

From its interchange at NC 210, Alternative I extends east across several minor roads and crosses Hoover Road north of South Topsail Elementary School. At Hoover Road, Alternative I turns south and ties into existing US 17 with an interchange near Grandview Drive south of the Topsail School complex. Alternative I then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative I was shown at the April 2007 citizens informational workshops. Because of their close proximity, the study corridors for Alternatives F and I were combined following the workshops. The resultant alternative, Alternative F-I, was selected to be studied in detail.

Alternative J

Alternative J begins in New Hanover County at the US 17 Wilmington Bypass interchange with Market Street. It extends north across undeveloped property, crossing Sidbury Road near the New Hanover County/Pender County line. Alternative J continues northeast, crossing Harrison Creek Road, to a proposed interchange at NC 210.

From the interchange at NC 210, Alternative J continues to the northeast, crossing a large power line easement near Godfrey Creek Road. North of Godfrey Creek Road, Alternative J extends through forested land, crosses Saps Road and Hoover Road and turns east. Alternative J extends to the north of Castle Bay and ties into existing US 17 near Long Leaf Drive with an interchange. Alternative J then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative J was eliminated from further study due to constructability issues. This alternative would result in the US 17 Wilmington Bypass, Market Street, and Hampstead Bypass traffic converging at one location, with one facility being full control of access and the other two facilities being partial to no control of access. From a design standpoint, it would not be feasible to separate traffic while maintaining a travel corridor along existing US 17. Alternative J was not shown at the April 2007 citizens informational workshops.

Alternative K

Alternative K begins in New Hanover County at the US 17 Wilmington Bypass interchange with Market Street. The alternative follows the same alignment as Alternative J from the Wilmington Bypass to NC 210.

From NC 210, Alternative K extends east across several minor roads and crosses Hoover Road north of South Topsail Elementary School. The alternative continues northeast through undeveloped property to a proposed interchange with US 17 north of the Topsail School complex near Long Leaf Drive. Alternative K then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative K was eliminated from further study due to constructability issues. This alternative would result in the US 17 Wilmington Bypass, Market Street, and Hampstead Bypass traffic converging at one location, with one facility being full control of access and the other two facilities being partial to no control of access. From a design standpoint, it would not be feasible to separate traffic while maintaining a travel corridor along existing US 17. Alternative K was not shown at the April 2007 citizens informational workshops.

Alternative L

Alternative L begins in New Hanover County at the US 17 Wilmington Bypass interchange with Market Street. The alternative follows the same alignment as Alternatives J and K from the Wilmington Bypass to NC 210.

From its interchange at NC 210, Alternative L extends east across several minor roads and crosses Hoover Road north of South Topsail Elementary School. At Hoover Road, Alternative L turns south and ties into existing US 17 with an interchange near Grandview Drive south of the Topsail School complex. Alternative L then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative L was eliminated from further study due to constructability issues. This alternative would result in the US 17 Wilmington Bypass, Market Street, and Hampstead Bypass traffic converging at one location, with one facility being full control of access and the other two facilities being partial to no control of access. From a design standpoint, it would not be feasible to separate traffic while maintaining a travel corridor along existing US 17. Alternative L was not shown at the April 2007 citizens informational workshops.

Alternative N

Alternative N begins in New Hanover County at the US 17 Wilmington Bypass approximately one mile west of the Market Street interchange. It extends northeast from the bypass through undeveloped land and crosses Sidbury Road near the New Hanover County/Pender County line. The alternative continues northeast across Harrison Creek Road to a proposed interchange at NC 210.

From the interchange at NC 210, Alternative N continues to the northeast, crossing a large power line easement near Godfrey Creek Road. North of Godfrey Creek Road, Alternative N extends through forested land, crosses Saps Road and Hoover Road and turns east. Alternative N extends to the north of Castle Bay and ties into existing US 17 near Long Leaf Drive with a proposed interchange. Alternative N then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative N was shown at the April 2007 citizens informational workshops. Alternative N was selected to be studied in detail following the workshops.

Alternative O

Alternative O begins in New Hanover County at the US 17 Wilmington Bypass approximately one mile west of the Market Street interchange. The alternative follows the same alignment as Alternative N from the Wilmington Bypass to NC 210.

From its interchange at NC 210, Alternative O extends northeast across several minor roads and crosses Hoover Road north of South Topsail Elementary School. The alternative continues northeast to a proposed interchange with existing US 17 near Long Leaf Drive. Alternative O then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative O was shown at the April 2007 citizens informational workshops. Alternative O was selected to be studied in detail following the workshops.

Alternative P

Alternative P begins in New Hanover County at the US 17 Wilmington Bypass approximately one mile west of the Market Street interchange. The alternative follows the same alignment as Alternatives N and O from the Wilmington Bypass to NC 210.

From its interchange at NC 210, Alternative P extends northeast across several minor roads and crosses Hoover Road north of South Topsail Elementary School. At Hoover Road, Alternative P turns east and ties into existing US 17 with a proposed interchange near Grandview Drive south of the Topsail School complex. Alternative P then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative P was shown at the April 2007 citizens informational workshops. Alternative P was selected to be studied in detail following the workshops.

Alternative Q

Alternative Q begins in New Hanover County at an interchange with the US 17 Wilmington Bypass approximately midway between I-40 and Market Street. Alternative Q extends northeast from the bypass and crosses Sidbury Road near the New Hanover County/Pender County line. The alternative continues northeast across Harrison Creek Road to a proposed interchange with NC 210.

From the interchange at NC 210, Alternative Q continues to the northeast, crossing a large power line easement near Godfrey Creek Road. North of Godfrey Creek Road, Alternative Q extends through forested land, crosses Saps Road and Hoover Road and turns east. Alternative Q extends to the north of Castle Bay and ties into existing US 17 near Long Leaf Drive with a proposed interchange. Alternative Q then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative Q was shown at the April 2007 citizens informational workshops. Alternative Q was selected to be studied in detail following the workshops.

Alternative R

Alternative R begins in New Hanover County at an interchange with the US 17 Wilmington Bypass approximately midway between existing interchanges with I-40 and Market Street. Alternative R extends northeast from the bypass and crosses Sidbury Road near the New Hanover County/Pender County line. The alternative continues northeast across Harrison Creek Road to a proposed interchange with NC 210.

From its interchange at NC 210, Alternative R extends northeast across several minor roads and crosses Hoover Road north of South Topsail Elementary School. The alternative continues northeast to a proposed interchange with existing US 17 near Long Leaf Drive. Alternative R then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative R was shown at the April 2007 citizens informational workshops. Alternative R was selected to be studied in detail following the workshops.

Alternative S

Alternative S begins in New Hanover County at an interchange with the US 17 Wilmington Bypass approximately midway between existing interchanges with I-40 and Market Street. Alternative S extends northeast from the bypass and crosses Sidbury Road near the New Hanover County/Pender County line. The alternative continues northeast across Harrison Creek Road to a proposed interchange with NC 210.

From its interchange at NC 210, Alternative S extends northeast across several minor roads and crosses Hoover Road north of South Topsail Elementary School. At Hoover Road, Alternative S turns east and ties into existing US 17 with a proposed interchange near Grandview Drive south of the Topsail School complex. Alternative S then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative S was shown at the April 2007 citizens informational workshops. Alternative S was selected to be studied in detail following the workshops.

Alternative T

Alternative T begins in New Hanover County at the existing US 17 Wilmington Bypass and Market Street interchange. The alternative extends along existing US 17 to a proposed interchange approximately two miles north of the New Hanover County line, where it transitions to new location. Alternative T intersects with NC 210 at an interchange approximately 0.5 mile west of existing US 17. From its interchange at NC 210, Alternative T curves northeast, connecting with existing US 17 at a proposed interchange near Grandview Drive south of the Topsail School complex. Alternative T then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative T was shown at the April 2007 citizens informational workshops. Alternative T was eliminated from further study following the workshops because compared to some alternatives it would cause a higher number of residential and business displacements and would likely impact several historic and archaeological sites.

Alternative U

Alternative U begins in New Hanover County at a proposed interchange with the US 17 Wilmington Bypass. The interchange location will vary depending on the selected preferred Military Cutoff Road Extension alternative (M1 or M2). Alternative U extends along existing US 17 to a proposed interchange approximately two miles north of the New Hanover County line, where it transitions to new location. Alternative U intersects with NC 210 at an interchange approximately 0.5 mile west of existing US 17. From its interchange at NC 210, Alternative U continues northeast parallel to existing US 17 and crosses Hoover Road south of South Topsail Elementary School. The corridor continues northeast to a proposed interchange with existing US 17 near Long Leaf Drive. Alternative U then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative U was shown at the April 2007 citizens informational workshops. Alternative U was selected to be studied in detail following the workshops.

Alternative V

Alternative V begins in New Hanover County at the US 17 Wilmington Bypass approximately one mile west of the Market Street interchange. Alternative V intersects with NC 210 at a proposed interchange approximately 0.5 mile west of existing US 17. From its interchange at NC 210, Alternative V curves northeast, connecting with existing US 17 at a proposed interchange near Grandview Drive south of the Topsail School complex. Alternative V then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative V was shown at the April 2007 citizens informational workshops. Alternative V was eliminated from further study following the workshops because compared to some alternatives it would cause a higher number of residential and business displacements, would impact more exceptionally significant wetlands and streams, and would likely impact several historic and archaeological sites.

Alternative W

Alternative W begins in New Hanover County at the US 17 Wilmington Bypass approximately one mile west of the Market Street interchange. Alternative W travels northeast to intersect with NC 210 at a proposed interchange approximately 0.5 mile west of existing US 17. From its interchange at NC 210, Alternative W continues northeast parallel to existing US 17 and crosses Hoover Road south of South Topsail Elementary School. The alternative continues northeast to a proposed interchange with existing US 17 near Long Leaf Drive. Alternative W then extends along existing US 17 to end at a signalized intersection at Sloop Point Loop Road.

Alternative W was shown at the April 2007 citizens informational workshops. Alternative W was eliminated from further study following the workshops because compared to some alternatives it would cause a higher number of residential and business displacements, would impact more exceptionally significant wetlands and streams, and would likely impact several historic and archaeological sites.

Alternative Z (Improve Existing Alternative)

Alternative Z is the “Improve Existing” alternative. This alternative adds lanes to Market Street and existing US 17 from College Road in New Hanover County to Sloop Point Loop Road in Pender County. Access to properties along existing US 17 is provided by service roads and interchanges at: realigned Sidbury Road and SR 1571 (Scotts Hill Loop Road); realigned NC 210 (approximately 0.5 mile south of existing NC 210); and approximately 0.25 mile south of the Topsail School complex.

Alternative Z was shown at the April 2007 citizens informational workshops. Alternative Z was selected to be studied in detail following the workshops.

2.2.4.2 MILITARY CUTOFF ROAD EXTENSION ALTERNATIVES

Military Cutoff Road Extension Alternatives M1 and M2 are new location alternatives extending Military Cutoff Road from Market Street to the US 17 Wilmington Bypass.

Alternative M1

Alternative M1 begins at a proposed interchange at Military Cutoff Road and Market Street. The alternative extends north through vacant County property between the two sections of Ogden Park and residential areas. Alternative M1 turns northwest and ends near Plantation Road and Crooked Pine Road at a proposed interchange with the US 17 Wilmington Bypass, approximately midway between the I-40 and Market Street interchanges.

The City of Wilmington adopted an official transportation corridor map for the proposed extension of Military Cutoff Road on August 8, 2005 (see Figure 7). Alternative M1 follows the adopted corridor map alignment.

Alternative M1 was shown at the April 2007 citizens informational workshops. Alternative M1 was selected to be studied in detail following the workshops.

Alternative M2

Alternative M2 begins with an interchange at Military Cutoff Road and Market Street. From the proposed interchange, Alternative M2 follows the same alignment as Alternative M1 for approximately two miles. Alternative M2 then turns northeast and extends through mostly undeveloped property to a proposed interchange with the US 17 Wilmington Bypass approximately one mile west of Market Street.

Alternative M2 was shown at the April 2007 citizens informational workshops. Alternative M2 was selected to be studied in detail following the workshops.

2.3 DETAILED STUDY ALTERNATIVES

Following the April 2007 citizens informational workshops, 13 of the preliminary study alternatives were selected for detailed study. Two new location detailed study alternatives were selected for Military Cutoff Road Extension (U-4751). Ten new location alternatives and one improve existing alternative were selected for Hampstead Bypass (R-3300). The 13 detailed study alternatives are shown on Figure 8 and a comparison of the alternatives is shown in Table 2-2.

All of the alternatives for the project will affect foraging habitat for red-cockaded woodpecker, a federally-listed endangered species (see Sections 3.5.4.3 and 4.5.4.3). Because of this, the detailed study alternatives were evaluated for ways to minimize impacts to red-cockaded woodpecker foraging habitat. Minimization options were developed and adopted for Alternatives E-H, O, R, and Alternative U.

Impacts to red-cockaded woodpecker foraging habitat were minimized by shifting the proposed interchange with existing US 17 near Long Leaf Drive to the south. The minimization option instead includes a proposed interchange approximately 0.7 mile west of Grandview Drive, south of Topsail High School. Existing US 17 will be realigned to the west to connect with the Hampstead Bypass at this interchange. With the minimization option, the Hampstead Bypass would tie into existing US 17 near Leeward Lane and the section of existing US 17 between Grandview Drive and Leeward Lane would function as a service road.

The alignment of detailed study alternatives D-G, F-I, N, P, Q, S, and Z corridors precluded the development of an option that would substantially minimize impacts to red-cockaded woodpecker foraging habitat for those alternatives. These alternatives were eliminated from further consideration due to their impacts to red-cockaded woodpecker foraging habitat and other resources (see Section 2.3.1.1). Detailed study alternatives that were retained for further study are presented in Section 2.4. Current detailed study alternatives are shown on Figure 9.

2.3.1 DESCRIPTION OF DETAILED STUDY ALTERNATIVES

Section 2.3.1.1 briefly describes the Hampstead Bypass detailed study alternatives which were dropped from consideration following detailed environmental surveys. Current detailed study alternatives are described in Section 2.4.

2.3.1.1 HAMPSTEAD BYPASS DETAILED STUDY ALTERNATIVES

Alternative D-G (Combination of preliminary build alternatives D and G)

Alternative D-G extends from a proposed interchange with the US 17 Wilmington Bypass approximately midway between I-40 and Market Street to existing US 17 at Sloop Point Loop Road. Alternative D-G was eliminated from further study following detailed environmental surveys because it would have greater impacts than several other alternatives to a number of resources including future potentially suitable and potentially suitable red-cockaded woodpecker habitat, streams, managed natural areas, forested areas, and floodplains.

Alternative F-I (Combination of preliminary build alternatives F and I)

Alternative F-I extends from a proposed interchange with the US 17 Wilmington Bypass approximately midway between I-40 and Market Street to existing US 17 at Sloop Point Loop Road. Alternative F-I was eliminated from further study following detailed environmental surveys because it would have greater impacts than several other alternatives to a number of resources including streams, ponds, residential and business displacements, and future potentially suitable and potentially suitable red-cockaded woodpecker habitat.

Table 2-2. Comparison of August 2007 Detailed Study Alternatives.

Detailed Study Alternatives													
Alternative	M1+D-G	M1+E-H*	M1+ F-I	M2+N	M2+O *	M2+P	M1+Q	M1+ R*	M1+S	M1+U*	M2+ U *	M1+ Z	M2+ Z
Military Cutoff Road Ext. Segment													
Segment West of NC 210													
Segment East of NC 210		--•--			--•--			--•--		--•--	--•--		
FEATURE¹	Detailed Study Corridor Alternative impacts are reported below based on the type of information and level of detail available at the point in the project development process the alternative was either dropped from further consideration or carried forward for detailed study.												
Length (miles)	18.22	17.51	17.82	17.21	16.56	16.88	17.77	17.09	17.43	18.01	16.80	21.26	21.21
Delineated Wetland Impacts (acres)	265.7	223.4	213.8	402.9	360.6	350.9	315.7	273.4	263.8	205.4	265.1	146.5	206.2
Delineated Stream Impacts (linear feet)	27,930	23,383	26,358	16,923	12,376	15,351	27,644	23,096	26,021	14,995	8,343	21,399	14,747
Delineated Pond Impacts (acres)	1.69	2.92	4.39	2.11	3.34	4.81	1.97	3.2	4.67	2.77	2.77	3.25	3.25
Residential Displacements	25	31	90	25	31	90	26	32	91	72	71	145	144
Business Displacements	37	33	69	37	33	69	37	33	69	42	42	269	269
Red-cockaded Woodpecker Future Potentially Suitable / Potentially Suitable Habitat (acres)	52.87/1.01	6.94/0.28	17.35/2.89	52.87 1.01	6.94/0.28	17.35/2.89	52.87/1.01	6.94/0.28	17.35/2.89	6.94/0.28	6.94/0.28	19.97/3.46	19.97/3.46
Other Surveyed Federal / State Threatened and Endangered Species Habitat Present	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Natural Heritage Program SNHA, Managed Areas and Wetland Mitigations Sites (acres)	18.27	4.43	4.42	56.78	42.93	42.93	18.85	5.00	5.00	3.23	34.37	3.23	34.37
Prime Farmlands/Farmlands of Statewide Importance (acres)	700.23	700.41	767.06	696.31	696.43	762.77	666.56	666.54	732.92	479.56	500.17	690.98	711.52
Forest (acres)	544.69	493.49	467.35	537.96	486.74	460.46	497.93	446.70	420.43	376.71	424.61	263.22	311.85
100 Year Floodplain and Floodway Crossings (no.)/(acres)	4/12.65	3/10.50	3/10.83	3/7.85	2/5.70	2/6.03	3/7.85	2/5.70	2/6.03	1/1.94	1/1.94	0/0.10	0/0.10
Recorded Historic Properties (no.)	0	0	0	0	0	0	0	0	0	1	1	1	1
Recorded Archaeological Sites (no.)	0	0	0	0	0	0	0	0	0	1	1	2	2
Wildlife Refuge/Game Lands (acres)	0.03	0	0	0.03	0	0	0.03	0	0	0	0	1.55	1.55
Recreational Areas/Parks (no.)	0	0	0	0	0	0	0	0	0	0	0	1	1
High Quality Waters (HQW, ORW, WS Protected or Critical Areas) (acres)	4.48	7.02	28.11	4.48	7.02	28.11	4.48	7.02	28.11	9.68	9.68	121.36	121.36
Cemeteries (no.)	3	3	4	3	3	4	3	3	4	5	5	9	9
Potential UST / Hazmat Sites (no.)	6	5	8	6	5	8	6	5	8	5	5	36	36

Notes: * Red-cockaded woodpecker minimization design option. Impacts based on concept sketches.

¹Impact calculations are based on preliminary design slope stake limits plus an additional 25 feet.

Alternative N

Alternative N extends from a proposed interchange with the US 17 Wilmington Bypass approximately one mile west of the Market Street interchange to existing US 17 at Sloop Point Loop Road. Alternative N was eliminated from further study following detailed environmental surveys because it would have greater impacts than several other alternatives to a number of resources including wetlands, managed natural areas, forested areas, and future potentially suitable and potentially suitable red-cockaded woodpecker habitat.

Alternative P

Alternative P extends from a proposed interchange with the US 17 Wilmington Bypass approximately one mile west of the Market Street interchange to existing US 17 at Sloop Point Loop Road. Alternative P was eliminated from further study following detailed environmental surveys because it would have greater impacts than several other alternatives to a number of resources including streams, wetlands, ponds, residential and business displacements, and future potentially suitable and potentially suitable red-cockaded woodpecker habitat.

Alternative Q

Alternative Q extends from a proposed interchange with the US 17 Wilmington Bypass approximately midway between I-40 and Market Street to existing US 17 at Sloop Point Loop Road. Alternative Q was eliminated from further study following detailed environmental surveys because it would have greater impacts than several other alternatives to a number of resources including streams and future potentially suitable and potentially suitable red-cockaded woodpecker habitat.

Alternative S

Alternative S extends from a proposed interchange with the US 17 Wilmington Bypass approximately midway between I-40 and Market Street to existing US 17 at Sloop Point Loop Road. Alternative S was eliminated from further study following detailed environmental surveys because it would have greater impacts than several other alternatives to a number of resources including streams, ponds, residential and business displacements, and future potentially suitable and potentially suitable red-cockaded woodpecker habitat.

Alternative Z (“Improve Existing” Alternative)

Alternative Z widens the existing Market Street / US 17 corridor. Alternative Z was eliminated from further study following detailed environmental surveys because it would have greater impacts on homes and businesses than any of the alternatives. Alternative Z would also have greater impacts than several other alternatives to a number of other resources including future potentially suitable and potentially suitable red-cockaded woodpecker habitat and High Quality Waters.

2.3.1.2 MILITARY CUTOFF ROAD EXTENSION DETAILED STUDY ALTERNATIVES

Both of the detailed study alternatives for the proposed Military Cutoff Road extension are still being considered. Alternatives M1 and M2 are described in Section 2.4.1.2.

2.4 CURRENT DETAILED STUDY ALTERNATIVES

There are four new location build alternatives for the Hampstead Bypass (R-3300) and two new location build alternatives for Military Cutoff Road Extension (U-4751) still under consideration. The current detailed study alternatives for Hampstead Bypass include E-H, O, R, and U (see Section 2.4.1.1). The current detailed study alternatives for Military Cutoff Road Extension include M1 and M2 (see Section 2.4.1.2). A comparison of the anticipated impacts for the current detailed study alternatives is included in Table 2-3. The current detailed study alternatives are shown in Figure 9 and Figures 10-A through 10-K.

2.4.1 DESCRIPTION OF CURRENT DETAILED STUDY ALTERNATIVES

2.4.1.1 HAMPSTEAD BYPASS CURRENT DETAILED STUDY ALTERNATIVES

Alternative E-H

Alternative E-H begins in New Hanover County at a proposed interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. The alternative extends northwest past Sidbury Road into Pender County. Land use between the bypass and Sidbury Road is mostly undeveloped property. Alternative E-H turns to the northeast and continues to a proposed interchange with NC 210 east of Island Creek Road.

From its interchange at NC 210, Alternative E-H extends northeast across several minor roads that include lightly developed residential areas and through undeveloped forested areas. Alternative E-H crosses Hoover Road north of South Topsail Elementary School and continues northeast through undeveloped property to a proposed interchange with realigned US 17 approximately 0.7 mile west of Grandview Drive. Alternative E-H continues north behind the Topsail School complex and then turns east to tie into existing US 17 near Leeward Lane. Alternative E-H continues north on existing US 17 to Sloop Point Loop Road.

Table 2-3. Comparison of Current Detailed Study Alternatives.

Current Detailed Study Alternatives					
Alternative	M1+ E-H	M2+O	M1+R	M1+U	M2+U
Military Cutoff Road Ext. Segment					
Segment West of NC 210					
Segment East of NC 210					
FEATURE¹					
Length (miles)	17.5	16.6	17.1	18.0	16.8
Delineated Wetland Impacts (acres)	246.1	384.4	297.4	218.4	283.8
Delineated Stream Impacts (linear feet)	24,531	13,842	24,571	15,450	8,786
Delineated Pond Impacts (acres)	3.9	4.3	4.2	3.7	3.7
Residential Displacements	61	60	59	93	95
Business Displacements²	84	84	84	106	106
Red-cockaded Woodpecker Future Potentially Suitable / Potentially Suitable Habitat (acres)	8.67/ 7.39	8.67/ 7.39	8.67/ 7.39	8.67/ 7.39	8.67/ 7.39
Other Surveyed Federal / State Threatened and Endangered Species Habitat Present	Yes	Yes	Yes	Yes	Yes
Natural Heritage Program SNHA, Managed Areas and Wetland Mitigations Sites (acres)	4.43	42.94	5.01	3.24	34.40
Prime Farmlands/Farmlands of Statewide Importance (acres)	67.5	58.1	58.1	49.9	49.9
Forest (acres)	518	512	472	406	455
100 Year Floodplain and Floodway Impacts(acres)	11.73	8.8	8.8	3.0	3.0
Historic Properties (no.)	1	1	1	4	4
Noise Receptor Impacts	257	236	248	310	304
Recorded Archaeological Sites (no.)	0	0	0	1	1
Wildlife Refuge/Game Lands (acres)	0	0	0	0	0
Recreational Areas/Parks (no.)	0	0	0	0	0
High Quality Waters (HQW, ORW, WS Protected or Critical Areas) (acres)	9.6	9.6	9.6	12.4	12.4
Cemeteries (no.)	2	2	2	5	5
Potential UST / Hazmat Sites (no.)	5	5	5	5	5

Notes: ¹Impact calculations are based on preliminary design slope stake limits plus an additional 25 feet.

²Includes non-profit displacements.

Alternative O

Alternative O begins in New Hanover County at a proposed interchange with the US 17 Wilmington Bypass approximately one mile west of the Market Street interchange. It extends north from the bypass through undeveloped land and crosses Sidbury Road at the New Hanover County/Pender County line. The alternative continues north through predominantly undeveloped land to a proposed interchange at NC 210.

From its interchange at NC 210, Alternative O extends northeast across several minor roads that include lightly developed residential areas and through undeveloped forested areas. It continues through farmland, crosses Hoover Road north of South Topsail Elementary School and continues northeast through undeveloped property to a proposed interchange with realigned US 17 approximately 0.7 mile west of Grandview Drive. Alternative O continues north behind the Topsail School complex and then turns east to tie into existing US 17 near Leeward Lane. Alternative O continues north on existing US 17 to Sloop Point Loop Road.

Alternative R

Alternative R begins in New Hanover County at an interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. Alternative R extends northeast from the bypass across undeveloped land and crosses Sidbury Road at the New Hanover County/Pender County line. The alternative continues north through predominantly undeveloped land to an interchange at NC 210.

From its interchange at NC 210, Alternative R crosses Hoover Road north of South Topsail Elementary School and continues northeast through undeveloped property to a proposed interchange with realigned US 17 approximately 0.7 mile west of Grandview Drive. Alternative R continues north behind the Topsail School complex and then turns east to tie into existing US 17 near Leeward Lane. Alternative R continues north on existing US 17 to Sloop Point Loop Road.

Alternative U

Alternative U begins in New Hanover County at a proposed interchange with the US 17 Wilmington Bypass. The interchange location will vary depending on the selected preferred Military Cutoff Road Extension alternative (M1 or M2). Alternative U follows the Wilmington Bypass through the existing interchange at Market Street. The alternative runs along existing US 17 to a proposed interchange with realigned Sidbury Road. Alternative U continues north on existing US 17 for approximately two miles to where it transitions to new location at a proposed interchange with existing US 17. Alternative U continues north on new location to intersect with NC 210 at a proposed interchange approximately 0.5 mile west of existing US 17.

From its interchange at NC 210, Alternative U continues north parallel to existing US 17 and crosses Hoover Road south of South Topsail Elementary School. The alternative continues northeast through undeveloped property to a proposed interchange with realigned US 17 approximately 0.5 mile west of Grandview Drive. Alternative U

continues north behind the Topsail School complex and then turns east to tie into existing US 17 near Leeward Lane. Alternative U continues north on existing US 17 to Sloop Point Loop Road.

2.4.1.2 MILITARY CUTOFF ROAD EXTENSION CURRENT DETAILED STUDY ALTERNATIVES

Military Cutoff Road Extension Alternatives M1 and M2 are new location alternatives extending Military Cutoff Road from Market Street to the US 17 Wilmington Bypass.

Alternative M1

Alternative M1 begins at a proposed interchange at Military Cutoff Road and Market Street. The alternative extends north through vacant County property between the two sections of Ogden Park and residential areas. Alternative M1 turns northwest and ends near Plantation Road and Crooked Pine Road at a proposed interchange with the US 17 Wilmington Bypass, approximately midway between I-40 and Market Street. The City of Wilmington adopted a Transportation Official Corridor map for the proposed extension of Military Cutoff Road on August 8, 2005 (see Figure 7). Alternative M1 follows the adopted corridor map alignment.

Alternative M2

Alternative M2 begins at a proposed interchange at Military Cutoff Road and Market Street. Alternative M2 follows the Alternative M1 alignment for approximately two miles. Alternative M2 then turns northeast and extends through mostly undeveloped property to a proposed interchange with the US 17 Wilmington Bypass approximately one mile west of Market Street.

2.4.2 CURRENT DETAILED STUDY ALTERNATIVES DESIGN CRITERIA

The design criteria used to develop preliminary designs are based on the project's location, function and classification. The design criteria conform to the standards established by the American Association of State Highway and Transportation Officials.

2.4.2.1 DESIGN SPEED

A 70 mph design speed (65 mph posted speed limit) is proposed for Hampstead Bypass. A 50 mph design speed (45 mph posted speed limit) is proposed for Military Cutoff Road Extension.

2.4.2.2 TYPICAL SECTIONS

The typical sections used for the proposed Hampstead Bypass and Military Cutoff Road Extension are influenced by the type of facility required to fulfill the project's purpose and need. The number of proposed lanes included in the typical sections is based on providing capacity for existing and future traffic. Traffic operations analyses are

discussed in detail in Section 2.5. Level of Service D is the desirable traffic service for the proposed facilities in the 2035 design year.

An exception to this methodology is in the area where impacts to red-cockaded woodpecker foraging habitat were minimized at the northern end of the proposed project. From the proposed interchange at realigned US 17 to the end of the project, traffic demand will exceed capacity (Level of Service F) in 2035 using the proposed four-lane typical section (two lanes in each direction) described in Section 2.4.2.2.1. However, the traffic carrying capacity of US 17 in this area will be improved, meeting purpose and need. Until the proposed Hampstead Bypass ties into existing US 17 near Leeward Lane, the amount of traffic on the bypass will be less than the amount of traffic on existing US 17 under the No Build condition. In addition, traffic service on existing US 17 in the area will be improved.

Other factors that contributed to the decision to propose the use of a four-lane typical section in this area include:

- The construction of a four-lane freeway for the preceding segment from the proposed Hampstead Bypass interchange at NC 210 to the proposed interchange at relocated US 17 will result in an acceptable level of service (Level of Service D) and minimize construction costs.
- Using a four-lane typical section along existing US 17 in the vicinity of Holly Shelter Game Land maintains connectivity between red-cockaded woodpecker foraging habitat partitions.
- The proposed Hampstead Bypass must transition to four lanes to meet the typical section of existing US 17 at the northern terminus of the project. Traffic demand on existing US 17 where the project will tie in is projected to exceed capacity (Level of Service F) in 2035.
- Using a six-lane typical section between two four-lane typical sections would create a traffic bottleneck.
- Because it is at the end of the project, it makes more sense in terms of the project as a whole to transition to four lanes earlier in order to minimize impacts to a protected species. This would not be effective in the middle of the proposed project where driver expectancy issues would arise and increased congestion would result from traffic bottlenecks.

2.4.2.2.1 HAMPSTEAD BYPASS TYPICAL SECTIONS

Figures 11-A and 11-B show the proposed typical sections for Hampstead Bypass. The North Carolina Department of Transportation proposes to construct the Hampstead Bypass as a freeway facility. Therefore, no bicycle lanes or sidewalks are proposed.

Alternatives E-H, O and R

The proposed typical section for Hampstead Bypass Alternatives E-H, O and R from the proposed interchange at the US 17 Wilmington Bypass to the proposed interchange at NC 210 consists of six 12-foot lanes (three in each direction) with 14-foot outside shoulders (12-foot paved). A 46-foot median is proposed. From the proposed interchange at NC 210 to existing US 17, the roadway typical section for Alternatives E-H, O and R is comprised of four 12-foot lanes (two in each direction) with 14-foot outside shoulders (12-foot paved). A 46-foot median is proposed.

The number of proposed lanes along Hampstead Bypass Alternatives E-H, O and R is based on providing capacity for existing and future traffic and efforts to minimize RCW habitat impacts. Traffic operations analyses are discussed in detail in Section 2.5. The analyses show that six lanes are required to accommodate future traffic volumes along the proposed bypass from the US 17 Wilmington Bypass to NC 210. Four lanes will accommodate future traffic volumes along the portion of the proposed bypass between NC 210 and the proposed interchange with existing US 17. Traffic volumes along the bypass increase again from the interchange with existing US 17 to the end of the project. However, in order to minimize RCW habitat impacts, only four lanes are proposed along this section of the bypass.

Alternative U

The proposed typical section for Hampstead Bypass Alternative U from the proposed interchange at the US 17 Wilmington Bypass to the proposed interchange with existing US 17 consists of ten 12-foot lanes (five in each direction) with 14-foot outside shoulders (12-foot paved). A 22-foot median with ten-foot inside shoulders and a two-foot concrete barrier is proposed.

Several considerations factored into the proposed typical section for this segment of Alternative U:

- Year 2035 traffic projections for Alternative U in this area are comparable to traffic found on the busiest roads in the most populated areas in North Carolina, including Charlotte and Raleigh.
- Traffic analyses show that the number of lanes required between the proposed interchange with the US 17 Wilmington Bypass and the proposed interchange at NC 210 are higher for Alternative U than for Alternatives E-H, O and R between the same points. This is because Alternatives E-H, O and R provide northbound travelers the option of either using the proposed Hampstead Bypass or existing US 17, while all traffic is directed along one route with Alternative U. More lanes are required to process this increased traffic on Alternative U.
- US 17 Wilmington Bypass and existing US 17, each with four lanes and poor traffic service, come together along this section of Alternative U. With their

combined traffic and an additional 70,000 cars, ten lanes are needed to accommodate projected 2035 traffic volumes.

- As noted above, the NCDOT proposes a freeway facility with full control of access for the Hampstead Bypass because in addition to increasing safety, it would provide greater benefit in terms of traffic service than the partial or open control of access options. An expressway, or non-freeway option, with direct access from the bypass to adjacent properties would require 14 travel lanes to provide adequate traffic carrying capacity. The signals required for an expressway reduce the capacity from approximately 2,200 passenger cars per hour for a freeway lane to approximately 450 vehicles per hour for an expressway lane. In addition, there would be driver expectancy and safety concerns associated with the Hampstead Bypass making the transition from a freeway to a 14-lane expressway with signalization and turning movements, and back to a freeway.
- Where Alternative U travels along existing US 17, a frontage road system is needed in addition to the main travel lanes to provide access to adjacent properties. Service roads would provide access to businesses, residences and community facilities along existing US 17 between the existing interchange with US 17 Wilmington Bypass and the proposed interchange with existing US 17 where Hampstead Bypass transitions to new location. Utilizing service roads minimizes impacts by reducing relocations and right of way costs.

Table 2-4 compares capacity and anticipated impacts for four, six, eight, and ten-lane typical sections between the existing interchange at US 17 Wilmington Bypass and Market Street to the proposed Hampstead Bypass interchange at existing US 17 south of Hampstead.

Table 2-4. Comparison of Alternative U Typical Sections

	From Existing Interchange at US 17 Wilmington Bypass and Market St. to Proposed Hampstead Bypass Interchange at Sidbury Rd.	From Proposed Hampstead Bypass Interchange at Sidbury Rd. to Proposed Hampstead Bypass Interchange at Existing US 17 (S. of Hampstead)
2035 ADT	117,000	86,100
10-Lane Freeway with a 22-foot median (or an 8-Lane Freeway with a 46-foot median)		
Level of Service / Density ¹	D / 28.5	C / 20.0
Wetland (acres)	0.71	1.10
Streams (linear feet)	0	385.87
Relocations	20 homes, 8 businesses, 2 churches	14 homes, 7 businesses, 3 churches
8-Lane Freeway with a 22-foot median		
Level of Service / Density ¹	E / 44.5	D / 26.0
Wetland (acres)	0.71	1.06
Streams (linear feet)	0	359.65
Relocations	19 homes, 8 businesses, 2 churches	14 homes, 7 businesses, 3 churches
6-Lane Freeway with a 22-foot median		
Level of Service / Density ¹	F (*)	E / 43.0
Wetland (acres)	0.71	1.01
Streams (linear feet)	0	333.11
Relocations	16 homes ² , 8 businesses, 1 church	13 homes, 7 businesses, 3 churches
4-Lane Freeway with a 22-foot median		
Level of Service / Density ¹	F (*)	F (*)
Wetland (acres)	0.71	0.97
Streams (linear feet)	0	305.72
Relocations	14 homes ² , 8 businesses, 1 church	13 homes, 6 businesses, 3 churches

¹ Density is defined as passenger cars per mile per lane.

² It is probable there would be two additional residential relocations with the six-lane and four-lane typical sections because dual lane exits would likely be needed at the US 17 Wilmington Bypass Interchange at Market Street.

* Overall density result is not computed when vehicle speed on freeway is less than 55 mph.

Notes:

- Poplar Grove (on National Register) and Wesleyan Chapel United Methodist Church (National Register eligible) are impacted by all typical sections.
- Impacts are calculated based on slope stake plus 25-feet.
- It is assumed that one 12-foot lane would be eliminated in each direction with each typical section two-lane reduction.

From the proposed interchange with existing US 17 to the proposed interchange at NC 210, the roadway typical section for Alternative U is comprised of six 12-foot lanes (three in each direction) with 14-foot outside shoulders (12-foot paved). A 46-foot median is proposed. The proposed typical section for Alternative U from the proposed interchange at NC 210 north to existing US 17 is four 12-foot lanes (two in each direction) with 14-foot outside shoulders (12-foot paved) in each direction with a 46-foot median. The proposed 46-foot median width would allow for a future widening to three 12-foot travel lanes in each direction without purchasing any additional right of way. Impact calculations include the median and therefore would include impacts associated with adding future lanes.

Traffic volumes decrease along the proposed four-lane section between NC 210 and the proposed interchange with existing US 17. Traffic volumes along the bypass increase again from the interchange with existing US 17 to the end of the project. However, in order to minimize RCW habitat impacts, only four lanes are proposed along this segment.

2.4.2.2.2 MILITARY CUTOFF ROAD TYPICAL SECTION

Figure 12 shows the proposed typical sections for Military Cutoff Road Extension.

Alternatives M1 and M2

The proposed typical section for Military Cutoff Road Extension Alternatives M1 and M2 from the proposed interchange at Market Street to approximately 0.9 mile north of Torchwood Boulevard consists of six lanes (three in each direction) with a 30-foot median and curb and gutter. Two 12-foot inside lanes and one 14-foot outside lane (to accommodate bicycles) with two-foot curb and gutter and a ten-foot berm are proposed in each direction. From approximately 0.9 mile north of Torchwood Boulevard to the proposed interchange at the US 17 Wilmington Bypass the proposed typical section for Military Cutoff Road Extension Alternatives M1 and M2 consists of six 12-foot lanes (three in each direction) with 14-foot outside shoulders (12-foot paved). A 46-foot median is proposed.

The Wilmington Metropolitan Planning Organization (MPO) has requested a multi-use path be constructed along proposed Military Cutoff Road Extension (see Appendix B). The multi-use path would tie into an existing multi-use path along Military Cutoff Road. The construction of a multi-use path as part of the proposed project will be dependent upon a cost-sharing and maintenance agreement between the NCDOT and the Wilmington MPO. The NCDOT will continue to coordinate with the Wilmington MPO on the inclusion of the multi-use path along Military Cutoff Road Extension. If a multi-use path is included along Military Cutoff Road Extension, the ten-foot berm will be expanded to 12 feet to accommodate the path.

2.4.2.3 PROPOSED RIGHT OF WAY AND TYPE OF ACCESS

The NCDOT proposes full control of access for the Hampstead Bypass because it would provide greater benefit in terms of traffic service than the partial or open control of access options. For Alternatives E-H, O and R, access is proposed at interchanges with the US 17 Wilmington Bypass, NC 210 and existing US 17 approximately 0.7 mile west of Grandview Drive. Interchange locations are shown on Figure 9. For Alternative U, access is proposed at interchanges with the US 17 Wilmington Bypass, the existing US 17 Wilmington Bypass interchange at Market Street, Sidbury Road, NC 210 and existing US 17 approximately 0.5 mile west of Grandview Drive. To provide access to adjacent properties, service roads are proposed for the sections of Alternative U that travel along existing US 17 from Market Street to where Hampstead Bypass transitions to new location. A total right of way width of 250 feet to 350 feet is proposed for Hampstead Bypass Alternatives E-H, O and R. A variable right of way width of 250 feet to 520 feet is proposed for Alternative U.

Military Cutoff Road Extension is proposed as a full/limited control of access facility. Access to Military Cutoff Road Extension is proposed at interchanges at Market Street and Military Cutoff Road, and the US 17 Wilmington Bypass. Additional access along Military Cutoff Road Extension is proposed at signalized directional crossovers with Putnam Drive, Lendire Road and Torchwood Boulevard. Only right turns will be permitted onto Military Cutoff Road Extension from these roads. Signalized U-turn lanes will be provided to accommodate left turns. A variable right of way width of 150 feet to 350 feet is proposed for Military Cutoff Road Extension.

2.4.2.4 STRUCTURES

Table 2-5 lists the proposed major hydraulic structures for the current detailed study alternatives. The NEPA/Section 404 merger team concurred on the size and location of the structures on May 26 and 27, 2010 (see Appendix B). The locations of the structures are shown on Figure 10-A.

Table 2-5. Proposed Hydraulic Structures.

Site No. ¹	Stream ID	Wetland ID	Corridor Alternative	Existing Structure	Recommended Structure
1	ZSB	EWF	U at M1 U at M2	1@12'x8' RCBC ²	Retain and Extend Existing Culvert
2	---	KWD	U at M1 U at M2	---	1@9'x8' RCBC
3	BSP	BWI	M1, M2	---	2@7'x12' RCBC
4	---	DWC	M2	---	1@9'x8' RCBC
5	---	GWA	O, R	---	3@12'x7' RCBC
6	ISA, ISB	IWN	O, R	---	Dual 100' Long Bridges
7	ISD	IWF	O, R	---	3@11'x8' RCBC
8	LSC, LSCC, LSCF	LWD	E-H, O, R	3@48"CM P ³	2@6'x5' RCBC ⁴
10	CSA, FSA	---	E-H, O, R, U at M1	1@72"RC P ⁵	Retain existing and add two 1@ 72" RCP ⁶
11	FSI	---	E-H, R	---	1@12'x9' RCBC
15	HBSF, HBSH	HBWK	E-H	---	Dual 230' Long Bridges
16	HBSD(2)	HBWD	E-H	---	Dual 200' Long Bridges
17	HSX	HWB	E-H	---	3@10'x9' RCBC
21	FSA	FWB	E-H, R	---	2@11'x9' RCBC
22	FSE	FWC	E-H, R	---	2@12'x7' RCBC
23	LSD	LWI	E-H, O, R	---	2@9'x7' RCBC
25	HBSC	HBWF	E-H	---	1@9'x8' RCBC

¹ Site numbers correspond to the project's Preliminary Hydraulic Study's site numbers. Some preliminary hydraulic sites were avoided during design and are therefore not included in the table.

² Reinforced concrete box culvert.

³ Corrugated metal pipe.

⁴ Preliminary design also includes dual 135-foot long bridges to maintain neighborhood access.

⁵ Reinforced concrete pipe.

⁶ Retain existing 72" RCP pipe under Wilmington Bypass and add 72" RCP at two interchange ramps.

Supplementation of existing 72" pipe or enlarging of proposed ramp pipes will be investigated during final design.

2.5 TRAFFIC OPERATIONS ANALYSES

2.5.1 ANALYSIS METHODOLOGY

A Traffic Operation Analysis Report was prepared for the proposed project in August 2010. The objective of this analysis is to evaluate the future travel conditions and to assess the effectiveness of the proposed Military Cutoff Road Extension and Hampstead Bypass in improving traffic flow in the study area for the current detailed study alternatives.

Freeway capacity analyses for the freeway mainline, merge/diverge junctions, and weaving segments were performed using the methodologies described in the 2000 Highway Capacity Manual. The arterial capacity analyses were performed using Synchro software program and in accordance with the 2000 Highway Capacity Manual. The intersection capacity analyses were performed using Synchro software in accordance with NCDOT Signalized Intersection Capacity Analysis Guidelines. Additional details of the methodology and analyses supporting the information provided in this section are provided in the August 2010 Traffic Operation Analysis Report, appended by reference.

2.5.2 YEAR 2035 BUILD TRAFFIC PROJECTIONS

Table 2-6 compares 2035 traffic projections for the current detailed study alternatives and the No-Build Alternative for Market Street, US 17, Hampstead Bypass, Military Cutoff Road, and Military Cutoff Road Extension. Year 2035 projected average daily traffic (ADT) volumes for the current detailed study alternatives and the surrounding roadway network are shown on Figures 13-A through 13-D. Volumes shown in Table 2-6 for existing US 17 from I-40 to Sloop Point Loop Road include the new location connector from existing US 17 to the northernmost interchange south of the school. The projected ADT for this interchange connector is substantially lower than other segments between these points.

The 2035 traffic forecasts for Alternatives M1+E-H, M2+O and M1+R indicate that the proposed Military Cutoff Road Extension and Hampstead Bypass projects will divert approximately 30 percent to 50 percent of the future traffic away from Market Street and US 17 between Gordon Road and Sloop Point Loop Road. As a result, traffic flow conditions will be substantially improved in these areas when compared with the traffic flow conditions under the No-Build Alternative.

The 2035 traffic forecasts for Alternatives M1+U and M2+U indicate that the proposed Military Cutoff Road Extension project will divert approximately 15 percent of the future traffic away from Market Street. Similarly, the proposed Hampstead Bypass project will divert approximately 50 percent to 65 percent of the future traffic away from US 17 between NC 210 and Sloop Point Loop Road. As a result, traffic flow conditions will be substantially improved in these areas when compared with the traffic flow conditions under the No-Build Alternative.

Table 2-6. 2035 Traffic Projections for No-Build and Detailed Study Alternatives.

	No-Build		M1+E-H & M1+R		M2+O		M1+U		M2+U	
	2035 ADT ¹	% TT ²	2035 ADT	% TT	2035 ADT	% TT	2035 ADT	% TT	2035 ADT	% TT
Market St. (College Rd. to US 17 Wilmington Bypass)	48,200 – 71,000	5-6	48,600 – 66,000	5-6	48,600 – 66,000	5-6	49,000 – 66,000	5-6	49,400 – 66,400	5-6
Existing US 17 (I-40 to Sloop Point Loop Road)	62,800 – 115,000	8-10	28,600 – 90,000 ³	5-10	29,600 – 86,000 ³	5-10	16,800 – 117,000 ³	5-10	16,800 – 117,000 ³	5-10
Hampstead Bypass	NA	NA	48,200 – 64,400	10	47,200 – 63,400	10	45,400 – 49,100	5-9	45,400 – 49,100	5-9
Military Cutoff Road	26,000 – 46,000	3	29,200 – 46,500	3	27,200 – 45,500	3	29,200 – 46,500	3	28,600 – 46,000	3
Military Cutoff Road Extension	NA	NA	44,000 – 53,400	7	45,000 – 54,400	7	38,000 – 46,400	7	38,000 – 48,400	7

¹ 2035 Average Daily Traffic ² Percent Truck Traffic

³ Volumes include the new location connector to the northernmost interchange south of the school and exclude the segment designated as Service Road in vicinity of Country Club Drive.

2.5.3 YEAR 2035 BUILD CAPACITY ANALYSIS

Year 2035 level of service for the current detailed study alternatives are shown on Figures 14-A through 14-D. The figures show 2035 level of service along the proposed Military Cutoff Road Extension and Hampstead Bypass, including proposed interchanges and signalized intersections. The figures also show the level of service for several connecting roadways that could experience changes in capacity as a result of the proposed project including Market Street/US 17 between College Road and Sloop Point Road, NC 210 and US 17 Wilmington Bypass.

The freeway and arterial capacity analyses for Alternatives M1+E-H, M2+O and M1+R indicate that the traffic demand along the majority of the proposed Military Cutoff Road Extension and Hampstead Bypass will function at Level of Service D or better, an acceptable rate of flow, throughout the day. However, the peak hour traffic demand along Military Cutoff Road Extension will experience significant queuing issues at several locations. As noted in Section 2.5.1, Alternatives M1+E-H, M2+O and M1+R will attract more traffic away from Market Street and US 17 to the proposed Military Cutoff Road Extension and Hampstead Bypass than Alternatives M1+U and M2+U. The traffic demand along Market Street, the US 17 Wilmington Bypass from I-40 to Military Cutoff Road Extension and much of existing US 17 from Market Street to Sloop Point

Loop Road will continue to exceed roadway capacity (Level of Service F). Nevertheless, travelers will experience improved driving conditions in these areas as the volume of traffic and associated congestion and delays would be reduced.

The freeway and arterial capacity analyses for alternatives M1+U and M2+U indicate that the traffic demand along the majority of the proposed Military Cutoff Road Extension and Hampstead Bypass will function at Level of Service D or better, an acceptable rate of flow, throughout the day. However, the peak hour traffic demand along Military Cutoff Road Extension will experience significant queuing issues at several locations. Under alternatives M1+U and M2+U, additional lanes will be added to the US 17 Wilmington Bypass between Military Cutoff Road Extension and Market Street. Additional lanes will also be added to existing US 17 from Market Street to where Hampstead Bypass transitions to new location. With these improvements in place, the traffic flow conditions in these areas will be improved from Level of Service F under the No-Build Alternative to Level of Service D. Traffic demand along the US 17 Wilmington Bypass from I-40 to Military Cutoff Road Extension and US 17 north of Hampstead Bypass will continue to exceed roadway capacity (Level of Service F) similar to the No-Build Alternative. However, travelers will experience improved driving conditions in these areas as the volume of traffic and associated congestion and delays would be reduced.

The proposed project will not eliminate all of the congestion problems on Market Street and US 17. The intersection capacity analysis for Alternatives M1+E-H, M2+O and M1+R indicates that traffic demand at 28 out of the 37 intersections analyzed along Military Cutoff Road, Market Street, existing US 17, and NC 210 would either approach or exceed (Level of Service E or F) roadway capacity during at least one peak hour of the day. The intersection capacity analysis for Alternatives M1+U and M2+U indicates that traffic demand at 18 out of the 37 intersections analyzed along Military Cutoff Road, Market Street, existing US 17, and NC 210 would either approach or exceed roadway capacity during at least one peak hour of the day. Table 2-7 compares projected delays at several intersections along Market Street and existing US 17 for the No-Build Alternative and the detailed study alternatives. Delays are shown for the intersections because, with the exception of Leeward Lane, all intersections shown in Table 2-7 exceed roadway capacity (Level of Service F) during at least one peak hour of the day. Level of service at each intersection is noted in parenthesis in Table 2-7. All of the detailed study alternatives would substantially reduce delay at most intersections over the No-Build Alternative.

Table 2-7. Average Intersection Delay and Level of Service along Existing US 17 for 2035 No-Build and Detailed Study Alternatives.

Intersection with Market Street or Existing US 17	No-Build		Alternatives M1+E-H and M1+R		Alternatives M2+O		Alternatives M1+U		Alternatives M2+U	
	2035 Peak Hour Average Intersection Delay (minutes per vehicle) and Level of Service ¹									
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Gordon Road	8.8 (F)	7.3(F)	2.4 (F)	1.8 (F)	2.4 (F)	1.8 (F)	2.4 (F)	2.0 (F)	2.5 (F)	2.0 (F)
Middle Sound Loop Road	4.7 (F)	4.4(F)	1.5 (F)	1.6 (F)	1.3 (E)	1.5 (F)	3.3 (F)	3.0 (F)	3.1 (F)	3.5 (F)
Porters Neck Road	9.1 (F)	9.4 (F)	5.3 (F)	5.7 (F)	4.9 (F)	5.4 (F)	6.9 (F)	7.5 (F)	6.6 (F)	7.9 (F)
NC 210	9.8 (F)	10.2 (F)	3.3 (F)	3.7 (F)	3.4 (F)	3.9 (F)	2.5 (F)	2.5 (F)	2.5 (F)	2.6 (F)
Hoover Road	5.7 (F)	5.1 (F)	3.9 (F)	4.1 (F)	4.1 (F)	4.1 (F)	2.7 (F)	3.4 (F)	2.8 (F)	3.4 (F)
Country Club Drive / Jenkins Road	>16.7 (F)	15.9 (F)	1.7 (F)	2.2 (F)	1.7 (F)	2.0 (F)	1.9 (F)	1.9 (F)	1.9 (F)	1.9 (F)
Leeward Lane	>16.7 (F)	>16.7 (F)	0.1 (B)	0.1 (B)	0.1 (B)	0.1 (B)	0.1 (B)	0.1 (B)	0.1 (B)	0.1 (B)
Sloop Point Loop Road	4.8 (F)	4.9 (F)	5.1 (F)	5.0 (F)	5.5 (F)	5.4 (F)	5.4 (F)	5.2 (F)	5.4 (F)	5.2 (F)

¹ Level of Service is shown in parentheses

Note: Year 2035 level of service (LOS) for the current detailed study alternatives are shown on Figures 14-A through 14-D. Year 2035 No-Build LOS is shown in Figure 5.

2.6 TRAFFIC SAFETY

The construction of any of the current detailed study alternatives would reduce the amount of traffic on Market Street and existing US 17. This reduction in traffic volumes should in turn reduce the number of accidents occurring on the existing roadways. Market Street and existing US 17 would continue to have occurrences of accidents. However, the anticipated reduction in traffic volumes is expected to have a corresponding reduction in the types of accidents generally associated with traffic congestion. This in turn is expected to result in reduced accident related property damage and injuries.

Both Military Cutoff Road Extension and Hampstead Bypass are proposed median divided facilities. Medians provide separation between opposing traffic and reduce the likelihood of head-on collisions.

Access to Hampstead Bypass will be via interchanges while access to Military Cutoff Road Extension will be provided by interchanges and signalized directional crossovers with U-turn locations. These types of access control can be expected to minimize the number of accidents associated with turning movements.

Severe accidents associated with high speeds on the proposed Hampstead Bypass are expected to be minimal. As noted above, the proposed multi-lane facility would include a median to separate opposing traffic and would be designed to accommodate high-speed traffic.

2.7 COSTS

Preliminary cost estimates for the detailed study alternatives are presented in Table 2-8.

Table 2-8. Cost Estimates for Detailed Study Alternatives

	Alternative				
	M1+E-H	M2+O	M1+R	M1+U	M2+U
Right of Way Acquisition	\$104,500,000	\$100,875,000	\$102,150,000	\$155,875,000	\$155,950,000
Utility Relocation	\$1,304,280	\$1,434,320	\$1,352,400	\$1,809,000	\$1,890,920
Wetland and Stream Mitigation	\$14,935,765	\$17,063,669	\$16,750,329	\$11,635,741	\$12,233,334
Construction	\$241,300,000	\$239,900,000	\$235,900,000	\$235,500,000	\$228,300,000
Total	\$362,040,045	\$359,272,989	\$356,152,729	\$404,819,741	\$398,374,254

3.0 AFFECTED ENVIRONMENT

This chapter describes the existing conditions and characteristics of the study area that could be affected by the proposed extension of Military Cutoff Road and the proposed Hampstead Bypass. The chapter includes comprehensive information relating to the study area as a whole rather than providing separate descriptions of the area as it relates to each alternative. Information presented relates to the existing social, economic, cultural, physical and natural environment settings. This chapter provides the basis for determining the specific impacts of each detailed study alternative, as discussed in Chapter 4.

3.1 HUMAN ENVIRONMENT

A Community Impact Assessment and Qualitative Indirect and Cumulative Effects Assessment were prepared for the proposed project in June 2009. City, county, state, and demographic area data were compared to identify characteristics and trends, and draw conclusions about the study area. The demographic area includes portions of New Hanover County, Pender County and the City of Wilmington in and around the study area. A copy of the Community Impact Assessment and Qualitative Indirect and Cumulative Effects Assessment, appended by reference, is located in the project file.

3.1.1 POPULATION CHARACTERISTICS

The population of New Hanover County, Pender County and the City of Wilmington grew at a fairly rapid rate between 1990 and 2000 (Table 3-1). The demographic area experienced rapid growth (55 percent) in the same time period.

Table 3-1. Population Growth Trends 1990-2000

Jurisdiction	Population		Growth	
	1990	2000	Actual Change 1990-2000	Percent Change 1990-2000
North Carolina	6,628,637	8,049,313	1,420,676	21.4%
New Hanover County	120,284	160,307	40,023	33.3%
Pender County	28,855	41,082	12,227	42.4%
Wilmington	55,530	75,838	20,308	36.6%
Demographic Area	24,043	37,348	13,305	55.3%

Source: US Census Bureau – Census 1990 STF 1 Table P001, Census 2000 SF1 Table P1

In comparison to New Hanover County, Pender County, Wilmington and the State, the demographic area has a higher percentage of Whites. The demographic area is 88.1 percent White, 9.5 percent Black or African American, 1.8 percent Hispanic or Latino, and less than one percent each of other races (American Indian, Asian, Pacific Islander, etc.).

3.1.2 ECONOMIC CHARACTERISTICS

In both 1989 and 1999, the median household income in the Demographic Area was higher than any of the other areas analyzed (Table 3-2). Correspondingly, the Demographic Area had a lower percentage of individuals below the poverty level in 1989 and 1999.

Table 3-2. Income and Poverty Status

Jurisdiction	Median Household Income		Percent Individuals Below Poverty Level	
	1989	1999	1989	1999
North Carolina	\$26,647	\$39,184	12.50%	12.30%
New Hanover County	\$27,320	\$40,172	14.0%	13.1%
Pender County	\$23,270	\$35,902	17.2%	13.6%
Wilmington	\$20,609	\$31,099	22.1%	19.6%
Demographic Area	\$34,883	\$46,106	7.0%	9.3%

New Hanover County, Pender County and the City of Wilmington all rely heavily on tourism. The region consists of many coastal communities enjoyed largely by seasonal residents and visitors. Wilmington has a rich history and substantial cultural resources which make it a popular destination for visitors.

Wilmington is home to a North Carolina Ports Authority complex that is designated as a foreign trade zone. The City also has inland transportation facilities such as CSX Intermodal and Norfolk Southern rail freight services. With major distribution services available, many manufacturing facilities have located in this area.

The Retail Trade and the Health Care and Social Assistance Sectors were the dominant industry sectors in New Hanover County in 2006. Retail Trade was the largest industry sector in Pender County. Other strong sectors in 2006 included Construction, Educational Services, Health Care and Social Assistance, and Public Administration.

Between 1990 and 2006, several industry sectors in both counties experienced triple digit growth.

There are no large employers within the demographic area. Most employers consist of small businesses such as retail establishments and offices. Most residents within the demographic area travel outside of the area to work at large employers such as New Hanover Regional Medical Center, Corning, Verizon, the University of North Carolina Wilmington, and others.

3.1.3 COMMUNITY FACILITIES AND SERVICES

There are a number of noteworthy public facilities within the study area:

- Topsail High School and Topsail Middle School share a campus off of US 17 near the northern end of the proposed project. Topsail Elementary School is located on Hoover Road.
- Daycare facilities are located on Gordon Road and US 17 in New Hanover County and on NC 210 and US 17 in Pender County.
- Ogden Park is the only park in the study area. This 160-acre facility includes fields for baseball, softball, and soccer, tennis courts, playgrounds, and restroom facilities among other amenities.
- There are several nearby golf courses located within residential developments in Pender County. In New Hanover County, there is a driving range located on Market Street at Military Cutoff Road.
- The 49,000-acre Holly Shelter Game Land is located immediately north of the study area.
- The Hampstead Branch of the Pender County Library is located off of US 17 north of Country Club Drive.
- A North Carolina Highway Patrol station/Division of Motor Vehicles license office is located near the Market Street/Gordon Road intersection in New Hanover County. Hampstead Fire Department and Pender Fire & EMS Rescue are located on US 17 between Hoover Road and Country Club Drive.
- There are several cemeteries located in the study area.
- A New Hanover County Water Treatment Plant is located north of Torchwood Boulevard.
- NC Bike Route 3 runs north-northeast from Wilmington to Hampstead along Sidbury Road, Holly Shelter Road and NC 210. NC Bike Route 3 ties into US 17 at Hampstead and continues north through Pender County. Military Cutoff Road is included as part of the Southside Route identified as Bike Route 11. A multi-use path is located on Military Cutoff Road south of Market Street, just outside of the study area.

3.1.4 COMMUNITY COHESION

In the southern portion of the study area there is a mix of dense commercial and residential development along Market Street, Military Cutoff Road, and Gordon Road. There is a large residential area comprised of several neighborhoods north of Ogden Park. With the exception of Island Creek Estates, a single-family residential neighborhood located off of Sidbury Road, there is minimal development north of the US 17 Wilmington Bypass to the New Hanover County line.

Hampstead is an unincorporated community in Pender County that includes several retail centers, residential areas and open space in the vicinity of NC 210 from the intracoastal waterway to north of US 17. Proximity to numerous coastal communities makes this area a popular second-home and retirement destination. The Hampstead area is home to four golf courses which are centered in large residential developments, including Castle Bay off of Hoover Road, Olde Point off of Country Club Drive, Belvedere off of Long Leaf Road, and Topsail Greens on Topsail Greens Drive just north of Sloop Point Loop Road.

NC 210 provides access to several low-density residential neighborhoods, including two mobile home communities. A large single-family residential development, Cross Creek, is also located off of NC 210. Low-density single family residential development is located along Harrison Creek Road, Godfrey Creek Road, Hoover Road, and St. John's Church Road.

3.2 LAND USE AND TRANSPORTATION PLANNING

3.2.1 LAND USE PLANS

Local jurisdictions in the study area include New Hanover County, Pender County and the City of Wilmington.

3.2.1.1 EXISTING LAND USE

The southern extent of the study area is characterized primarily by a mix of dense commercial and residential development. From the Wilmington Bypass to NC 210, the intensity of development along US 17 decreases. However, in Hampstead, from NC 210 to the northern end of the study area, land adjacent to US 17 is moderately to heavily developed with commercial and institutional uses. In this area, US 17 provides access to several residential developments.

With the exception of properties near US 17, land use north of the Wilmington Bypass is predominantly rural in nature and includes preserved land, undeveloped forests, open fields, and wetlands. A mix of single family residential and business land uses are located along NC 210. There is limited residential land use on Sidbury Road, Harrison Creek Road, and Hoover Road.

3.2.1.2 ZONING CHARACTERISTICS

Zoning regulations are in place for the Military Cutoff Road Extension and Hampstead Bypass study area in both New Hanover and Pender Counties (Figure 15). Land in the New Hanover County portion of the study area is largely zoned for low-density residential uses (R-15) with some industrial uses along the Northeast Cape Fear River.

Land in the Pender County portion of the study area is zoned Rural Agriculture (RA) and Residential District-20 (R-20). RA zoning comprises the majority of the study area and is defined to accommodate very low-density residential development, and non-residential development not requiring urban services. R-20 zoning applies to areas along the existing NC 210 corridor and is defined to accommodate low-density residential uses.

3.2.1.3 FUTURE LAND USE

The City of Wilmington developed *The Wilmington Future Land Use Plan, 2004-2025* to guide physical development within the City and to determine how to build or preserve certain aspects of the community. The plan has a long range planning horizon of twenty years. The plan notes that Wilmington is nearing build-out and there is a need to redevelop aging or underutilized properties. A small part of the study area is included in this plan's boundaries. A few areas along Market Street south of Military Cutoff Road are classified as small infill tracts in Varied Use Areas. This area of Market Street is mostly a Tier Two Redevelopment Area. These areas are characterized by declining or marginal commercial enterprises and/or businesses that have not kept pace with more recent trends. Tier 2 properties are targeted for upgrade as opportunities arise.

The *Market Street Corridor Study* (July 2010) includes a long-term view on development along the Market Street corridor as defined by efficient land use patterns, transportation choices, distinctive architecture, and high quality of life. Plans for redevelopment of areas around Military Cutoff Road are premised on the proposed Military Cutoff Road Extension. The design intent for this area is to create a compact neighborhood center with a walkable street network and neighborhood services. The Study presents the opinion that the Military Cutoff Road Extension intersection with Market Street should be grade separated.

Both New Hanover and Pender Counties participate in the cooperative state-local North Carolina Coastal Area Management Act (CAMA) program. CAMA requires local governments within the 20 coastal counties to prepare land use plans which provide a balance of protection, preservation, and orderly development.

The *2006 Wilmington-New Hanover County CAMA Land Use Plan Update* functions as the future plan for both the City of Wilmington and New Hanover County. The future land use for the New Hanover County portion of the Military Cutoff Road Extension and Hampstead Bypass study area is identified as Wetland Resource Protection Area, Rural, and Conservation Areas (primarily flood prone). According to the plan document, the Rural classification is comprised of low intensity land uses (agriculture, forest) and

discourages urban-type uses. Only low density residential development (less than 2.5 units per acre) is permitted in the Rural area.

New Hanover County does not have a separate land use plan outside of the joint *2006 Wilmington-New Hanover County CAMA Land Use Plan Update*. Small area plans exist for the Middle Sound and Porters Neck communities. However, New Hanover County considers these plans outdated as they are more than 20 years old.

The *2005 Pender County CAMA Land Use Plan Update* focuses on policies designed to protect significant and irreplaceable natural systems. It includes a land use classification system as a tool to protect natural systems but does not provide detailed guidance for land use decisions. In the CAMA plan, future land use for the Pender County portion of the study area is identified as an Urban Growth Area and Conservation Area. The Urban Growth Area classification provides for the continued development of areas provided with water and/or sewer services or where the County is actively engaged in planning these services. This area classification provides for higher net densities. The Conservation Area Classification is intended to protect natural systems from inappropriate development. The CAMA Land Use Plan shows Conservation Areas along Harrisons Creek, Godfrey Creek, and tributaries to Harrisons Creek, Godfrey Creek and Island Creek.

The June 2010 *Pender County Comprehensive Land Use Plan* includes future land use classifications that are intended to reflect and expand on the land classifications used in the CAMA Land Use Plan. The comprehensive plan incorporates a *Coastal Pender Small Area Plan* that includes the study area from the Pender County line near Sidbury Road to Holly Shelter Game Land and Sloop Point Loop Road. The small area plan designates a Mixed Use future land use classification from Sidbury Road to near Harrison Creek Road, between NC 210 and US 17. The Mixed Use classification applies to locations where a mix of higher density uses is to be encouraged. The Mixed Use classification continues along US 17 to Sloop Point Loop Road, with the exception of a few areas classified as Conservation. Conservation Areas have special significance or unique characteristics that make them worthy of preservation. These areas include South Topsail Elementary School, the Topsail Middle and High School complex, and Holly Shelter Game Land. Northwest of US 17, from Harrison Creek Road to Holly Shelter Game Land, the future land use classification is predominantly Suburban Growth. The Suburban Growth classification identifies areas where significant residential growth is expected to occur. *The Coastal Pender Small Area Plan* indicates regulations should be revised to protect the Hampstead Bypass Corridor from future development and to encourage development that is in harmony with the bypass when a corridor alternative is selected.

Porters Neck Crossing is a proposed commercial development in New Hanover County. The approximately 54-acre project is located near Porters Neck Road in the southwest quadrant of the intersection of Market Street and Wilmington Bypass. The proposed development is expected to include at least one anchor retailer, including a Lowe's Home

Improvement store, along with complimentary commercial services to possibly include retail, restaurant and hotel uses.

Several residential developments are also planned or under construction in New Hanover County. New Hanover County approved The Registry at Vineyard Plantation with 106 single-family lots at Porters Neck Road. A mixed use development called Scotts Hill Village is also planned near the Pender County line. Several small to medium-sized residential developments are in various stages of construction between Market Street and the proposed Military Cutoff Road Extension. These include Westside/Park Ridge, Palm Grove, Copperfield, and Garlington Heights.

Four large proposed mixed use developments are in various stages of planning in Pender County in the study area: East Haven, Bayberry Farms, Hampstead Commons, and Hawksbill Cove. The Easthaven development has received master plan and Phase I approval from the Pender County Planning Board. The planned development is proposed just north of the Pender County line. Access points into the development would include Sidbury Road and US 17. Easthaven's plan calls for both commercial and residential land use. At build-out, up to 4,096 single and multi-family homes with approximately 10,000 residents are anticipated.

Bayberry Farms is a proposed mixed-use development. The Bayberry Farms development has received master plan and Phase I approval from the Pender County Planning Board. Future plans include 461 single and multi-family homes and retail space. The development is adjacent to Topsail High School and borders Holly Shelter Game Land. Access points would include Jenks Road and US 17. Representatives with Bayberry have met with County staff and NCDOT staff on the future of their development. A revised Traffic Impact Analysis has been submitted to NCDOT Congestion Management for review. A proposal to continue the project through the development process with the County has yet to be initiated.

Hampstead Commons consists of 384 multi-family units and 200,000 square feet of commercial on 63.22 acres with direct access to US 17 and Caison Drive. This has received master plan approval from the Pender County Planning Board in December 2009 and a conditional preliminary plat for the first phase consisting of 144 residential units was approved by the Planning Board in November 2010.

Hawksbill Cove is a proposed 376-acre development located along Country Club Road that would extend from the Intracoastal Waterway to US 17. The Hawksbill Cove development has received master plan and Phase I approval from the Pender County Planning Board. Access to Hawksbill Cove would be from US 17 via Country Club Road and Leeward Lane. Revisions to the master plan that include access to the development from Transfer Station Road are pending. The proposed mixed-use development includes 710 single-family residences, 395 multi-family units, and commercial, office and retail space.

There are several other pending residential and commercial developments in Pender County. Breezy Pines, a seven-lot subdivision off of Hoover Road was approved in 2007. Commercial developments are planned off of US 17 near Ravenswood Road, and Long Leaf Drive. Hampstead Town Center is planned on US 17 near County Club Road.

3.2.2 TRANSPORTATION PLANS

3.2.2.1 HIGHWAY PLANS

There are several local transportation plans that include portions of the study area:

- The Final Draft of the *Cape Fear Commutes 2035 Transportation Plan* (October 2010) notes the proposed Military Cutoff Road Extension and Hampstead Bypass projects are current roadway projects in the STIP.
- The *Thoroughfare Plan for Pender County North Carolina* (June 1997) shows the Hampstead Bypass in its list of TIP projects and on its adopted Thoroughfare Plan map (see Figure 16).
- The *Coastal Pender County Collector Street Plan* (May 2007) notes plans for the Hampstead Bypass. The plan notes the opportunity to re-envision the function and appearance of existing US 17 after the construction of the Hampstead Bypass to that of a regional arterial and community main street with a “village boulevard” cross section.
- The *City of Wilmington 20-Year Transportation Needs* (January 2007) discusses Market Street Access Management Improvements. The improvements are scheduled between Colonial Drive and Porters Neck Road.
- The *Greater Wilmington Urban Area Thoroughfare Plan* (2006) shows Military Cutoff Road and the proposed extension as a major thoroughfare. The proposed Hampstead Bypass is shown as a proposed freeway (see Figure 17).
- The *Wilmington Urban Area 2030 Long Range Transportation Plan* (2005) lists both the Military Cutoff Road Extension and Hampstead Bypass projects as regionally significant in terms of long-term impact on travel patterns in the Greater Wilmington Urban Area.
- The *Roadway Corridor Official Map of Military Cutoff Road Extension* (2005) shows the corridor the City of Wilmington has preserved for the Military Cutoff Road Extension project (see Figure 7).
- The *Market Street Corridor Plan* (2004) provides strategies that will make Market Street less congested and more attractive. The plan notes that Market Street serves as an entrance corridor to downtown and leads to major commercial and service destinations for both City residents and regional shoppers.

There are two other transportation improvement projects included in the *2011-2020 Draft STIP* in the study area (Table 3-3). The US 17 Access Management Improvements (U-4902) are expected to reduce delays and improve safety along US 17 between Colonial Drive and SR 1402 (Porters Neck Road). Other recent improvements to Military Cutoff Road, Market Street and US 17 were implemented to reduce delays, improve access, and address safety concerns. These include improvements implemented as part of a new shopping center development at Market Street and Porters Neck Road. Future no-build traffic projections and traffic capacity analyses performed for the subject project assumed these other projects were constructed.

In addition, a feasibility study (FS-0803B) is underway to evaluate adding additional lanes to existing US 17 from the US 17 Wilmington Bypass in New Hanover County to NC 50 in Onslow County. No funding for right of way acquisition or construction is included in the *2011-2020 Draft STIP* for this work. The additional lanes and access management improvements are being studied in an effort to improve safety along US 17. Traffic volumes are expected to exceed the capacity of existing US 17, even with other planned improvements, including the Hampstead Bypass.

Table 3-3. NCDOT *2011-2020 Draft STIP* Projects in the Study Area

STIP Project	Description	Schedule (Draft STIP)
U-3831	SR 2048 (Gordon Road), NC 132 Interchange Ramp to West of US 17 Business (Market Street) – Widen to multi-lanes. 2.4 miles. Section A is from the NC 132 interchange ramp to SR 2270 (Wood Sorrell Road). Section B is from Wood Sorrell Road to west of Market Street.	Section A: Right of way and construction in 2012. Section B is unfunded.
U-4902	US 17, Colonial Drive to SR 1402 (Porters Neck Road) – Access Management Improvements (8.6 miles). Section A is from SR 1272 (New Centre Dr.) to Martin Luther King, Jr. Blvd. Section B is from Colonial Dr. to SR 1272 (New Centre Dr.). Section C is from Martin Luther King Jr. Blvd. to SR 1409 (Military Cutoff Road). Section D is from Military Cutoff Road to SR 1402 (Porters Neck Road).	No right of way. Construction: Section A: In progress Section B: 2019 Section C: 2012 Section D: 2017

3.2.2.2 TRANSIT PLANS

The Cape Fear Public Transportation Authority (Wave Transit) provides transit services in Wilmington, most of New Hanover County, and portions of Brunswick County.

Through Wave Transit a variety of public transportation options are available, including fixed bus routes, paratransit vans, the Front Street free trolley (serving downtown Wilmington), Seahawk shuttle (serving the University of North Carolina Wilmington (UNC-W) campus), Castle Hayne shuttle, Brunswick Connector, and Columbus Connector. Wave Transit Eastwood Road/Mayfair Route travels along a short section of Military Cutoff Road south of the study area. Intercity bus services are provided by Greyhound Bus Lines and Carolina Trailways. A new multimodal transportation center was recently constructed in downtown Wilmington.

The *Wave Short-Range Transit Plan* includes New Hanover County and northeast portions of Brunswick County. Goals in the plan include increasing the role of transit in the region, providing high-quality service to all residents, providing adequate funding, and improving transit service reliability and efficiency. A Porters Neck Shuttle route is recommended in the plan along Market Street. A potential park and ride facility is shown in the plan along Market Street north of Military Cutoff Road. Military Cutoff Road is included on the proposed Central Loop route. A satellite transfer station is recommended east of the study area off of Military Cutoff Road.

The Final Draft of the *Cape Fear Commutes 2035 Transportation Plan* includes an express bus route between downtown Wilmington and Hampstead and serving Scotts Hill and Porters Neck. Future public transportation needs are also addressed in the Wilmington Urban Area 2030 Long Range Transportation Plan.

Pender County does not currently have public transit operations in place. Pender Adult Services provides limited van service to low-income, disabled, and/or elderly county residents.

The study area is not currently served by passenger rail service. There is one inactive railroad in the study area and one active railroad in the project vicinity. The inactive line extends from Craven County to northern Brunswick County and parallels existing US 17 in the study area. The active line is operated by CSX and extends from the North Carolina-Virginia state line in Northampton County southward to Wilmington, offering freight services only.

3.2.2.3 BICYCLE/PEDESTRIAN PLANS

The North Carolina Division of Bicycle and Pedestrian Transportation has designated a cross-state system of bicycling highways. One of these designated bicycle highways, NC Bike Route 3, runs through New Hanover and Pender Counties. Within the study area, NC Bike Route 3 runs north-northeast from Wilmington to Hampstead along Sidbury Road, Blue Clay Road, Holly Shelter Road, and NC 210. NC Bike Route 3 ties into US 17 at Hampstead and continues north through Pender County.

While New Hanover County and the City of Wilmington completed a comprehensive bicycle plan in 1979, only portions of the plan have been implemented to date. In an effort to plan and implement missing portions of the region's bicycle system, the Bicycle System Element program was included as part of the *Greater Wilmington Urban Area*

Transportation Plan. Components include a regional bicycle system which provides a coordinated network of bicycle facilities on locally-owned streets and state-owned roads. This regional system is intended to accommodate longer distance bicycle trips and provide access to regional activity centers. A local bicycle system consisting of collector and local service facilities and neighborhood routes would also provide access to Wave Transit routes.

Military Cutoff Road is included as part of the Southside Route identified as Bike Route 11, which connects the Middle Sound Area (near Ogden) to Carolina Beach Road. Providing bike paths on Military Cutoff Road and on Eastwood Road from Military Cutoff Road to the Intracoastal Waterway (ICW) are considered high priorities under the Bicycle System Element program.

The *Coastal Pender County Collector Street Plan* (May 2007) notes the lack of existing bicycle and pedestrian facilities in the Pender County portion of the study area.

The *Final Draft Cape Fear Commutes 2035 Transportation Plan* notes plans for several facilities, including: a multi-use path along Military Cutoff Road Extension; future bicycle improvements along several roadways including Sidbury Road, NC 210, and Hoover Road; the East Coast Greenway, which is proposed to follow Military Cutoff Road Extension and the Hampstead Bypass; and the Coastal Pender Greenway along the Progress Energy Company's transmission line right of way, between NC 210 and Sloop Point Loop Road.

The 2010 *Pender County Comprehensive Parks and Recreation Plan* includes recommendations for several facilities in the study area, including: a five-to 20-acre Island Creek Neighborhood Park in the vicinity of NC 210 and Island Creek Road; a 20-to 75-acre park along US 17 in the Scotts Hill area between Sidbury Road and NC 210; the Coastal Pender Greenway; and, the Coastal Pender Rail-Trail, which would utilize the former rail corridor along US 17 in Pender County. The Plan also recommends the development of a comprehensive bicycle and pedestrian plan, which would incorporate the bicycle facilities recommended by the Wilmington MPO in the *Cape Fear Commutes 2035 Transportation Plan*.

The primary goal of the Pedestrian Element of the *Greater Wilmington Urban Area Transportation Plan* is to create a continuous network of safe, convenient and accessible pedestrian facilities to and within regional activity centers and major transit facilities. A number of action items are listed, including incorporating pedestrian plans in the Transportation Capital Improvement Program and implementing sidewalks as part of all transportation improvements, when feasible.

Walk Wilmington: A Comprehensive Pedestrian Plan presents a comprehensive pedestrian plan for the City of Wilmington and was partly funded through a grant from NCDOT. The Plan was adopted by the Wilmington City Council on August 4, 2009.

The Cross-City Trail is a proposed 20-mile, off-road, multi-use trail which will provide bicycle and pedestrian access to numerous destinations in Wilmington. The trail is a

public-private venture that will make up part of the East Coast Greenway, a multi-use path extending from Maine to Florida. None of the proposed Cross-City Trail will be located in the subject study area.

3.3 PHYSICAL ENVIRONMENT CHARACTERISTICS

3.3.1 NOISE CHARACTERISTICS

Noise is basically defined as unwanted sound. It is emitted from many sources including airplanes, factories, railroads, power generation plants, and highway vehicles. Highway noise, or traffic noise, is usually a composite of noises from engine exhaust, drive train, and tire-roadway interaction.

The magnitude of noise is usually described by its sound pressure. Since the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference level, usually the decibel (dB). Sound pressures described in decibels are called sound pressure levels and are often defined in terms of frequency-weighted scales (A, B, C, or D). The weighted-A decibel scale is used almost exclusively in vehicle noise measurements because it places the most emphasis on the frequency range to which the human ear is most sensitive (1,000-6,000 Hertz). Sound levels measured using a weighted-A decibel scale are often expressed as dBA. Examples of noise pressure levels in dBA are a jackhammer at 120 dBA, a garbage disposal at 80 dBA, a window air-conditioner at 60 dBA, and a dripping faucet at 30 dBA.

Noise measurements were taken in the vicinity of the project to determine ambient (existing) noise levels. This project is primarily on new location; therefore, ambient measurements were taken in locations that were in close proximity to the study corridors. The purpose of this noise level information was to quantify the existing acoustic environment and to provide a base for assessing the impact of future noise level increases. The measured current noise levels in the study area ranged from 53 dBA to 73 dBA.

3.3.2 AIR QUALITY

Air pollution originates from various sources. Emissions from industry and internal combustion engines are the most prevalent sources. Air quality is defined according to criteria established by the US Environmental Protection Agency (EPA). Under the Clean Air Act, these criteria are designated as the National Ambient Air Quality Standards (NAAQS). Criteria have been established for six air pollutants that motor vehicles emit: carbon monoxide (CO), nitrogen oxide (NO), hydrocarbons (HC), particulate matter, sulfur dioxide (SO₂), and lead (Pb) (listed in order of decreasing emission rate).

All areas within North Carolina are designated as attainment, non-attainment, or unclassifiable with respect to each of the six pollutants under the NAAQS. Areas that have pollutant concentrations below the NAAQS are designated as attainment. The

project is located in New Hanover and Pender counties, which have been determined to comply with the NAAQS. The proposed project is located in an attainment area.

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. The six primary MSATs are benzene, formaldehyde, acrolein, 1,3-butadiene, acetaldehyde, and diesel exhaust. Section 4.3.2 of this document contains a more detailed discussion of MSATs.

3.3.3 FARMLANDS

North Carolina Executive Order Number 96, *Conservation of Prime Agricultural and Forest Lands*, requires all state agencies to consider the impact of land acquisition and construction projects on prime farmland soils, as designated by the Natural Resources Conservation Service (NRCS). Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural products within allowable soil erosion tolerance. Prime farmland does not include land already in or committed to urban development, transportation or water storage. Table 3-4 shows prime farmland soils in the study area. Soils in the study area are included on Figure 18.

Table 3-4. Prime Farmland Soils in the Study Area

Soil Series	Mapping Unit	County
Craven fine sandy loam	Cr	New Hanover
Johns fine sandy loam*	Jo	Pender
Lynchburg fine sandy loam*	Ls	New Hanover
Norfolk loamy fine sand	NoB	Pender
Onslow loamy fine sand	On	New Hanover/Pender
Pantego loam*	Pn	New Hanover
Rains fine sandy loam*	Ra	New Hanover /Pender
Torhunta mucky fine sandy loam*	To	New Hanover/ Pender
Woodington fine sandy loam*	Wo	New Hanover /Pender
Wrightsboro fine sandy loam	Wr	New Hanover

* Prime farmland if drained

3.3.4 UTILITIES

Water and wastewater services in Wilmington and New Hanover County are provided by the Cape Fear Public Utility Authority. Sewer lines and water lines extend along Market Street, US 17, Sidbury Road, and Military Cutoff Road. A Cape Fear Public Utility Authority well field and water treatment facility is located north of Torchwood Boulevard.

Pender County Utilities provides water and wastewater services in Pender County. Existing sewer and water lines are present along US 17, NC 210, and Hoover Road.

Other utilities vary in density from light to heavy with fiber optic, telephone, underground telephone, power, and cable TV in residential areas and along Market Street. A natural gas line runs along Market Street. There are fiber optic, telephone and water lines located along US 17. One of AT&T's main fiber optic lines on the east coast runs along the west side of US 17 and along an abandoned railroad right of way. There is a water tower near the Topsail school complex north of Hampstead.

There are power line easements near Ogden Park and in the northwestern portion of the study area south of Island Creek Road. Power substations are located northeast of the intersection of Military Cutoff Road and Market Street in New Hanover County and off of St. John's Church Road near County Club Road in Pender County.

3.3.5 HAZARDOUS MATERIALS

Hazardous material sites are regulated by the Resource Conservation Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Hazardous materials are generally defined as material or a combination of materials that present a potential hazard to human health or the environment.

A field reconnaissance was conducted in February 2009. Geographic Information Systems data was reviewed to identify known sites of concern in the study area. A search of the appropriate environmental agencies' databases was performed to assist in evaluating identified sites. Twenty eight sites that may contain petroleum underground storage tanks (USTs) within the study area were identified (see Figure 10-B). No hazardous waste sites and no landfills were identified. Seven other geoenvironmental concerns were identified in the study area. These included five automotive repair facilities, one junkyard and one golf course maintenance shop.

3.3.6 MINERAL RESOURCES

The North Carolina Department of Natural Resources, Division of Land Management, lists four permitted active mines in the study area as of August 27, 2010. The four sites are permitted for sand and gravel operations and include: West Bay Pond Mine in New Hanover County (see Figure 10-C), Whitehouse Creek Mine in Pender County (see Figure 10-G), HanPen Mine in Pender County (see Figure 10-F), and Whitehead Fish Farm Mine in Pender County (see Figure 10-H).

3.3.7 FLOODPLAINS/FLOODWAYS

Both New Hanover County and Pender County participate in the National Flood Insurance Regulatory Program and portions of the study area are within the 100-year floodplain. Figures 10-A through 10-K show floodplains in the study area. There are no Federal Emergency Management Agency (FEMA) buyout properties within the study area.

3.3.8 PROTECTED LANDS

3.3.8.1 WILD AND SCENIC RIVERS

No Wild and Scenic Rivers are located in the study area.

3.3.8.2 STATE/NATIONAL FORESTS

No state or national forests are located in the study area.

3.3.8.3 GAMELANDS AND PRESERVATION AREAS

There are several Significant Natural Heritage Areas or managed preservation areas in the study area. These areas are described below and shown on Figures 10-A through 10-K.

Holly Shelter Game Land is located at the northern end of the study area. The site is managed by the state of North Carolina and is part of a Significant Natural Heritage Area. At over 50,000 acres, Holly Shelter Game Land is one of the highest quality areas of pocosin habitat and savanna flatwoods remaining on the east coast. Holly Shelter Swamp, one of the largest peat-filled pocosin basins in the southeastern U.S., makes up approximately 75 percent of the game land. The site supports numerous rare species and plants including rough-leaved loosestrife (*Lysimachia asperulifolia*) and red-cockaded woodpecker (*Picoides borealis*). Red-cockaded woodpecker clusters on Holly Shelter Game Land are part of the Coastal North Carolina Primary Core Recovery Population within the Mid-Atlantic Coastal Plain Recovery Unit Population. The management of the red-cockaded woodpecker is a major function of Holly Shelter Game Land.

Blake Savannah is a Significant Natural Heritage Area located in Pender County adjacent to Sidbury Road. The site is privately owned. Blake Savanna has a good quality example of a rare Pine Savannah natural community variant.

Several NCDOT mitigation sites exist in the study area. NCDOT currently manages each of these sites. The Corbett Tract Mitigation Site is an approximately 618-acre wetland mitigation site located along the existing US 17 Wilmington Bypass near the I-40 interchange. The Corbett Tract site provided 493 acres of wetlands mitigation for impacts related to the construction of the US 17 Wilmington Bypass.

The Corbett Tract also contains a buffer strip, or residual strip, along US 17 Wilmington Bypass approximately midway between I-40 and Market Street. The 28.5-acre Corbett

Tract Residual Site was not used for mitigation. However, per a January 2002 NCDOT Biological Assessment and a May 2002 US Fish and Wildlife Service Biological Opinion, it is intended to be maintained for conservation measures associated with endangered species, specifically rough-leaved loosestrife.

The eastern end of the Corbett Tract Residual Site is adjacent to the northwestern corner of the Plantation Road Site. The Plantation Road Site is used specifically for conservation measures associated with endangered species, specifically rough-leaved loosestrife.

Two residual sites are located along the north side of the US 17 Wilmington Bypass. A 34-Acre Residual Site is located near the northeastern corner of the Plantation Road Site. A 22-Acre Residual Site is just west of the US 17 Wilmington Bypass interchange with Market Street. The residual sites were not used directly for conservation measures or mitigation.

There are several other Significant Natural Heritage Areas and managed areas in the project vicinity. These sites include Sidbury Road Savanna, Castle Bay Preserve, a North Carolina Ecosystem Enhancement Program Site adjacent to Holly Shelter Game Land, and portions of Howe, Pages and Futch creeks.

3.4 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800), requires federal agencies to take into account the effects of their undertaking on historic properties (including archaeological sites) and afford the Advisory Council on Historic Preservation an opportunity to comment on the effects of the undertaking. Since the proposed project does not use funds from the Federal Highway Administration, but requires a federal permit from the US Army Corps of Engineers, the USACE will serve as the lead federal agency with respect to compliance with Section 106. The proposed project is not subject to Section 4(f) of the US DOT Act of 1966.

3.4.1 HISTORIC ARCHITECTURAL RESOURCES

A preliminary architectural survey was conducted in January 2010 and identified a total of 78 individual resources that were built prior to 1961 within the Area of Potential Effects (APE). Of those resources, one is listed on the National Register of Historic Places, and the State Historic Preservation Office (HPO) determined four other properties required in-depth evaluations of eligibility for the National Register. These resource locations are shown on Figures 10-C, 10-E, 10-G, and 10-I.

Property Listed on the National Register

Poplar Grove – This property is located on US 17 North, across from Sidbury Road in Pender County.

Poplar Grove was erected circa 1850 for Joseph Mumford Foy, an amateur architect who designed the residence. The antebellum Poplar Grove plantation house was erected to face the New Bern-to-Wilmington plank road that traversed the estate. The Foy plantation contained 64 slaves and produced naval stores, as well as peanuts, beans, corn, and swine for northern markets. After the Civil War, the farm was owned by Joseph T. Foy, an influential landowner, businessman, and politician who was instrumental in linking New Bern to Wilmington by railroad. The property was listed in the National Register in 1979 due to its associations with the prominent Foy family and its architectural integrity.

It is recommended that the National Register Boundary be amended to exclude a new commercial building and its 0.7 acre site, which was subdivided from the original National Register tract along Scotts Hill Loop Road.

Properties Eligible for the National Register

Mount Ararat AME Church – This property is located along Market Street and Ogden Park Drive.

Mount Ararat AME Church was constructed in the Middle Sound community of New Hanover County soon after Reconstruction ended. The cornerstone indicates the church was built in 1878, although a 1985 county-wide architectural survey described it as one of five extant buildings that dated to the 1880s. The church is notable for its early use of a projecting entrance tower and pointed arch windows, reflecting the influence of Gothic Revival ecclesiastical architecture. Mount Ararat AME Church is recommended eligible for the National Register under Criterion C for architecture and under Criterion Consideration A: Religious Properties.

Wesleyan Chapel United Methodist Church – This property is located at the junction of US 17 North and Sidbury Road.

The 1931 church is a brick-veneered, Colonial Revival edifice with a front-gable main block, frame cupola, and both jack-arched and segmental-arched windows and entrance. A church history states that the interior is largely intact and retains its auditorium plan and original finishes. A church cemetery divided into sections is located behind the church building and contains headstones that date primarily from the late nineteenth century to recent decades. Wesleyan Chapel United Methodist Church is recommended eligible for the National Register under Criterion C for architecture and under Criterion Consideration A: Religious Properties.

Scotts Hill Rosenwald School – This school sits on a 1.71-acre lot facing northwest towards US 17 North in Pender County.

The school was constructed between 1926 and 1927, and is a one-room, frame building with a one-story, front-gable form of German siding, brick foundation piers, and a shed-roofed front entry. Original wood floors, walls, and ceiling appear to have survived. Scotts Rosenwald School is eligible for the National Register under Criterion A for both education and African American heritage and under Criterion C for architecture.

Topsail Consolidated School – This school faces west along US 17 North in the Hampstead community of Pender County.

Built in 1925, the vacant school is an expansive, Neo-Classical Revival building that features a prominent, colossal portico capped by a pediment. The school building has replacement one-over-one, wood sash windows throughout, but original brick lintels with soldier courses and cast-stone decorative treatments remain intact. Plaster walls, wood ceilings, and wood-paneled classroom doors also remain intact. Topsail Consolidated School is eligible for the National Register under Criterion A for education and Criterion C for architecture.

3.4.2 ARCHAEOLOGICAL RESOURCES

Due to the number of detailed study alternatives, an intensive archaeological survey has not been initiated. After the selection of a preferred corridor, an archaeological investigation will be conducted pursuant to Section 106 of the National Historic Preservation Act and the guidelines issued by the Advisory Council on Historic Preservation.

3.4.3 TRIBAL LANDS

There are no American Indian tribal lands in the project study area.

3.5 NATURAL ENVIRONMENT CHARACTERISTICS

Field investigations were conducted by qualified biologists between February 14, 2008 and June 23, 2010 to assess the existing natural environment within the study area. Details of the methodology and investigations supporting the information provided in this section are provided in the Natural Resources Technical Report (NRTR) completed in August 2010, appended by reference.

3.5.1 SOILS/TOPOGRAPHY/GEOLOGY

A limited geotechnical investigation was completed by NCDOT in December 2008 to evaluate subsurface conditions. The investigation consisted of a field reconnaissance visit and review of existing subsurface data in the study area to determine the suitability of subgrade material and ground water depth.

The proposed project lies within the Coastal Plain Physiographic Province. Topography in the study area is nearly level with numerous creeks bisecting the upland areas.

Elevations in the study area range from 10 to 65 feet above mean sea level. Existing US 17 follows an upland ridge. Northwest of US 17, the project lies within the Northeast Cape Fear River drainage basin and surface water flows to the northwest. Southeast of US 17, surface water flows into Topsail and Middle Sound. Subsurface drainage is typically poorly drained to well drained.

The geology within the study area consists of mostly undivided coastal plain sediments consisting of granular and less abundant cohesive soils. The majority of these soils exhibit excellent to good engineering properties and are suitable for embankment construction.

Northwest of US 17 and north of the developed area of Wilmington, surficial organic soils are present as topsoil and vary from one to three feet thick. Most of the creeks in the study area contain five to 15 feet of organic soils in associated floodplains. Carolina Bays are present in the study area. The bays typically contain organic soils. The organic soils exhibit poor engineering properties.

Limestone of the Eocene age Castle Hayne formation was encountered in the study area near sea level. Sinkholes are present in the study area due to collapse of the limestone layers.

The New Hanover County Soil Survey identifies 20 soil unit types within the New Hanover County portion of the study area. Additionally, the Pender County Soil Survey identifies 17 soil unit types within the Pender County portion of the study area. Table 3-5 below lists the soils series, drainage class, and hydric status for these units.

Table 3-5. Soils in the Study Area

Soil Series	Mapping Unit	Drainage Class	Hydric Status	County
Alpin fine sand	AnB	Excessively Drained	Hydric*	Pender
Autryville fine sand	AuB	Well Drained	Hydric*	Pender
Baymeade fine sand	Be BaB	Well Drained	Hydric*	New Hanover Pender
Craven fine sandy loam ¹	Cr	Moderately Well Drained	Hydric*	New Hanover
Dorovan soils	DO	Very Poorly Drained	Hydric	New Hanover
Foreston loamy fine sand	Fo	Moderately Well Drained	Hydric*	Pender
Johns fine sandy loam ²	Jo	Somewhat Poorly Drained	Hydric*	Pender
Johnston soils	JO	Very Poorly Drained	Hydric	New Hanover
Kureb sand	Kr KuB	Excessively Drained	Hydric*	New Hanover Pender
Leon sand	Le LnA	Poorly Drained	Hydric	New Hanover Pender
Lynchburg fine sandy loam ²	Ls	Somewhat Poorly Drained	Hydric*	New Hanover

Table 3-5. Soils in the Study Area *continued*

Soil Series	Mapping Unit	Drainage Class	Hydric Status	County
Lynn Haven fine sand	Ly	Poorly Drained	Hydric	New Hanover
Mandarin fine sand	Ma	Somewhat Poorly Drained	Hydric*	Pender
Marvyn and Craven soils	McC	Moderately/Well Drained	Hydric*	Pender
Muckalee loam	Mk	Poorly Drained	Hydric	Pender
Murville muck	Mu	Very Poorly Drained	Hydric	New Hanover Pender
Norfolk loamy fine sand ¹	NoB	Well Drained	Hydric*	Pender
Onslow loamy fine sand ¹	On	Moderately Well/ Somewhat Poorly Drained	Hydric*	New Hanover Pender
Pactolus fine sand	PaA	Moderately Well/ Somewhat Poorly Drained	Hydric*	Pender
Pantego loam ²	Pn	Very Poorly Drained	Hydric	New Hanover
Rains fine sandy loam ²	Ra	Poorly Drained	Hydric	New Hanover Pender
Rimini sand	Rm	Excessively Drained	Hydric*	New Hanover
Seagate fine sand	Se	Somewhat Poorly Drained	Hydric*	New Hanover
Stallings fine sand	St	Somewhat Poorly Drained	Hydric*	New Hanover
Torhunta mucky fine sandy loam ²	To	Very Poorly Drained	Hydric	New Hanover Pender
Urban land	Ur	None	Nonhydric	New Hanover
Wakulla sand	Wa	Somewhat Excessively Drained	Nonhydric	New Hanover
Woodington fine sandy loam ²	Wo	Poorly Drained	Hydric	New Hanover Pender
Wrightsboro fine sandy loam ¹	Wr	Moderately Well Drained	Nonhydric	New Hanover

*Soils which are primarily nonhydric, but which contain hydric inclusions

¹ All areas are prime farmland

² Prime farmland if drained

3.5.2 BIOTIC COMMUNITIES AND WILDLIFE

Biotic resources in the study area include both terrestrial and aquatic communities. The composition of these communities is reflective of the topography, soils, hydrologic influences, and past and present land uses. The following sections describe the existing vegetation and associated wildlife that have been identified within the study area.

3.5.2.1 TERRESTRIAL COMMUNITIES AND WILDLIFE

3.5.2.1.1 TERRESTRIAL COMMUNITIES

Fifteen terrestrial communities were identified in the study area. Figures 19-A through 19-K show the location and extent of these terrestrial communities. Table 3-6 summarizes the terrestrial community coverage within the study area.

Maintained/Disturbed

This community consists of areas that are periodically maintained by human influences, such as roadside and power line rights of way, regularly mowed lawns, commercial and industrial properties, and open areas. All of these land uses tend to have similar vegetation, with few large trees and abundant herbaceous cover. The tree species observed in the study area include loblolly pine, red maple, sweet-gum, live oak, black cherry, white oak, and longleaf pine; however, residential properties tended to have a wide range of large tree species. Two common shrubs to this vegetative sub-type, observed occurring both naturally and as escaped plants, are wild and cultivated roses and wax myrtle. Fescue is the dominant groundcover species throughout most of these areas. Other groundcover and herbaceous species included goldenrod, broomsedge, dog-fennel, Bermuda grass and Japanese honeysuckle.

Table 3-6. Coverage of Terrestrial Communities in the Study Area

Community	Coverage (acres)
Maintained/Disturbed	2,942.4
Mesic Pine Flatwoods	1,627.9
Wet Pine Flatwoods	850.2
Pond Pine Woodland	819.0
Pocosin	517.8
Xeric Sandhill Scrub	359.5
Coastal Plain Bottomland Hardwood - Blackwater Subtype	288.7
Nonriverine Wet Hardwood Forest	263.2
Pine Savanna	192.4
Cutover	176.1
Coastal Plain Small Stream Swamp - Blackwater Subtype	162.6
Cypress/Gum Swamp - Blackwater Subtype	140.5
Nonriverine Swamp Forest	58.3
Small Depression Pocosin	20.0
Small Depression Pond	4.3
TOTAL	8,422.9

Mesic Pine Flatwoods

This community is found on mesic (non-wetland) sites of either flat or rolling coastal plain sediments. These sites are neither excessively drained nor have a significant seasonal high water table. In the study area, Mesic Pine Flatwoods commonly occurred on the breaks of interstream divides. This community has a closed to open canopy of longleaf pine, sometimes mixed with loblolly pine.

The understory is sparse (in frequently burned sites) to dense (in unburned sites), and contains species such as southern red oak, water oak, post oak, blackjack oak, mockernut hickory, and sweet-gum. A low shrub layer of varying density is usually present. Common species include inkberry, large gallberry, fetterbush, sweet bay, red bay, giant cane, and creeping blueberry. The herb layer is generally dominated by wiregrass in frequently burned areas, with bracken fern dominant in patches. Other typical herb species included broomstraw and panic grass.

Wet Pine Flatwoods

This community occurs on seasonally wet to usually wet sites, generally on flat or nearly flat coastal plain sediments. While seasonally saturated, this community may become quite dry for part of the year. Wet Pine Flatwoods are most commonly observed in broad areas of interstream divides. In the study area, this community has a canopy of longleaf, loblolly or pond pine, or any combination of the three. The understory is sometimes absent but usually contains invading hardwoods. The shrub layer varies in density and contains species similar to those in the Mesic Pine Flatwoods community. The herb layer is generally dominated by wiregrass, with bracken fern dominating locally. Other typical herbs included broomstraw and panic grass.

Pond Pine Woodland

This community occurs on poorly drained interstream flats that are temporarily flooded or saturated. The Pond Pine Woodland community has an open to nearly closed canopy of pond pine, sometimes codominant with loblolly bay, and commonly includes lesser amounts of sweet bay, red maple, loblolly pine, and swamp bay. The shrub layer is usually tall and very dense unless recently burned. Common shrubs are titi, fetterbush, inkberry, large gallberry, sweet pepperbush, and swamp bay. Giant cane is often present in the shrub layer and laurel greenbrier is also common. Herbs are nearly absent under the dense woody cover, although occasional Virginia chain-fern, netted chain-fern, and moss clumps were observed.

Pocosin

This community occurs on central to intermediate parts of domed peatlands on poorly drained interstream flats, and peat-filled Carolina bays and swales. In the study area, Pocosins were commonly observed serving as headwater wetlands to small coastal plain streams. A dense shrub layer between four to eight feet tall is common, with little evidence of fire. Pocosins are dominated by fetterbush, titi, and inkberry, with abundant

laurel greenbrier. Scattered pond pine, swamp bay, loblolly bay, and sweet bay were also commonly observed. Herbs are usually nearly absent beneath the dense shrub layer.

Xeric Sandhill Scrub

This community consists of coarse, deep sands of ridge and swale systems, Carolina bay rims, and sandy uplands. These areas are the driest in the coastal plain. In the study area, the Xeric Sandhill Scrub community most commonly occurs on the sand ridge rims of pocosin-like Carolina bays. This community has an open canopy of longleaf pine, with an open to dense understory of turkey oak. Occasional sassafras and persimmon were observed. A sparse low shrub layer consisting primarily of huckleberry and poison oak is sometimes present. A sparse to moderately dense herb layer consists of species such as wiregrass and spikemoss.

Coastal Plain Bottomland Hardwood Forest – Blackwater Subtype

This community is seasonally to intermittently flooded, and is commonly observed on the floodplains of larger streams in the study area. Bottomland hardwoods are expected to form a stable climax forest, having an uneven-aged canopy with primarily gap phase regeneration. The canopy is dominated by various combinations of bottomland hardwoods and conifers. Species observed include laurel oak, water oak, red maple, loblolly pine, and sweet-gum. The understory includes red maple, swamp bay, American holly, and sweet bay. The shrub layer is often well developed and sometimes includes dense titi and giant cane. Vines are sometimes dense with common greenbrier, poison ivy, muscadine, and supplejack. The herb layer is poorly developed but includes occurrences of Christmas fern, Virginia chain-fern, netted chain-fern, and royal fern.

Nonriverine Wet Hardwood Forest

This community occurs on poorly drained interstream flats not associated with rivers or estuaries. These sites are seasonally saturated or flooded by high water tables, poor drainage, and by sheet flow from adjacent pocosins. The community is dominated by various hardwood trees typical of bottomlands. Common species include swamp chestnut oak, laurel oak, yellow poplar, sweet-gum, red maple, and swamp blackgum. The understory includes species such as muscledwood, red maple, and American holly. The shrub layer is generally sparse to moderately dense. Species include spicebush, swamp bay, coastal doghobble, sweet pepperbush, highbush blueberry, wax myrtle, giant cane, swamp palmetto, and beauty-berry. Vines such as crossvine, poison ivy, trumpet creeper, and grape vines are common. The herb layer includes sedges, lizard's tail, false nettle, Christmas fern, and netted chain-fern.

Pine Savanna

This community occurs on wet, generally flat areas that are seasonally saturated by a high or perched water table. These communities naturally experience frequent, fairly low intensity surface fires. The Pine Savanna community has an open to sparse canopy of longleaf pine with pond pine sometimes codominating or dominating. Scattered inkberry, creeping blueberry, wax myrtle and other shrubs are often present. The herb

layer is generally dense, unless recently burned, and is very diverse, with grasses, sedges, composites, orchids, and lilies particularly prominent. Insectivorous plants such as Venus flytrap, yellow pitcher plant, purple pitcher plant, and sundew are commonly observed.

Cutover

This community consists of areas that have been logged within five years and are in early forest succession stages. Small loblolly and pond pines are common growing beneath larger shrub and herbaceous species that are first to establish dominance in these areas. Aside from the pines, the dominant species include sweet-gum, red maple, inkberry, wax myrtle, red chokeberry, fetterbush, greenbrier, blackberry, Japanese honeysuckle, broomsedge, and goldenrods.

Coastal Plain Small Stream Swamp – Blackwater Subtype

This community is found on floodplains of small blackwater streams. Blackwater streams, in contrast to brownwater, tend to have highly variable flow regimes, with floods of short duration, and periods of very low flow resulting in the community being intermittently, temporarily, or seasonally flooded. The canopy is dominated by various combinations of bald cypress, swamp blackgum, and various other blackwater river floodplain species including sweet-gum, yellow poplar, red maple, laurel oak, swamp chestnut oak, river birch, loblolly pine, and pond pine. The understory is similarly variable. Species include muscledwood, red maple, American holly, sweet bay, swamp bay, and titi. The shrub layer ranges from sparse to dense and almost pocosin-like. Dominant species include coastal doghobble and fetterbush. Vines, particularly poison ivy, greenbrier, laurel greenbrier, and supplejack are common.

Cypress/Gum Swamp – Blackwater Subtype

Cypress/Gum Swamp communities are common in the lower and middle parts of the coastal plain. This community is found in backswamps, sloughs, swales, and featureless floodplains of blackwater rivers, and is seasonally to semi-permanently flooded. In the study area, this community most commonly occurs as backswamp areas to larger perennial streams and open bodies of water. The canopy is dominated by swamp blackgum, bald cypress, or pond cypress. The understory and shrub layer are usually poorly developed or absent. Swamp blackgum and red maple are the most typical species, with swamp bay, sweet bay and buttonbush occurring in places. Observed shrub species include titi and fetterbush. The herb layer ranges from nearly absent to moderate cover. Species include lizard's tail, sedge, and netted chain-fern.

Nonriverine Swamp Forest

This community is observed on wet, very poorly drained upland flats that are saturated at least seasonally or are shallowly flooded by the high water table. The canopy contains varying mixtures of pond cypress, bald cypress, swamp tupelo, loblolly pine, pond pine, yellow poplar, and red maple. Understory species that were observed include sweet bay,

swamp bay, titi, fetterbush, sweet pepperbush, blueberry, and laurel greenbrier. Typical herbs include Virginia chain-fern, netted chain-fern, sedges, and sphagnum moss.

Small Depression Pocosin

This community occurs in the form of small Carolina bays and other small depressions in upland, usually sandy areas. These areas are seasonally flooded or intermittently exposed and may receive drainage from surrounding sandy areas. In the study area, this community commonly occurs in areas mapped with Autryville and Baymeade soil types. A dense to fairly dense shrub layer was observed, with species including fetterbush, titi, inkberry, sweet pepperbush, dangleberry, blueberry, and lamb-kill. The canopy is usually dominated by pond pine, red maple, or swamp bay, with associated sweet bay, swamp blackgum, pond cypress, loblolly pine and loblolly bay. Laurel greenbrier is common. Herbs are generally sparse, but cinnamon fern, Virginia chain-fern, netted chain-fern, and sedges were observed.

Small Depression Pond

This community occurs in the form of sinkholes, Carolina bays, and other upland depressions that are permanently flooded in the center and grade outward to the prevailing hydrology of the surrounding area. This community is also generally associated with upland soils such as Autryville and Baymeade, but sometimes occurs within larger wetland complexes. These ponds are surrounded by a pocosin-like density of shrubs and include species such as titi, fetterbush, and inkberry, along with distinctive pond-shore species such as buttonbush. Scattered pond cypress and swamp blackgum were observed. Shallow water and exposed edges may contained a variety of emergent and wetland plants, including panic grass, spike-rush and other rush species, a number of sedge species, sundew, and often Virginia chain-fern.

3.5.2.1.2 INVASIVE EXOTIC PLANT SPECIES

Fifteen species from the NCDOT Invasive Exotic Plant List for North Carolina were found to occur in the study area. The species identified were tree of heaven (Threat level 1), Chinese privet (Threat level 1), multiflora rose (Threat level 1), Japanese grass (Threat level 1), kudzu (Threat level 1), hydrilla (Threat level 1), mimosa (Threat level 2), autumn olive (Threat level 2), shrub lespedeza (Threat level 2), bamboo (Threat level 2), Johnson grass (Threat level 2), English ivy (Threat level 2), Japanese honeysuckle (Threat level 2), Chinese wisteria (Threat level 2), and Bradford pear (Threat level 3).

3.5.2.1.3 TERRESTRIAL WILDLIFE

Terrestrial communities in the study area are comprised of both natural and disturbed habitats that may support a diversity of wildlife species. Species observed during field investigations are discussed below. Species for which there was evidence in the form of scat or tracks are also included in the discussion.

Mammal species that were observed utilizing forested habitats and stream corridors within the study area include beaver, black bear, coyote, bobcat, Eastern cottontail, gray

squirrel, muskrat, cotton mouse, raccoon, gray fox, Virginia opossum, wild pig, white-tailed deer, and woodchuck. Birds that were observed using forest and forest edge habitats include American bittern, crow, woodcock, Carolina chickadee, bobwhite quail, cardinal, Carolina wren, common flicker, downy woodpecker, red-bellied woodpecker, Eastern bluebird, mockingbird, mourning dove, myrtle warbler, pine warbler, prairie warbler, tufted titmouse, prothonotary warbler, wild turkey, wood thrush, and yellow-rumped warbler. Birds observed using the open habitat or water bodies within the study area include bald eagle, belted kingfisher, Canada goose, Cooper's hawk, field sparrow, gray catbird, great blue heron, laughing gull, ring-billed seagull, mallard, osprey, red-tailed hawk, turkey vulture, and red-winged blackbird. Reptile and amphibian species observed using terrestrial communities in the study area include black racer, eastern box turtle, eastern fence lizard, eastern king snake, five-lined skink, eastern garter snake, green anole, rat snake, six-lined racerunner, rough green snake, copperhead, canebrake rattlesnake, spring peeper, and southern toad.

3.5.2.2 AQUATIC COMMUNITIES AND WILDLIFE

Aquatic communities in the study area consist of perennial and intermittent coastal plain streams, swamps, small depression ponds, and maintained farm ponds. These communities can support various fish, reptile, and amphibian species, as well as mollusks and crustaceans. Species observed in or along perennial streams in the study area include brown water snake, snapping turtle, bluegill, Eastern crayfish, green treefrog, barking treefrog, and water moccasin. Intermittent streams in the study area are relatively small in size but were observed supporting crayfish, yellowbelly slider, bullfrogs, and various benthic macroinvertebrates. Pond and swamp habitats support bluegill, largemouth bass, snapping turtle, crayfish, bullfrogs, American alligator, spotted turtle, green treefrog, brown water snake, and water moccasin.

3.5.3 WATER RESOURCES

Descriptions of water resources identified in the study area during field investigations include physical and water quality characteristics, best usage classifications, and relationships to major regional drainage systems. Water resources in the study area are part of the Cape Fear River basin (U.S. Geological Survey [USGS] Hydrologic Units 03030007 and 03020302).

3.5.3.1 GROUNDWATER

Groundwater data indicate the groundwater surface is typically one to four feet below the natural ground surface. Lateral ditches along existing roads appear to be functioning adequately. Portions of five different aquifers are located within the study area. Descriptions of the aquifers are provided below.

Castle Hayne Aquifer

The Castle Hayne aquifer is located in both the New Hanover and Pender County portions of the study area. In addition to supplying some industrial and agricultural

usages, a number of municipal well fields are supplied by the aquifer. These municipal areas include the City of Wilmington, New Hanover beach towns, the New Hanover County water system, Topsail Island, and Surf City. According to the North Carolina Division of Water Resources, the Castle Hayne aquifer is the state's most productive aquifer. Wells associated with this aquifer yield 200-500 gallons per minute (gpm) on average, although the yield can reach more than 2,000 gpm.

Peedee Aquifer

The Peedee aquifer is present in the New Hanover County portion of the study area. The Peedee aquifer supplies well fields used by New Hanover County. On average, wells associated with this aquifer yield up to 200 gpm.

Black Creek, Upper Cape Fear, and Lower Cape Fear Aquifers

Black Creek, Upper Cape Fear, and Lower Cape Fear aquifers are present in the study area. However, New Hanover and Pender Counties depend little, if any, on these aquifers for water supply, due to their increased salinity.

3.5.3.1.1 WELLS

North Carolina Department of Environment and Natural Resources, Division of Environmental Health data indicate there are numerous public water supply wells in the study area. The Cape Fear Public Utility Authority in New Hanover County has several existing and proposed well sites associated with their Nano Water Treatment Plant.

3.5.3.2 SURFACE WATERS

3.5.3.2.1 STREAMS

A total of 134 streams were identified in the study area (Table 3-7). Streams within the detailed study alternative corridors are shown in Figures 10-A through 10-K. Four streams within one mile downstream of the study area have been designated High Quality Water (HQW), and one stream within one mile downstream of the study area has been designated Outstanding Resource Water (ORW) by the North Carolina Division of Water Quality (NCDWQ). Futch Creek, Old Topsail Creek, Pages Creek, and an unnamed tributary to the Atlantic Intracoastal Waterway (AIWW) receive water from streams in the study area and are designated HQW from their source to their confluence with the AIWW. Howe Creek receives water from streams in the study area and has been designated ORW from its source to its confluence with the AIWW. There are no water supply watersheds (WS-I or WS-II) or North Carolina 303(d) listed streams within one mile downstream of the study area. Additionally, there are no benthic and/or fish monitoring sites within one mile downstream of the study area. No shellfish growing areas or primary nursery areas are present in the study area.

Table 3-7. Physical Characteristics of Streams within Study Area

Stream ID	Stream Name	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Stream Determination
ASA	UT to Spring Branch	6 - 7	10 - 12	4 - 6	Sand	Slow	Clear	977	Perennial
BSA	UT to Smith Creek	6 - 7	8 - 10	6 - 10	Sand	Slow	Slightly Turbid	799.63	Perennial
BSJ	UT to Smith Creek	5 - 6	8 - 10	2 - 4	Sand	Slow	Slightly Turbid	2,466.12	Perennial
BSK	UT to Smith Creek	5 - 6	8 - 10	4 - 6	Sand	Slow	Slightly Turbid	3,012.17	Perennial
BSL	UT to Smith Creek	5 - 6	8 - 10	4 - 8	Sand	Slow	Slightly Turbid	318.06	Perennial
BSM	UT to Smith Creek	6 - 7	15 - 20	4 - 6	Sand	Slow	Slightly Turbid	1,065.21	Perennial
BSN	UT to Smith Creek	6 - 7	15 - 20	4 - 6	Sand	Slow	Slightly Turbid	970.2	Perennial
BSO	UT to Smith Creek	6 - 7	15 - 20	12 - 18	Sand	Slow	Turbid	2,401.7	Perennial
BSP	UT to Smith Creek	5 - 6	15 - 18	8 - 16	Sand/Gravel	Moderate	Slightly Turbid	1,342.78	Perennial
BSQ	UT to Smith Creek	5 - 6	15 - 18	8 - 16	Sand/Gravel	Moderate	Slightly Turbid	450.13	Perennial
BDITCH1	UT to Howe Creek	3	7	4-12	Sand	Slow	Turbid	254.09	OHWM ¹
								513.01	
CSA	UT to Island Creek	6 - 7	10 - 12	12 - 16	Sand	Slow	Turbid	3,021.28	Perennial
CSB	UT to Island Creek	6 - 8	12 - 15	12 - 16	Sand	Slow	Turbid	2175.34	Perennial
CSC	UT to Smith Creek	4 - 5	8 - 10	4 - 8	Sand	Stagnant	Slightly Turbid	944.11	OHWM ¹
CSD	UT to Smith Creek	4 - 5	8 - 10	4 - 8	Sand	Stagnant	Slightly Turbid	2,470.29	Intermittent
								1,087.24	Perennial
CSE	UT to Smith Creek	3 - 4	6 - 8	2 - 4	Sand	Stagnant	Slightly Turbid	629.51	OHWM ¹
CSF	UT to Smith Creek	2	3 - 4	2	Sand	Stagnant	Slightly Turbid	161.59	OHWM ¹
CSG	UT to Smith Creek	6 - 7	12 - 15	4 - 8	Sand	Stagnant	Slightly Turbid	499.56	Intermittent
CSH	UT to Smith Creek	6 - 7	12 - 15	6 - 10	Sand	Slow	Slightly Turbid	832.96	Intermittent
CSI	UT to Smith Creek	6 - 7	12 - 15	6 - 10	Sand	Stagnant	Slightly Turbid	1,070.75	Perennial
CSJ	UT to Island Creek	6 - 7	12 - 15	4 - 6	Sand	Stagnant	Slightly Turbid	1,503.26	Perennial
CSK	UT to Island Creek	5 - 6	10 - 14	4 - 8	Sand/Gravel	Slow	Clear	399.56	Perennial
DSA	UT to Island Creek	6 - 8	12 - 15	12 - 16	Sand	Slow	Turbid	3,486.92	Perennial
ESA	UT to Mill Creek	2	6	4 - 24	Sand	Slow	Slightly Turbid	1,431.43	Perennial

Table 3-7. Physical Characteristics of Streams in the Study Area *continued*

Stream ID	Stream Name	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Stream Determination
ESB	UT to Mill Creek	2	3	3 - 8	Sand	Slow	Slightly Turbid	245.43	Perennial
FSA	UT to Island Creek	3 - 6	12	0.5 - 36	Sand	Moderate	Clear/Tannic	4,475.76	Perennial
FSB	UT to Island Creek	4 - 5	12	12 - 24	Sand	Moderate	Clear/Tannic	1,085.48	Intermittent
FSC	UT to Island Creek	2 - 4	8	6 - 12	Sand	Slow	Clear	538.43	Intermittent
FSD	UT to Island Creek	4 - 5	2	2	Sand	Slow	Clear	120.33	Intermittent
FSE	UT to Island Creek	1 - 2	2 - 3	6 - 12	Sand/Clay	Slow	Clear/Tannic	1,609.51	Perennial
FSF	UT to Island Creek	6 - 8	4	12 - 24	Sand	Stagnant	Clear/Tannic	526.05	OHWM ¹
								916.85	
FSH	UT to Island Creek	4 - 6	8 - 10	12 - 24	Sand	Moderate	Clear/Tannic	100.63	OHWM ¹
								269.69	
								713.05	Intermittent
								1,163.97	Perennial
FSI	UT to Island Creek	2 - 4	6 - 8	6 - 24	Sand	Moderate	Clear/Tannic	568.64	Perennial
FSJ	UT to Island Creek	3 - 6	3 - 6	0.5 - 36	Sand	Moderate	Clear/Tannic	858.61	Intermittent
FSK	UT to Island Creek	1 - 2	2 - 4	3 - 12	Sand	Slow	Tannic	1295.5	Intermittent
GFSE	UT to Island Creek	4	8	6-36	Sand	Fast	Clear/Tannic	1176.4	Perennial
GSA	UT to Island Creek	0.5 - 2	4	6 - 12	Sand	Moderate	Clear/Tannic	417.82	Perennial
GSB	UT to Island Creek	3 - 6	8 - 12	24 - 48	Sand	Stagnant	Clear/Tannic	259.38	Intermittent
GSG	UT to Island Creek	6 - 8	8	12 - 48	Sand	Stagnant	Clear/Tannic	913.05	Intermittent
GSX	UT to Island Creek	1	5	6-10	Sand	Moderate	Clear/Tannic	392.87	Perennial
HBSA	UT to Island Creek	2 - 3	2 - 3	6 - 18	Sand	Slow	Clear	1,892.57	Perennial
HBSAA	UT to Island Creek	2 - 5	5	3 - 6	Sand	Slow	Clear	349.96	Intermittent
								1,564.99	Perennial
HBSB	UT to Island Creek	2 - 3	2.5 - 3	3 - 6	Sand	Slow	Clear	535.6	Intermittent
HBSC	UT to Island Creek	1 - 3	2.5 - 3	6 - 12	Sand	Slow	Clear	420.97	Intermittent
								1,343.94	Perennial
HBSD(1)	UT to Island Creek	1 - 3	2.5 - 3	6 - 10	Sand	Slow	Clear	628.05	Intermittent
								544.09	Perennial

Table 3-7. Physical Characteristics of Streams in the Study Area *continued*

Stream ID	Stream Name	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Stream Determination
HBSD(2)	UT to Island Creek	2 - 4	12 - 15	6 - 24	Sand	Slow	Clear/Tannic	7,326.24	Perennial
HBSE	UT to Island Creek	2 - 3	1 - 2	6 - 12	Sand	Stagnant	Clear/Tannic	406.4	Perennial
HBSF	Island Creek	2 - 4	8 - 12	3 - 36	Sand	Slow	Clear/Tannic	5,430.04	Perennial
HBSG	UT to Island Creek	2 - 4	12 - 12	6 - 24	Sand	Slow	Clear	2,552.85	Perennial
HBSH	UT to Island Creek	2 - 3	2	1 - 4	Sand	Slow	Clear	391.78	Intermittent
HSA	UT to Harrison's Creek	3	5	1 - 6	Sand	Stagnant	Clear	103.82	Intermittent
HSB	UT to Harrison's Creek	1	5	1 - 6	Sand	Stagnant	Clear	789.7	Intermittent
HSC	UT to Harrison's Creek	2 - 3	5	1 - 6	Sand	Stagnant	Clear	3,382.55	Perennial
HSCA	UT to Harrison's Creek	1 - 2	2 - 3	1 - 6	Sand	Slow	Clear	228.37	Intermittent
HSD	UT to Harrison's Creek	2	2 - 4	2 - 10	Sand	Slow	Clear	176.33	Intermittent
HSE	UT to Island Creek	0.5 - 1	2	1 - 6	Sand	Moderate	Clear	66.9	Intermittent
HSX	UT to Harrison's Creek	0.5 - 2	6 - 8	6 - 24	Sand	Moderate	Clear/Tannic	1,241.32	Perennial
HSZ	UT to Harrison's Creek	2 - 3	2 - 4	6 - 18	Sand	Moderate	Slightly Turbid	176.39	Perennial
HDITCH1	UT to Harrison's Creek	6-8	8	12-24	Sand	Slow	Clear/Tannic	2,041.86	OHWM ¹
HDITCH2	UT to Harrison's Creek	6-8	8	12-24	Sand	Slow	Clear/Tannic	1691.7	OHWM ¹
ISA	UT to Island Creek	0.5 - 1	5 - 10	3 - 6	Sand	Moderate	Clear	392.6	Intermittent
								797.73	Perennial
ISB	UT to Island Creek	0 - 1	5 - 15	3 - 9	Sand	Moderate	Clear	1,873.06	Perennial
ISC	UT to Harrison's Creek	0.5 - 1	5	6 - 12	Sand	Moderate	Clear	616.06	Intermittent
								615.71	Perennial

Table 3-7. Physical Characteristics of Streams in the Study Area *continued*

Stream ID	Stream Name	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Stream Determination
ISD	UT to Harrisons Creek	0.5 - 2	6 - 8	6 - 24	Sand	Moderate	Clear/Tannic	1,350.07	Perennial
IDITCH1	UT to Harrisons Creek	6-8	5	6-12	Sand	Fast	Clear/Tannic	1,775.16	OHWM ¹
JSA	UT to Old Topsail Creek	3	3	2 - 6	Sand	Slow	Slightly Turbid	109.51	OHWM ¹
								671.96	
								1,168.01	Intermittent
JSB	UT to Old Topsail Creek	2	3	2 - 6	Sand	Slow	Slightly Turbid	523.77	Intermittent
JSC	UT to Old Topsail Creek	3	3	2 - 6	Sand	Slow	Clear	729.48	Intermittent
JSD	UT to Old Topsail Creek	2	3	3 - 12	Sand	Slow	Clear	1,049.63	Intermittent
								1,314.95	Perennial
LSA	UT to Harrisons Creek	0 - 6	20	48 - 60	Sand	Slow	Clear/Tannic	709.28	Perennial
LSAA	UT to Harrisons Creek	0.5-1	3-5	6-12	Sand	Slow	Clear/Tannic	330.44	Perennial
LSAB	UT to Harrisons Creek	0.5-1	3-5	2-6	Sand	Slow	Clear/Tannic	216.05	OHWM ¹
LSB	UT to Harrisons Creek	0.5 - 1	3 - 8	3 - 6	Silt/Sand	Moderate	Clear	2,341.71	Perennial
LSC	Harrisons Creek	1 - 3	10 - 15	3 - 9	Sand	Moderate	Clear	2,897.09	Perennial
LSCA	UT to Harrisons Creek	0.5 - 1	4	2 - 6	Silt/Sand	Moderate	Clear	353.54	Intermittent
								503.33	Perennial
LSCAA	UT to Harrisons Creek	1	3	2 - 6	Silt/Sand	Moderate	Clear	530.3	Perennial
LSCB	UT to Harrisons Creek	0 - 0.5	6	2 - 6	Silt/Sand	Moderate	Clear	877.37	Perennial

Table 3-7. Physical Characteristics of Streams in the Study Area *continued*

Stream ID	Stream Name	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Stream Determination
LSCBA	UT to Harrisons Creek	0 - 0.5	3	1 - 3	Silt/Sand	Slow	Clear	65.75	OHWM ¹
LSCC	UT to Harrisons Creek	3 - 4	4	2 - 6	Silt/Sand	Slow	Turbid	456.63	Perennial
LSCD	UT to Harrisons Creek	1 - 2	2	1 - 3	Silt/Sand	Moderate	Clear	203.29	Intermittent
LSCE	UT to Harrisons Creek	3 - 4	4	1 - 3	Silt/Sand	Slow	Turbid	210.14	Intermittent
LSCF	UT to Harrisons Creek	3 - 4	3	1 - 3	Silt/Gravel	Moderate	Clear	167.22	Intermittent
LSD	Godfrey Creek	1 - 2	10	2 - 6	Sand	Slow	Clear	2,870.01	Perennial
LSDA	UT to Godfrey Creek	3	2	2 - 6	Silt/Sand	Slow	Turbid	1012.8	Intermittent
LSE	UT to Godfrey Creek	2 - 3	5 - 10	2 - 6	Sand	Moderate	Clear	1,484.12	Perennial
LTRIB1	UT to Godfrey Creek	2 - 3	5 - 10	2 - 6	Silt/Sand	Slow	Turbid	703.55	OHWM ¹
MSA	UT to Trumpeters Swamp	3	4	1 - 3	Sand	Slow	Clear	128.1	Intermittent
MSAA	UT to Trumpeters Swamp	3	4	1 - 3	Sand	Moderate	Clear	226.14	OHWM ¹
MSB	UT to Trumpeters Swamp	2	6	2 - 10	Silt/Sand	Slow	Clear	1002.8	Perennial
MSC	UT to Godfrey Creek	10	3	2 - 12	Sand	Moderate	Clear/Tannic	1,388.7	Perennial
MSCA	UT to Godfrey Creek	5	7	6-18	Sand	Fast	Clear/Tannic	445.65	Perennial
MSD	Godfrey Creek	0.5 - 1	7	2 - 24	Sand	Moderate	Clear/Tannic	1,193.96	Perennial
MSDA	UT to Godfrey Creek	3 - 4	2	2 - 6	Sand	Moderate	Clear	689.23	OHWM ¹
								186.09	Intermittent
								152.75	Perennial
MSE	UT to Harrisons Creek	0.5	3	2 - 10	Sand	Slow	Clear/Tannic	236.97	Perennial
MSF	Harrisons Creek	0.5	8 - 10	12 - 36	Sand	Slow	Clear/Tannic	1,255.75	Perennial

Table 3-7. Physical Characteristics of Streams in the Study Area *continued*

Stream ID	Stream Name	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Stream Determination
MSFA	UT to Harrisons Creek	0.5 - 1	2	2 - 8	Sand	Moderate	Clear	448.66	Perennial
MSFB	UT to Harrisons Creek	0.5 - 1	2	1 - 4	Sand	Slow	Clear	133.24	Intermittent
MSI	UT to Godfrey Creek	3	2 - 3	3 - 6	Sand	Fast	Clear	274.01	OHWM ¹
								744.77	Intermittent
MDITCH1	UT to Godfrey Creek	5	7	6-18	Sand	Stagnant	Clear/Tannic	1,025.42	OHWM ¹
MDITCH2	UT to Godfrey Creek	5	7	6-18	Sand	Stagnant	Clear/Tannic	1011.27	OHWM ¹
MDITCH3	UT to Godfrey Creek	3	2 - 3	3 - 6	Sand	Slow	Clear/Tannic	395.49	OHWM ¹
MDITCH4	UT to Godfrey Creek	3	2 - 3	3 - 6	Sand	Slow	Clear/Tannic	622.23	OHWM ¹
MDITCH5	UT to Godfrey Creek	3	2 - 3	3 - 6	Sand	Slow	Clear/Tannic	466.64	OHWM ¹
MDITCH6	UT to Godfrey Creek	3	2 - 3	3 - 6	Sand	Slow	Clear/Tannic	518.44	OHWM ¹
MDITCH7	UT to Godfrey Creek	5	7	6-18	Sand	Stagnant	Clear/Tannic	1,260.69	OHWM ¹
MDITCH8	UT to Godfrey Creek	5	7	6-18	Sand	Stagnant	Clear/Tannic	2,028.45	OHWM ¹
MDITCH9	UT to Godfrey Creek	5	7	6-18	Sand	Slow	Clear/Tannic	2,032.12	OHWM ¹
MDITCH10	UT to Godfrey Creek	3	2 - 3	3 - 6	Sand	Slow	Clear/Tannic	528.69	OHWM ¹
MDITCH11	UT to Godfrey Creek	3	2 - 3	3 - 6	Sand	Slow	Clear/Tannic	583.05	OHWM ¹
MDITCH12	UT to Godfrey Creek	3	2 - 3	3 - 6	Sand	Slow	Clear/Tannic	1,028.25	OHWM ¹
NSA	UT to AIWW ²	2 - 3	3 - 4	4 - 8	Sand	Slow	Clear	346.17	Intermittent
								129.12	Perennial
NSB	UT to AIWW ²	6	4 - 5	4 - 8	Sand	Slow	Clear	82.65	OHWM ¹
NSE	UT to AIWW ²	4 - 5	2 - 8	4 - 8	Sand	Slow	Clear	60.82	OHWM ¹
								62.11	
NSF	UT to AIWW ²	4 - 5	4 - 6	4 - 8	Sand	Slow	Slightly Turbid	483.38	Intermittent
								1,445.17	Perennial
NDITCH1	UT to AIWW ²	2-3	5-7	2-8	Sand	Slow	Clear	259.68	OHWM ¹
ZSA	UT to Pages Creek	3	3 - 4	2 - 6	Sand	Slow	Clear	79.14	Intermittent
ZSB	UT to Futch Creek	1 - 3	4 - 6	6 - 24	Sand	Fast	Tannic	452.6	Perennial

Table 3-7. Physical Characteristics of Streams in the Study Area *continued*

Stream ID	Stream Name	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Stream Determination
ZSC	UT to Mill Creek	3	4 - 5	6	Sand	Moderate	Clear	303.29	OHWM ¹
								267.96	Intermittent
ZSD	UT to Old Topsail Creek	2	2 - 3	6 - 12	Sand	Slow	Tannic	340.76	Perennial
ZSE	UT to Harrisons Creek	1	2	6 - 12	Sand	Stagnant	Clear	90.29	OHWM ¹
								16.7	
								103.73	Intermittent
ZSF	UT to Pages Creek	1	2 - 3	6 - 12	Sand	Fast	Clear	90.78	Intermittent
ZSG	UT to Pages Creek	0.5 - 3	4 - 5	4 - 8	Sand	Slow	Tannic	151.4	Perennial
ZSH	Spring Branch	2 - 3	4 - 5	4 - 8	Sand	Fast	Clear	952.87	Perennial
ZSJ	UT to Old Topsail Creek	2	5 - 6	6 - 8	Sand	Fast	Clear/Tannic	195.56	Intermittent
ZSK	UT to Prince George Creek	1 - 3	3 - 4	6 - 18	Sand	Fast	Tannic	3,216.93	Perennial
ZSL	UT to Prince George Creek	1 - 3	3 - 4	6 - 18	Sand	Fast	Tannic	322.7	Perennial
ZSM	UT to Old Topsail Creek	<1	2 - 3	4 - 10	Sand	Slow	Clear	807.98	Intermittent
ZDITCH1	UT to Mill Creek	4	3	0 - 2	Sand	Slow	Clear	187.33	OHWM ¹
ZDITCH2	UT to Mill Creek	4	3	0 - 2	Sand	Slow	Clear	213.42	OHWM ¹
ZDITCH3	UT to Mill Creek	4	3	0 - 2	Sand	Slow	Clear	385.88	OHWM ¹
ZDITCH4	UT to Mill Creek	4	3	0 - 2	Sand	Slow	Clear	169.28	OHWM ¹
ZDITCH5	UT to Mill Creek	4	3	0 - 2	Sand	Slow	Clear	147.04	OHWM ¹
ZTRIB1	UT to Old Topsail Creek	4	4	6-12	Sand	Slow	Clear	206.59	OHWM ¹
ZTRIB2	UT to Harrisons Creek	5	10	12-24	Sand	Stagnant	Slightly Turbid	430.27	OHWM ¹

¹ Resource determined by USACE to be a jurisdictional tributary based on the presence of an ordinary high water mark (OHWM) during field verification.

² Atlantic Intracoastal Waterway

3.5.3.2.2 PONDS

Eighty-five ponds are located in the study area. Ponds within the detailed study alternative corridors are shown in Figures 10-A through 10-K. Table 3-8 describes the appearance of each pond including its approximate size in acres. If the pond is directly connected to a jurisdictional stream or wetland, the name of that feature is also indicated in the table.

Table 3-8. Physical Characteristics of Ponds in the Study Area

Pond ID	Appearance	Connected Feature Map ID	Pond Area in Study Area (acres)
BPA	Stormwater Pond	No Connection	0.15
BPB	Stormwater Pond	No Connection	0.14
BPC	Residential Small Lake	No Connection	1.66
BPD	Manmade/Maintained	BWE	0.41
BPE	Stormwater Pond	BSL	4.08
BPF	Stormwater Pond	BSO	2.28
BPG	Stormwater Pond	BSO	0.60
BPH	Stormwater Pond	No Connection	0.46
BPI	Stormwater Pond	BSA	0.30
BPJ	Stormwater Pond	No Connection	0.12
BPK	Stormwater Pond	No Connection	0.07
CPA	Small Borrow Pit	CWF	0.05
EPA	Stormwater Pond	No Connection	0.03
GPA	Stormwater Pond	GWA	0.12
GPB	Stormwater Pond	GWA	0.07
GPC	Stormwater Pond	GWA	0.12
GPD	Stormwater Pond	No Connection	0.11
IPA	Maintained Farm Pond	IWA	0.11
IPA2	Stormwater Pond	IWT	0.57
IPB	Maintained Farm Pond	IWA	0.04
IPB2	Small Depression Pond	IWA	0.06
IPC	Small Depression Pond	IWT	0.08
IPD	Maintained Farm Pond	HWA	0.15

Table 3-8. Physical Characteristics of Ponds in the Study Area *continued*

Pond ID	Appearance	Connected Feature Map ID	Pond Area in Study Area (acres)
IPE	Stormwater Pond	No Connection	0.27
IPF	Manmade/Maintained	IWB	0.54
IPG	Maintained Farm Pond	No Connection	0.07
IPH	Stormwater Pond	IWT	0.11
JPA	Stormwater Pond	JWD	0.11
JPB	Stormwater Pond	No Connection	0.09
JPC	Small Depression Pond	JWJ	0.37
JPD	Cypress/Gum Depression	No Connection	2.44
JPE	Stormwater Pond	No Connection	0.10
JPF	Stormwater Pond	No Connection	0.10
JPG	Stormwater Pond	JWQ	0.07
JPH	Small Depression Pond	No Connection	0.32
KPA	Manmade/Maintained	No Connection	0.37
KPB	Cypress/Gum Depression	KWA/KWG	0.54
KPC	Manmade/Maintained	KWF	0.57
KPD	Manmade/Maintained	KWD	0.15
KPE	Stormwater Pond	KWD	0.02
KPF	Stormwater Pond	KWD	0.09
KPG	Stormwater Pond	KWE	0.26
KPH	Cypress/Gum Depression	KWA/KWG	0.09
LPA	Manmade/Maintained	LSC	0.15
LPB	Manmade/Maintained	LWF	0.50
LPC	Manmade/Maintained	LWK	0.07
LPD	Manmade/Maintained	LWA	0.33
LPE	Manmade/Maintained	No Connection	0.38
MPA	Stormwater Pond	MWJ	0.05
MPB	Stormwater Pond	MWJ	0.11
MPC	Wastewater Retention	No Connection	1.14
MPD	In-line Pond	MSDA	0.10
MPE	Small Borrow Pond	MWL	0.08
MPF	Manmade/Maintained	MWH	0.13
MPG	Manmade/Maintained	MWH	0.40

Table 3-8. Physical Characteristics of Ponds in the Study Area *continued*

Pond ID	Appearance	Connected Feature Map ID	Pond Area in Study Area (acres)
MPH	Manmade/Maintained	No Connection	0.11
MPI	Small Farm Pond	No Connection	0.08
NPA	Small Borrow Pond	No Connection	0.37
NPB	In-line Pond	NSF	0.41
NPC	Stormwater Pond	No Connection	0.06
NPD	Stormwater Pond	No Connection	0.26
NPE	Water Treatment Pond	No Connection	0.70
ZNPA	Manmade/Borrow Pond	NWP	1.24
ZNPB	Manmade/Borrow Pond	No Connection	0.74
ZPA	Manmade/Borrow Pond	GWB	0.02
ZPB	Manmade/Borrow Pond	GWB	1.96
ZPC	Manmade/Maintained	No Connection	0.60
ZPD	Stormwater Pond	No Connection	0.50
ZPE	Stormwater Pond	No Connection	0.44
ZPF	Stormwater Pond	No Connection	0.49
ZPG	Stormwater Pond	ZWBB	0.15
ZPH	Manmade/Excavated	No Connection	0.13
ZPI	Stormwater Pond	ZWAA	0.10
ZPJ	Stormwater Pond	ZWAA	0.54
ZPK	Stormwater Pond	ZWAA	0.07
ZPL	Stormwater Pond	No Connection	0.65
ZPM	Stormwater Pond	ZWBB	0.08
ZPN	Stormwater Pond	No Connection	0.08
ZPO	Stormwater Pond	No Connection	0.08
ZPP	Stormwater Pond	ZWG	0.21
ZPQ	Stormwater Pond	No Connection	0.16
ZPR	Manmade/Maintained	No Connection	0.11
ZPS	Stormwater Pond	No Connection	0.72
ZPT	Manmade/Maintained	No Connection	0.03
ZPU	Small Depression Pond	No Connection	0.05

3.5.3.2.3 WETLANDS

A total of 286 jurisdictional wetlands were identified within the study area. Wetlands within the detailed study alternative corridors are shown in Figures 10-A through 10-K. Wetland classification and quality rating data are presented in Table 3-9. All wetlands in the study area are within the Cape Fear River basin (USGS Hydrologic Units 03030007 and 03020302).

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
BWB	PFO4B	Non-riparian	27	0.31
BWC	PFO	Non-riparian	25	0.35
BWD	PFO	Non-riparian	34	5.02
BWI	PFO1/3/4B	Non-riparian	34	11.09
CWA	PFO3/4A	Non-riparian	34	28.42
CWB	PSS3/4B	Non-riparian	36	66.17
CWC	PSS3/4Bd	Non-riparian	36	15.02
CWD	PSS3/4Bd	Non-riparian	36	26.5
CWE	PFO3/4Bg	Non-riparian	36	65.5
		Riparian		3.51
CWF	PFO3/4B	Non-riparian	36	61.44
DWC	PSS3/4B	Non-riparian	36	286.63
EWA	No ID	Non-riparian	15	0.35
EWB	No ID	Non-riparian	13	0.22
EWC	No ID	Riparian	16	2.81
EWD	No ID	Non-riparian	19	1.39
EWF	PFO	Riparian	14	0.46
EWH	PFO	Non-riparian	20	1.52
EWH1	PFO	Riparian	20	4.09
EWI	PFO	Riparian	37	2.77
EWJ	PFO	Riparian	15	3.81
EWK	PSS1C	Non-riparian	25	1.69
EWL	PSS1C	Non-riparian	23	1
EWM	PF01C	Riparian	19	5.86
EWN	PFO	Non-riparian	15	0.04
EWO	PUB4C	Non-riparian	20	0.43
EWP	PUB4C	Non-riparian	20	0.39
EWQ	PUB4C	Non-riparian	20	0.07

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
EWR	PUB4C	Non-riparian	20	0.44
EWS	PUB4C	Non-riparian	20	0.13
FWA	PFO	Non-riparian	30	2.5
FWB	PFO	Riparian	20	9.85
FWC ²	PFO	Non-riparian	48	21.5
		Riparian		11.18
FWD	PSS3B	Non-riparian	28	32.25
FWF	PFO	Non-riparian	37	20.91
		Riparian		2.69
FWH	PFO	Non-riparian	33	0.86
FWHA	PFO	Non-riparian	29	2.11
FWHB	PFO	Non-riparian	24	0.48
FWHC	PFO	Non-riparian	24	0.73
FWI	PFO	Non-riparian	17	1.25
FWJ	PFO	Non-riparian	17	0.6
FWK	PFO	Non-riparian	17	1.12
FWL	PFO	Non-riparian	19	1.1
FWX	PFO	Non-riparian	31	0.15
FWY	PFO	Non-riparian	20	1.01
GWA	PEM/PSS	Riparian	61	25.15
GWB ³	PSS	Non-riparian	32	18.99
GWC	PFO	Non-riparian	32	138.14
GWD	PFO	Non-riparian	32	19.74
		Riparian		3.13
GWF	PFO	Riparian	19	0.02
GWH	PFO	Riparian	54	0.26
GWZ	PSS	Non-riparian	19	0.41
HBAA ⁴	PSS/PFO	Riparian	32	2.29
HBAB	PSS/PFO	Non-riparian	27	4.13
HBWA	PFO	Riparian	32	0.69
HBWB	PSS/PFO	Riparian	32	0.08
HBWD	PSS/PFO	Riparian	83	59.92
HBWE	PSS	Riparian	32	0.05
HBWF	PEM/PSS	Riparian	32	5.42
HBWG	PSS/PFO	Non-riparian	32	3.01

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
		Riparian		1.68
HBWH	PFO	Non-riparian	20	0.43
HBWH2	PFO	Non-riparian	20	0.11
HBWH3	PFO	Non-riparian	20	0.03
HBWI	PSS/PFO	Riparian	32	0.74
HBWK ⁵	PFO/PSS	Riparian	83	72.63
HBWL	PFO/PSS	Non-riparian	18	0.28
HBWM	PFO/PSS	Non-riparian	18	0.23
HBWN	PFO	Non-riparian	18	0.11
HBWO	PSS	Non-riparian	14	1.14
HBWQ	PFO	Non-riparian	18	0.04
HBWR	PSS/PFO	Non-riparian	18	0.43
HBWS	PFO/PSS	Non-riparian	18	0.48
HBWT	PSS	Non-riparian	14	0.39
HBWV	PSS	Non-riparian	14	0.15
HBWX	PSS/PFO	Non-riparian	14	0.06
HBWY	PSS/PFO	Non-riparian	32	0.06
HWA	PFO	Riparian	21	1.8
HWB	PFO	Riparian	50	10.53
HWC	PSS	Non-riparian	15	0.15
HWD	PFO	Non-riparian	21	1.5
HWE	PFO/PSS	Non-riparian	27	13.84
HWF	PFO/PSS	Non-riparian	15	0.35
HWG ⁶	PFO/PSS	Riparian	15	8.2
		Non-riparian		1.64
HWH	PFO	Non-riparian	26	0.15
HWH1	PFO	Non-riparian	26	0.09
HWH2	PFO	Non-riparian	26	0.03
HWH3	PFO	Non-riparian	26	0.07
HWH4	PFO	Non-riparian	26	0.02
HWH5	PFO	Non-riparian	26	0.23
HWH6	PFO	Non-riparian	26	0.1
HWI	PFO	Non-riparian	26	0.02
HWJ	PFO	Non-riparian	26	0.03
HWK	PFO	Non-riparian	26	1.05

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
HWL	PFO	Non-riparian	26	0.32
HWL1	PFO	Non-riparian	26	0.06
HWP	PSS	Non-riparian	26	0.26
HWR	PFO	Riparian	51	0.09
HWS	PFO	Riparian	44	2.53
HWT	PFO	Non-riparian	15	0.24
HWU	PFO	Non-riparian	15	0
HWV	PFO/PSS	Non-riparian	38	0.07
HWY	PFO	Non-riparian	26	0.33
HWZ	PFO	Non-riparian	21	0.66
HWAA ⁷	PFO	Non-riparian	40	123.09
		Riparian		11.02
HWCC	PFO	Non-riparian	25	0.04
HWDD	PFO	Non-riparian	25	0.1
HWEE	PFO	Riparian	25	0.56
HWFF	PFO/PSS	Riparian	34	1.49
HWGG	PSS	Riparian	34	1.39
HWHH	PFO	Non-riparian	34	1.57
HWJJ	PFO	Riparian	34	1.86
HWKK	PFO	Non-riparian	21	0.92
HWMM ⁸	PFO	Non-riparian	36	19.77
		Riparian		1.37
HWMX	PFO	Non-riparian	40	1.19
IWA	PFO	Riparian	80	2.78
IWA_MM	PFO	Non-riparian	39	22.78
IWB	PFO	Riparian	25	1.62
IWC	PFO	Riparian	20	0.49
IWD	PFO	Non-riparian	31	31.3
		Riparian		2.13
IWE	PFO	Non-riparian	13	0.16
IWF ⁹	PFO	Riparian	69	15.86
		Non-riparian		6.7
IWG_CC1	PFO	Non-riparian	41	0.94
IWG_CC2	PFO	Non-riparian	41	0.44
IWG_CC3	PFO	Non-riparian	41	0.99

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
IWH ¹⁰	PFO	Non-riparian	53	19.26
		Riparian		3.83
IWJ	PFO	Non-riparian	10	2.85
IWK	PFO	Riparian	77	20.43
		Non-riparian		6
IWL	PFO	Riparian	33	1.75
IWM	PFO	Non-riparian	11	4.15
IWN	PFO	Riparian	79	40.49
IWO	PFO	Non-riparian	7	0.16
IWP	PFO	Non-riparian	15	0.13
IWQ	PFO	Non-riparian	7	0.64
IWS	PFO	Non-riparian	10	1.3
IWT ¹¹	PFO	Non-riparian	41	56.09
		Riparian		9.16
IWU	PFO	Non-riparian	13	0.45
IWV	PFO	Non-riparian	42	13.77
IWW	PFO	Non-riparian	45	43.84
JWA	PFO	Non-riparian	4	0.04
JWB	PFO	Non-riparian	7	0.01
JWC	PFO	Non-riparian	14	0.39
JWD	PFO	Non-riparian	22	3.67
		Riparian		2.18
JWG	PFO	Riparian	15	0.94
JWH	PFO	Riparian	34	0.08
JWI	PFO	Riparian	26	5.87
JWJ	PFO	Non-riparian	35	1.02
JWK	PFO	Non-riparian	14	0.42
JWL	PFO	Non-riparian	22	0.38
JWM	PFO	Non-riparian	9	0.79
JWN	PFO	Riparian	6	0.52
JWO	PFO	Non-riparian	12	0.24
JWP	PFO	Riparian	13	0.38
JWQ	PFO	Riparian	82	3.57
JWR	PFO	Riparian	10	0.09
JWS	PFO	Riparian	69	2.06

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
JWT	PFO	Riparian	73	2.27
JWU	PFO	Riparian	26	0.68
KWA	PFO3/4B	Non-riparian	30	24.46
KWB	PFO1/2C	Non-riparian	22	3.19
KWC	PFO1/2C	Non-riparian	17	11.77
KWD	PFO4A	Non-riparian	26	19.49
KWE	PFO4Bd	Non-riparian	19	5.77
KWF	PFO/PSS	Non-riparian	45	29.15
KWG	PFO1/2G	Non-riparian	43	13.05
KWH ¹²	PFO1/2C	Non-riparian	42	17.5
KWI	PFO1/3/4B	Non-riparian	49	139.44
KWN	PFO4B	Non-riparian	46	80.96
KWO	PFO4B	Non-riparian	37	28.95
KWS	PFO1/4B	Non-riparian	33	4.11
KWST	PFO2/4Eg	Non-riparian	39	0.1
LWA	PFO	Riparian	70	5.8
LWB	PFO	Riparian	72	12.09
LWC ¹³	PFO	Non-riparian	30	1.72
LWD	PFO	Riparian	83	18.98
LWD1	PFO	Riparian	48	0.08
LWE	PFO	Non-riparian	29	24.36
LWF	PFO	Non-riparian	11	0.28
LWG	PFO	Non-riparian	46	1.04
LWH	PFO	Non-riparian	23	0.2
LWI	PFO	Riparian	80	15.79
LWJ	PFO	Non-riparian	40	44.05
LWJA	PFO	Non-riparian	21	0.16
LWK	PFO	Non-riparian	78	8.11
		Riparian		6.17
LWL	PFO	Riparian	76	4.94
MWA ¹⁴	PSS/PFO	Non-riparian	36	17.95
MWC	PFO4	Non-riparian	31	59.18
MWE	PFO/PSS	Non-riparian	30	9.43
MWF	PFO	Non-riparian	19	7.66
MWG	PFO/PSS	Non-riparian	20	0.32

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
MWH ¹⁵	PFO	Non-riparian	33	70.31
MWI	PFO4	Non-riparian	20	0.03
MWJ	PFO	Non-riparian	33	31.44
MWK	PFO4	Non-riparian	20	0.57
MWL	PFO	Riparian	68	18.08
		Non-riparian		9.04
MWM(1)	PFO	Non-riparian	25	28.79
MWM(2)	PFO	Riparian	68	14.31
		Non-riparian		11.95
MWN(1)	PFO	Riparian	25	0.1
MWN(2)	PFO	Non-riparian	21	0.13
MWX	PFO	Non-riparian	25	1.63
MWY	PFO	Riparian	25	1.41
MWZ	PFO	Non-riparian	25	4.73
MWAA	PFO	Non-riparian	25	6.33
NWA	PFO	Non-riparian	12	0.63
NWB	PEM/PFO	Non-riparian	13	3.72
NWC	PEM/PFO	Non-riparian	12	0.18
NWD	PSS	Non-riparian	12	1.28
NWE	PEM/PFO	Non-riparian	12	3.18
NWF	PEM/PSS	Non-riparian	12	0.35
NWG	PEM	Non-riparian	12	0.01
NWH	PEM	Non-riparian	12	0.09
NWI	PEM	Non-riparian	12	0.03
NWJ	PSS/PFO	Non-riparian	12	0.22
NWK	PSS	Non-riparian	12	2.23
NWL	PSS	Riparian	50	2.89
NWM	PFO	Non-riparian	22	4.07
NWN	PFO4A	Non-riparian	12	1.64
NWO	PFO4	Non-riparian	17	5.01
NWP	PSS	Non-riparian	17	104.38
NWQ	PSS	Riparian	12	0.48
NWS	PSS	Non-riparian	17	3.3
ZWA	PFO	Non-riparian	19	0.44
ZWB	PFO	Non-riparian	23	1.89
ZWC	PEM	Non-riparian	26	2.1

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
ZWD	PFO	Non-riparian	16	1.13
ZWE	PSS	Non-riparian	21	3.65
ZWF	PSS	Non-riparian	16	0.51
ZWG	PSS	Non-riparian	24	2.08
ZWH	PFO	Non-riparian	20	0.11
ZWJ	PFO	Non-riparian	26	1.69
ZWK	PEM	Non-riparian	16	0.08
ZWL	PFO	Non-riparian	20	0.24
ZWM	PFO	Non-riparian	20	0.04
ZWO	PFO	Non-riparian	22	1.1
ZWP	PFO	Non-riparian	20	0.54
ZWQ	PSS	Riparian	40	0.7
ZWS	PFO	Non-riparian	36	15.99
ZWT	PFO	Non-riparian	16	1.18
ZWU	PFO	Non-riparian	16	0.12
ZWV	PFO	Riparian	39	0.17
ZWW	PFO	Riparian	23	1.16
ZWX	PFO	Riparian	16	0.3
ZWY	PFO	Non-riparian	10	0.08
ZWZ	PFO	Riparian	34	0.1
ZWAA	PFO	Non-riparian	22	0.79
ZWBB	PFO	Riparian	40	1.44
ZWCC	PFO	Riparian	28	0.85
ZWDD	PFO	Non-riparian	26	6.69
		Riparian		1.46
ZWGG	PSS	Non-riparian	16	12.32
ZJWMM	PFO	Riparian	30	1.22
PD-01 ¹⁶	PFO/PSS	Non-riparian	N/A	1.41
PD-02	PFO/PSS	Non-riparian	N/A	0.23
PD-03	PFO/PSS	Non-riparian	N/A	32.37
PD-04	PFO/PSS	Non-riparian	N/A	25.49
PD-05	PFO/PSS	Non-riparian	N/A	0.14
PD-06	PFO/PSS	Riparian	N/A	1.36
PD-07	PFO/PSS	Riparian	N/A	0.1
PD-08	PFO/PSS	Riparian	N/A	0.03
PD-09	PFO/PSS	Non-riparian	N/A	0.39

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

Wetland ID	Cowardin ¹ Classification	Hydrologic Classification	DWQ Wetland Rating	Wetland Area in Study Area (acres)
PD-10	PFO/PSS	Non-riparian	N/A	0.72
PD-11	PFO/PSS	Non-riparian	N/A	0.7
PD-12	PFO/PSS	Non-riparian	N/A	0.15
PD-13	PFO/PSS	Non-riparian	N/A	0.43
PD-14	PFO/PSS	Non-riparian	N/A	0.53
PD-15	PFO/PSS	Non-riparian	N/A	0.53
PD-16	PFO/PSS	Non-riparian	N/A	0.63
PD-17	PFO/PSS	Non-riparian	N/A	22.81
		Riparian		5.58
PD-18	PFO/PSS	Non-riparian	N/A	1.73
PD-19	PFO/PSS	Non-riparian	N/A	0.41
PD-20	PFO/PSS	Non-riparian	N/A	0.01
PD-21	PFO/PSS	Non-riparian	N/A	0.43
PD-22	PFO/PSS	Non-riparian	N/A	0.02
PD-23	PFO/PSS	Non-riparian	N/A	0.51
PD-24	PFO/PSS	Non-riparian	N/A	7.52
PD-25	PFO/PSS	Non-riparian	N/A	46.3
PD-26	PFO/PSS	Non-riparian	N/A	0.04
PD-27	PFO/PSS	Riparian	N/A	3.34
PD-28	PFO/PSS	Non-riparian	N/A	0.28
PD-29	PFO/PSS	Non-riparian	N/A	28.36
PD-30	PFO/PSS	Non-riparian	N/A	2.89
PD-31	PFO/PSS	Non-riparian	N/A	17.84
PD-32	PFO/PSS	Non-riparian	N/A	3.86
		Riparian		1.59
PD-33	PFO/PSS	Non-riparian	N/A	8.17
		Riparian		1.98
PD-34	PFO/PSS	Non-riparian	N/A	2.93
PD-35	PFO/PSS	Non-riparian	N/A	9.84
PD-36	PFO/PSS	Non-riparian	N/A	0.15
PD-37	PFO/PSS	Non-riparian	N/A	2.9
PD-38	PFO/PSS	Non-riparian	N/A	1.63

¹ Cowardin classifications are based on characteristics of each wetland at the specific time and location of observation. Wetlands having 'No ID' were not characterized due to impacted appearance at the time of observation

Table 3-9. Jurisdictional Characteristics of Wetlands in the Study Area *continued*

² Includes wetland FWE	¹⁰ Includes wetland IWI
³ Includes wetland ZGWB	¹¹ Includes wetlands IWR
⁴ Includes wetland HBAC	¹² Includes wetlands KWJ, KWK, and KWL
⁵ Includes wetland HBWP	¹³ Includes wetland MWO
⁶ Includes wetlands HWM, HWN, HWO	¹⁴ Includes wetland NWR
⁷ Includes wetlands HWBB, HWII, HWLL	¹⁵ Includes wetlands MWH(2-8)
⁸ Includes HWW	¹⁶ Delineation data previously verified; no DWQ wetland rating forms completed for these wetlands
⁹ Includes wetland IWG	

3.5.4 JURISDICTIONAL ISSUES

3.5.4.1 WATERS OF THE UNITED STATES

Section 404 of the Clean Water Act requires regulation of discharges into “Waters of the United States.” The US Environmental Protection Agency (USEPA) is the principal administrative agency of the Clean Water Act; however, the US Army Corps of Engineers (USACE) has the responsibility for implementation, permitting, and enforcement of the provisions of the Act. The USACE regulatory program is defined in 33 CFR 320-330.

Surface waters (lakes, rivers, and streams) and wetlands are subject to jurisdictional consideration under the Section 404 program. Any action that proposes to place fill into these areas falls under the jurisdiction of the USACE under Section 404 of the Clean Water Act (33 U.S.C. 1344).

Section 401 of the Clean Water Act grants authority to individual states for regulation of discharges into “Waters of the United States.” Under North Carolina General Statutes, 113A “Pollution Control and Environment” and codified in NCAC 15A, the NCDWQ has the responsibility for implementation, permitting, and enforcement of the provisions of the Act.

3.5.4.2 BUFFER AREAS

Streams within the study area are part of the Cape Fear River basin. Therefore, no North Carolina River Basin Buffer Rules apply to streams in the study area.

3.5.4.3 PROTECTED SPECIES

Some populations of fauna and flora have been, or are in the process of decline due to either natural forces or their inability to coexist with humans. Federal law (under the provisions of Section 7 of the Endangered Species Act [ESA] of 1973, as amended) requires that any action likely to adversely affect a species classified as federally-protected be subject to review by the US Fish and Wildlife Service (USFWS). Prohibited actions which may affect any species protected under the ESA are outlined in Section 9 of the Act.

Species which are listed, or are proposed for listing, as endangered (E) or threatened (T) are recorded in Section 4 of the ESA. As defined by the ESA, an endangered species is any plant or animal which is in danger of extinction throughout all or a significant portion of its range within the foreseeable future. A threatened species is any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

As of September 22, 2010, the USFWS lists 11 federally protected species for New Hanover County and 12 federally protected species for Pender County (Table 3-10). As of September 22, 2010, the USFWS does not list any candidate species for New Hanover or Pender Counties. Habitat requirements for each species are based on the current best available information as per referenced literature and USFWS correspondence.

Table 3-10. Federally Protected Species Listed for New Hanover & Pender Counties

Scientific Name	Common Name	Federal Status	Habitat Present	County
<i>Alligator mississippiensis</i>	American alligator	T(S/A)	Yes	New Hanover Pender
<i>Chelonia mydas</i>	Green sea turtle	T	No	New Hanover Pender
<i>Caretta caretta</i>	Loggerhead sea turtle	T	No	New Hanover Pender
<i>Charadrius melodus</i>	Piping plover	T	No	New Hanover Pender
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	Yes	New Hanover Pender
<i>Acipenser brevirostrum</i>	Shortnose sturgeon	E	No	New Hanover Pender
<i>Trichechus manatus</i>	West Indian manatee	E	No	New Hanover Pender
<i>Schwalbea americana</i>	American chaffseed*	E	Yes*	Pender
<i>Thalictrum cooleyi</i>	Cooley's meadowrue	E	Yes	New Hanover Pender
<i>Carex lutea</i>	Golden sedge	E	Yes	New Hanover Pender
<i>Lysimachia asperulaefolia</i>	Rough-leaved loosestrife	E	Yes	New Hanover Pender
<i>Amaranthus pumilus</i>	Seabeach amaranth	T	No	New Hanover Pender

E – Endangered T – Threatened T(S/A) - Threatened due to Similarity of Appearance

* Historic record (the species was last observed in the county more than 50 years ago)

American alligator

In North Carolina, alligators have been recorded in nearly every coastal county and many inland counties to the fall line. The alligator is found in rivers, streams, canals, lakes, swamps, and coastal marshes. Adult animals are highly tolerant of salt water, but the young are apparently more sensitive, with salinities greater than five parts per thousand considered harmful. The American alligator remains on the protected species list due to its similarity in appearance to the Endangered American crocodile.

Suitable habitat is present for American alligator in the study area.

Green sea turtle

The green sea turtle is found in temperate and tropical oceans and seas. Nesting in North America is limited to small communities on the east coast of Florida requiring beaches with minimal disturbances and a sloping platform for nesting (they do not nest in North Carolina). The green sea turtle can be found in shallow waters. They are attracted to lagoons, reefs, bays, mangrove swamps and inlets where an abundance of marine grasses can be found, as this is the principle food source for the green turtle.

Suitable habitat for green sea turtle does not exist in the study area.

Loggerhead turtle

The loggerhead is widely distributed within its range, and is found in three distinct habitats during their lives. These turtles may be found hundreds of miles out in the open ocean, in nearshore areas, or on coastal beaches. In North Carolina, this species has been observed in every coastal county. Loggerheads occasionally nest on North Carolina beaches, and are the most common of all the sea turtles that visit the North Carolina coast. They nest nocturnally, at two to three year intervals, between May and September, on isolated beaches that are characterized by fine-grained sediments. In nearshore areas, loggerheads have been observed in bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky places, and shipwrecks are often used as foraging areas.

Suitable habitat for loggerhead turtle does not exist in the study area.

Piping plover

The piping plover breeds along the entire eastern coast of the United States. North Carolina is the only state where the piping plover's breeding and wintering ranges overlap and the birds are present year-round. They nest most commonly where there is little or no vegetation, but some may nest in stands of beachgrass. The nest is a shallow depression in the sand that is usually lined with shell fragments and light-colored pebbles.

Suitable habitat for piping plover does not exist in the study area.

Red-cockaded woodpecker

The red-cockaded woodpecker (RCW) typically occupies open, mature stands of southern pines, particularly longleaf pine (*Pinus palustris*), for foraging and nesting/roosting habitat. The RCW excavates cavities for nesting and roosting in living pine trees, aged 60 years or older, and which are contiguous with pine stands at least 30 years of age to provide foraging habitat. The foraging range of the RCW is normally no more than 0.5 mile.

Suitable RCW foraging and nesting/roosting habitat is present throughout the study area.

Shortnose sturgeon

Shortnose sturgeon occur in most major river systems along the eastern seaboard of the United States. The species prefers the nearshore marine, estuarine, and riverine habitat of large river systems. It is an anadromous species that migrates to faster-moving freshwater areas to spawn in the spring, but spends most of its life within close proximity of the river's mouth. Large freshwater rivers that are unobstructed by dams or pollutants are imperative to successful reproduction.

Suitable habitat for shortnose sturgeon does not exist in the study area.

West Indian manatee

Manatees have been observed in all the North Carolina coastal counties. Manatees are found in canals, sluggish rivers, estuarine habitats, salt water bays, and as far off shore as 3.7 miles. They utilize freshwater and marine habitats at shallow depths of five to 20 feet. In the winter, between October and April, manatees concentrate in areas with warm water. During other times of the year, habitats appropriate for the manatee are those with sufficient water depth, an adequate food supply, and in proximity to freshwater. Manatees require a source of freshwater to drink. Manatees are primarily herbivorous, feeding on any aquatic vegetation present, but they may occasionally feed on fish.

Suitable habitat for West Indian manatee does not exist in the study area.

American chaffseed

American chaffseed generally occurs in habitats described as open, moist to dryish mesic pine flatwoods and longleaf pine flatlands, pine savannas, and other open grass/sedge-dominated communities. This herb also occurs in the ecotonal areas between peaty wetlands and xeric sandy soils and on the upper ecotones of, or sites close, to streamhead pocosins. The species prefers sandy peat or sandy loam, acidic, seasonally moist to dry soils in sunny or partly sunny areas subject to frequent fires in the growing season. The plant is dependent on factors such as fire, mowing, or fluctuating water tables to maintain its required open to partly-open habitat. Most extant populations, and all of the most vigorous populations, are in areas subject to frequent fire. This species is

also known to occur on road cuts and power line rights of way that experience frequent mowing or clearing. Soil series that it is found on include Blaney, Candor, Gilead, Fuquay, Lakeland, and Vacluse.

Suitable habitat for American chaffseed is present in the study area.

Cooley's meadowrue

Cooley's meadowrue, documented in the pine savanna natural community, occurs in circumneutral soils in sunny, moist to wet grass-sedge bogs, wet-pine savannas over calcareous clays, and savannah-like areas, often at the ecotones of intermittent drainages or non-riverine swamp forests. This rhizomatous perennial herb is also found along plowed firebreaks, roadside ditches and rights of way, forest clearings dominated by grass or sedge, and power line or utility rights of way. The species requires some type of disturbance (*e.g.*, mowing, clearing, periodic fire) to maintain its open habitat. The plant typically occurs on slightly acidic (pH 5.8-6.6) soils that are loamy fine sand, sandy loam, or fine sandy loam; at least seasonally moist or saturated; and mapped as Foreston, Grifton, Muckalee, Torhunta, or Woodington series. Atlantic white cedar, tulip poplar, golden sedge, and bald and pond cypress are a few of its common associate species.

Suitable habitat for Cooley's meadowrue is present in the study area.

Golden sedge

Golden sedge grows in sandy soils overlying calcareous deposits of coquina limestone, where the soil pH, typically between 5.5 and 7.2, is unusually high for this region. This perennial prefers the ecotone between the pine savanna and adjacent wet hardwood or hardwood/conifer forest. Most plants occur in the partially shaded savanna/swamp where occasional to frequent fires favor an herbaceous ground layer and suppress shrub dominance. Soils supporting the species are very wet to periodically shallowly inundated. The plant can occur in disturbed areas such as roadside and drainage ditches or power line rights of way, where mowing and/or very wet conditions suppress woody plants. Poorly viable populations may occur in significantly disturbed areas where ditching activities that lower the water table and/or some evidence of fire suppression threatens the species. Tulip poplar, pond cypress, red maple, wax myrtle, colic root, and Cooley's meadowrue are a few of its associate species.

Suitable habitat for golden sedge is present in the study area.

Rough-leaved loosestrife

Rough-leaved loosestrife generally occurs in the ecotones or edges between longleaf pine uplands and pond pine pocosins in dense shrub and vine growth on moist to seasonally saturated sands and on shallow organic soils overlaying sand (spodosolic soils). Occurrences are found in such disturbed habitats as roadside depressions, maintained power and utility line rights of way, firebreaks, and trails. The species prefers full sunlight, is shade intolerant, and requires areas of disturbance (*e.g.*, clearing, mowing, periodic burning) where the overstory is minimal. It can, however, persist vegetatively

for many years in overgrown, fire-suppressed areas. Blaney, Gilead, Johnston, Kalmia, Leon, Mandarin, Murville, Torhunta, and Vaucluse are some of the soil series that occurrences have been found on.

Suitable habitat for rough-leaved loosestrife is present in the study area.

Seabeach amaranth

Seabeach amaranth occurs on barrier island beaches where its primary habitat consists of overwash flats at accreting ends of islands, lower foredunes, and upper strands of noneroding beaches (landward of the wrack line). In rare situations, this annual is found on sand spits 160 feet or more from the base of the nearest foredune. It occasionally establishes small temporary populations in other habitats, including sound-side beaches, blowouts in foredunes, interdunal areas, and on sand and shell material deposited for beach replenishment or as dredge spoil. The plant's habitat is sparsely vegetated with annual herbs (forbs) and, less commonly, perennial herbs (mostly grasses) and scattered shrubs. It is, however, intolerant of vegetative competition and does not occur on well-vegetated sites. The species usually is found growing on a nearly pure silica sand substrate, occasionally with shell fragments mixed in. Seabeach amaranth appears to require extensive areas of barrier island beaches and inlets that function in a relatively natural and dynamic manner. These characteristics allow it to move around in the landscape, occupying suitable habitat as it becomes available.

Suitable habitat for seabeach amaranth does not exist in the study area.

3.5.4.4 BALD EAGLE AND GOLDEN EAGLE PROTECTION ACT

The bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered Species effective August 8, 2007. The bald eagle remains federally-protected under the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d). The Eagle Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb".

Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large, dominant trees are utilized for nesting sites, typically within one mile of open water. Potential foraging habitat for bald eagle exists in the study area in the form of a large open water cypress swamp immediately south of Sidbury Road. This area was delineated as a wetland during field investigations and is shown on Figure 10-F as wetland GWA. The open water component of wetland GWA extends beyond the study area and encompasses approximately 17 acres. During field investigations, two independent sightings of an adult bald eagle were observed in the area of wetland GWA.

3.5.4.5 ESSENTIAL FISH HABITAT

The National Marine Fisheries Service has developed fishery management plans for Essential Fish Habitats (EFH) in various waters of the United States. The management plans are directed towards maintaining functioning, profitable commercial fishery populations with a long-term recommendation of “no net loss” of existing habitat. The South Atlantic Region has developed mapping depicting in-land primary and secondary nursery areas for certain commercial species. A review of North Carolina Division of Marine Fisheries maps in July 2010 did not indicate any anadromous fish spawning areas, shellfish growing areas, or primary nursery areas present in the study area.

3.5.4.6 AREAS OF ENVIRONMENTAL CONCERN

An on-site field meeting was held in May 2010 with the North Carolina Division of Coastal Management to review the potential for Areas of Environmental Concern within the study area. At the field review it was determined that no Coastal Area Management Act Areas of Environmental Concern are present in the study area.

3.5.4.7 ANADROMOUS FISH HABITAT

Anadromous fish are species that spend their adult lives in the ocean but return to freshwater habitats to reproduce. A review of North Carolina Division of Marine Fisheries maps in July 2010 determined no anadromous fish spawning areas are present in the study area.

Harrisons Creek and Island Creek are designated as inland waters under the jurisdiction of the North Carolina Wildlife Resources Commission (NCWRC).

3.5.4.8 SUBMERGED AQUATIC VEGETATION

There is no submerged aquatic vegetation present in the study area.

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter identifies the beneficial and adverse social, economic and environmental consequences of each detailed study alternative. Both human and natural environmental resources within the study area, or alternative corridors, were identified in Chapter 3. A preliminary design was established within each detailed study alternative corridor for the purpose of assessing environmental and socioeconomic impacts. The direct and indirect impacts presented in this chapter are based on preliminary design plans. A preferred alternative will be selected following distribution of this document and after a public hearing has been held. The selection will be based on impact analysis, public comments and agency review.

4.1 HUMAN ENVIRONMENT IMPACTS

4.1.1 COMMUNITY IMPACTS

Community cohesion in most of the study area is not expected to be impacted by either the proposed Military Cutoff Road Extension or the proposed US 17 Hampstead Bypass. However, in small focused areas, some changes are expected. The most likely areas to experience change would be in the vicinity of the proposed Hampstead Bypass interchange at NC 210. This area is characterized by rural residential development, with a few nearby businesses. The stability of the rural community in these areas could be affected by people potentially moving away if they don't feel that the new interchange is compatible with their community.

Since Military Cutoff Road Extension will be limited control of access, it will provide alternative access points to some neighborhoods north of Ogden Park. Access to existing commercial properties generally would be maintained, though the pattern of access may change. No neighborhood or commercial access issues have been identified for the Hampstead Bypass.

Development patterns may be affected by the Hampstead Bypass alternatives in areas where new access is provided. It is expected that the market for development may shift somewhat along NC 210 to include higher intensity residential uses and potentially business uses clustered around the proposed interchange. All of the Hampstead Bypass alternatives will cross proposed Bayberry Farms and East Haven developments.

It is anticipated that through traffic along existing US 17 through Hampstead will be transferred to the Hampstead Bypass. Existing US 17 between the proposed Hampstead Bypass northern interchange west of Grandview Drive to east of Leeward Lane would be converted into a service road. There would be no connection between the service road and Hampstead Bypass where it ties back in to US 17 near Leeward Lane. Some local traffic patterns will change. Traffic volumes along existing US 17 are expected to remain high. However, businesses that rely on drive-by traffic would likely see a reduction in those customers. For local traffic remaining on existing US 17, the resulting reduced traffic delays should improve accessibility to businesses. The 2007 Pender

County Collector Street Plan recommends a “village boulevard” cross section for existing US 17 in the Hampstead area. This concept would include a landscaped median and buffers, pedestrian and bicycle facilities, and improved access management. Removal of through traffic and restricted accessibility to existing US 17 through Hampstead will help support this local vision of a pedestrian-friendly, main street-type facility.

Population growth in both New Hanover and Pender Counties is forecasted to exceed the state’s rate in the coming decades. Local plans and zoning are in place to guide anticipated growth. Future land use maps and zoning maps show that growth is expected along the US 17 corridor and major adjoining roads, including NC 210. Both Military Cutoff Road Extension and the Hampstead Bypass have been included in local growth projections. It is anticipated that neither project would substantially alter growth beyond what is already expected by local planners. Growth, particularly along existing roadways such as US 17, is expected to continue with or without these projects.

4.1.2 COMMUNITY FACILITIES AND SERVICES

All of the Hampstead Bypass alternatives are in close proximity to the Topsail High School and Topsail Middle School campus and adjacent to Holly Shelter Game Land. Direct impacts to these facilities are not anticipated.

Both of the Military Cutoff Road Extension alternatives follow an alignment that goes between the eastern and western portions of Ogden Park. The park boundary was designed to accommodate a transportation corridor and the proposed project does not cross park property. Military Cutoff Road Extension will be carried over Ogden Park Drive with a bridge and current access between the park sections will be maintained. Fences will be located along Military Cutoff Road Extension through the park area, which will prevent visitors from having direct access to Military Cutoff Road Extension from within the park. It is anticipated that pedestrian access to existing multi-use path facilities and Ogden Park would be improved if pedestrian facilities are constructed. Views will be diminished equally by either Military Cutoff Road Extension alternative from Ogden Park. As vegetation is removed and replaced by asphalt, the roadway will change views in a portion of the park from a more intimate recreational setting to a more urban/disturbed environment.

Both Military Cutoff Road Extension alternatives will impact the driving range on Market Street at Military Cutoff Road.

Both of the Military Cutoff Road Extension alternatives will affect two cemeteries:

- Prospect Cemetery is located adjacent to Military Cutoff Road just south of its intersection with Market Street. The relocation of grave sites is not anticipated as a result of the proposed project. Currently, access to Prospect Cemetery is permitted from Market Street via a service road and from Military Cutoff Road. Access to the cemetery from Military Cutoff Road would not be permitted under either Alternative M1 or Alternative M2. Access to Prospect Cemetery will be further evaluated during final roadway design.

- Mount Ararat AME Church, located at Market Street and Ogden Park Drive, has a small cemetery adjacent to Market Street. Grave sites in this cemetery could be impacted by Alternatives M1 and M2.

Hampstead Bypass Alternatives EH, O, and R will each result in the displacement of three churches: St. John the Apostle Catholic Church, Angel Food Ministries, and Topsail Baptist Church. Hampstead Bypass Alternative U will result in the displacement of eight churches (St. Stephen AME Zion Church, Wesley Chapel United Methodist Church, Scotts Hill Baptist Church and Administrative Office, First Baptist Church, “Old” Scotts Hill AME Zion Church, St. John the Apostle Catholic Church, Angel Food Ministries, and Topsail Baptist Church) and one pre-school (Creative Minds Pre-School).

Hampstead Bypass Alternative U will impact three cemeteries. It is anticipated that the proposed US 17 interchange at Sidbury Road and Scotts Hill Loop Road would impact grave sites at Pollocks Cemetery, McClammy and King Family Cemetery, and the Wesleyan Chapel United Methodist Church cemetery. In all, approximately 647 graves will be relocated as a result of Alternative U.

4.1.3 RELOCATION OF HOMES AND BUSINESSES

Relocation reports were prepared for the proposed project. All of the detailed study alternatives will result in the relocation of homes and businesses. Total anticipated residential and business displacements for each detailed study alternative are shown in Table 4-1. The number of minority-owned or occupied homes and businesses are also shown in Table 4-1. Information regarding the NCDOT Relocation Assistance Program and relocation reports are included in Appendix C.

Table 4-1. Residential and Business Relocations

	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Residential Relocations	61 (13)	60 (11)	59 (13)	93 (36)	95 (36)
Business Relocations	84 (11)	84 (11)	84 (11)	106 (22)	106 (22)

Notes: Numbers in parenthesis indicate minority-owned or occupied homes and businesses.
Business relocations include non-profits.

4.1.4 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs that “each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental

effects of its programs, policies, and activities on minority populations and low-income populations.” Disproportionately high and adverse effects on minority and low-income populations are defined as adverse effects that are:

- Predominantly borne by a minority population and/or low-income population, or
- Will be suffered by a minority population and/or low-income population and are appreciably more severe or greater in magnitude than the adverse effects that will be suffered by the non-minority population and/or non-low-income population.

Demographic data were collected and analyzed to determine if there were concentrations of minority persons and low-income persons. Block level data were used to evaluate minority statistics. Poverty statistics were obtained at the block group level, which is the smallest unit available from the US Census Bureau. The following blocks and block groups were evaluated:

New Hanover County

Tract 116.01 Block Group 1 Blocks 1000, 1038
Tract 116.04 Block Group 2 Blocks 2006, 2007, 2008, 2009, 2013, 2030, 2037
Tract 116.04 Block Group 3 Blocks 3000, 3048, 3049, 3050, 3051
Tract 117.01 Block Group 2 Blocks 2000, 2001
Tract 117.04 Block Group 1 Blocks 1009, 1013, 1014
Tract 117.04 Block Group 5 Blocks 5001, 5013, 5014, 5015, 5016

Pender County

Tract 9802 Block Group 2 Blocks 2081, 2085, 2087, 2097, 2098, 2099, 2103, 2104, 2105, 2109
Tract 9802 Block Group 3 Blocks 3000, 3001, 3006, 3007, 3008, 3009, 3015, 3024, 3025
Tract 9802, Block Group 5, Blocks 5000, 5002, 5008, 5031

For purposes of this evaluation, a minority block is defined as one in which the non-white population equals or exceeds twice the percentage of non-white persons in the county. Census 2000 data indicate there are five blocks that meet this criterion in the study area. All are located in New Hanover County. Four of the five blocks are located predominantly between the US 17 Wilmington Bypass and the New Hanover County line, with two found on each side of existing US 17. All of the project alternatives pass through the two blocks located on the north side of existing US 17. Military Cutoff Road Extension Alternatives M1 and M2 and Hampstead Bypass Alternatives EH, O, and R pass through largely undeveloped areas and do not result in any relocations within these census blocks. Alternative U would result in the relocation of approximately 12 homes, one church, a portion of a cemetery, and three businesses along Stephens Church Road. Alternative U also passes through the two minority blocks located on the south side of existing US 17 across from Stephens Church Road. Alternative U would result in

the relocation of a church, one business, and approximately five houses in these two blocks.

The fifth census block meeting the criteria described above is located in the vicinity of the proposed Military Cutoff Road Extension interchange with Market Street. This area is predominantly commercial. It is anticipated that Military Cutoff Road Extension Alternatives M1 and M2 would result in the relocation of two houses, two churches, and eight businesses in this census block.

There are no minority census blocks in the Pender County portion of the study area. The percentage of non-white persons in a large block located between existing US 17, NC 210 and Island Creek Road is just below the threshold of two times the County percentage. Because of the size of this block and the apparent lack of concentration of minority persons (based on field review and discussions with local planners), it was not included as an area of environmental justice concern.

For the low-income assessment, a block group is considered low-income if the percentage of persons below the poverty level is at least two times the percentage of persons below poverty in the county. Census data did not indicate any concentrations of low-income persons in the study area. A windshield survey found there is housing typical of low-income persons in the study area. This housing is generally widely dispersed and includes individual homes and a few small clusters.

Planners in New Hanover and Pender Counties were contacted about potential locations of low-income and minority persons in the area most likely to be affected by the proposed project. Pender County contacts confirmed that there were no concentrations of low-income or minority persons in the study area. New Hanover County contacts indicated that homes in the Stephens Church Road area may be predominantly minority occupied residences.

The relocation reports prepared for the project provide an estimate of minority relocations (see Appendix C). The reports also provide an estimate of the income level of households that would be displaced as a result of the proposed project. All of the current detailed study alternatives will result in the relocation of minority-owned or occupied homes and businesses. Given the number of relocations and other environmental impacts along the entire project corridor, the project is not expected to have disproportionately high and adverse human health and environmental effects on low-income or minority populations.

In accordance with Title III of the Civil Right Act of 1964 and Executive Order 12898, it has been determined that the project would not directly or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin nor would it have a disproportionate effect on minority or low-income communities.

Public outreach activities have extended to the entire study area, including minority and low-income persons. Three newsletters were mailed to property owners in the study area

and two workshops were held – one in Pender County and one in New Hanover County. Citizens were given the opportunity to comment or ask questions via comment forms at the workshop, email, and a toll-free project information line.

4.1.5 ECONOMIC EFFECTS

It is anticipated that any new and/or improved access and mobility provided by the proposed project will have a positive economic effect.

Complementary development such as highway-oriented uses is not expected to be associated with either Military Cutoff Road Extension alternative. It is anticipated that development would follow current nearby uses and zoning, which is mostly residential. A mix of higher density uses could occur along either alternative. Complementary development could be expected for all Hampstead Bypass detailed study alternatives around the proposed NC 210 interchange. Rural residential uses may transition to higher density residential development in the vicinity of this interchange, as well.

New roadway infrastructure combined with water and sewer availability could encourage growth. However, the project will only provide new access in a few select areas, such as along the Military Cutoff Road Extension corridor and at the proposed NC 210 interchange.

The Wilmington area in general is likely to continue to be a regional draw for development. Since the area around Military Cutoff Road is already built upon or planned for development, it is not expected that Military Cutoff Road Extension would have any influence on intraregional land development location decisions. All of the Hampstead Bypass detailed study alternatives would make conditions more favorable for commuters coming to the Wilmington area from the north. More favorable commuting conditions combined with a desirable location near Wilmington could have some influence on intraregional land development location decisions.

Substantial travel time savings (more than ten minutes) are expected for travelers using the Hampstead Bypass because they will have a through route without the traffic signals and congestion characteristic of Market Street and existing US 17. Although not as substantial as the Hampstead Bypass, Military Cutoff Road Extension will also offer travel time savings as an alternative to Market Street and a connection to the Hampstead Bypass.

Property values may increase in areas where new access to developable land is provided. This could occur with the Military Cutoff Road Extension alternatives and the Hampstead Bypass alternatives near the proposed interchange at NC 210.

A decrease in value to some properties could be possible. Where the roadway alignment extends very close to residential areas, such as existing neighborhoods near Military Cutoff Road Extension or properties near the proposed Hampstead Bypass, properties could decrease in value because of potential loss in aesthetics, increase in noise, or partial taking of some properties.

4.2 LAND USE AND TRANSPORTATION PLANNING

4.2.1 LAND USE PLANS

Wilmington and New Hanover County are generally supportive of growth, with an emphasis on redeveloping degraded properties, protecting area resources, and ensuring that proper infrastructure is in place. The proposed Military Cutoff Road Extension is compatible with local public policy, since it will improve infrastructure and provide access to areas designated for residential growth.

Pender County is supportive of growth, but also exhibits caution to protect the county's resources and rural lifestyle. Plans adopted by officials show that in areas most likely to experience growth from the Hampstead Bypass, growth has already been anticipated and planned for.

The area between the Wilmington Bypass and the New Hanover County/Pender County line is shown as "Wetland Resource Protection Areas" in the *2006 Wilmington-New Hanover County CAMA Land Use Plan Update*. Since there would be no access to developable land in this area with the proposed Hampstead bypass, this project is not considered to be in conflict with the Plan.

4.2.2 TRANSPORTATION PLANS

4.2.2.1 COMPATIBILITY WITH HIGHWAY PLANS

Military Cutoff Road Extension (U-4751) and Hampstead Bypass (R-3300) are compatible with New Hanover County and Pender County transportation plans.

Project U-4751 is included in the approved *2009-2015 NCDOT State Transportation Improvement Program (STIP)* as an extension of Military Cutoff Road on new location from its current terminus at US 17 Business (Market Street) in Wilmington north to the US 17 Wilmington Bypass (John Jay Burney Jr. Freeway). Project R-3300 is included in the approved *2009-2015 STIP* as a US 17 bypass of Hampstead. Both projects are included in the Draft *2012-2018 STIP*.

4.2.2.2 COMPATIBILITY WITH TRANSIT PLANS

The proposed project does not conflict with New Hanover County transit plans. Pender County does not currently have public transit operations in place. The proposed projects could benefit intercity bus service by reducing delay for bus routes operating on Market Street. The study area is not currently served by passenger rail service.

4.2.2.3 COMPATIBILITY WITH BICYCLE/PEDESTRIAN PLANS

The proposed project does not conflict with bicycle or pedestrian plans.

All of the Hampstead Bypass alternatives will cross NC Bike Route 3 at NC 210. From NC 210, NC Bike Route 3 ties into existing US 17 and continues north through Pender County. Hampstead Bypass alternatives will tie into a section of existing US 17 that includes NC Bike Route 3. Bicycle safe bridge railing will be provided on the NC 210 bridge over the Hampstead Bypass.

Military Cutoff Road is included as part of the Southside Route identified as Bike Route 11, which connects the Middle Sound Area (near Ogden) to Carolina Beach Road. Fourteen-foot outside lanes are proposed on Military Cutoff Road Extension to accommodate bicycles.

The Wilmington Metropolitan Planning Organization (MPO) has requested the inclusion of a multi-use path along proposed Military Cutoff Road Extension (see Appendix B). The multi-use path would tie into an existing multi-use path along Military Cutoff Road. The construction of a multi-use path as part of the proposed project will be dependent upon a cost-sharing and maintenance agreement between NCDOT and the Wilmington MPO. The NCDOT will continue to coordinate with the Wilmington MPO on the inclusion of the multi-use path along Military Cutoff Road Extension.

All of the Hampstead Bypass alternatives would construct a fully-controlled access facility. No bicycle or pedestrian accommodations are proposed on Hampstead Bypass, as bicycles and pedestrians are prohibited from using freeways. Any proposed bridges carrying local roads over the proposed bypass will be constructed with an offset between the edge of the travel lane and the bridge rail to provide a walking area across the bridge.

4.3 IMPACTS TO THE PHYSICAL ENVIRONMENT

4.3.1 NOISE IMPACTS

A noise study was conducted for the project. Details of the methodology and investigations are provided in the February 2011 Noise Analysis report and the March 2011 Review of Revised Traffic Noise Technical Memorandum, appended by reference.

The Federal Highway Administration (FHWA) has developed Noise Abatement Criteria (NAC) and procedures to be used in the planning and design of highways to determine whether highway noise levels are or are not compatible with various land uses. These abatement criteria and procedures are set forth in Title 23 Code of Federal Regulations Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR 772).

A summary of the noise abatement criteria for various land uses is presented in Table 4-2. The Leq, or equivalent sound level, is the level of constant sound which in a given situation and time period has the same energy as time varying sound. In other words, the fluctuating sound levels of traffic noise are represented in terms of a steady noise level with the same energy content. A summary of the criteria to determine substantial increases in noise is presented in Table 4-3.

Table 4-2. Noise Abatement Criteria.

Noise Abatement Criteria¹ for Each FHWA Activity Category Hourly A-Weighted Sound Level – Decibels (dBA)		
Activity Category	Leq(h)	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities are essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

¹ Title 23 Code of Federal Regulations (CFR) Part 772, U.S. Department of Transportation, FHWA

Table 4-3. Criteria for Substantial Increase in dBA.

Criteria for Substantial Increase ² Hourly A-Weighted Sound Level - Decibels (dBA)	
Existing Noise Level in Leq(h)	Increase in dBA from Existing Noise Levels to Future Noise Levels
<= 50	>= 15
51	= 14
52	= 13
53	= 12
54	= 11
>= 55	>= 10

² North Carolina Department of Transportation Traffic Noise Abatement Policy (09/02/04).

4.3.1.1 TRAFFIC NOISE IMPACTS

Receptors expected to experience traffic noise impacts either by approaching or exceeding the NCDOT NAC or by a substantial increase in exterior noise levels are considered “impacted.” Design year 2035 traffic noise levels are expected to approach or exceed the NAC for 118 receptors for Alternative E-H, 95 Receptors for Alternative O, 101 receptors for Alternative R, 163 receptors for Alternative U, 147 receptors for Alternative M1, and 141 receptors for Alternative M2.

The maximum number of receptors predicted to be impacted is shown in Table 4-4 for each alternative.

Table 4-4. Predicted Noise Traffic Impacts

Traffic Noise Impacts	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Residential	187	167	176	209	204
Commercial	66	65	68	91	90
Churches/Schools	4	4	4	10	10
TOTAL	257	236	248	310	304

The 2035 predicted noise level increases for the proposed project range from -1 dBA to +38 dBA for Alternatives E-H, O and R, -3 dBA to +24 dBA for Alternative U, and +1 dBA to +40 dBA for Alternatives M1 and M2.

4.3.1.2 TRAFFIC NOISE ABATEMENT MEASURES

Measures for reducing or eliminating the traffic noise impacts were considered for all impacted receptors for each alternative. The primary noise abatement measures evaluated for highway projects include highway alignment changes, traffic system management measures, buffer acquisition, and noise barriers, including vegetative noise barriers. For each of these measures, benefits versus costs, engineering feasibility, effectiveness and practicability, land use issues, and other factors were included in the noise abatement considerations.

Substantially changing the highway alignment to minimize noise impacts is not considered to be a viable option for this project due to engineering and/or environmental factors. Traffic systems management measures are not considered appropriate for noise abatement for this project due to their negative effect on the capacity and level of service of the proposed roadway. The acquisition of property in order to provide buffer zones to minimize noise impacts is not considered to be a reasonable noise mitigation measure for this project. The cost to acquire property for

buffer zones would exceed the abatement threshold of \$35,000 per benefited receptor plus the incremental increase of \$500 per dBA average increase in the impacted receptors. The use of vegetation for noise mitigation is not considered reasonable for this project due to the substantial amount of right of way necessary to make vegetative barriers effective. The cost to acquire right of way for these vegetative barriers would exceed the abatement threshold of \$35,000 per benefited receptor plus the incremental increase of \$500 per dBA average increase in the impacted receptors.

Based on the NCDOT Traffic Noise Abatement Policy, nine noise barriers are expected to meet feasibility and reasonableness criteria, as found in NCDOT Traffic Noise Abatement Policy. Reasonable cost per benefited receptor is such that the cost of the noise mitigation divided by the number of benefited receptors must be equal to or less than \$35,000 plus \$500 multiplied by the average increase in predicted exterior noise levels. A Design Noise Report with a detailed study of potential traffic noise mitigation will be completed at the time of final assessment of this project. Depending on the selected alternative, an analysis of the following barriers is proposed:

- Barrier B3 located along existing US 17 southbound approaching the US 17 Wilmington Bypass interchange with Market Street (see Figure 10E). It is anticipated that the barrier would benefit 36 receptors along Alternative U.
- Barrier C1 located along existing US 17 southbound (see Figure 10G). It is anticipated that the barrier would benefit 8 receptors along Alternative U.
- Barrier F located along existing US 17 northbound (see Figures 10I and 10K). It is anticipated that the barrier would benefit 77 receptors along Alternatives E-H, O, R and U.
- Barriers H1 and H2 along Hampstead Bypass (see Figure 10H). It is anticipated that the barriers would benefit impacted receptors along Alternatives E-H, O and R. Barrier H1 would benefit 11 receptors and Barrier H2 would benefit 16 receptors.
- Barriers J1 through J4 located along Military Cutoff Road Extension between Putnam Drive and just north of Torchwood Boulevard (see Figure 10C). It is anticipated that the barriers would benefit impacted receptors along Alternatives M1 and M2. Barrier J1 would benefit ten receptors. Barrier J2 would benefit 42 receptors. Barrier J3 would benefit six receptors. Barrier J4 would benefit seven receptors.

4.3.1.3 TRAFFIC NOISE SUMMARY

Nine noise barriers are expected to meet feasibility and reasonableness criteria based on NCDOT's Traffic Noise Abatement Policy. During final design, more in-depth TNM modeling will be performed at these locations to verify that mitigation is both feasible and reasonable and included in the Design Noise Study. The final decision on the installation of abatement measures will be made upon completion of the project design and the public involvement process.

In accordance with NCDOT Traffic Noise Abatement Policy, the Federal/State governments are not responsible for providing noise abatement measures for new developments where building permits are issued within the noise impact area of a proposed highway after the Date of Public Knowledge. The Date of Public Knowledge for the proposed project will be the approval date of the Record of Decision. For development occurring after this date, local governing bodies are responsible for ensuring that noise compatible designs are utilized along the proposed facility.

4.3.2 AIR QUALITY

An air quality assessment was performed for the project in July 2009. Details of the methodology and investigations are provided in the Air Quality Analysis report, appended by reference.

The project is located in New Hanover and Pender counties, which have been determined to comply with the National Ambient Air Quality Standards (NAAQS). The proposed project is located in an attainment area; therefore, 40 CFR Parts 51 and 93 are not applicable. This project is not anticipated to create any adverse effects on the air quality of this attainment area.

Carbon Monoxide

Automobiles are considered the major source of carbon monoxide (CO) in the study area. In accordance with 40 CFR 93.126, this project is an air quality neutral project. It is not required to be included in the regional emissions analysis (if applicable) and a project level CO analysis is not required.

Ozone and Nitrogen Oxide

Automobiles are regarded as sources of hydrocarbons (HC) and nitrogen oxides (NO_x). Hydrocarbons and nitrogen oxides emitted from cars are carried into the atmosphere where they react with sunlight to form ozone (O₃) and nitrogen dioxide (NO₂). Automotive emissions of HC and NO_x are expected to decrease in the future due to the continued installation and maintenance of pollution control devices on new cars. However, regarding area-wide emissions, these technological improvements may be offset by the increasing number of cars on the transportation facilities of the area.

Particulate Matter and Sulfur Dioxide

Automobiles are not regarded as significant sources of particulate matter or sulfur dioxide.

Lead

It is not expected that traffic on the proposed project will cause the NAAQS for lead to be exceeded.

Mobile Source Air Toxics

This draft environmental impact statement (DEIS) includes a basic analysis of the likely mobile source air toxics (MSAT) emission impacts of this project. However, available technical tools are unable to predict the project-specific health impacts of the emission changes associated with the alternatives in this DEIS. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:

Evaluating the environmental and health impacts resulting from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

Even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives.

For each detailed study alternative, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each of the detailed study alternatives will likely be slightly higher than for the no-build alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. The increased VMT would lead to higher MSAT emissions for the action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds. According to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Because the estimated VMT of each of the detailed study alternatives are nearly the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT

growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

Because the project involves constructing a roadway on new location, with each alternative there will be localized areas where ambient concentrations of MSATs could be higher than the no-build alternative. However, as discussed above, the magnitude and the duration of these potential increases compared to the no-build alternative cannot be accurately quantified due to the inherent deficiencies of current models. In sum, when a new highway is constructed closer to receptors, the localized level of MSAT emissions for the detailed study alternatives could be higher relative to the no-build alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSATs will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover will, over time, cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Section 176(c) of the Clean Air Act General Conformity Rule Review

The proposed permit action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. It has been determined that the activities proposed under this permit will not exceed de minimis levels of direct or indirect emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps' continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons a conformity determination is not required for this permit action.

4.3.3 FARMLAND IMPACTS

All of the detailed study alternatives will impact prime farmland. Prime farmland does not include land already in or committed to urban development or water storage. Prime farmland "already in" urban development includes all land that has been designated for commercial or industrial use, or residential use that is not intended at the same time to protect farmland in a:

1. Zoning code or ordinance adopted by the state or local unit of government; or
2. A comprehensive land use plan which has expressly been either adopted or reviewed in its entirety by the unit of local government in whose jurisdiction it is operative within ten years preceding the implementation of the project.

According to the Natural Resource Conservation Service, the detailed study alternatives in New Hanover County and portions of their study area in Pender County meet the criteria and are exempt from evaluation of prime farmland impacts. Table 4-5 shows the anticipated prime farmland impacts associated with each detailed study alternative.

Table 4-5. Prime Farmland Impacts

	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Prime Farmland Impacts (acres)	67.48	58.10	58.12	49.88	49.88

4.3.4 UTILITY IMPACTS

All of the detailed study alternatives will impact both private and public utilities. Impacts will include the relocation, adjustment or modification of gas, water, electric, sewer, telephone and fiber optic cable lines. The relocation of power poles also will be required as a result of the proposed project.

Hampstead Bypass Alternatives EH, O, R and U will isolate water tanks for Belvedere Plantation subdivision and cut off access to a cell tower. Military Cutoff Road Extension Alternatives M1 and M2 extend onto the Cape Fear Public Utility Authority’s well field and water treatment plant property. Neither alternative is expected to impact structures associated with on-site water treatment or storage. Both Alternatives M1 and M2 cross existing and proposed raw water lines. Alternative M2 would impact more existing and proposed water lines than Alternative M1. Information regarding impacts to Cape Fear Public Utility Authority well sites is included in Section 4.5.3.1.1. Table 4-6 shows the anticipated utility costs associated with each detailed study alternative.

Executive Orders 13212 and 13302 require federal agencies to take actions to expedite projects which will increase the production, transmission, or conservation of energy, or which strengthen pipeline safety. The subject project is not energy-related, therefore Executive Orders 13212 and 13302 do not apply.

Table 4-6. Utility Relocation and Construction Costs

	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Utility Relocation and Construction Costs	\$1,838,580	\$2,068,520	\$1,886,700	\$2,502,300	\$2,684,120

4.3.5 HAZARDOUS MATERIALS IMPACTS

Military Cutoff Road Extension Alternatives M1 and M2 may impact five properties that either have or formerly had underground storage tanks (USTs). The properties are located along Market Street in the vicinity of the proposed interchange with Military

Cutoff Road Extension (see Figure 10-B). Preliminary site assessments to identify the nature and extent of any contamination will be performed on these sites prior to right of way acquisition. The sites include:

- Kelly's Automotive, 6747 Market Street – This facility (formerly Ed's Brake & Lube) presently operates as an automotive repair shop. One UST for used waste oil was closed in 1998. This facility has one in-ground hydraulic lift currently in use. The site is anticipated to present low geoenvironmental impacts.
- Walgreens Drug Store, 6861 Market Street – This business (formerly Snak Mart, Inc.) presently operates as a drug store. Five USTs were closed at this site in 2001. There are no USTs currently in use. The site is anticipated to present low geoenvironmental impacts.
- O'Leary's Auto Repair, 5905 Market Street – This facility currently operates as an automotive repair shop. There are no USTs currently in use at this facility. The site is anticipated to present low geoenvironmental impacts.
- Pro Lube, 6940 Market Street – This business presently operates as an oil change facility. There are no USTs currently in use at this site. The site is anticipated to present low geoenvironmental impacts.
- Market Street Citgo, 6980 Market Street – This facility currently operates as a convenience store and gas station. The UST registry shows six tanks currently in use at this facility. This site was investigated as part of NCDOT TIP project 4902B. The site is anticipated to present low geoenvironmental impacts.

4.3.6 MINERAL RESOURCES

Whitehouse Creek Mine off of US 17 in Pender County (see Figure 10-G) is located adjacent to Alternative U. HanPen Mine off of Sidbury Road in Pender County (see Figure 10-F) is located adjacent to Alternative E-H. The current extent of sand and gravel mining activities at these sites will not be impacted by the project. The HanPen mine has recently requested an expansion. Alternative E-H may impact the future expansion of mining activities at this site.

4.3.7 FLOODPLAIN/FLOODWAY IMPACTS

All of the detailed study alternatives cross floodplains. Hampstead Bypass alternatives E-H, O and R include major hydraulic crossings in a Federal Emergency Management Agency (FEMA) detailed study Special Flood Hazard Zone. Hydraulic design for these crossings will not create constraints to flow. Therefore, upstream floodways will not be affected by placement of these structures.

In accordance with Executive Order 11988, the Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP), the delegated state agency for administering FEMA's National Flood Insurance Program, to determine the status of the project with

regard to applicability of NCDOT’s Memorandum of Agreement with FMP (dated 6/5/08), or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

This project involves construction activities on or adjacent to FEMA-regulated streams. Therefore, NCDOT Division 3 shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structure(s) and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

4.3.8 PROTECTED LANDS IMPACTS

4.3.8.1 WILD AND SCENIC RIVERS

As noted in Section 3.3.8.1, no Wild and Scenic Rivers are located in the study area.

4.3.8.2 STATE/NATIONAL FORESTS

As noted in Section 3.3.8.2, no state or national forests are located in the study area.

4.3.8.3 GAMELANDS AND PRESERVATION AREAS

All of the detailed study alternatives will impact preservation areas (see Table 4-7). Additional information regarding these sites is included in Section 3.3.8.3.

Table 4-7. Gamelands and Preservation Area Impacts

Gamelands and Preservation Area Impacts (acres)	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Holly Shelter Game Land	0.00	0.00	0.00	0.00	0.00
Corbett Tract Mitigation Site	0.58	0.00	0.58	0.08	0.00
Corbett Tract Residual Strip	3.55	0.27	3.55	2.85	0.00
Plantation Road Site	0.30	13.28	0.30	0.31	22.03
34-Acre Residual Site	0.00	28.81	0.00	0.00	12.37
22-Acre Residual Site	0.00	0.00	0.00	0.00	0.00
Blake Savannah	0.00	0.58	0.58	0.00	0.00
TOTAL	4.43	42.94	5.01	3.24	34.40

4.4 CULTURAL RESOURCES IMPACTS

4.4.1 HISTORIC ARCHITECTURAL RESOURCES

As described in Section 3.4.1, there is one property within the Area of Potential Effect listed on the National Register of Historic Places and four properties eligible for listing. The potential effect of the proposed project on historic architectural resources was evaluated in accordance with Section 106 of the National Historic Preservation Act. Effects are summarized by alternative in Table 4-8.

Table 4-8. Historic Architectural Resource Effects

Historic Property	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Poplar Grove	No Effect	No Effect	No Effect	Adverse Effect	Adverse Effect
Mount Ararat AME Church	Adverse Effect				
Wesleyan Chapel United Methodist Church	No Effect	No Effect	No Effect	Adverse Effect	Adverse Effect
Scotts Hill Rosenwald School	No Effect	No Effect	No Effect	Adverse Effect	Adverse Effect
Topsail Consolidated School	No Effect				

The State Historic Preservation Office concurred with these effect determinations at a meeting held on March 8, 2011. A copy of the concurrence form is included in Appendix B.

4.4.2 ARCHAEOLOGICAL RESOURCES

As noted in Section 3.4.2, archaeological surveys will be conducted for the project after the selection of the preferred alternative.

4.4.3 TRIBAL LANDS

As noted in Section 3.4.3, there are no American Indian tribal lands in the project study area. In accordance with Executive Order 13175, it has been determined that the project will have no substantial direct effect on one or more Indian tribes.

4.5 IMPACTS TO THE NATURAL ENVIRONMENT

4.5.1 SOILS/TOPOGRAPHICAL/GEOLOGICAL IMPACTS

There are geotechnical engineering concerns associated with all of the detailed study alternatives due to the soft organic soils in the creek crossings and Carolina Bays. Soil improvement techniques may be necessary for the organic soils in order to control differential settlement. Side slopes of 3:1 or flatter are needed to establish vegetation and assist in erosion control. Additional subsurface drainage may be necessary to assist in drainage and/or consolidation of very wet or soft soils.

4.5.2 BIOTIC COMMUNITY AND WILDLIFE IMPACTS

4.5.2.1 TERRESTRIAL COMMUNITIES AND WILDLIFE IMPACTS

4.5.2.1.1 TERRESTRIAL COMMUNITY IMPACTS

Impacts to terrestrial communities resulting from land clearing are unavoidable. Project construction activities in or near terrestrial resources have the potential to impact the biological function of these resources. Table 4-9 shows the anticipated impacts of the project alternatives on terrestrial communities.

North Carolina Department of Transportation Best Management Practices for the management of invasive plant species will be followed, which will comply with Executive Order 13112.

Table 4-9. Terrestrial Community Impacts

Terrestrial Community Impacts (acres)	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Maintained/Disturbed	310.2	270.16	310.78	497.25	459.36
Mesic Pine Flatwoods	235.86	93.65	171.60	175.68	150.91
Wet Pine Flatwoods	69.77	68.86	81.33	76.79	76.65
Pond Pine Woodland	83.63	222.71	83.63	59.62	133.68
Pocosin	51.63	60.27	62.34	21.66	21.66
Xeric Sandhill Scrub	49.59	49.87	47.83	18.00	18.00
Coastal Plain Bottomland Hardwood - Blackwater Subtype	29.48	40.90	43.31	9.18	9.18
Nonriverine Wet Hardwood Forest	0.06	0.06	0.06	49.72	49.72
Pine Savanna	20.13	16.72	16.72	0.00	0.00
Cutover	29.10	32.79	40.10	0.38	0.38
Coastal Plain Small Stream Swamp - Blackwater Subtype	19.48	3.67	12.89	0.00	0.00
Cypress/Gum Swamp - Blackwater Subtype	2.49	8.17	7.45	0.04	0.04
Nonriverine Swamp Forest	1.63	1.63	1.63	16.62	16.62
Small Depression Pocosin	0.24	0.00	0.00	0.00	0.00
Small Depression Pond	1.49	1.49	1.49	2.05	2.05
TOTAL	904.78	870.95	881.16	926.99	938.25

4.5.2.1.2 TERRESTRIAL WILDLIFE IMPACTS

Temporary fluctuation in populations of animal species which utilize terrestrial areas is anticipated during the course of construction. Slow-moving, burrowing, and subterranean organisms will be directly impacted by construction activities, while mobile organisms will be displaced to adjacent communities. Habitat reduction can occur when project construction affects undisturbed areas surrounding an existing man-dominated environment. When this occurs, competitive forces in the adapted communities will result in a redefinition of population equilibrium.

Hampstead Bypass Alternative U will impact less wildlife habitat than the other Hampstead Bypass alternatives because it has less construction on new location.

Fragmentation and loss of forested habitat may impact wildlife in the area by reducing potential nesting and foraging areas, as well as displacing animal populations. Forested areas provide connectivity between populations, allowing for gene flow, as well as a means of safe travel from one foraging area to another. Table 4-10 shows the anticipated impacts of the detailed study alternatives on forests in the study area.

Table 4-10. Forest Impacts

	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Forest Impacts (acres)	518	512	472	406	455

4.5.2.2 AQUATIC COMMUNITIES AND WILDLIFE IMPACTS

Aquatic organisms are very sensitive to the discharges and inputs resulting from construction activities. Impacts usually associated with in-stream construction include increased channelization and scouring of the streambed. In-stream construction alters the substrate and impacts adjacent stream-side vegetation. Such disturbances within the substrate lead to increased siltation that can clog the gills and feeding mechanisms of benthic organisms, fish, and amphibian species. The populations of these organisms are slow to recover and may not do so once a stream has been severely impacted. The anticipated impacts of the detailed study alternatives on streams in the study area are presented in Section 4.5.3.2.1. Section 4.5.3.2.3 presents the anticipated impacts of the detailed study alternatives on wetlands in the study area.

Appropriate measures will be taken to avoid spillage of construction materials and control runoff. Such measures will include an erosion and sedimentation control plan, provisions for disposal and handling of waste materials and storage, stormwater management measures, and appropriate road maintenance measures. NCDOT's *Best Management Practices for Protection of Surface Waters* (BMP-PSW) and Sedimentation Control guidelines will be enforced during the construction stages of the project. Long-term impacts to water resources may include permanent changes to the stream banks and temperature increases caused by the removal of stream-side vegetation.

4.5.3 WATER RESOURCES IMPACTS

Primary sources of water quality degradation in urban and developed areas are non-point sources of discharge, which include surface water runoff and runoff from construction activities. Short-term impacts to water quality from construction-related activities include increased sedimentation and turbidity in nearby water resources. Long-term impacts include substrate destabilization, bank erosion, increased turbidity, altered flow rates, and possible temperature fluctuations within the channel due to removal of streamside vegetation.

The removal of streamside vegetation and placement of fill material during construction contributes to erosion and possible sedimentation. Erosion and sedimentation may carry soils, toxic compounds, trash, and other materials into the aquatic communities at the construction site. As a result, sand bars may be formed both at the site and downstream. Increased light penetration from the removal of streamside vegetation may also increase water temperatures. Warmer water contains less oxygen, thus reducing aquatic life that depends on high oxygen concentrations. Quick revegetation of these areas helps to reduce the impacts by supporting the underlying soils.

The proposed project will impact surface waters, wetlands and ponds, as described in the sections below. Construction activities associated with the project will strictly follow NCDOT's *Best Management Practices for Construction and Maintenance Activities* (BMP-CMA) and *Protection of Surface Waters* (BMP-PSW). Sedimentation control guidelines will be strictly enforced during the construction stages of the project.

4.5.3.1 GROUNDWATER IMPACTS

Impacts to groundwater aquifers are not anticipated as a result of the proposed project.

4.5.3.1.1 WELLS

Alternatives M1 and M2 cross two existing well sites operated by the Cape Fear Public Utility Authority.

Alternative M2 would impact two additional existing Cape Fear Public Utility Authority well sites and a proposed well site. Alternative M2 would also impact raw water line and concentrate discharge line infrastructure that provides a connection to several anticipated future Cape Fear Public Utility Authority well sites. The Authority indicates that future well sites were selected based on aquifer access, anticipated yields, and because the area is undeveloped, which protects the well heads from contamination. Estimates by the Authority indicate impacts to these future well sites could result in a loss of up to six million gallons per day of anticipated future New Hanover County water supply resources.

Alternative U impacts three existing transient non-community water supply wells in the vicinity of the proposed US 17 interchange at Sidbury Road and Scotts Hill Loop Road. Transient non-community wells serve 25 or more people at least 60 days out of the year at facilities such as restaurants and churches.

4.5.3.2 SURFACE WATER IMPACTS

4.5.3.2.1 STREAM IMPACTS

A total of 59 jurisdictional streams are located within the current detailed study alternatives' study corridors (see Figures 10-A through 10-K). Anticipated impacts by stream are presented for the detailed study alternatives in Table 4-11. Total stream impacts for each alternative are shown in Table 4-12.

Table 4-11. Individual Stream Impacts

Stream ID	Stream Name	Figure No.	Corridor Alternative ⁵	Stream Impact (feet)*	Compensatory Mitigation Required	Stream Determination
BSA	UT to Smith Creek	10-C	M1, M2	294.71	Yes	Perennial
BSJ	UT to Smith Creek	10-C	M1, M2	153.12	Yes	Perennial
BSK	UT to Smith Creek	10-C	M1, M2	609.43	Yes	Perennial
BSL	UT to Smith Creek	10-C	M1, M2	287.65	Yes	Perennial
BSM	UT to Smith Creek	10-C	M1, M2	732.16	Yes	Perennial
BSN	UT to Smith Creek	10-C	M1, M2	970.20	Yes	Perennial
BSO	UT to Smith Creek	10-C	M1, M2	M1- 2,329.25 M2- 2,321.95	Yes	Perennial
BSP	UT to Smith Creek	10-C	M1, M2	M1-398.21, M2-328.11	Yes	Perennial
BSQ	UT to Smith Creek	10-C	M1, M2	M1-83.23 M2- 82.13	Yes	Perennial
BDITCH1	UT to Howe Creek	10-C	M1, M2	613.25	No ²	OHWM ¹
					No ³	
CSA	UT to Island Creek	10-D	E-H, R, U1, M1	E-H, R- 1,949.14, U1- 2,079.61, M1- 2,079.15	Yes	Perennial
CSB	UT to Island Creek	10-C, 10-D	E-H, R, U1, M1	E-H,R- 257.70, M1, U1- 270.64	Yes	Perennial
CSC	UT to Smith Creek	10-C, 10-D	M1	943.08	No ²	OHWM ¹
CSD	UT to Smith Creek	10-C, 10-D	M1	902.39	Yes	Intermittent
					Yes	Perennial
CSE	UT to Smith Creek	10-C	M1	239.16	No ²	OHWM ¹
CSG	UT to Smith Creek	10-C	M1	280.66	Yes	Intermittent
CSH	UT to Smith Creek	10-C	M1	230.00	Yes	Intermittent
CSI	UT to Smith Creek	10-C	M1	231.87	Yes	Perennial
CSJ	UT to Island Creek	10-D	E-H, R, U1, M1	E-H, R- 1,289.61, U1, M1- 932.20	Yes	Perennial
CSK	UT to Island Creek	10-D	E-H, R, U1, M1	399.56	Yes	Perennial

Table 4-11. Individual Stream Impacts *continued*

Stream ID	Stream Name	Figure No.	Corridor Alternative ⁵	Stream Impact (feet)*	Compensatory Mitigation Required	Stream Determination
DSA	UT to Island Creek	10-C	O, U2, M2	O-359.29, M2, U2-444.32	Yes	Perennial
ESA	UT to Mill Creek	10-G	U1, U2	848.71	Yes	Perennial
ESB	UT to Mill Creek	10-G	U1, U2	130.43	Yes	Perennial
FSA	UT to Island Creek	10-D	E-H, O R, U1, M1	E-H, R-2131.71, O-16.03, M1, U1-520.14	Yes	Perennial
FSC	UT to Island Creek	10-D	O, U1, U2, M1, M2	O-52.86, U1, U2, M1, M2-37.42	Yes	Intermittent
FSE	UT to Island Creek	10-D	E-H, R	331.14	Yes	Perennial
FSF	UT to Island Creek	10-F	R	289.51	No ²	OHWM ¹
					No ³	
FSH	UT to Island Creek	10-D	E-H	494.65	No ²	OHWM ¹
					No ³	
					Yes	Intermittent
					Yes	Perennial
FSI	UT to Island Creek	10-D	E-H, R	E-H-273.54, R-266.68	Yes	Perennial
FSJ	UT to Island Creek	10-D	E-H, R	858.61	Yes	Intermittent
FSK	UT to Island Creek	10-F	R	81.02	Yes	Intermittent
GFSE	UT to Island Creek	10-E	O	301.99	Yes	Perennial
GSA	UT to Island Creek	10-F	O, R	417.82	Yes	Perennial
GSG	UT to Island Creek	10-E, 10-F	O	190.25	Yes	Intermittent
HBSAA	UT to Island Creek	10-F	E-H	141.44	Yes	Intermittent
					Yes	Perennial
HBSC	UT to Island Creek	10-F	E-H	368.56	Yes	Intermittent
					Yes	Perennial
HBSD(1)	UT to Island Creek	10-F	E-H	269.34	Yes	Intermittent
					Yes	Perennial
HBSH	UT to Island Creek	10-F	E-H	319.90	Yes	Intermittent
HSB	UT to Harrison's Creek	10-H	E-H	262.08	Yes	Intermittent
HSC	UT to Harrison's Creek	10-F, 10-H	E-H	403.72	Yes	Perennial

Table 4-11. Individual Stream Impacts *continued*

Stream ID	Stream Name	Figure No.	Corridor Alternative ⁵	Stream Impact (feet)*	Compensatory Mitigation Required	Stream Determination
HSX	UT to Harrisons Creek	10-H	E-H	305.58	Yes	Perennial
ISA	UT to Island Creek	10-F	O, R	725.75	Yes	Intermittent
					Yes	Perennial
ISC	UT to Harrisons Creek	10-H	O, R	276.96	Yes	Intermittent
					Yes	Perennial
ISD	UT to Harrisons Creek	10-H	O, R	424.9	Yes	Perennial
IDITCH1	UT to Harrisons Creek	10-F	O, R	397.01	No ²	OHW ¹
LSB	UT to Harrisons Creek	10-H	E-H, O, R	1,397.92	Yes	Perennial
LSC	Harrisons Creek	10-H	E-H, O, R	655.51	Yes	Perennial
LSCA	UT to Harrisons Creek	10-H	E-H, O, R	441.54	Yes	Intermittent
					Yes	Perennial
LSCAA	UT to Harrisons Creek	10-H	E-H, O, R	208.86	Yes	Perennial
LSCB	UT to Harrisons Creek	10-H	E-H, O, R	307.07	Yes	Perennial
LSCC	UT to Harrisons Creek	10-	E-H, O, R	130.65	Yes	Perennial
LSCF	UT to Harrisons Creek	10-H	E-H, O, R	119.60	Yes	Intermittent
LSD	Godfrey Creek	10-H, 10-I	E-H, O, R	284.51	Yes	Perennial
LSDA	UT to Godfrey Creek	10-I	E-H, O, R	194.73	Yes	Intermittent
NSA	UT to AIWW ⁴	10-K	E-H, O, R, U1, U2	441.60	Yes	Intermittent
					Yes	Perennial
NSF	UT to AIWW ⁴	10-I	E-H, O, R, U1, U2	104.83,	Yes	Intermittent
					Yes	Perennial
ZSB	UT to Futch Creek	10-E	U1, U2	385.87	Yes	Perennial
ZSK	UT to Prince George Creek	10-D	E-H, R	849.12	Yes	Perennial
ZSL	UT to Prince George Creek	10-D	E-H, R	40.23	Yes	Perennial

*Impacts are for all alternatives unless otherwise noted. Individual impacts calculated for Military Cutoff Road Extension Alternatives M1 and M2 utilize the corresponding Hampstead Bypass Alternative U interchange configuration.

Table 4-11. Individual Stream Impacts *continued*

¹ Resource determined by USACE to be a jurisdictional tributary based on the presence of an ordinary high water mark (OHWM) during field verification.

² Tributary feature exists within the boundaries of an adjacent wetland and therefore does not require mitigation independent of the wetland.

³ Tributary feature does not require stream mitigation but may require mitigation by the USACE as a "Water of the US" dependent upon the type of impact proposed at the time of permit application.

⁴ Atlantic Intracoastal Waterway.

⁵ U1 is Hampstead Bypass Alternative U starting at an interchange with US 17 Wilmington Bypass at Military Cutoff Road Extension Alternative M1. U2 is Hampstead Bypass Alternative U starting at an interchange with US 17 Wilmington Bypass at Military Cutoff Road Extension Alternative M2.

Table 4-12. Total Stream Impacts

Delineated Stream Impacts (linear feet)	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Perennial	17,987	11,486	18,634	11,755	7,687
Intermittent	3,487	1,346	2,553	997	486
Other ¹	3,057	1,010	3,384	2,698	613
Total	24,531	13,842	24,571	15,450	8,786

¹ Tributary waters determined to be jurisdictional during preliminary jurisdictional determination process based on the presence of an ordinary high water mark (OHWM)

4.5.3.2.2 POND IMPACTS

Seventeen ponds are located within the corridors of the current detailed study alternatives (see Figures 10-A through 10-K). Anticipated impacts for each pond are presented for the detailed study alternatives in Table 4-13. Total pond impacts for each alternative are shown in Table 4-14.

Table 4-13. Individual Pond Impacts

Pond ID	Figure No.	Corridor Alternative(s) ¹	Appearance	Connected Feature Map ID	Pond Impacts (acres)*
BPE	10-C	M1, M2	Stormwater Pond	BSL	0.75
BPF	10-C	M1, M2	Stormwater Pond	BSO	0.41
BPJ	10-C	M1, M2	Stormwater Pond	No Connection	0.11
BPK	10-B	M1, M2	Stormwater Pond	No Connection	0.01
GPA	10-F	O	Stormwater Pond	GWA	0.09
GPB	10-F	O, R	Stormwater Pond	GWA	0.07
GPC	10-F	O, R	Stormwater Pond	GWA	O - 0.11, R - 0.06
GPD	10-F	O, R	Stormwater Pond	No Connection	0.01
IPA2	10-F	O, R	Stormwater Pond	IWT	0.14
IPE	10-H	E-H, O, R	Stormwater Pond	No Connection	0.27
JPD	10-I	E-H, O, R, U1, U2	Cypress/Gum Depression	No Connection	E-H, O, R - 1.68, U1, U2 - 1.65
KPB	10-I	E-H, O, R, U1, U2	Cypress/Gum Depression	KWA/KWG	E-H, O, R - 0.31, U1, U2 - 0.55
KPC	10-I	U1, U2	Manmade/Maintained	KWF	0.18
LPD	10-H	E-H, O, R	Manmade/Maintained	LWA	0.02
LPE	10-H	E-H, O, R	Manmade/Maintained	No Connection	0.23
NPC	10-I	E-H, O, R, U1, U2	Stormwater Pond	No Connection	0.06
NPE	10-I	E-H, O, R, U1, U2	Water Treatment Pond	No Connection	0.05

¹Impacts are for all alternatives unless otherwise noted. Individual impacts calculated for Military Cutoff Road Extension Alternatives M1 and M2 utilize the corresponding Hampstead Bypass Alternative U interchange configuration.

*U1 is Hampstead Bypass Alternative U starting at an interchange with US 17 Wilmington Bypass at Military Cutoff Road Extension Alternative M1. U2 is Hampstead Bypass Alternative U starting at an interchange with US 17 Wilmington Bypass at Military Cutoff Road Extension Alternative M2.

Table 4-14. Total Pond Impacts

	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Delineated Pond Impacts (acres)	3.90	4.32	4.18	3.68	3.68

4.5.3.2.3 WETLAND IMPACTS

One hundred and eight (108) jurisdictional wetlands are located within the current detailed study alternatives' corridors (see Figures 10-A through 10-K). Anticipated impacts by wetland are presented for the detailed study alternatives in Table 4-15. Total wetland impacts for each alternative are shown in Table 4-16.

Table 4-15. Individual Wetland Impact

Wetland ID	Figure No.	Corridor Alternative(s)*	Cowardin Classification ¹	Hydrologic Classification	DWQ Wetland Rating	Wetland Impacts (acres)**
BWB	10-C	M1,M2	PFO4B	Non-riparian	27	0.23
BWC	10-C	M1,M2	PFO	Non-riparian	25	0.18
BWD	10-C	M1,M2	PFO	Non-riparian	34	1.90
BWI	10-C	M1,M2	PFO1/3/4B	Non-riparian	34	M1-1.66, M2-1.89
CWA	10-C	M1,M2	PFO3/4A	Non-riparian	34	M1-6.37, M2-4.80
CWB	10-C, 10-D	M1, E-H, R, U1	PSS3/4B	Non-riparian	36	E-H, R-1.11, M1-112.52, U1-1.06
CWD	10-D	E-H, R, U1	PSS3/4Bd	Non-riparian	36	E-H, R-7.51, U1-9.82
CWE	10-D	E-H, R, U1	PFO3/4Bg	Non-riparian	36	E-H-36.83, R-36.83, U1-23.89
				Riparian		
CWF	10-C, 10-D	E-H, O, R, U1, U2	PFO3/4B	Non-riparian	36	E-H, R- 21.52, O- 2.11, U1-7.23, U2-1.05
DWC	10-C, 10-D, 10-E	E-H, M2, O, R, U1, U2	PSS3/4B	Non-riparian	36	E-H, R-0.13, O-92.65, U1-0.12, M2-92.50, U2-77.36
EFW	10-E	U1, U2	PFO	Riparian	14	0.37
EWH	10-G	U1, U2	PFO	Non-riparian	20	1.18
EWH1	10-G	U1, U2	PFO	Riparian	20	1.23
EWI	10-G	U1, U2	PFO	Riparian	37	0.53
EWK	10-G	U1, U2	PSS1C	Non-riparian	25	0.06

Table 4-15. Individual Wetland Impacts *continued*

Wetland ID	Figure No.	Corridor Alternative(s)*	Cowardin Classification ¹	Hydrologic Classification	DWQ Wetland Rating	Wetland Impacts (acres)**
EWM	10-G	U1, U2	PF01C	Riparian	19	5.26
FWA	10-C, 10-D	O, U1, U2	PFO	Non-riparian	30	O-0.67, U1-0.45, U2-0.48
FWB	10-D	E-H, R	PFO	Riparian	20	5.01
FWC ²	10-D, 10-F	E-H, R	PFO	Non-riparian	48	E-H-1.46, R-8.24
				Riparian		
FWD	10-F	R	PSS3B	Non-riparian	28	7.36
FWF	10-F	E-H	PFO	Non-riparian	37	6.89
				Riparian		
FWHB	10-F	E-H	PFO	Non-riparian	24	0.04
FWI	10-F	E-H	PFO	Non-riparian	17	0.38
FWL	10-F	E-H	PFO	Non-riparian	19	0.03
FWY	10-D	E-H, R	PFO	Non-riparian	20	0.18
GWA	10-F	O, R	PEM/PSS	Riparian	61	O-6.05, R-7.94
GWC	10-C, 10-D, 10-E	O, U1, U2	PFO	Non-riparian	32	O-75.81, U1-0.68, U2-27.17
GWD	10-E, 10-F	O	PFO	Non-riparian	32	4.53
				Riparian		
HBAA ³	10-F	E-H	PSS/PFO	Riparian	32	0.06
HBAB	10-F	E-H	PSS/PFO	Non-riparian	27	1.09
HBWD	10-F	E-H	PSS/PFO	Riparian	83	1.14
HBWF	10-F	E-H	PEM/PSS	Riparian	32	0.76
HBWK ⁴	10-F	E-H	PFO/PSS	Riparian	83	1.47
HBWT	10-F	E-H	PSS	Non-riparian	14	0.39
HWB	10-H	E-H	PFO	Riparian	50	2.36
HWD	10-H	E-H	PFO	Non-riparian	21	0.35
HWG ⁵	10-H	E-H	PFO/PSS	Riparian	15	0.88
				Non-riparian		
HWH	10-H	E-H	PFO	Non-riparian	26	0.15
HWH1	10-H	E-H	PFO	Non-riparian	26	0.09
HWH2	10-H	E-H	PFO	Non-riparian	26	0.03
HWH3	10-H	E-H	PFO	Non-riparian	26	0.07
HWH4	10-H	E-H	PFO	Non-riparian	26	0.02
HWH5	10-H	E-H	PFO	Non-riparian	26	0.23
HWY	10-F, 10-H	E-H	PFO	Non-riparian	26	0.23
HWAA ⁶	10-F	E-H	PFO	Non-riparian	40	15.40
				Riparian		

Table 4-15. Individual Wetland Impacts *continued*

Wetland ID	Figure No.	Corridor Alternative(s)*	Cowardin Classification ¹	Hydrologic Classification	DWQ Wetland Rating	Wetland Impacts (acres)**
HWEE	10-F	E-H	PFO	Riparian	25	0.15
HWHH	10-F	E-H	PFO	Non-riparian	34	0.24
HWMX	10-H	E-H	PFO	Non-riparian	40	0.05
IWA	10-H	E-H, O, R	PFO	Riparian	80	0.03
IWA_MM	10-F, 10-H	O, R	PFO	Non-riparian	39	4.81
IWB	10-H	E-H, O, R	PFO	Riparian	25	0.09
IWC	10-H	E-H, O, R	PFO	Riparian	20	0.13
IWD	10-H	E-H, O, R	PFO	Non-riparian Riparian	31	O,R-17.43, E-H-18.64
IWE	10-H	E-H, O, R	PFO	Non-riparian	13	0.16
IWF ⁷	10-H	O, R	PFO	Riparian Non-riparian	69	7.61
IWH ⁸	10-H	O, R	PFO	Non-riparian Riparian	53	7.67
IWK	10-F	O, R	PFO	Riparian Non-riparian	77	7.30
IWN	10-F	O, R	PFO	Riparian	79	4.89
IWQ	10-F	O, R	PFO	Non-riparian	7	0.48
IWT ⁹	10-F	O, R	PFO	Non-riparian Riparian	41	14.57
IWU	10-F	O, R	PFO	Non-riparian	13	0.29
IWV	10-F	O, R	PFO	Non-riparian	42	4.81
IWW	10-F	O, R	PFO	Non-riparian	45	10.38
KWA	10-I	U1, U2	PFO3/4B	Non-riparian	30	2.27
KWC	10-I	U1, U2	PFO1/2C	Non-riparian	17	4.47
KWD	10-G, 10-I	U1, U2	PFO4A	Non-riparian	26	4.73
KWF	10-I	U1, U2	PFO/PSS	Non-riparian	45	6.01
KWG	10-I	E-H, O, R, U1, U2	PFO1/2G	Non-riparian	43	E-H,O,R- 0.57, U1,U2- 2.88
KWH ¹⁰	10-I	U1, U2	PFO1/2C	Non-riparian	42	5.70
KWI	10-G	U1, U2	PFO1/3/4B	Non-riparian	49	32.18
KWN	10-G	U1, U2	PFO4B	Non-riparian	46	24.01
KWO	10-G	U1, U2	PFO4B	Non-riparian	37	18.02
KWS	10-I	U1, U2	PFO1/4B	Non-riparian	33	U1,U2-0.52
LWA	10-H	E-H, O, R	PFO	Riparian	70	0.13
LWB	10-H	E-H, O, R	PFO	Riparian	72	7.81
LWD	10-H	E-H, O, R	PFO	Riparian	83	5.86
LWD1	10-H	E-H, O, R	PFO	Riparian	48	0.08
LWE	10-H	E-H, O, R	PFO	Non-riparian	29	8.22

Table 4-15. Individual Wetland Impacts *continued*

Wetland ID	Figure No.	Corridor Alternative(s)*	Cowardin Classification ¹	Hydrologic Classification	DWQ Wetland Rating	Wetland Impacts (acres)**
LWG	10-H	E-H, O, R	PFO	Non-riparian	46	0.17
LWH	10-H	E-H, O, R	PFO	Non-riparian	23	0.20
LWI	10-H, 10-I	E-H, O, R	PFO	Riparian	80	2.50
LWJ	10-I	E-H, O, R	PFO	Non-riparian	40	5.26
MWM(2)	10-H	E-H, O, R	PFO	Riparian	68	2.70
				Non-riparian		
NWB	10-K	E-H, O, R, U1, U2	PEM/PFO	Non-riparian	13	0.02
NWE	10-K	E-H, O, R, U1, U2	PEM/PFO	Non-riparian	12	0.03
NWF	10-K	E-H, O, R, U1, U2	PEM/PSS	Non-riparian	12	0.04
NWJ	10-K	E-H, O, R, U1, U2	PSS/PFO	Non-riparian	12	E-H,O,R- 0.02, U1,U2- 0.02
NWK	10-K	U1, U2	PSS	Non-riparian	12	0.02
NWM	10-K	E-H, O, R, U1, U2	PFO	Non-riparian	22	E-H,O,R- 0.68, U1,U2- 0.68
NWO	10-I	E-H,O,R	PFO4	Non-riparian	17	3.11
NWP	10-I	E-H, O, R, U1, U2	PSS	Non-riparian	17	E-H,O,R- 29.13, U1,U2-11.38
ZWJ	10-E	U1, U2	PFO	Non-riparian	26	1.37
ZWK	10-E	U1, U2	PEM	Non-riparian	16	0.08
ZWL	10-G	U1, U2	PFO	Non-riparian	20	0.24
ZWM	10-G	U1, U2	PFO	Non-riparian	20	0.04
ZWY	10-C	M1,M2	PFO	Non-riparian	10	0.04
ZWCC	10-K	E-H, O, R, U1, U2	PFO	Riparian	28	0.03
ZWDD	10-D	E-H, R	PFO	Non-riparian	26	1.16
				Riparian		
PD-01 ¹¹	10-C	M1,M2	PFO/PSS	Non-riparian	N/A	0.07
PD-03	10-C	M1,M2	PFO/PSS	Non-riparian	N/A	7.21
PD-04	10-C	M1,M2	PFO/PSS	Non-riparian	N/A	6.42
PD-15	10-I	E-H, O, R, U1, U2	PFO/PSS	Non-riparian	N/A	0.48
PD-16	10-I	E-H, O, R, U1, U2	PFO/PSS	Non-riparian	N/A	0.58
PD-29	10-I	E-H, O, R, U1, U2	PFO/PSS	Non-riparian	N/A	E-H,O,R- 8.58, U1,U2- 8.56

Table 4-15. Individual Wetland Impacts *continued*

Wetland ID	Figure No.	Corridor Alternative(s)*	Cowardin Classification ¹	Hydrologic Classification	DWQ Wetland Rating	Wetland Impacts (acres)**
PD-31	10-I	E-H, O, R, U1, U2	PFO/PSS	Non-riparian	N/A	2.91
PD-33	10-I	E-H, O, R, U1, U2	PFO/PSS	Non-riparian	N/A	0.82
				Riparian		
PD-34	10-I	E-H, O, R, U1, U2	PFO/PSS	Non-riparian	N/A	1.08
PD-35	10-I	E-H, O, R, U1, U2	PFO/PSS	Non-riparian	N/A	3.08

¹ Cowardin classifications are based on characteristics of each wetland at the specific time and location of observation. Wetlands having 'No ID' were not characterized due to impacted appearance at the time of observation.

² Includes wetland FEW

³ Includes wetland HBAC

⁴ Includes wetland HBWP

⁵ Includes wetlands HWM, HWN, HWO

⁶ Includes wetlands HWBB, HWII, HWLL

⁷ Includes wetland IWG

⁸ Includes wetland IWI

⁹ Includes wetlands IWR

¹⁰ Includes wetlands KWJ, KWK, and KWL

¹¹ Delineation data previously verified; no DWQ wetland rating forms completed for these wetlands

*U1 is Hampstead Bypass Alternative U starting at an interchange with US 17 Wilmington Bypass at Military Cutoff Road Extension Alternative M1. U2 is Hampstead Bypass Alternative U starting at an interchange with US 17 Wilmington Bypass at Military Cutoff Road Extension Alternative M2.

**Impacts are for all alternatives unless otherwise noted. Individual impacts calculated for Military Cutoff Road Extension Alternatives M1 and M2 utilize the corresponding Hampstead Bypass Alternative U interchange configuration.

Table 4-16. Total Wetland Impacts

	Alternative				
	M1+EH	M2+O	M1+R	M1+U	M2+U
Delineated Wetland Impacts (acres)	246.05	384.42	297.24	218.35	283.77

4.5.4 JURISDICTIONAL ISSUES

4.5.4.1 WATERS OF THE UNITED STATES

4.5.4.1.1 AVOIDANCE AND MINIMIZATION OF IMPACTS

During the development of the detailed study alternatives, efforts were made to avoid and minimize impacts to wetlands and streams wherever practicable.

Preliminary build alternatives (Section 2.2.4) were established through an evaluation of suitability mapping based on available socioeconomic, cultural, and environmental resource data. Potential corridor alternatives were screened for suitability based on several criteria, including meeting the purpose of and need for the proposed project, minimizing impacts to resources, and consideration of community features. Geographic information system (GIS) data and modeling, aerial photography and observations from field visits were used in the analysis. Corridor centerlines were drawn to reflect alignments that minimized impacts. Impacts were calculated by section for each alignment and the sections with the least overall impacts were retained and combined into alignment alternative segments.

The segment centerlines were buffered and several 1,000-foot corridor alternatives were generated by merging the segments in different combinations. Roadway alignments were developed and placed within the 1,000-foot corridors to minimize impacts to resources, provide a roadway that is constructible, and crosses roads, streams and utility easements at a reasonable angle.

Preliminary build alternatives that met the purpose of and need for the proposed project and with the least impacts to the human and natural environments were identified as detailed study alternatives (Section 2.3). Preliminary design plans were developed for alternatives selected for detailed study. The detailed study alternatives selection process incorporated recommendations made by federal and state environmental regulatory and resource agencies and comments received from two citizens informational workshops held in April 2007.

Because of the number of streams and wetlands present in the study area, total avoidance of surface waters is not practicable. Impacts to wetlands and streams were considered during the selection of the current detailed study alternatives. Alignments for the alternatives have been developed within the study corridors that minimize impacts to streams and wetlands. The NEPA/Section 404 merger team has concurred on the streams that should be bridged by the alternatives. NCDOT will attempt to avoid and minimize impacts to streams and wetlands to the greatest extent practicable in selecting the preferred alternative and during project design.

Four streams within one mile downstream of the study area have been designated HQW by the North Carolina Division of Water Quality (DWQ). These streams, Futch Creek, Old Topsail Creek, Pages Creek, and an unnamed tributary to the Atlantic Intracoastal Waterway, receive water from streams in the study area. In addition, Howe Creek has been designated an ORW by DWQ. All tributaries of these streams within the study area

are identified in Section 3.5.3.2.1 and are designated as HQW or ORW due to the classification of their receiving waters. Design Standards for Sensitive Watersheds will be implemented for these streams during project construction.

4.5.4.1.2 COMPENSATORY MITIGATION OF IMPACTS

The purpose of compensatory mitigation is to replace the lost functions and values from a project's impacts to Waters of the United States, including wetlands.

The NCDOT will investigate potential on-site stream and wetland mitigation opportunities once the preferred alternative has been selected. On-site mitigation will be used as much as possible. Offsite mitigation needed to satisfy the federal Clean Water Act requirements for this project will be provided by the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program in accordance with the "North Carolina Department of Environment and Natural Resources' Ecosystem Enhancement Program In-Lieu Fee Instrument", dated July 28, 2010.

4.5.4.2 BUFFER IMPACTS

As discussed in Section 3.5.4.2, no North Carolina River Basin Buffer Rules apply to project streams.

4.5.4.3 PROTECTED SPECIES IMPACTS

As discussed in Section 3.5.4.3, as of September 22, 2010, the U.S. Fish and Wildlife Service (USFWS) lists 11 federally-protected species for New Hanover County and 12 federally-protected species for Pender County. Following are the biological conclusions rendered for each species based on survey results in the study area; species' habitat descriptions are found in Section 3.5.4.3. Table 4-17 summarizes the federally-protected species listed for New Hanover and Pender Counties and the biological conclusion for this project's likely effect on each species.

American alligator

Biological Conclusion: Not Required

Species listed as threatened due to similarity of appearance do not require Section 7 consultation with the USFWS. However, suitable habitat is present for American alligator in the study area in the form of large streams, ponds, and wetland swamps. A review of North Carolina Natural Heritage Program (NHP) data, updated April 13, 2010, indicates no known occurrences within one mile of the study area. An alligator was observed dead in the median of US 17 in the area of Topsail High School by biologists on June 11, 2008.

Table 4-17. Federally-Protected Species Effects

Scientific Name	Common Name	Federal Status	County	Biological Conclusion	Alternatives
<i>Alligator mississippiensis</i>	American alligator	T(S/A)	New Hanover Pender	Not Required	--
<i>Chelonia mydas</i>	Green sea turtle	T	New Hanover Pender	No Effect	--
<i>Caretta caretta</i>	Loggerhead sea turtle	T	New Hanover Pender	No Effect	--
<i>Charadrius melodus</i>	Piping plover	T	New Hanover Pender	No Effect	--
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	New Hanover Pender	May Affect, Likely to Adversely Affect	E-H, O, R, U
<i>Acipenser brevirostrum</i>	Shortnose sturgeon	E	New Hanover Pender	No Effect	--
<i>Trichechus manatus</i>	West Indian manatee	E	New Hanover Pender	No Effect	--
<i>Schwalbea americana</i>	American chaffseed*	E	New Hanover Pender	No Effect	--
<i>Thalictrum cooleyi</i>	Cooley's meadowrue	E	New Hanover Pender	May Affect, Likely to Adversely Affect	O, R
<i>Carex lutea</i>	Golden sedge	E	Pender	May Affect, Likely to Adversely Affect	O, R
<i>Lysimachia asperulaefolia</i>	Rough-leaved loosestrife	E	New Hanover Pender	May Affect, Likely to Adversely Affect	E-H, O, R, U, M1, M2
<i>Amaranthus pumilus</i>	Seabeach amaranth	T	New Hanover Pender	No Effect	--

E – Endangered T – Threatened T(S/A) - Threatened due to Similarity of Appearance
 * Historic record (the species was last observed in the county more than 50 years ago)

Green sea turtle

Biological Conclusion: No Effect

Suitable habitat for green sea turtle does not exist in the study area. Waters within the study area are freshwater and do not contain marine grasses. A review of NHP data, updated April 13, 2010, indicates no known occurrences within one mile of the study area.

Loggerhead turtle

Biological Conclusion: No Effect

Suitable habitat for loggerhead turtle consisting of open ocean, nearshore areas, or coastal beaches does not exist in the study area. A review of NHP data, updated April 13, 2010, indicates no known occurrences within one mile of the study area.

Piping plover

Biological Conclusion: No Effect

Suitable habitat for piping plover does not exist in the study area. A review of NHP data, updated April 13, 2010, indicates no occurrences within one mile of the study area.

Red-cockaded woodpecker

Biological Conclusion: May Affect, Likely to Adversely Affect

Suitable red-cockaded woodpecker (RCW) foraging and nesting/roosting habitat in the form of open, mature stands of longleaf pine is present throughout the study area.

A review of NHP data, updated April 13, 2010, indicates two extant element occurrences of RCW within one mile of the study area in New Hanover County and six extant element occurrences of RCW within one mile of the study area in Pender County.

A combination of ground and aerial surveys were conducted by NCDOT biologists between January 22 and March 17, 2008. Surveys of areas where element occurrences were listed within one mile of the study area in New Hanover County revealed no cavity trees within the project boundaries. The six known element occurrences within one mile of the study area in Pender County are active clusters existing within the boundary of Holly Shelter Game Land, and are part of the Mid-Atlantic Coastal Plain Recovery Unit. Additionally, during aerial surveys, an unrecorded cluster was discovered within the study area approximately 0.5 mile southwest of Holly Shelter Game Land. Additional ground surveys were conducted on March 5, 2008 and a red-cockaded woodpecker foraging habitat analysis (FHA) was completed in August 2009. Additional study area has been added to the project since the completion of the initial RCW surveys and FHA. Additional forest stand data was collected in November and early December 2010. An updated red-cockaded woodpecker foraging habitat analysis (FHA) was completed in January 2011.

Results of the 2011 analysis show few areas within the foraging partitions are considered suitable habitat for red-cockaded woodpecker. However, red-cockaded woodpeckers are subsisting under these conditions. Potentially suitable and future potentially suitable foraging habitat exists in the study area (see Figures 10-I, 10-J and 10-K). All of the Hampstead Bypass alternatives would impact 7.39 acres of potentially suitable and 8.67 acres of future potentially suitable red-cockaded woodpecker foraging habitat. No RCW cavity trees will be removed or impacted.

All Hampstead Bypass alternatives include improvements along existing US 17 in the vicinity of Holly Shelter Game Land. There is potentially suitable and future potentially suitable red-cockaded woodpecker foraging habitat adjacent to both the east and west sides of US 17 in this area. Roadway widening improvements associated with Hampstead Bypass along US 17 in this area will not exceed a width of 200 feet in order to maintain connectivity between the foraging habitats.

It is expected that the proposed project may affect, and is likely to adversely affect, the red-cockaded woodpecker as a result of the removal of potentially suitable and future potentially suitable foraging habitat of active red-cockaded woodpecker clusters.

Informal consultation for red-cockaded woodpecker has taken place between NCDOT and the USFWS since 2006. Informal consultation includes project meetings, NEPA/Section 404 Merger meetings, and correspondence between the agencies. The NCDOT will continue to coordinate with the USFWS regarding the potential effects of the proposed project on the red-cockaded woodpecker. The US Army Corps of Engineers (USACE) will serve as the lead federal agency with respect to compliance with Section 7 of the Endangered Species Act. It is anticipated that the USACE will request of the USFWS that formal consultation for red-cockaded woodpecker be initiated in accordance with Section 7 of the Endangered Species Act after the least environmentally damaging practicable alternative for the proposed project has been identified.

Shortnose sturgeon

Biological Conclusion: No Effect

Suitable habitat for shortnose sturgeon consisting of nearshore marine, estuarine, and riverine habitat of large river systems does not exist in the study area. Email correspondence from the DMF dated September 12, 2008 indicates that the proposed project will have no effect on shortnose sturgeon.

A review of NHP data, updated April 13, 2010, indicates no occurrences within one mile of the study area.

West Indian manatee

Biological Conclusion: No Effect

Suitable habitat for West Indian manatee consisting of canals, sluggish rivers, estuarine habitats, salt water bays, and off shore areas does not exist in the study area.

Additionally, streams in the study area are not deep enough to support manatee, which require water depths from five to 20 feet deep.

A review of NHP data, updated April 13, 2010, indicates no occurrences within one mile of the study area.

American chaffseed

Biological Conclusion: No Effect

Suitable habitat for American chaffseed consisting of open, moist to dryish Mesic Pine Flatwoods, longleaf pine flatlands, Pine Savannas, road cuts, and power line easements exists in the study area. However, appropriate soil series consisting of Blaney, Candor, Gilead, Fuquay, Lakeland, and Vacluse soil units do not exist in the study area. On May 12, 2008, Dale Suiter of the USFWS stated the Service does not anticipate this plant to be present in the study area and that surveys for American chaffseed would not be required.

A review of NHP data, updated April 13, 2010, indicates no occurrences within one mile of the study area.

Cooley's meadowrue

Biological Conclusion: May Affect, Likely to Adversely Affect

Suitable habitat for Cooley's meadowrue consisting of plowed firebreaks, roadside ditches and rights of way, and power line easements exists in the study area. Additionally, soils that are loamy fine sand, sandy loam, or fine sandy loam; at least seasonally moist or saturated, including Foreston, Muckalee, Torhunata, and Woodington soil series are common in the study area. Biologists visited a reference population of Cooley's meadowrue at the Sandy Run Swamp Savanna on June 3, 2008 prior to conducting surveys of the study area on June 4-5, June 17-18, 2008 and June 2-4, 2009. No individuals of Cooley's meadowrue were observed in Pender County. After the 2008 surveys, a population of Cooley's meadowrue was discovered within the study area in New Hanover County. This population is located adjacent to a gravel driveway off of Sidbury Road approximately 1.75 miles west of US 17. This occurrence has been recorded by NCNHP, and the USFWS updated its species list for New Hanover County on August 5, 2009 to include Cooley's meadowrue (previously unlisted for New Hanover County). Additionally, expanded study area was added to the project since the 2008 surveys were conducted. Suitable habitat for Cooley's meadowrue within these additional areas, as well as suitable habitat within the study area in New Hanover County was surveyed by biologists on June 16-17, 2010. No new populations of Cooley's meadowrue were observed, however, additional stems were identified at the Sidbury Road site. This population of Cooley's meadowrue is located within the study corridor associated with Alternatives O and R.

A review of NHP data, updated April 13, 2010, indicates the Sidbury Road population as the only occurrence within one mile of the study area.

It is expected that the proposed project may affect, and is likely to adversely affect, Cooley's meadowrue as a result of potential indirect effects associated with the construction of Hampstead Bypass Alternative O or Alternative R. Indirect effects may include changes in habitat conditions that would negatively impact Cooley's meadowrue, such as hydrologic changes, isolating small populations by roads, or the introduction of invasive species along the roadway. Direct impacts from the proposed project to Cooley's meadowrue are not anticipated.

Informal consultation for Cooley's meadowrue has taken place between NCDOT and the USFWS since 2009. The NCDOT will continue to coordinate with the USFWS regarding the potential effects of the proposed project on Cooley's meadowrue. If Alternative M2+O or Alternative M1+R is selected as the least environmentally damaging practicable alternative for the proposed project, it is anticipated that the USACE will request of the USFWS that formal consultation for Cooley's meadowrue be initiated in accordance with Section 7 of the Endangered Species Act.

Golden sedge

Biological Conclusion: May Affect, Likely to Adversely Affect

Suitable habitat for golden sedge consisting of roadside and drainage ditches or power line rights of way where mowing and/or very wet conditions suppress woody plants is present in the study area. Surveys for golden sedge were conducted June 2-4, 2009. No individuals of golden sedge were observed. The USFWS updated its species list for New Hanover County on August 5, 2009 to include golden sedge (previously unlisted for New Hanover County). Suitable habitat for golden sedge within additional study areas, as well as suitable habitat within the study area in New Hanover County was surveyed by biologists on June 16-17, 2010. No individuals of golden sedge were observed, however, multiple stems of an unidentified sedge were noted growing in close proximity to a population of Cooley's meadowrue adjacent to Sidbury Road. Though surveys were conducted during the appropriate survey window, no fruiting bodies were found on these plants. Because of the close association between golden sedge and Cooley's meadowrue, it was determined there was a high probability for golden sedge to be present at this site. This site is located within the study corridor associated with Alternatives O and R. Suitable habitat within an approximately 0.25 mile range of the Cooley's meadowrue stems identified at the Sidbury Road site was surveyed for golden sedge on May 23, 2011. A variety of sedges with fruiting bodies were present. However, no individuals of golden sedge were observed.

A review of NHP data, updated April 13, 2010, indicates no occurrences within one mile of the study area.

Because of the close association between golden sedge and Cooley's meadowrue, it is expected that the proposed project may affect, and is likely to adversely affect, golden sedge as a result of potential indirect effects associated with the construction of Hampstead Bypass Alternative O or Alternative R. Indirect effects may include changes in habitat conditions that would negatively impact golden sedge, such as hydrologic

changes, isolating small populations by roads, or the introduction of invasive species along the roadway. Direct impacts from the proposed project to golden sedge are not anticipated.

Informal consultation for golden sedge has taken place between NCDOT and the USFWS since July 2010. The NCDOT will continue to coordinate with the USFWS regarding the potential effects of the proposed project on golden sedge. If Alternative M2+O or Alternative M1+R is selected as the least environmentally damaging practicable alternative for the proposed project, it is anticipated that the USACE will request of the USFWS that formal consultation for golden sedge be initiated in accordance with Section 7 of the Endangered Species Act.

Rough-leaved loosestrife

Biological Conclusion: May Affect, Likely to Adversely Affect

Suitable habitat for rough-leaved loosestrife consisting of ecotones or edges between longleaf pine uplands and pond pine pocosins, roadside depressions, maintained power and utility line rights of way, firebreaks, and trails exists in the study area. Surveys for rough-leaved loosestrife were conducted June 2-4, 2009. No individuals of rough-leaved loosestrife were observed. Suitable habitat for rough-leaved loosestrife within additional study areas was surveyed by biologists on June 16-17, 2010. No individuals were observed.

A review of NHP data, updated April 13, 2010, indicates three extant occurrences and one historic occurrence within one mile of the study area in New Hanover County and two extant populations within one mile of the study area in Pender County. The two Pender County populations are located on Holly Shelter Game Land, while the three extant populations in New Hanover County are located within the boundaries of NCDOT's Corbett Tract Mitigation Site. Moreover, as of November 2009, two additional occurrences of rough-leaved loosestrife located within a section of NCDOT's mitigation site known as the Plantation Road Site were removed from the NHP dataset. Prior to their removal, these two occurrences were listed as extant populations, having last been observed in June 2000. At the request of USFWS, biologists visited these two locations on June 16-17 and June 23, 2010. Multiple stems of rough-leaved loosestrife were found in the vicinity of both element occurrences. One population is located within the study corridors of Alternatives M2, O, and U at M2. The second population is located within the study corridor paralleling the US 17 Wilmington Bypass between Alternatives M1 and M2. Though surveys were conducted during the appropriate survey window, no stems at either location were found in bloom.

It is expected that the proposed project may affect, and is likely to adversely affect, rough-leaved loosestrife as a result of clearing associated with the construction of Alternatives M2, O, or U at M2. These alternatives would directly impact occurrences of rough-leaved loosestrife at the Plantation Road Site. In addition, the proposed project may affect, and is likely to adversely affect, rough-leaved loosestrife as a result of indirect

effects associated with potential hydrologic changes at the Plantation Road Site resulting from the construction of any of the proposed project alternatives.

Informal consultation for rough-leaved loosestrife has taken place between NCDOT and the USFWS since 2008. The NCDOT will continue to coordinate with the USFWS regarding the potential effects of the proposed project on rough-leaved loosestrife. It is anticipated that the USACE will request of the USFWS that formal consultation for rough-leaved loosestrife be initiated in accordance with Section 7 of the Endangered Species Act after the least environmentally damaging practicable alternative for the proposed project has been identified.

Seabeach amaranth

Biological Conclusion: No Effect

Suitable habitat for seabeach amaranth consisting of barrier island beaches does not exist in the study area.

A review of NHP data, updated April 13, 2010, indicates no occurrences within one mile of the study area.

4.5.4.4 BALD EAGLE AND GOLDEN EAGLE PROTECTION ACT

As discussed in Section 3.5.4.4, potential foraging habitat for bald eagle exists in the study area near wetland GWA and two independent sightings of an adult bald eagle were observed in this area. Wetland GWA is located in the study corridors for Alternatives O and R. Forested areas surrounding wetland GWA are primarily immature and lack large dominant trees. No eagle nests were observed by biologists in the study area or within 660 feet of the study area during field investigations. The project is not expected to impact bald eagle.

4.5.4.5 ESSENTIAL FISH HABITAT IMPACTS

As discussed in Section 3.5.4.5, there is no designated Essential Fish Habitat present in the study area.

4.5.4.6 AREAS OF ENVIRONMENTAL CONCERN IMPACTS

As discussed in Section 3.5.4.6, no Coastal Area Management Act Areas of Environmental Concern are present in the study area.

4.5.4.7 ANADROMOUS FISH HABITAT IMPACTS

As discussed in Section 3.5.4.7, there is no anadromous fish habitat present in the study area.

As noted in Section 3.5.4.7, Harrison's Creek and Island Creek are designated as inland waters under the jurisdiction of the North Carolina Wildlife Resources Commission (NCWRC). Coordination with NCWRC concluded that no in-water construction moratoria are necessary for these streams.

4.5.4.8 SUBMERGED AQUATIC VEGETATION IMPACTS

As discussed in Section 3.5.4.8, there is no submerged aquatic vegetation present in the study area.

4.6 INDIRECT AND CUMULATIVE EFFECTS

The Department of Environment and Natural Resources, in 15A NCAC 1C .0101 Conformity with North Carolina Environmental Policy Act, Statement of Purpose, Policy and Scope, defines "Cumulative Effects" as those effects resulting "from the incremental impact of the proposed activity when added to other past, present, and reasonably foreseeable future activities regardless of what entities undertake such other activities." Cumulative effects can result when activities taking place over time are collectively significant, even when individually those activities are minor. The Code defines "Indirect Effects" as those effects "caused by and resulting from the proposed activity although they are later in time or further removed in distance, but they are still reasonably foreseeable."

Several factors are taken into consideration when evaluating the potential for indirect and cumulative impacts, and to determine if further analysis is warranted. Examples may include whether a project conflicts with local planning, whether it serves economic and/or specific development purposes, if the project could stimulate complementary development, and how the project could affect natural features.

Both Military Cutoff Road Extension and the Hampstead Bypass are included in local transportation planning documents. Conflicts with the plans are not anticipated. The project is not associated with an explicit economic development purpose nor is it intended to serve a specific development.

Complementary development such as highway-oriented uses is not expected to be associated with either Military Cutoff Road Extension alternative. It is anticipated that development would follow current nearby uses and zoning, which is mostly residential. Complementary development such as highway-oriented uses could be expected for Hampstead Bypass alternatives around the proposed NC 210 interchange. Rural residential uses may transition to higher density residential development in the vicinity of this interchange as well.

The Wilmington area in general is likely to continue to be a regional draw for development. Military Cutoff Road Extension would provide access to undeveloped parcels allowing them to follow surrounding trends and develop as residential properties. The Hampstead Bypass would make conditions more favorable for commuters coming

to the Wilmington area and coastal communities from the north. More favorable commuting conditions combined with a desirable location near Wilmington could have some influence on intraregional land development location decisions.

The evaluation of certain indicators helps to determine the potential for land use change induced by transportation projects. These factors include change in accessibility, change in property values, forecasted growth, land supply versus land demand, water and sewer availability, market for development, water quality and the natural environment and local public policy. Tables 4-18 and 4-19 show the relative rating of potential indirect and cumulative effects to each of these indicators. Indirect and cumulative effects on water quality have been evaluated based on the watershed in which actions have occurred or will likely occur. There are eight watersheds in the study area (see Figure 20). Table 4-20 below provides baseline information for each watershed.

Table 4-18. Relative Rating of Indirect and Cumulative Effects, Military Cutoff Road Extension

Rating	Accessibility/ Travel Time Savings	Property Values	Forecasted Growth	Land Supply/ Land Demand	Water/ Sewer Availability	Market for Development	Water Quality/ Natural Environment	Local Public Policy
Strong ↑ * * * ↓ Weak	X	X	X	X	X	X	X	X
Cause	Travel time savings could improve and access to the Wilmington Bypass will be provided.	Land is already high in value due to location.	Local and regional forecasted growth is high.	Some land near Wilmington Bypass could be affected. The rest is already built-out.	Water and sewer available or can easily be extended within the area.	Market for development in undeveloped areas is high.	Some effects to water resources (wetlands) and potentially habitat.	Generally pro-growth, with conservation of resources a major goal.

Table 4-19. Relative Rating of Indirect and Cumulative Effects, Hampstead Bypass

Rating	Accessibility/ Travel Time Savings	Property Values	Forecasted Growth	Land Supply/ Land Demand	Water/ Sewer Availability	Market for Development	Water Quality/ Natural Environment	Local Public Policy
Strong ↑ * * * ↓ Weak	X	X	X	X	X	X	X	X
Cause	Travel time savings will improve at the local and regional level.	Land is already high in value due to location and the project will increase values in some areas near access points.	Local and regional forecasted growth is high.	There is a large land supply and a large land demand.	Water and sewer available in some areas, especially along major routes.	Market for development in undeveloped areas is high.	Some effects to water resources (wetlands) and potentially habitat.	Generally pro-growth, with conservation of resources a major goal.

Table 4-20. Baseline Watershed Data by Hydrologic Unit Code (HUC)

Watershed (HUC)	Wetlands in HUC (acres)/ Percent of HUC that is in Wetlands	Streams in HUC (linear miles)	Wetlands Permitted by USACE in HUC since 2006 (acres)	Streams Permitted by USACE in HUC since 2006 (linear feet)/ [linear miles]	Alternatives Located within HUC
030203020401	4,040/38%	102	0.4	0/[0]	U
030203020402	3,310/41%	54	8.6	90/[0.02]	E-H, O, R, U
030203020403	8,160/38%	268	8.7	506/[0.1]	E-H, O, R, U
030203020502	11,658/36%	319	3.8	3,940/[0.75]	E-H, O, R, U, M1, M2
030300070803	9,909/77%	146	1.3	0/[0]	E-H, O, R, U
030300070804	15,701/67%	174	0.6	25/[0.005]	E-H, O, R, U
030300070805	14,054/58%	133	0.2	0/[0]	E-H, O, R, U, M1, M2
030300070808	7,134/34%	61	82.8	2,287/[0.43]	E-H, O, R, U, M1, M2
Total	73,966/48%	1,257	106.4	6,848 linear feet/ [1.3 linear miles]	

4.6.1 EVALUATION OF INDIRECT EFFECTS

Population growth in both New Hanover and Pender Counties is forecasted to exceed the state's rate in the coming decades. Local plans and zoning are in place to guide anticipated growth. Future land use and zoning show that growth is expected along the Market Street and US 17 corridor and major adjoining roads, including NC 210 where proposed Hampstead Bypass alternatives cross. Both Military Cutoff Road Extension and the Hampstead Bypass have been included in local transportation plans and growth models. Neither project is expected to substantially alter growth beyond what has already been projected by local planners.

Military Cutoff Road Extension could encourage residential growth if the land zoned as residential directly south of the US 17 Wilmington Bypass is available for development, and future access is allowed in this area.

Substantial travel time savings (more than ten minutes) are expected for travelers who use the Hampstead Bypass because they will have a through route without the traffic signals and congestion characteristic of Market Street and existing US 17. Although not as substantial as the Hampstead Bypass, Military Cutoff Road Extension will also offer travel time savings as an alternative to Market Street and a connection to the Hampstead Bypass.

Complementary development such as highway-oriented uses could be expected for all Hampstead Bypass alternatives. Highway-oriented uses would likely cluster around the proposed NC 210 interchange. Rural residential uses may transition to higher density residential development in the vicinity of this interchange, as well. In addition, the Hampstead Bypass may spur residential development pressures along NC 210 because of the increased access provided by the proposed interchange.

Project-related growth could result in negative indirect effects to water quality and the natural environment. These effects could include a decline in water quality, an increase in the amount and rate of stormwater runoff, and loss of wildlife habitat. The 030300070804 watershed would likely experience higher indirect effects, as a result of potential development around the proposed NC 210 interchange. However, this area is expected to continue to build out regardless of the proposed Military Cutoff Road Extension and Hampstead Bypass projects. Local and state planning regulations and controls can be used to temper these potential effects. Steps have also been taken during project planning to avoid and minimize water quality impacts by developing alignments, in coordination with the NEPA/Section 404 merger team, that minimize impacts to wetlands and streams. In addition, the NCDOT will investigate potential on-site stream and wetland mitigation opportunities once the preferred alternative has been selected. On-site mitigation will be used as much as possible. Offsite mitigation needed to satisfy the federal Clean Water Act requirements for this project will be provided by the North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program in accordance with the “North Carolina Department of Environment and Natural Resources’ Ecosystem Enhancement Program In-Lieu Fee Instrument”, dated July 28, 2010.

4.6.2 EVALUATION OF CUMULATIVE EFFECTS

Cumulative effects to land development, travel times savings, and the natural environment could result when the proposed projects are considered in combination with other proposed transportation projects, past transportation and development projects (most notably the US 17 Wilmington Bypass) and planned development.

Current actions are primarily the proposed projects, which would provide new access. Past actions mainly include residential development, the widening of Military Cutoff Road, the realignment of US 17 and SR 1561 (Sloop Point Road), the upgrade of intersections along US 17 between the US 17 Wilmington Bypass and SR 1571 (Scotts Hill Loop Road), and the US 17 Wilmington Bypass, which improved east-west access in the corridor. Reasonably foreseeable actions include proposed TIP projects (see Table 3-3) and residential development, primarily in the Pender County portion of the study area.

The proposed projects could have a noteworthy effect on cumulative travel time savings (greater than ten minutes).

Future development could increase the amount of impervious surfaces in the study area, causing an increase in stormwater runoff in streams and wetlands. There are a number of planned transportation projects in the City of Wilmington that are located outside of the project study area but within the 030300070808 watershed. The cumulative effect of the projects should not result in substantial impacts to the watershed, since much of that area is already highly developed. For Hampstead Bypass Alternatives E-H, O, and R, cumulative effects would likely be higher in the 030300070805, 030203020403, and 030203020402 watersheds as a result of increased impervious surfaces by planned development, the US 17 Wilmington Bypass, and the proposed project. Impacts would likely be higher in the 030203020401, 030203020403, and 030203020402 watersheds for Hampstead Bypass Alternative U, when combined with planned development.

Increases in impervious area could result in increased sedimentation and stormwater runoff, leading to deteriorated water quality and negative impacts to the natural environment. Use of Best Management Practices, stormwater regulations and other local ordinances regulating development will minimize adverse effects, particularly in areas of environmental concern.

Cumulatively, the construction of Military Cutoff Road Extension and the Hampstead Bypass combined with past NCDOT projects (US 17 Wilmington Bypass) that provide improved east-west regional access, and continued commercial and residential development in the study area, could affect regional land demand due to these favorable conditions.

Substantial development resulting exclusively from this project is not expected. Any development would be implemented in accordance with local ordinances and land use plans. Since the project is not likely to result in a change in land use as a result of the transportation impact causing activities associated with the project, cumulative effects beyond those discussed above would be minimal or low.

4.7 CONSTRUCTION IMPACTS

Construction of any of the current detailed study alternatives is expected to result in similar temporary impacts as described below. Examples of construction activities include clearing and grubbing, maintenance of traffic, bridge construction, utility relocations, traffic signal construction, and roadway paving. Typical types of negative impacts from construction would include noise from construction equipment, driver time delays at existing road crossings, and dust from construction sites.

Since construction operations would be limited to the time needed to complete the project, both benefits and impacts to resources would be considered temporary. Utilization of NCDOT standards and specifications would ensure that these impacts are minimized.

4.7.1.1 ENERGY

A substantial amount of energy will be required to construct any of the build alternatives. However, the energy use will be temporary and should ultimately result in energy use reductions upon project completion, due to reduced congestion and increased operational safety in the study area. Because of congestion reductions and increased safety, construction of any of the build alternatives is expected to result in less total energy utilization than the No-Build Alternative.

Executive Orders 13212 and 13302 require federal agencies to take actions to expedite projects which will increase the production, transmission, or conservation of energy, or which strengthen pipeline safety. The subject project is not energy-related, therefore Executive Orders 13212 and 13302 do not apply.

4.7.1.2 LIGHTING

Because construction activities could occur 24 hours a day, construction areas could be lit to daylight conditions at night. Night lighting would not be used near residential areas.

4.7.1.3 VISUAL

Temporary visual impacts would affect properties adjacent to areas where construction, staging, and stockpiling operations occur. Upon project completion, the contractor would be required to remove all equipment and excess materials, as well as reseed any disturbed areas.

4.7.1.4 CONSTRUCTION NOISE

Construction noise varies greatly with the type of equipment in use and the phase of construction activity. Noise levels near a construction project therefore fluctuate greatly from day to day and hour to hour. Construction noise sources include truck and equipment engines, equipment noise from clearing and excavation, back-up alarms, and truck tailgates. Noise generated by construction equipment can reach noise levels of 67 dBA to 98 dBA at a distance of 50 feet. Noise impacts, such as temporary speech interference for passers-by and those individuals living or working near the project, can be expected during construction of any of the current detailed study alternatives.

NCDOT specifications require the contractor to limit noise levels to 80 dBA Leq in noise sensitive areas adjacent to the project. NCDOT may also monitor construction noise and require abatement measures where limits are exceeded. NCDOT also can limit work that produces objectionable noise during normal sleeping hours.

4.7.1.5 AIR

During construction of the proposed project, all materials resulting from clearing and grubbing, demolition, or other operations will be removed from the project, burned or

otherwise disposed of by the contractor. Any burning will be performed in accordance with applicable local laws and ordinances and regulations of the North Carolina State Implementation Plan (SIP) for air quality in compliance with 15 NCAC 2D.0520. Care will be taken to ensure burning will be performed at the greatest distance practical from dwellings and not when atmospheric conditions are such as to create a hazard to the public. Burning will be performed under constant surveillance. Emissions from construction equipment are regulated.

During construction, measures will be taken to reduce the dust generated by construction when the control of dust is necessary for the protection and comfort of motorists or area residents. Dust control methods may include:

- Minimizing exposed earth surface
- Temporary and permanent seeding and mulching
- Watering of working areas and haul roads during dry periods
- Covering, shielding, or stabilizing material stockpiles
- Using covered haul trucks

4.7.1.6 UTILITIES

Construction of the proposed project will require some adjustment, relocation, or modification to existing utilities. Any disruption to utility service during construction will be minimized by close coordination with utility providers and property owners in affected areas, as well as phased adjustments to utilities.

4.7.1.7 WATER QUALITY AND EROSION CONTROL

Erosion and sedimentation caused by construction activities could affect drainage patterns and water quality. Erosion and sedimentation during project construction will be controlled through the specification, installation, and maintenance of stringent erosion and sedimentation control methods. In accordance with the North Carolina Sedimentation Pollution Control Act (15A NCAC 4B.001-.0027), an erosion and sedimentation control plan will be prepared for the selected alternative. The plan will follow guidelines established in the North Carolina Department of Environment and Natural Resources publication *Erosion and Sediment Control Planning and Design* and NCDOT's *Best Management Practices for Protection of Surface Waters*.

Impacts resulting from erosion and sedimentation will be kept to a minimum by employing Best Management Practices such as revegetating or covering disturbed areas and the use of berms, dikes, silt barriers, and catch basins.

The NCDOT has *Standard Specifications* that require proper handling and use of construction material. The contractor will be responsible for taking precautions during

construction to prevent the pollution of water bodies. These precautions include, but are not limited to the following:

- Pollutants such as chemicals, fuels, lubricants, raw sewage, bitumens, and other harmful wastes shall not be discharged into any body of water.
- Contractors may not ride or drive mechanical equipment across streams unless construction is required in the streambed.
- Excavated materials must be stored and disposed in a way that prevents erosion of the material into surface waters. If material storage in these areas cannot be avoided, best management practices must be implemented to avoid runoff.

4.7.1.8 GEODETIC MARKERS

The proposed project could impact geodetic survey markers. The North Carolina Geodetic Survey will be contacted prior to construction in order to allow resetting of monuments that would be affected. Intentional destruction of a geodetic monument is a violation of North Carolina General Statute 102-4.

4.7.1.9 BORROW AND DISPOSAL SITES

Construction of the roadway and bridges may require excavation of unsuitable material and placement of embankments. Specific locations of borrow and disposal sites will be determined during the final design phase of the project.

Following award of the construction contract, the contractor will be responsible for obtaining all necessary permits resulting from borrow and waste activities that impact waters of the US. All construction waste material generated during clearing, grubbing, and other construction phases will be disposed of by the contractor, either on-site in retention areas or off-site, in accordance with state and local regulations. Prior to approval by NCDOT of any proposed borrow source and the removal of any material, the contractor will be required to provide certification from the State Historic Preservation Office that the removal of the borrow material will have no effect on any property eligible for or listed on the National Register of Historic Places. Borrow material from sources in any area under the jurisdiction of the US Army Corps of Engineers (USACE) and the placement of waste materials in wetlands or streams will not be allowed unless NCDOT has obtained a permit for those activities from the USACE.

4.7.1.10 TRAFFIC MAINTENANCE & DETOUR ACCESSIBILITY

Detours and road closures may be required in locations where the proposed project utilizes or crosses existing roadways. Maintenance of traffic and construction sequencing will be planned and scheduled to minimize traffic delays within the project limits. Temporary lane closures and detours may be required at times during construction. A traffic control plan will be prepared during the final design phase of the project, which will detail impacts to existing traffic patterns, as well as road closures or realignments. The plan will also define detour routes, designated truck routes, and parking areas for

construction equipment. Signs will be used where appropriate to provide notice of road closures and other pertinent information to the traveling public. Access to all businesses and residences will be maintained to the extent practical during construction.

4.7.1.1 1 BRIDGE DEMOLITION

None of the detailed study alternatives will remove existing bridges. It is not expected that any materials from existing structures will be dropped into Waters of the United States during project construction.

4.8 IRRETRIEVABLE & IRREVERSIBLE COMMITMENT OF RESOURCES

Implementation of any of the current detailed study alternatives would involve a commitment of a range of natural, physical, human, and fiscal resources. Land used for the construction of the proposed project is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if a greater need arises for the use of the land or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion will be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as concrete, aggregate, and bituminous material would be expended to build the proposed project. Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use will not have an adverse effect upon continued availability of these resources. Any construction also would require a substantial one-time expenditure of state funds, which are not retrievable.

The commitment of these resources is based on the concept that residents in the immediate area, region and state will benefit from the improved quality of the transportation system.

4.9 RELATIONSHIP BETWEEN LONG TERM & SHORT TERM USES/BENEFITS

The most disruptive short-term impacts associated with the proposed project would occur during land acquisition and project construction. However, these short-term uses of human, physical, economic, cultural, and natural resources would contribute to the long-term productivity of the study area.

Existing homes and businesses within the selected alternative's right of way will be displaced. However, adequate replacement housing, land and space are available for homeowners and business owners to relocate within the study area.

The project is consistent with the objectives of state and local transportation plans. It is anticipated that the proposed project will enhance long-term access and connectivity opportunities in New Hanover County and Pender County and will support local, regional, and statewide commitments to transportation improvement and economic viability.

5.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

This chapter identifies the public involvement and environmental resource and regulatory agency coordination that is integral to the project development and decision-making process.

5.1 AGENCY COORDINATION

This project was coordinated with the appropriate federal, state and local agencies. Comments and concerns received throughout the project development process were incorporated into this document.

5.1.1 NEPA/SECTION 404 MERGER PROCESS

This project has followed the NEPA/Section 404 merger process. The merger process is an interagency procedure integrating the regulatory requirements of Section 404 of the Clean Water Act into the National Environmental Policy Act and State Environmental Policy Act decision-making process. The agencies represented on the U-4751 and R-3300 NEPA/Section 404 merger team are:

- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish and Wildlife Service
- National Marine Fisheries Service
- NC Division of Coastal Management
- NC State Historic Preservation Office
- NC Division of Marine Fisheries
- NC Division of Water Quality
- NC Wildlife Resources Commission
- NC Department of Transportation
- Wilmington Metropolitan Planning Organization

The merger team has concurred on the purpose and need, alternatives to be studied in detail and wetlands and streams to be bridged. Copies of the concurrence forms are included in Appendix B. The merger team will concur on the least environmentally damaging practicable alternative for the project following the public hearing. The team will also concur on further avoidance and minimization measures for the project following the selection of the preferred corridor.

5.1.2 OTHER AGENCY COORDINATION

A project scoping letter announcing the start of the proposed Military Cutoff Road Extension (U-4751) and Hampstead Bypass (R-3300) project development, environmental and engineering studies was mailed out to federal, state and local agencies in August 2005. Comments on the project were requested from the agencies listed below. An asterisk (*) next to the agency name indicates that a written response was received in response to the scoping letter. Copies of this and other agency correspondence are included in Appendix B.

- US Department of the Army – Corps of Engineers, Wilmington District
- US Environmental Protection Agency
- * US Department of the Interior – US Fish and Wildlife Service, Raleigh
- National Oceanic and Atmospheric Administration - National Marine Fisheries Service
- Federal Highway Administration
- Federal Emergency Management Agency - National Flood Insurance Program
- * NC Department of Agriculture
- NC Department of Emergency Management (NCDEM)
- NC DEM - Division of Crime Control and Public Safety
- * NC Department of Cultural Resources
- * NC Department of Administration – State Clearinghouse
- NC Department of Environment and Natural Resources (DENR) - Division of Marine Fisheries
- NC DENR – Division of Coastal Management
- NC DENR – Division of Water Quality
- NC DENR – Groundwater Section
- NC DENR – Division of Land Resources
- NC DENR – Wildlife Resources Commission
- * NC DENR – Division of Environmental Health
- NC DENR – NC Division of Air Quality
- NC DENR – Natural Heritage Program
- NC Department of Public Instruction
- Cape Fear Council of Government
- * New Hanover County
- Pender County
- * City of Wilmington

A project scoping meeting was held on September 29, 2005 to exchange information about the proposed project. Representatives from NCDOT and Wilmington Metropolitan Planning Organization attended the meeting.

5.2 PUBLIC INVOLVEMENT

5.2.1 CITIZENS INFORMATIONAL WORKSHOPS

Citizens informational workshops were held on April 23, 2007 in Hampstead and on April 24, 2007 in Wilmington. Citizens received notification through the mail about the workshops and also through local media advertisement. The purpose of the workshops was to introduce citizens to the project and receive their comments and concerns.

A total of 174 participants signed in at the workshops. The majority of comments and questions related to project alternatives and the effects of the proposed project on individual properties. Several meeting participants recommended a project website. Concerns were voiced about potential property value and environmental impacts. Eighty-seven comment sheets were completed at the workshops. Thirty-four citizens indicated their support of the proposed Hampstead Bypass on the comment sheets and six citizens expressed opposition to the bypass. Citizens submitting written comments were generally in favor of the proposed Military Cutoff Road Extension. However, support for Alternative M1 and Alternative M2 was split, with slightly more preferring Alternative M2.

5.2.2 SMALL GROUP MEETINGS

A small group meeting was held August 19, 2009 with the Greater Hampstead Homeowners Association to discuss the project and its status.

5.2.3 OTHER PUBLIC OUTREACH

Three newsletters were mailed to citizens and other stakeholders within the study area. The first newsletter was sent in April 2007 to announce the citizens informational workshops, as well as provide general project information. A second newsletter mailed in September 2008 announced the alternatives selected for detailed study and provided a project status update and a summary of the citizens informational workshops. The third newsletter, mailed in September 2010, provided a project update, including information on the detailed study alternatives and project schedule.

A toll-free project information line was established in 2007 to receive project comments and questions. A project website (www.ncdot.org/projects/US17HampsteadBypass) was developed in 2008 to make project mapping, newsletters, and other project information available to the public. In addition, the website provides contact information for project representatives, including the telephone number for the toll-free information line. The website link was provided in project newsletters and handouts.

5.2.4 PUBLIC HEARING

A public hearing for this project will be held following approval of this document and prior to right of way acquisition. The alternatives still under consideration for the project will be presented to the public for their comments at the hearing. The recommended alternative for the project will be selected following the hearing. Citizen comments will

be taken into consideration in the selection of the recommended alternative. A second hearing will be held following the selection of the recommended alternative to present the proposed design within the recommended corridor.

5.3 USACE PUBLIC INTEREST REVIEW

The proposed project will be reviewed in accordance with 33 CFR 320-332, the Regulatory Programs of the US Army Corps of Engineers, and other pertinent laws regulations and executive orders. The decision whether to authorize this proposal will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed action on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors, which may be relevant to the proposal, will be considered. Among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs and, in general, the needs and welfare of the people.

All public interest factors have been reviewed. The following public interest factors included in Sections 5.3.1 through 5.3.20 below are considered relevant to this proposal. Both cumulative and secondary impacts on the public interest were considered.

5.3.1 CONSERVATION

As described in Section 3.2.1, with the exception of properties near US 17, land use north of the Wilmington Bypass is predominantly rural in nature and includes preserved land, undeveloped forests, open fields, and wetlands. Conservation areas are addressed in Section 3.2.1.3 in relation to the *2006 Wilmington-New Hanover County CAMA Land Use Plan Update*, the *2005 Pender County CAMA Land Use Plan Update*, and the *Pender County Comprehensive Land Use Plan*. Section 4.2.1 of the DEIS provides information on compatibility with local land use plans. Indirect and cumulative effects related to development can be found in Section 4.6.

5.3.2 ECONOMICS

In accordance with 33 CFR 320.4(q), Section 4.1.5 of this document describes how new and/or improved access and mobility provided by the proposed project will have an overall positive economic effect. Indirect and cumulative economic effects are described in Section 4.6. The proposed project is not expected to directly contribute to National Economic Development, which is an increase in the net value of the national output of goods and services.

5.3.3 AESTHETICS

The proposed project is on new location, much of it through rural areas. While the new roadway will visually alter the area, the proposed project is compatible with local land use plans and future planned development. Both Military Cutoff Road Extension and the Hampstead Bypass will result in visual and aesthetic impacts. Views would be diminished equally by either Military Cutoff Road Extension alternative from Ogden Park, a recreational setting. All of the Hampstead Bypass alternatives would result in some replacement of vegetation with asphalt and vertical and horizontal changes in the view of the rural landscape, which would impact travelers using existing roadways and nearby homes and businesses.

Hampstead Bypass Alternatives E-H, O, R, and U will impact the views from a visually sensitive property – Topsail High School. The back of the school includes recreational fields that currently overlook a forested area. Alternative U is also expected to impact low-income rural residents' views at NC 210 with the introduction of an interchange, which would create horizontal and vertical changes in the landscape. This alternative would also impact residents' views in the area of the Hoover Road crossing.

Section 4.7.1.3 addresses temporary visual impacts associated with project construction.

5.3.4 GENERAL ENVIRONMENTAL CONCERNS

General environmental concerns, including beneficial and detrimental effects have been evaluated in accordance with (33 CFR 320.4(p)). Section 4.1.4 of this document evaluates Environmental Justice. Information pertaining to other environmental factors is addressed in Sections 5.3.5 through 5.3.20 below.

5.3.5 WETLANDS

Wetland impacts have been evaluated in accordance with 33 CFR 320.4(b). Although estimated wetland impacts for the project range from 218.35 acres to 384.42 acres, depending on the alternative, no anadromous fish spawning areas, shellfish growing areas, or primary nursery areas will be affected. Additionally, there is no Essential Fish Habitat or Coastal Area Management Act Areas of Environmental Concern in the project study area. Sections 3.2.1.3 and 4.2.1 address wetland conservation areas. Sections 3.5.4, 4.5.4, and 4.6 provide additional specific information, including indirect and cumulative effects, regarding wetlands in the project study area.

5.3.6 HISTORIC AND CULTURAL RESOURCES

In accordance with 33 CFR 320.4(e), impacts to historic and cultural resources have been evaluated as a part of the project. Sections 3.4 and 4.4 provide information on the resources and impacts.

5.3.7 FISH AND WILDLIFE VALUES

In accordance with 33 CFR 320.4(c), NCDOT has coordinated extensively with the US Fish and Wildlife Service and the NC Wildlife Resources Commission, as detailed in Section 5.1 and Appendix B. Fish and wildlife resources are detailed in Sections 3.5.2 and 4.5.2.

5.3.8 FLOOD HAZARDS

Sections 3.3.7 and 4.3.7 address flood hazard issues. In addition, NCDOT has coordinated with local planners to ensure the proposed project is compatible with local plans, including hazard mitigation.

5.3.9 FLOODPLAIN VALUES

As stated in 33 CFR 320.4(l)(1)(i), floodplains are valuable in providing a natural moderation of floods, water quality maintenance, and groundwater recharge. All of the detailed study alternatives cross the 100-year floodplain. In accordance with Executive Order 11988, NCDOT will coordinate the project with the NC Floodplain Mapping Program. Because hydraulic design for the crossings will not create constraints to flow, upstream floodways will not be affected by placement of the proposed hydraulic structures. Additional information regarding floodplains is located in Sections 3.3.7 and 4.3.7.

5.3.10 LAND USE

Land use information and impacts are detailed in Sections 3.2 and 4.2.

5.3.11 NAVIGATION

At its closest point, the proposed project is approximately 1.5 miles from a channel leading to the Intracoastal Waterway. The project will have no effect on navigation, and no permits from the US Coast Guard are required.

5.3.12 SHORE EROSION AND ACCRETION

The proposed project will have no effect on shore erosion or accretion, as it pertains to 33 CFR 320.4(g)(2).

5.3.13 RECREATION

As stated in the Project Commitments and Section 2.4.2.2.2, the Wilmington MPO has requested the inclusion of a multi-use path as part of the proposed project. The multi-use path would tie into an existing multi-use path along Military Cutoff Road. The NCDOT will continue to coordinate with the Wilmington MPO on the inclusion of the multi-use path in the proposed project. It is anticipated that pedestrian access to existing multi-use path facilities and Ogden Park would be improved if pedestrian facilities are

constructed. The Hampstead Bypass would not be conducive to pedestrian or bicycle uses, and is not expected to affect pedestrian or bicycle access. Sections 3.1.3 and 4.1.2 discuss recreation in the area. Section 4.2.2.3 provides information related to bicycle and pedestrian impacts.

5.3.14 WATER SUPPLY

In accordance with 33 CFR 320.4(m), impacts to the project area water supply are detailed in Sections 3.5.3 and 4.5.3.

5.3.15 WATER QUALITY

The proposed project will require a Water Quality Certification from the NC Division of Water Quality (NCDWQ). NCDOT has coordinated extensively with NCDWQ and EPA regarding compliance with the Clean Water Act, in accordance with 33 CFR 320.4(d). Detailed information related to water quality compliance and coordination can be found in Sections 3.5.4, 4.5.3, 4.5.4.1.2, 4.6, and 5.1 and Appendix B.

5.3.16 ENERGY NEEDS

As stated in Section 4.7.1.1, and in accordance with 33 CFR 320.4(n), the proposed project will not increase the production, transmission, or conservation of energy. However, construction of the proposed project is expected to result in less total energy utilization than the No-Build Alternative, due to congestion reductions and increased safety (refer to Section 4.7.1.1).

5.3.17 SAFETY

The proposed project is expected to reduce the potential for accidents along existing roadways, due to a reduction in traffic volumes. Both Military Cutoff Road Extension and Hampstead Bypass are proposed as median-divided facilities, reducing the likelihood of head-on collisions. Additional safety information is located in Section 2.6.

5.3.18 FOOD AND FIBER PRODUCTION

Section 4.3.3 states that the proposed project will impact prime farmland in Pender County, ranging from 49.88 acres to 67.48 acres, depending on the alternative. These impacts have been coordinated with the Natural Resources Conservation Service.

5.3.19 MINERAL NEEDS

The current extent of mining activities in the project area will not be impacted by the project. The HanPen mine has recently requested an expansion. Alternative E-H may impact the future expansion of mining activities at this site. Additional information related to mineral resources is located in Sections 3.3.6 and 4.3.6.

5.3.20 CONSIDERATIONS OF PROPERTY OWNERSHIP

Considerations of property ownership have been made during evaluation of the proposed project. Every effort has been made to balance impacts to both the human and natural environments. There will be no impacts to public rights to navigation. Any unavoidable impacts, including to riparian rights, on individual property owners will be handled during the right of way acquisition phase of the project. Additional information related to considerations of property ownership can be found in Sections 3.1.3, 3.1.4, and 4.1.1-4.1.3.

6.0 LIST OF PREPARERS

Chapter 6 includes a list of the principal participants in the preparation of this Draft Environmental Impact Statement.

6.1 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Name	Qualifications	Primary Responsibilities
James McInnis, Jr. PE Project Engineer	BS in Civil Engineering with 19 years experience in project planning and development	Project development and document review
Olivia Farr Project Planning Engineer	BS in Education with 26 years experience in traffic engineering, roadway design, and project planning and development	Project management and document review
Robert Hanson, PE Eastern Project Development Engineer	MS in Civil Engineering and BS in Civil Engineering with 24 years experience in transportation engineering	Management oversight and document review
Gary Lovering, PE Project Engineer	BS in Civil Engineering with 31 years experience in roadway design	Functional and Preliminary Design review
Ed Robbins, PE Project Design Engineer	BS in Civil Engineering with 10 years experience in roadway design	Functional and Preliminary Design review
Anthony West Project Design Engineer	AAS in Civil Engineering Technology with 23 years experience in roadway design	Functional and Preliminary Design review
Richard Tanner Traffic Forecasting Engineer	Master of Economics and BS in Mathematics with 7 years experience in traffic forecasting	Traffic forecast
Benjetta Johnson, PE Congestion Management Regional Engineer	BS in Civil Engineering with 10 years experience in traffic engineering	Traffic Analysis Report review
Stephen Yeung, PE Congestion Management Project Design Engineer	BS in Electrical Engineering with 6 years experience in traffic engineering	Traffic Analysis Report review

Name	Qualifications	Primary Responsibilities
Amy James Environmental Specialist	MS in Environmental Management and BS in psychobiology with 9 years experience in natural resource investigations	Natural Resource Technical Report review
Rachelle Beaugard Environmental Supervisor	BS in Fisheries and Wildlife Science 13 years experience in natural resource investigations, Section 7 field investigations, protected species surveys	Red-cockaded Woodpecker Survey, Red-cockaded Woodpecker Foraging Habitat Analysis Report review
Herman Huang, Ph.D. Community Planner	Ph.D. in City and Regional Planning, MS in Environmental Science, and BS in Chemistry with 3 years experience in community planning	Community Impact Assessment/ Indirect and Cumulative Effects Assessment Review
Steve Gurganus, AICP Community Studies Team Leader	Master of Public Affairs and BA in Anthropology with 13 years experience in community planning	Community Impact Assessment/ Indirect and Cumulative Effects Assessment Review

6.2 MULKEY ENGINEERS AND CONSULTANTS

Name	Qualifications	Primary Responsibilities
Liz Kovasckitz, AICP Planning Group Manager	MS in Environmental Studies and BA in Geography with 20 years experience in environmental and transportation planning and project development	Overall project management and development of the DEIS
J.A. Bissett, P.E. Principal	BS in Civil Engineering with 26 years experience in transportation planning and project development	Quality Assurance
Tim Jordan, PE Roadway Design Engineer	BS in Civil Engineering with 20 years experience in roadway design	Functional and Preliminary Design

Name	Qualifications	Primary Responsibilities
Paddy Jordan Roadway Designer	Associates in Civil Engineering/Survey with 8 years experience in roadway design	Functional and Preliminary Design
Johnny Banks	Associates in Architectural Technology with 22 years experience in roadway design	Preliminary Design
Nicole Bennett, AICP Project Manager	MS in Regional Planning and BA in Economics with 15 years experience in community and transportation planning and project development	Community impacts analysis, Indirect and cumulative effects analysis, environmental document preparation
Colista Freeman, PE Senior Planner	BS in Civil Engineering with 12 years experience in transportation planning and project development	Environmental document preparation
Carl Furney, GISP, AICP GIS Analyst	MA in Geography and BA in Geography with 15 years experience in planning and GIS	Alternatives development, Community impacts analysis, Indirect and cumulative effects analysis
Andy Belcher GIS Specialist	BA in History with Minor in Geography and Program Certificate in GIS with 6 years experience in geographic information systems and graphics	Impacts analysis, figures
Mark Mickley Environmental Scientist	BS in Biology with 6 years experience in natural resource investigations	Natural resource investigations Principal Investigator
Wendee Smith Environmental Services Group Manager	BS in Natural Resource Ecosystem Assessment with Minor in Environmental Science with 11 years experience in natural resource investigations	Natural resource investigations
Cindy Carr Senior Scientist	BS in Natural Resource Ecosystem Assessment and AS in Business Administration with 21 years experience in natural resource investigations	Natural resource investigations

Name	Qualifications	Primary Responsibilities
Tom Barrett Senior Scientist	MS in Forest Management, MS in Environmental Health, and BS in Forest Management with 9 years experience in natural resource investigations	Red-cockaded woodpecker foraging analysis, Natural resource investigations
Ralph Costa Wildlife Biologist	MS in Watershed Management (Forestry) and BS in Wildlife Biology with 33 years experience in forestry, wildlife conservation and endangered species policy and conservation / recovery programs	Red-cockaded woodpecker foraging analysis
Kevin Alford, PE, CFM	BS in Civil Engineering with 12 years experience in hydraulic / hydrologic design	Hydraulic investigations
Matt Harvey, EI	BS in Civil Engineering with 8 years experience in hydraulic and roadway design	Hydraulic investigations

6.3 RS&H ARCHITECTS-ENGINEERS-PLANNERS, INC.

Name	Qualifications	Primary Responsibilities
Radha Krishna Swayampakala, P.E. Transportation Engineer	MS in Civil Engineering with 8 years experience in traffic operations and transportation planning	Traffic operations analysis

6.4 SEPI ENGINEERING GROUP, INC.

Name	Qualifications	Primary Responsibilities
Richard Drayton Project Manager	AAS in Civil Engineering Technology BA in Civil Engineering Science with 14 years experience as a Transportation Engineer (9 in air quality and noise analysis)	Air Quality Analysis, Traffic Noise Analysis

APPENDIX A

FIGURES

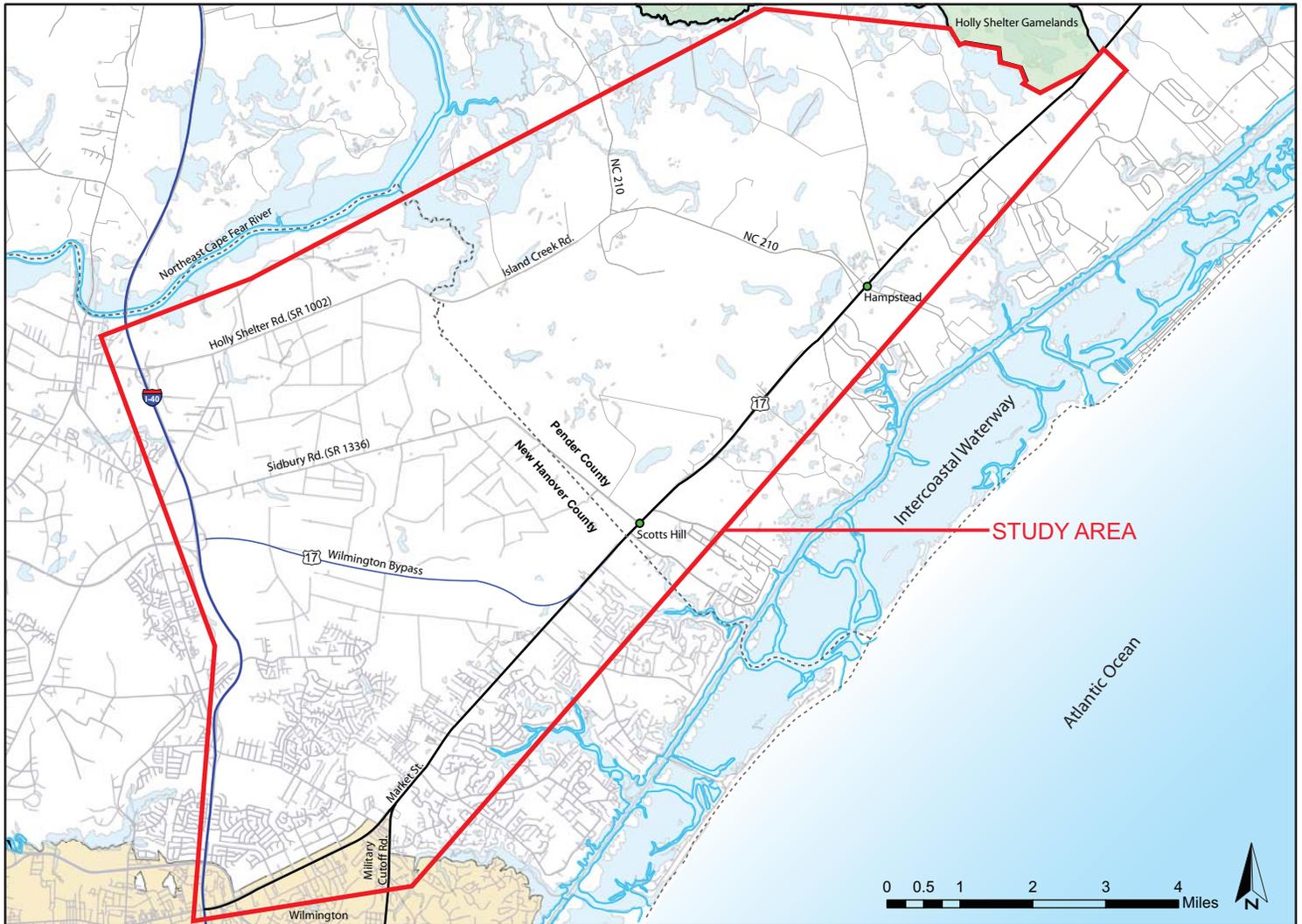
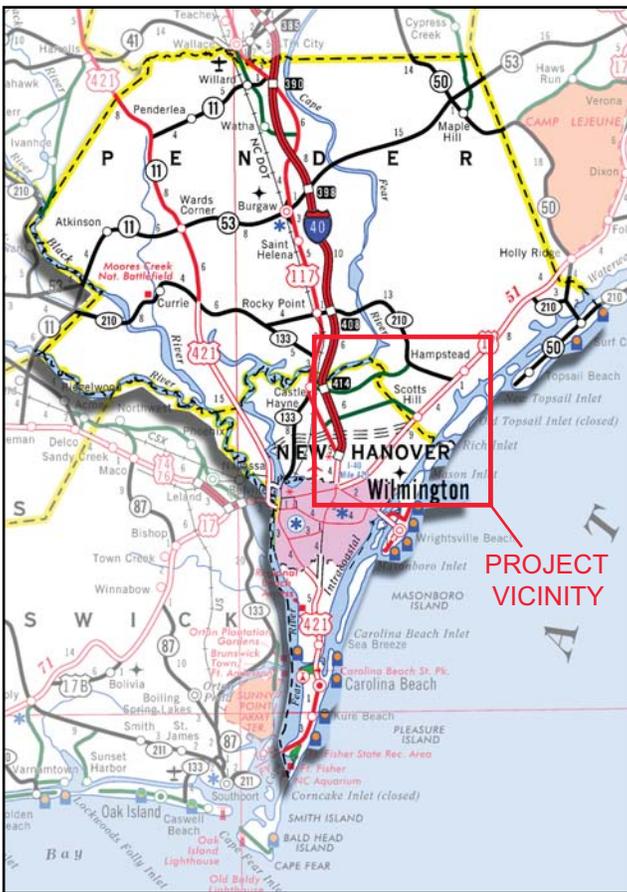
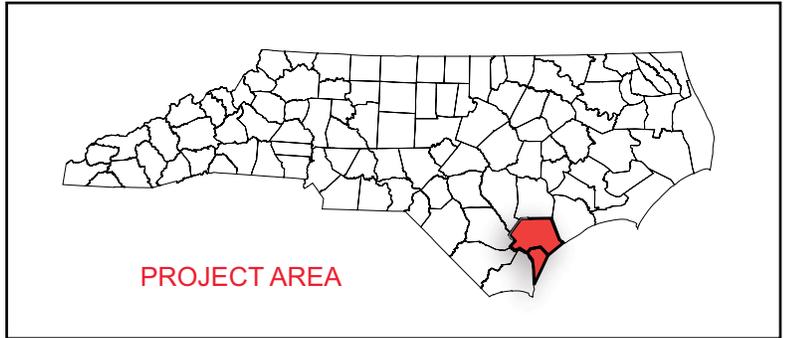
Figure 1

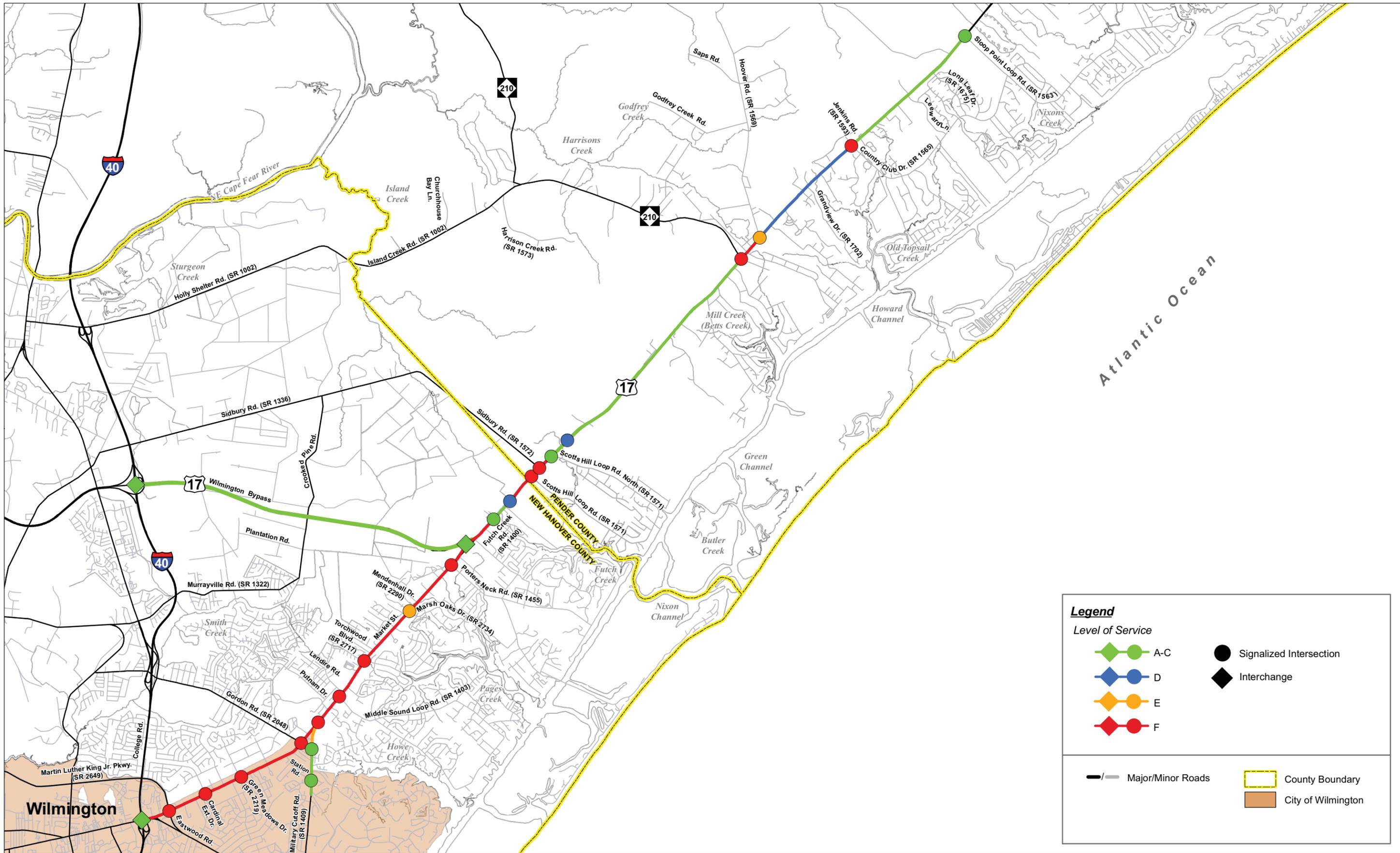
PROJECT VICINITY

US 17 Corridor Study
NCDOT TIP Nos. U-4751 and R-3300
New Hanover and Pender Counties



North Carolina
Department of Transportation





Prepared by: MULKEY
ENGINEERS & CONSULTANTS

Prepared for:



**2008 Level of Service
Existing Conditions**
US 17 Corridor Study
NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC



Data Sources: NCDOT and Mulkey GIS
U-4751/R-3300 Traffic Operations Analysis Report
Figure Prepared: 10/21/10



Figure No.
3

LEGEND

No. of Vehicles Per Day (VPD) in 100s

DHV $\frac{PM}{(d,t)}$ D

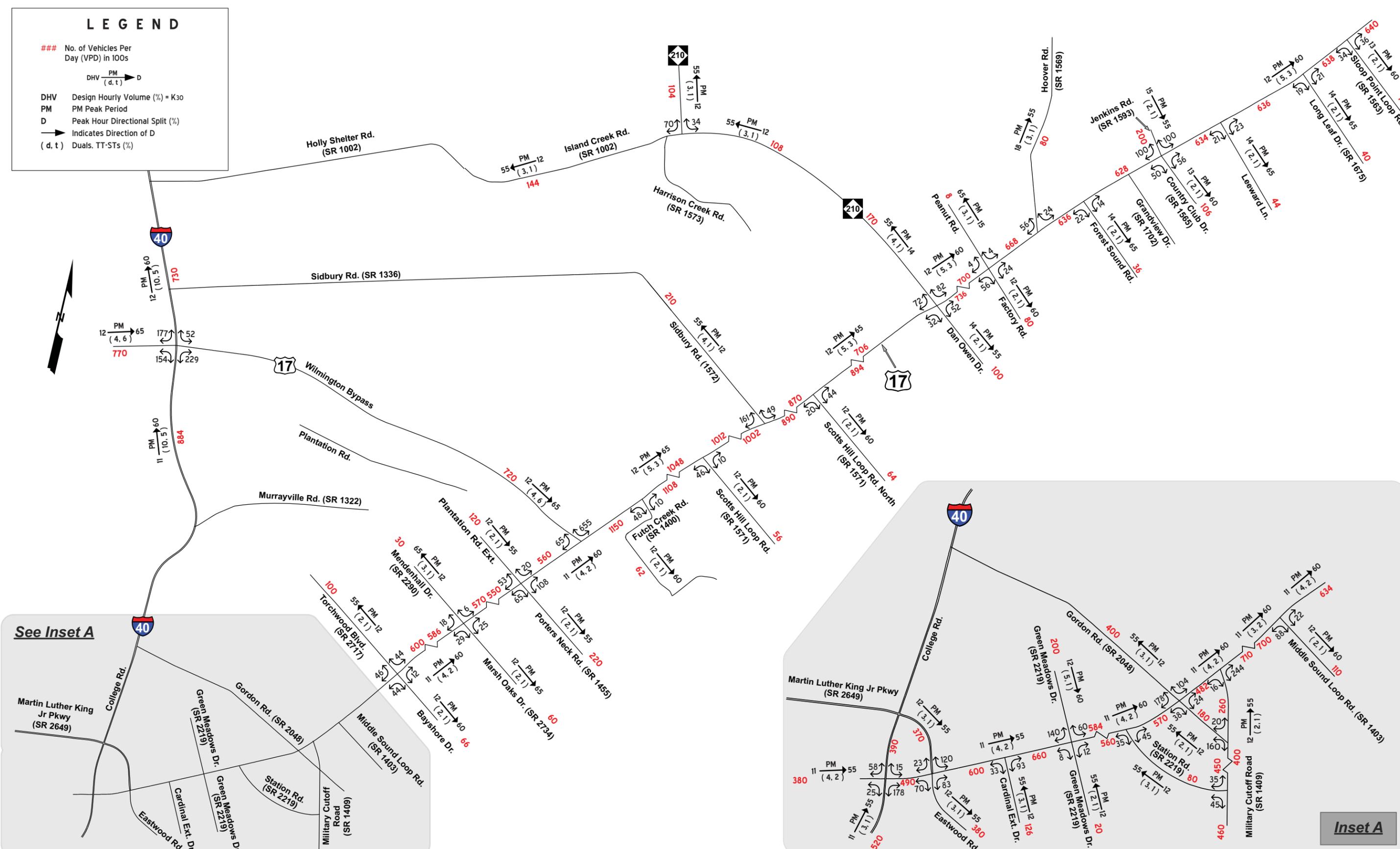
DHV Design Hourly Volume (%) = K30

PM PM Peak Period

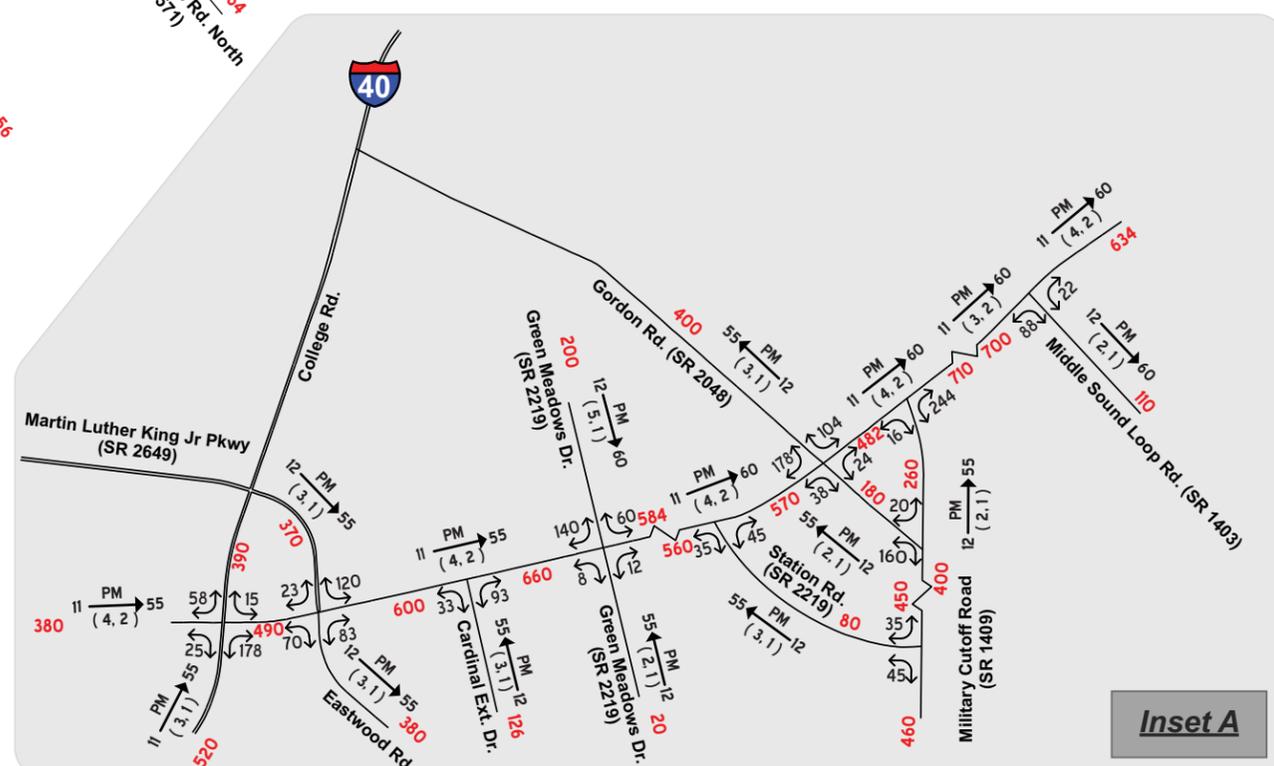
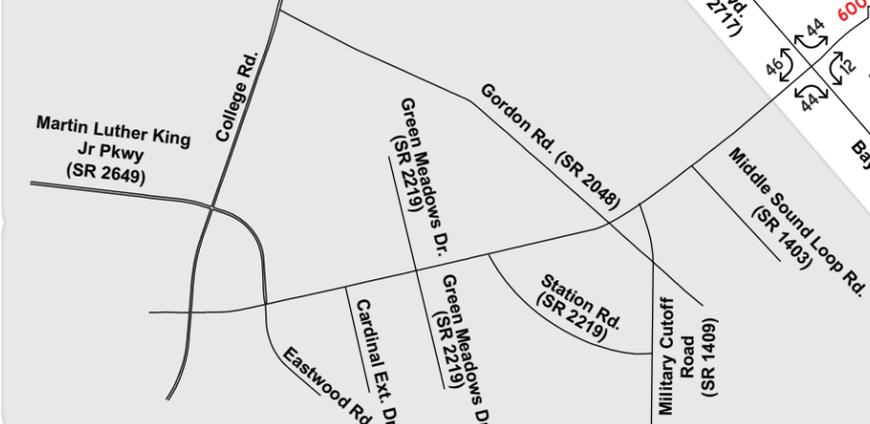
D Peak Hour Directional Split (%)

→ Indicates Direction of D

(d, t) Duals, TT-STs (%)



See Inset A



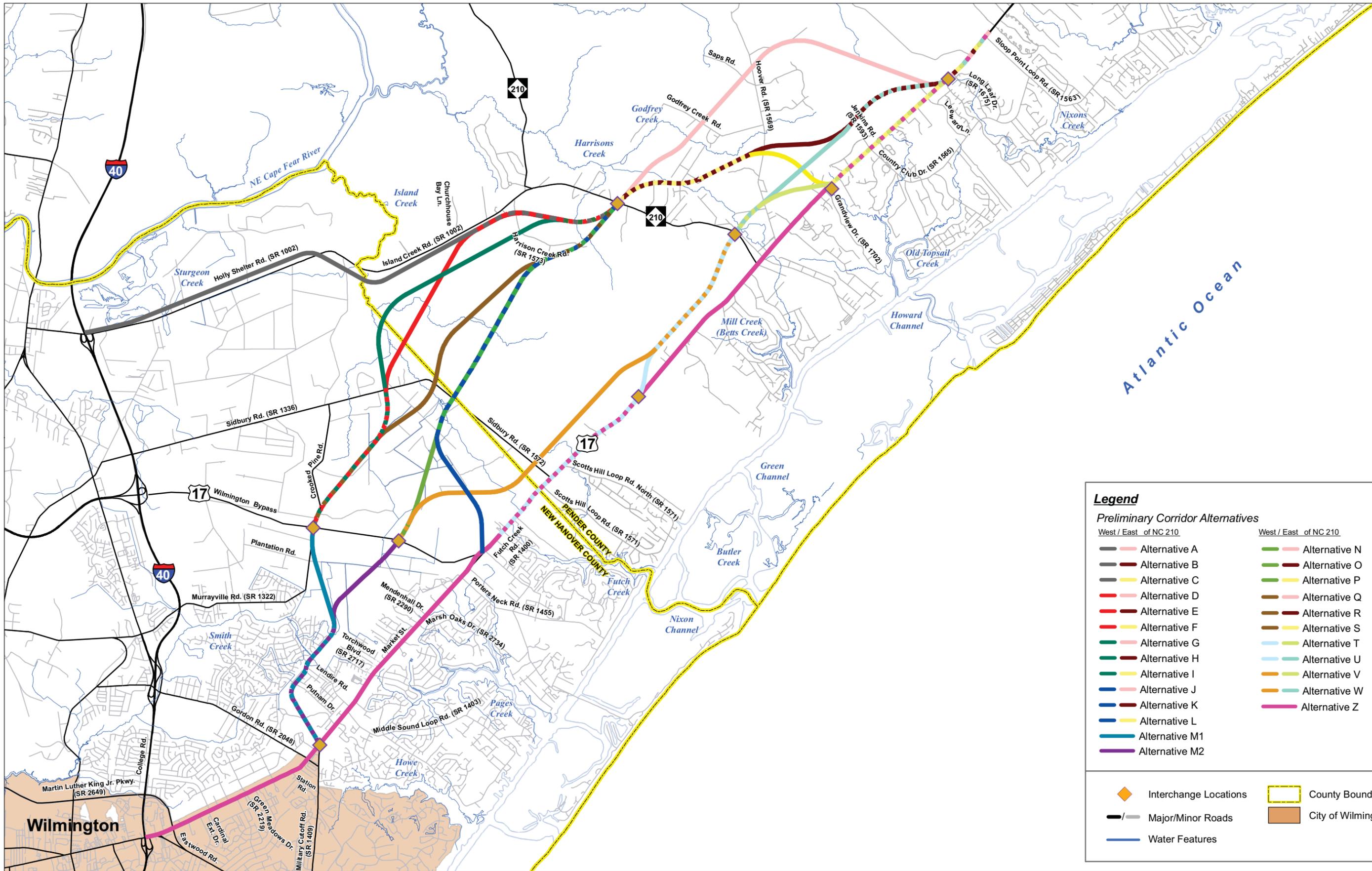
Inset A



2035 Average Annual Daily Traffic
No Build
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

Not to Scale
 Figure Prepared 1/17/2011

Figure No.
4



Legend

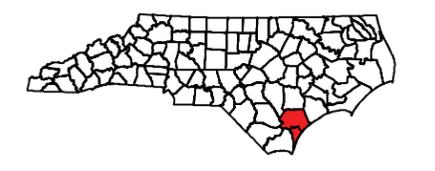
Preliminary Corridor Alternatives

West / East of NC 210		West / East of NC 210	
	Alternative A		Alternative N
	Alternative B		Alternative O
	Alternative C		Alternative P
	Alternative D		Alternative Q
	Alternative E		Alternative R
	Alternative F		Alternative S
	Alternative G		Alternative T
	Alternative H		Alternative U
	Alternative I		Alternative V
	Alternative J		Alternative W
	Alternative K		Alternative Z
	Alternative L		
	Alternative M1		
	Alternative M2		

	Interchange Locations		County Boundary
	Major/Minor Roads		City of Wilmington
	Water Features		

Prepared by: MULKEY
 ENGINEERS & CONSULTANTS

Prepared for:



Preliminary Corridor Alternatives
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

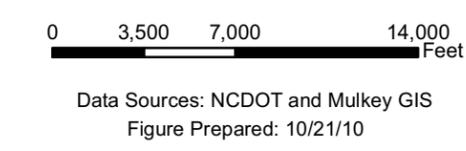


Figure No.
6

NEW HANOVER COUNTY NORTH CAROLINA

I, ARNOLD W. CARSON, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL GPS SURVEY MADE UNDER MY SUPERVISION (DESCRIPTIONS RECORDED AS SHOWN HEREON); THAT THE INDIVIDUAL BOUNDARIES WERE NOT SURVEYED AND ARE CLEARLY INDICATED AS DRAWN FROM INFORMATION FOUND AS SHOWN HEREON; THAT THIS GPS SURVEY WAS PERFORMED EXCEEDING ORDER (C) 3 OF THE FGCC SPECIFICATIONS AND THAT I USED RTK (STATIC MODE) GPS FIELD PROCEDURES AND COORDINATES WERE OBTAINED BY AVERAGE MEAN METHOD OF 3 OR MORE OBSERVATIONS WITH DEVIATIONS LESS THAN 0.1" OF EACH POINT SHOWN HEREON; THAT THIS SURVEY WAS PERFORMED IN APRIL - JULY, 2005 USING (2) TOPCON HYPER L1/L2 RECEIVERS AND ALL COORDINATES ARE BASED ON NAD '83.

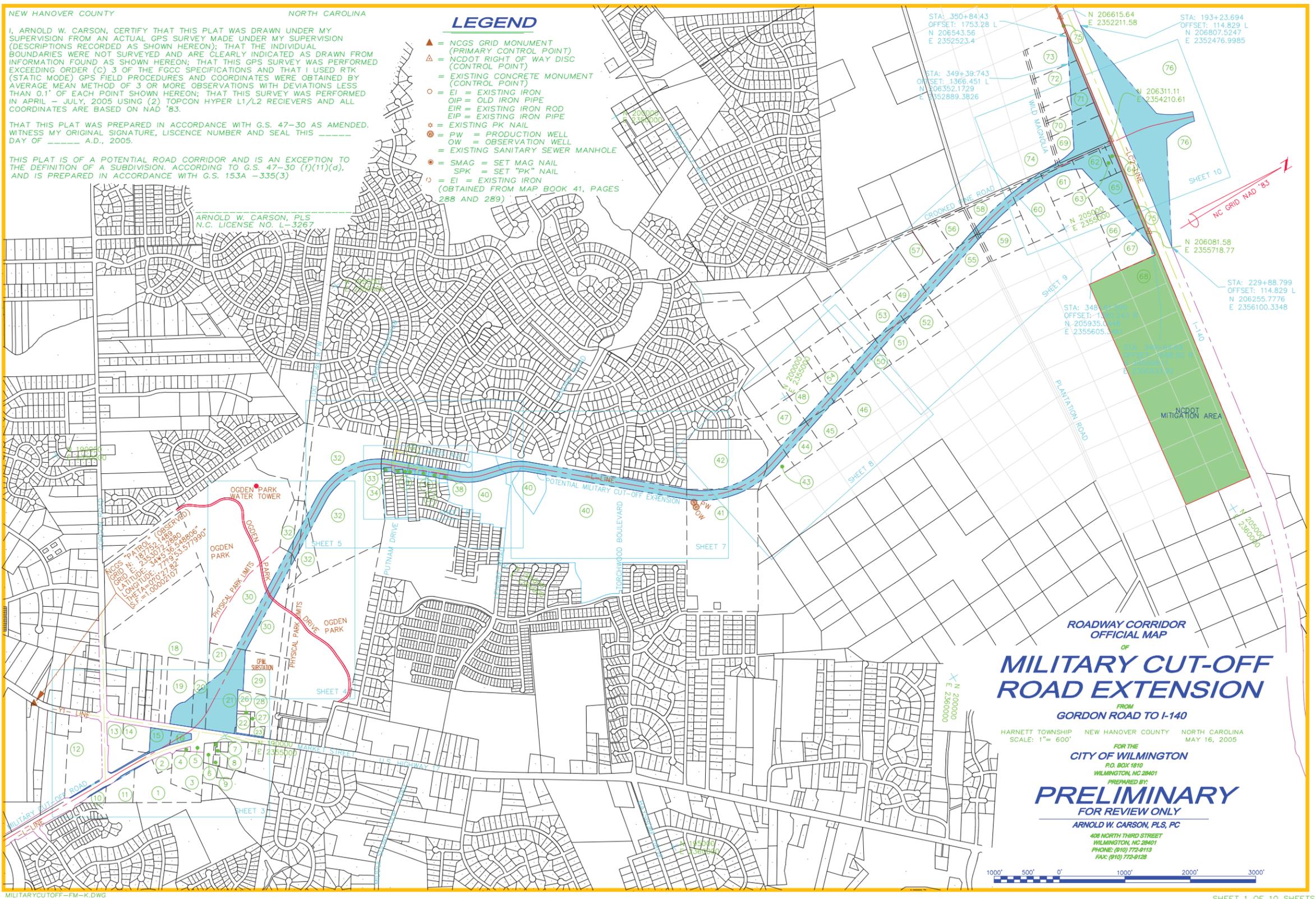
THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, LICENCE NUMBER AND SEAL THIS DAY OF _____ A.D., 2005.

THIS PLAT IS OF A POTENTIAL ROAD CORRIDOR AND IS AN EXCEPTION TO THE DEFINITION OF A SUBDIVISION, ACCORDING TO G.S. 47-30 (f)(11)(d), AND IS PREPARED IN ACCORDANCE WITH G.S. 153A -335(3)

LEGEND

- ▲ = NCGS GRID MONUMENT (PRIMARY CONTROL POINT)
- △ = NCDOT RIGHT OF WAY DISC (CONTROL POINT)
- = EXISTING CONCRETE MONUMENT (CONTROL POINT)
- = EI = EXISTING IRON
- = OIP = OLD IRON PIPE
- = EIR = EXISTING IRON ROD
- = EIP = EXISTING IRON PIPE
- ☆ = EXISTING PK NAIL
- ⊙ = PW = PRODUCTION WELL
- ⊙ = OW = OBSERVATION WELL
- = EXISTING SANITARY SEWER MANHOLE
- = SMAG = SET MAG NAIL
- = SPK = SET "PK" NAIL
- = EI = EXISTING IRON (OBTAINED FROM MAP BOOK 41, PAGES 288 AND 289)

ARNOLD W. CARSON, PLS
N.C. LICENSE NO. L-3267



**ROADWAY CORRIDOR
OFFICIAL MAP
OF
MILITARY CUT-OFF
ROAD EXTENSION**

FROM
GORDON ROAD TO I-140

HARNETT TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA
SCALE: 1" = 600' MAY 16, 2005

FOR THE
CITY OF WILMINGTON
P.O. BOX 1810
WILMINGTON, NC 28401

PREPARED BY:
PRELIMINARY
FOR REVIEW ONLY

ARNOLD W. CARSON, PLS, PC
408 NORTH THIRD STREET
WILMINGTON, NC 28401
PHONE: (910) 772-9113
FAX: (910) 772-9128



MILITARYCUTOFF-FM-K.DWG

SHEET 1 OF 10 SHEETS

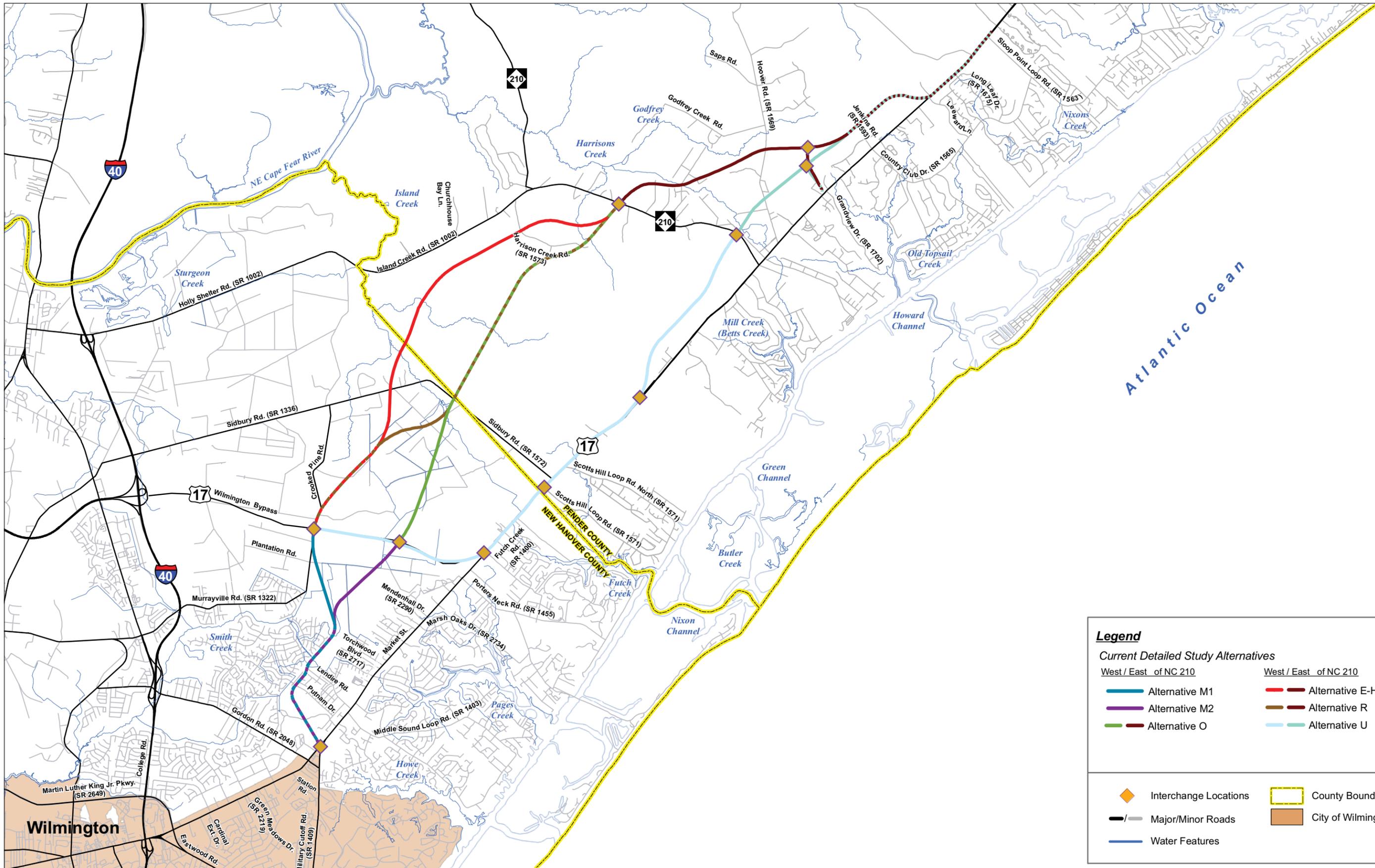
Prepared by:
Prepared for:



**City of Wilmington Military Cut-Off Road Extension
Transportation Corridor Official Map**
US 17 Corridor Study
NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Data Source: City of Wilmington
Figure Prepared: 10/21/10

Figure No.
7



Legend

Current Detailed Study Alternatives

<u>West / East of NC 210</u>		<u>West / East of NC 210</u>	
	Alternative M1		Alternative E-H
	Alternative M2		Alternative R
	Alternative O		Alternative U

	Interchange Locations		County Boundary
	Major/Minor Roads		City of Wilmington
	Water Features		

Prepared by: MULKEY ENGINEERS & CONSULTANTS

Prepared for:



Current Detailed Study Alternatives
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC



Data Sources: NCDOT and Mulkey GIS
 Figure Prepared: 10/21/10



Figure No.
9

Map 10D

Map 10F

Map 10H

Map 10J



Map 10B

Map 10C

Map 10E

Map 10G

Map 10I

Map 10K

Legend

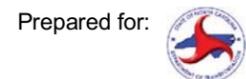
County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Future Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

Alternatives

Alternative M1	Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

West / East of NC 210

Prepared by:



Current Detailed Study Alternatives
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC



Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11

Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXTXH with supposed sub-meter accuracy.



Figure No.

10A



Ogden P

Map 10B

Map 10C

Legend

County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Future Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

Alternatives

Alternative M1	Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

0 600 1,200 2,400 Feet

Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXTXH with supposed sub-meter accuracy.

Figure No. 10B



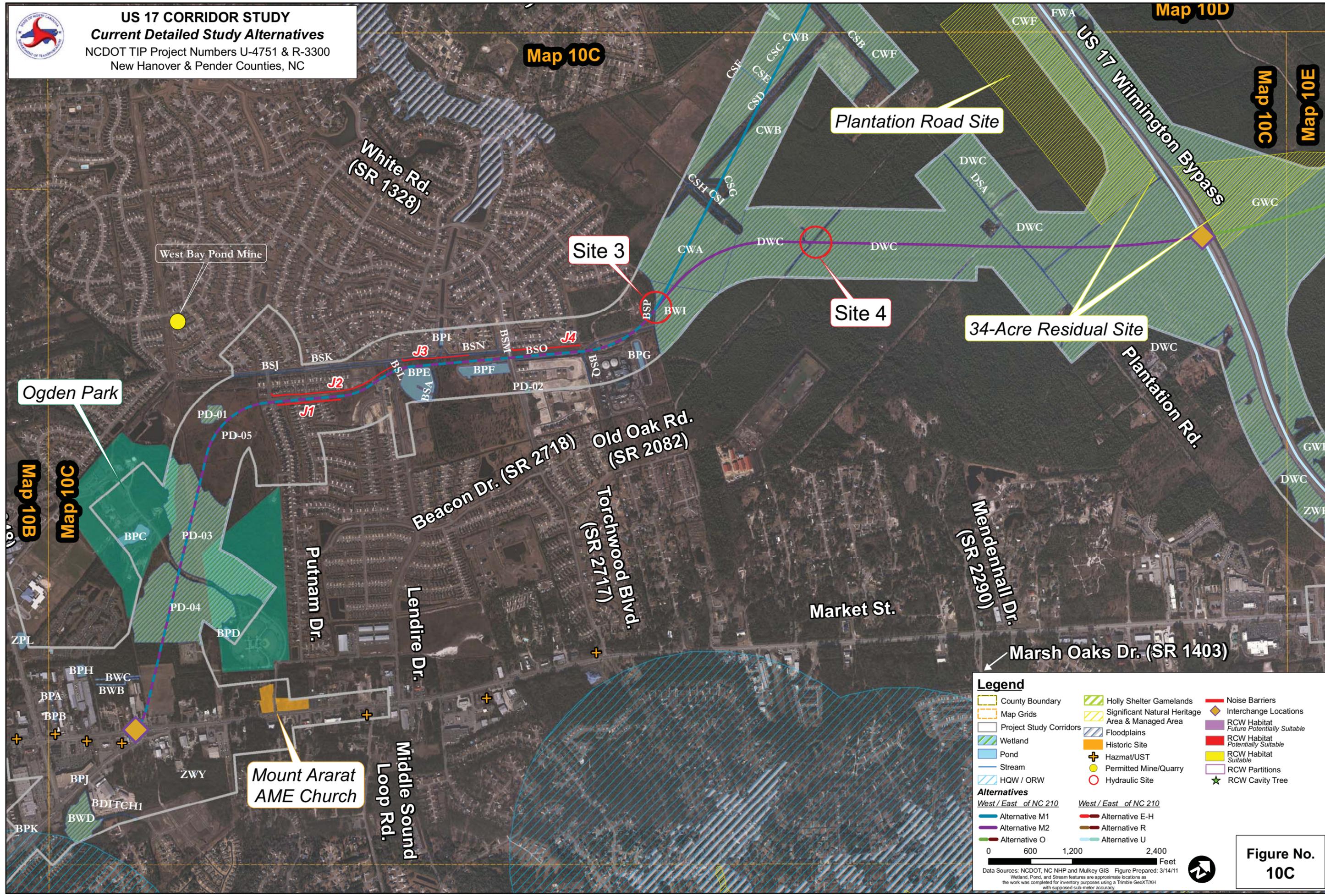
US 17 CORRIDOR STUDY
Current Detailed Study Alternatives
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

Map 10C

Map 10D

Map 10C

Map 10E



Legend

County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Future Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

Alternatives

Alternative M1	Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

0 600 1,200 2,400 Feet

Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXT104 with supposed sub-meter accuracy.

Figure No. 10C



Corbett Tract Mitigation Site

Corbett Strip Residual Site

Site 10

Site 21

Site 22

Site 11

Legend

County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Future Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

Alternatives

Alternative M1	Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

0 600 1,200 2,400 Feet

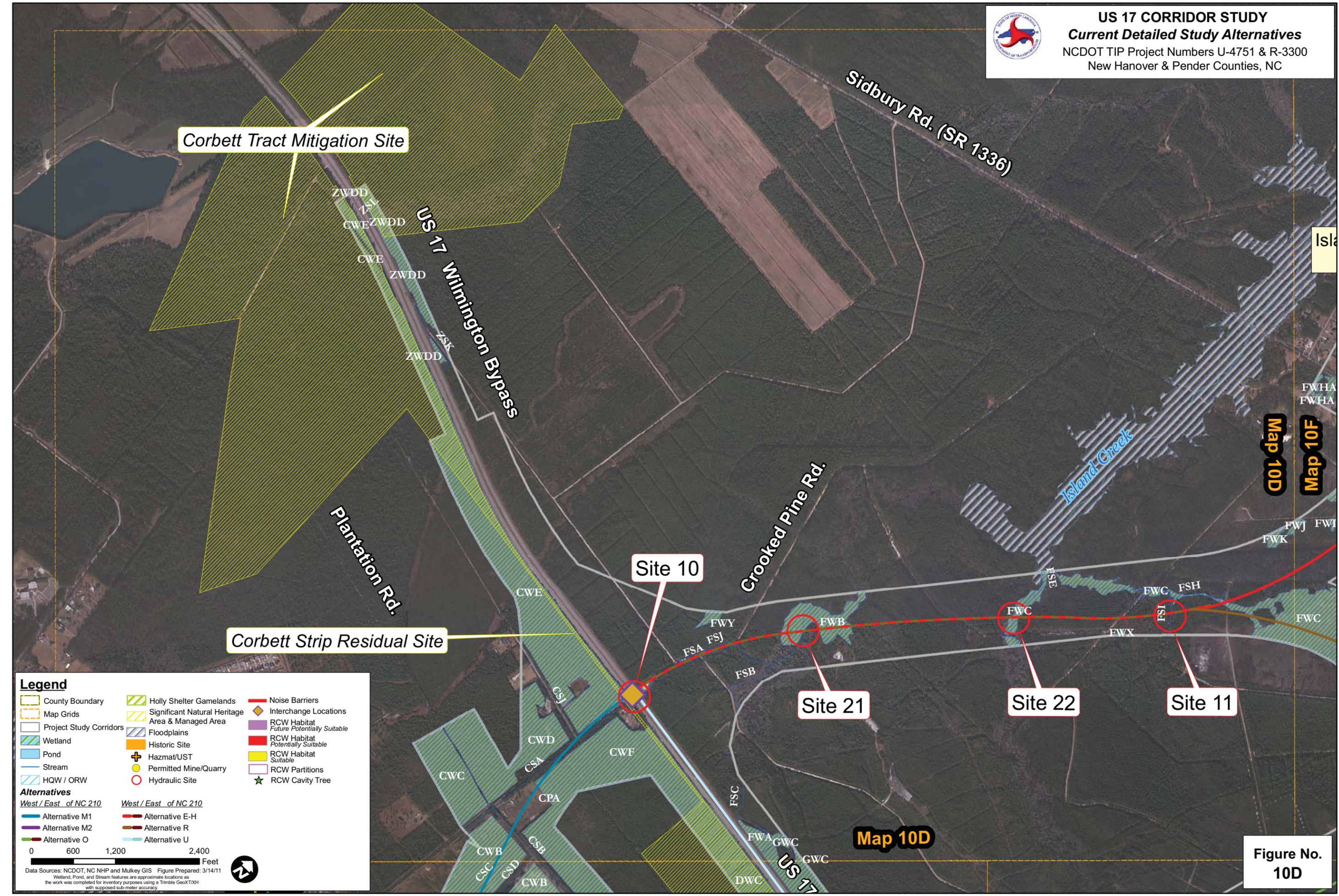
Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXTXH with supposed sub-meter accuracy.

Map 10D

Figure No. 10D

Map 10D

Map 10F



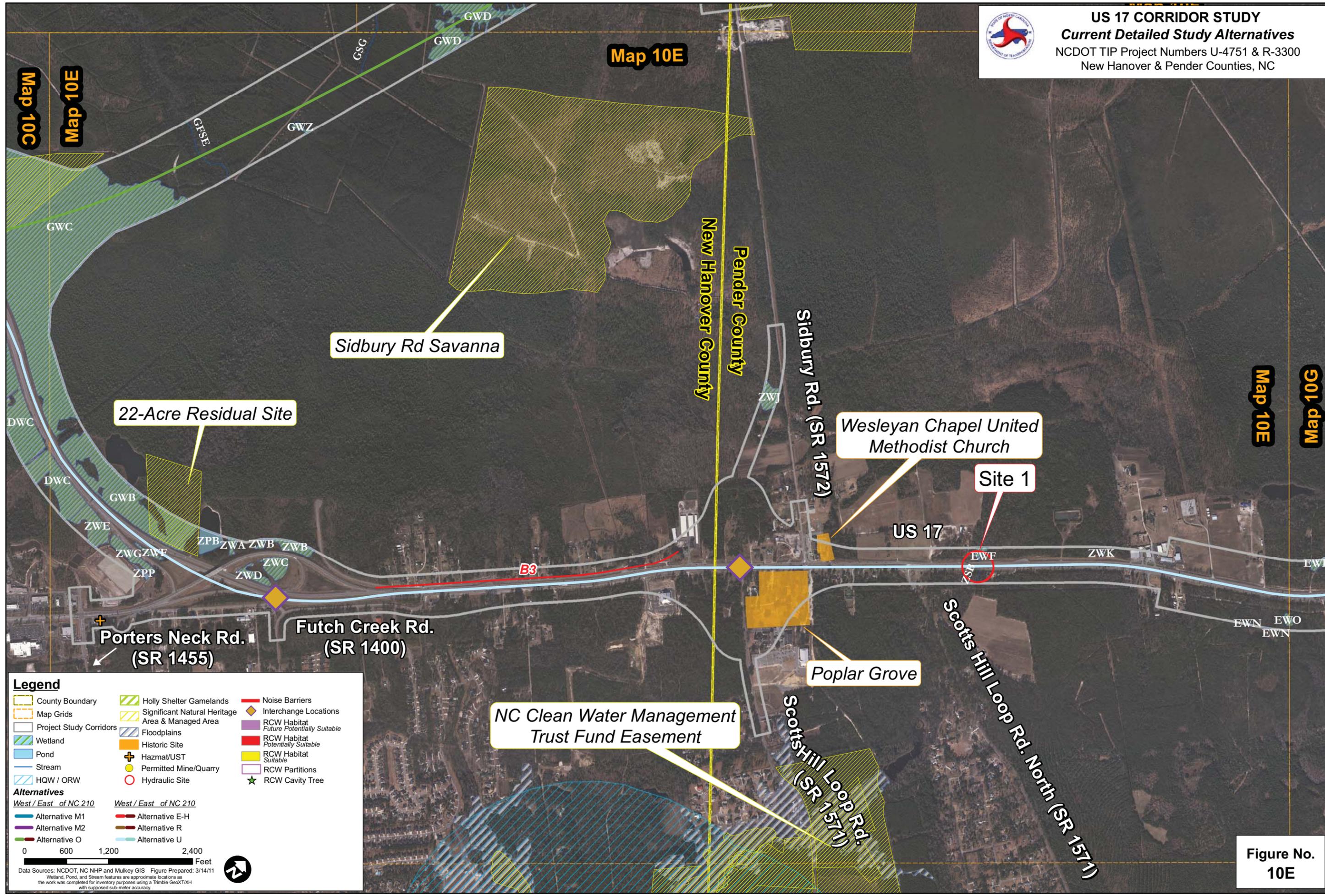
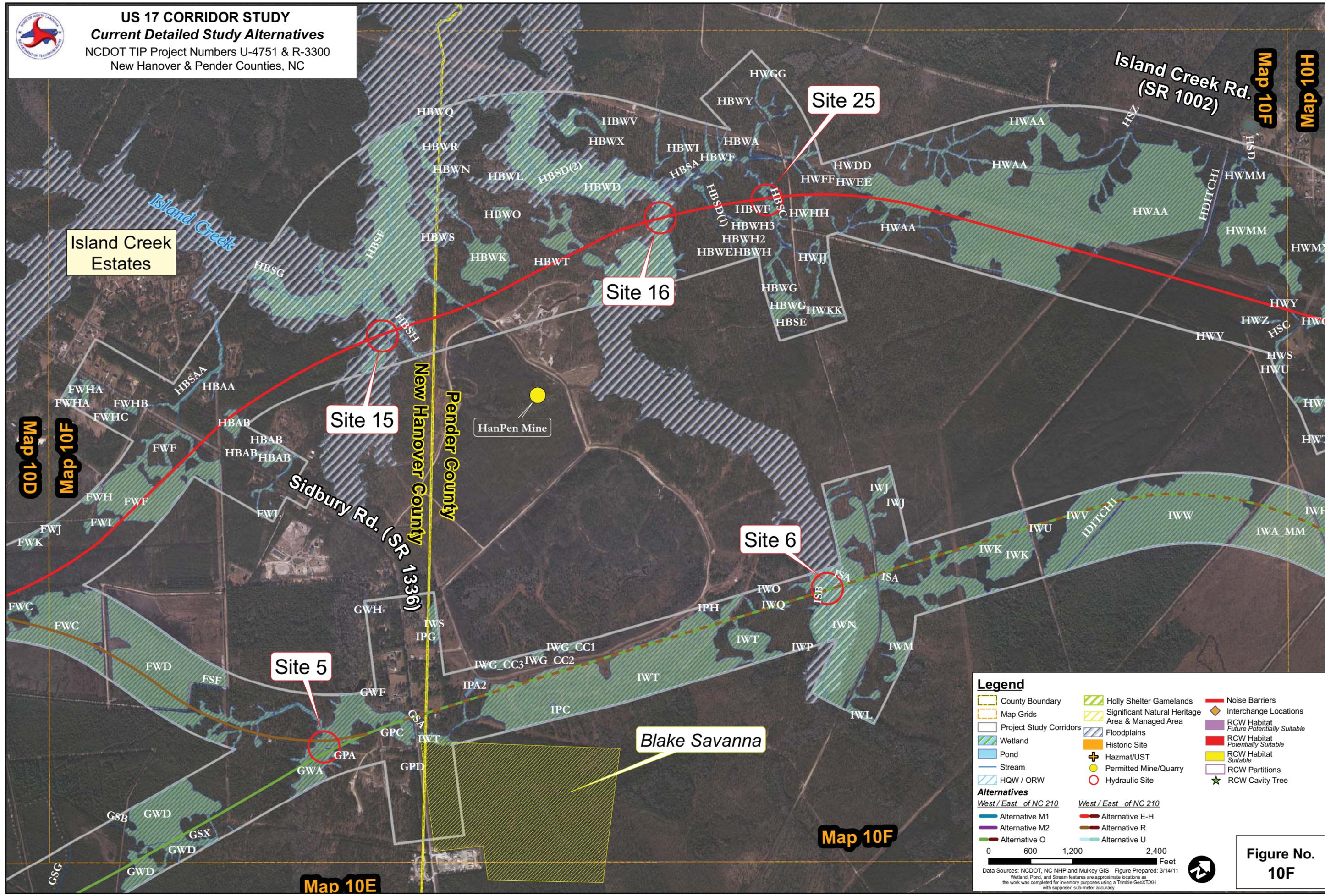


Figure No. 10E



US 17 CORRIDOR STUDY
Current Detailed Study Alternatives
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC



Legend

County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Future Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

Alternatives

West / East of NC 210 Alternative M1	West / East of NC 210 Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

0 600 1,200 2,400 Feet

Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXT1X4 with supposed sub-meter accuracy.

Figure No. 10F

Map 10D
 Map 10F

Map 10F
 Map 10H

Map 10F

Map 10E



US 17 CORRIDOR STUDY
Current Detailed Study Alternatives
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

Map 10H

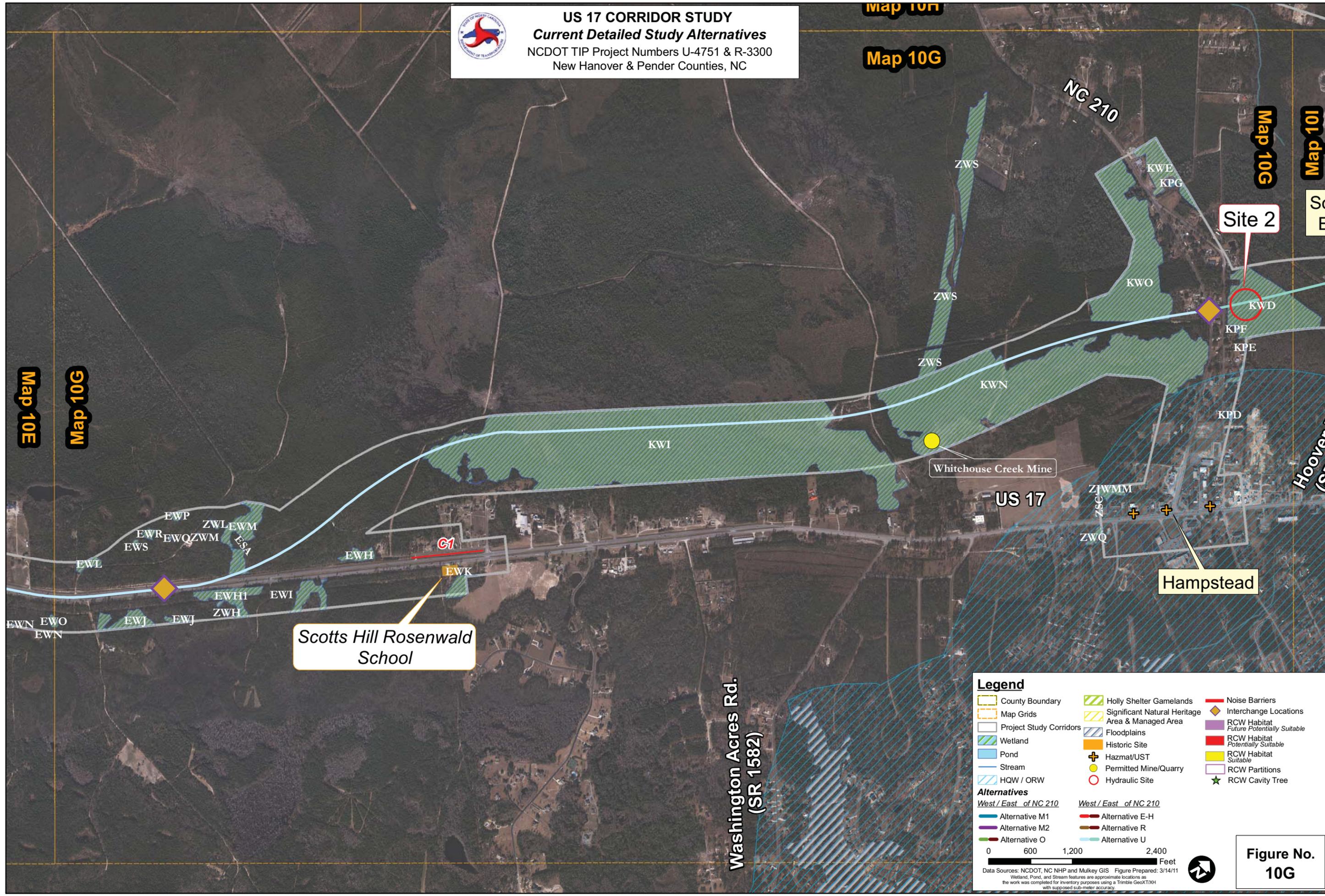
Map 10G

Map 10G

Map 10I

Map 10E

Map 10G



Scotts Hill Rosenwald School

Whitehouse Creek Mine

Hampstead

Legend

County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

Alternatives

Alternative M1	Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

0 600 1,200 2,400 Feet

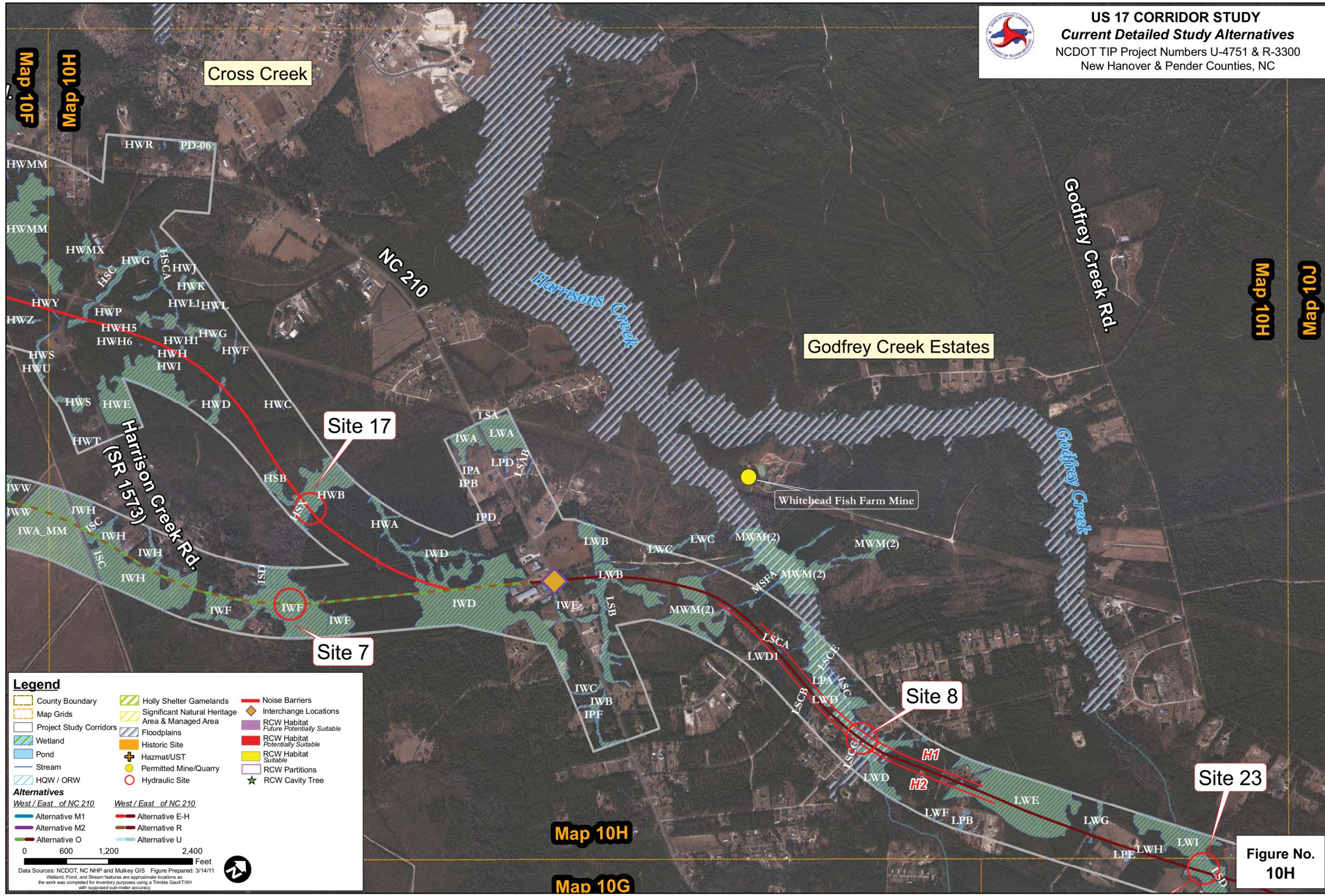
Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXT1XH with supposed sub-meter accuracy.

Figure No. 10G



Map 10F
Map 10H

Map 10H
Map 10J



Legend

County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Future Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

Alternatives

Alternative M1	Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

0 600 1,200 2,400 Feet

Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXTXH with supposed sub-meter accuracy.

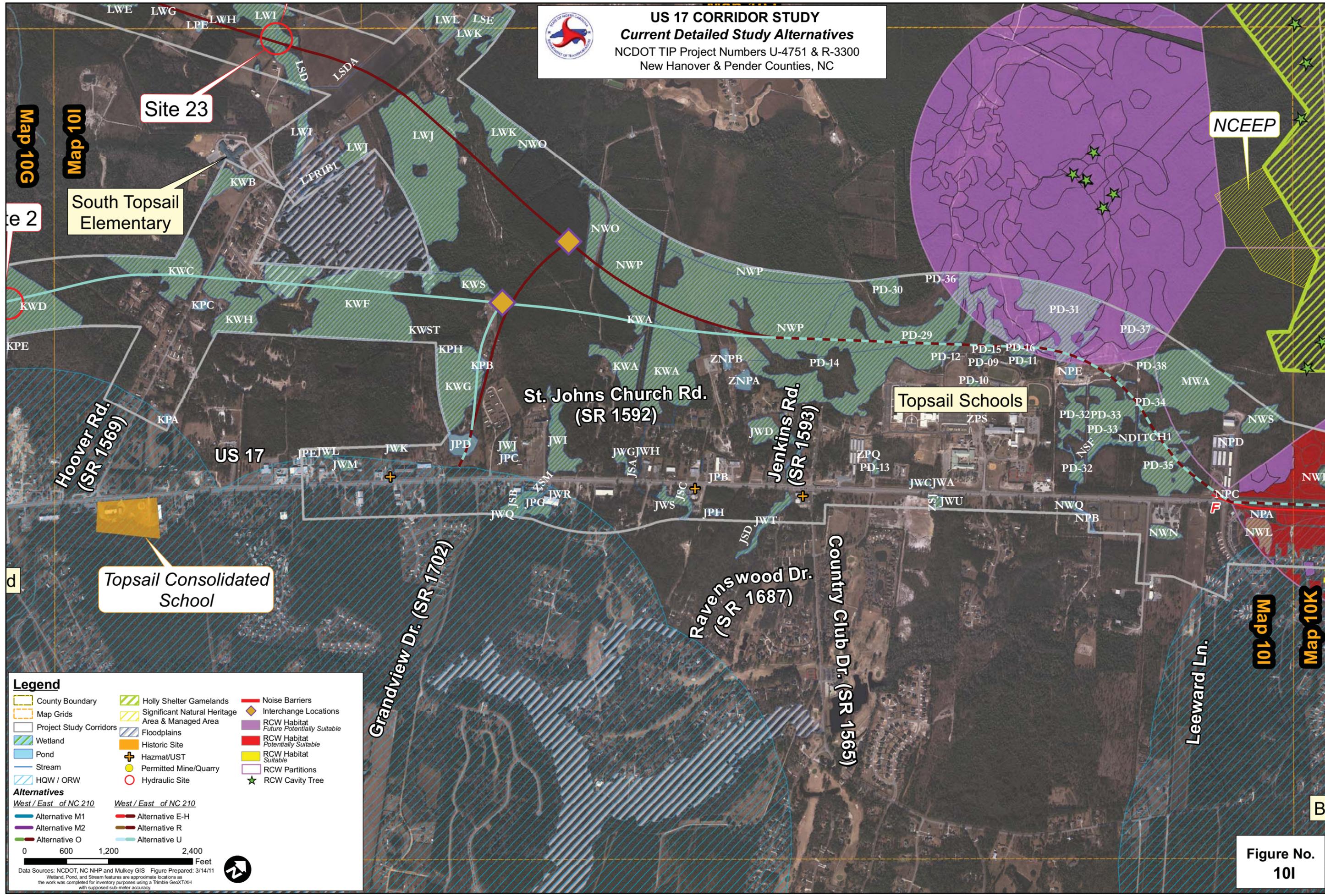
Map 10H

Map 10G

Figure No. 10H



US 17 CORRIDOR STUDY
Current Detailed Study Alternatives
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC



Map 10G
Map 10I

Site 23

South Topsail Elementary

NCEEP

St. Johns Church Rd. (SR 1592)

Topsail Schools

Topsail Consolidated School

Ravenswood Dr. (SR 1687)

Country Club Dr. (SR 1565)

Grandview Dr. (SR 1702)

Leeward Ln.

Map 10I

Map 10K

Legend

County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Future Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

Alternatives

Alternative M1	Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

0 600 1,200 2,400 Feet

Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXTXH with supposed sub-meter accuracy.

Figure No. 10I



Map 10H
 Map 10J

23

Hoover Rd.
 (SR 1569)

Sataps Rd.

Castle Bay

Castle Bay Preserve

Holly Shelter Gamelands

Trumpeter Swamp

LPC
 LWL LSE
 LWK

Map 10J

Map 10I

Legend

- | | | |
|-------------------------|--|---|
| County Boundary | Holly Shelter Gamelands | Noise Barriers |
| Map Grids | Significant Natural Heritage Area & Managed Area | Interchange Locations |
| Project Study Corridors | Floodplains | RCW Habitat Future Potentially Suitable |
| Wetland | Historic Site | RCW Habitat Potentially Suitable |
| Pond | Hazmat/UST | RCW Habitat Suitable |
| Stream | Permitted Mine/Quarry | RCW Partitions |
| HQW / ORW | Hydraulic Site | RCW Cavity Tree |

Alternatives

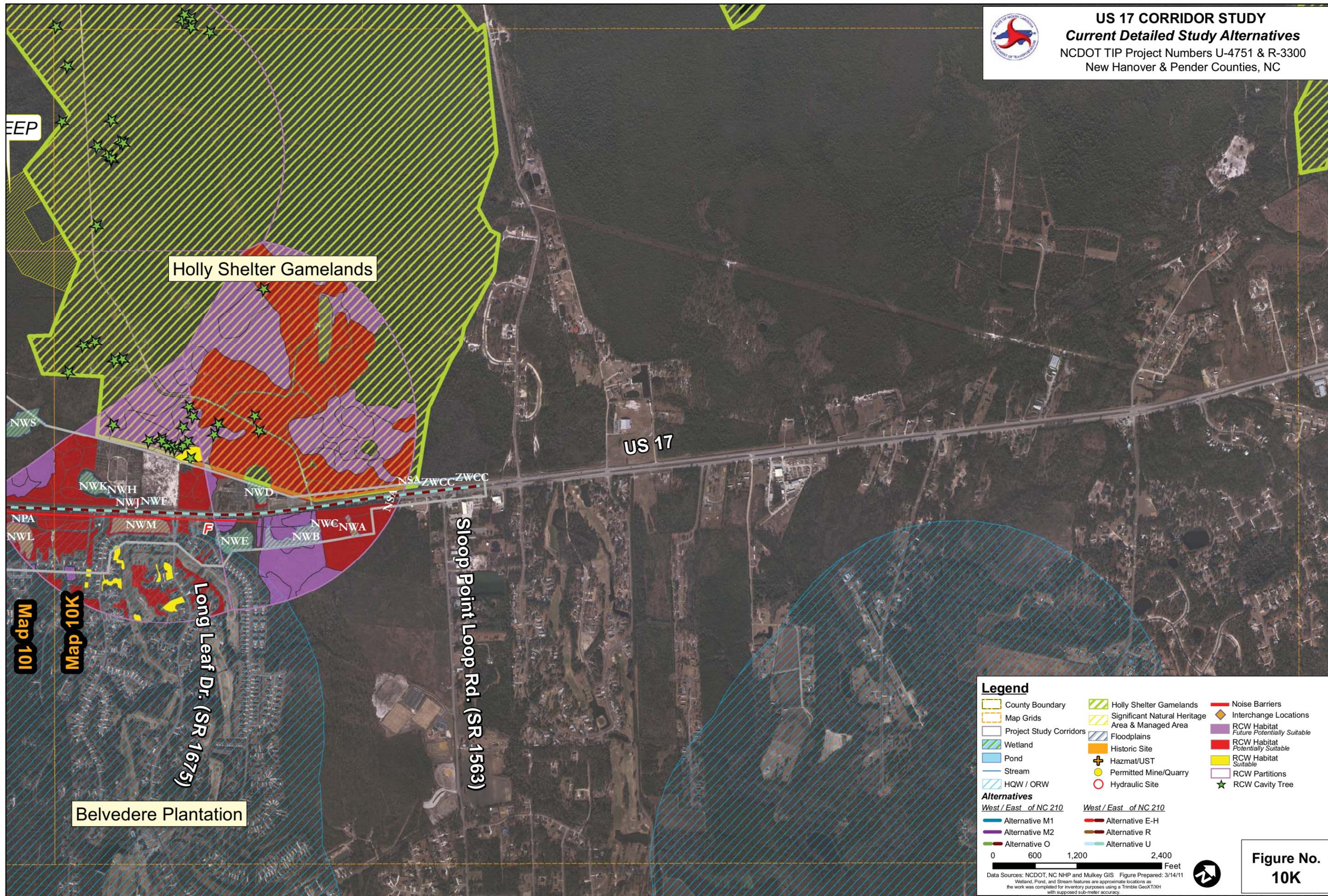
- | | |
|----------------|-----------------|
| Alternative M1 | Alternative E-H |
| Alternative M2 | Alternative R |
| Alternative O | Alternative U |

0 600 1,200 2,400 Feet

Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXT10H with supposed sub-meter accuracy.



Figure No.
10J



Legend

County Boundary	Holly Shelter Gamelands	Noise Barriers
Map Grids	Significant Natural Heritage Area & Managed Area	Interchange Locations
Project Study Corridors	Floodplains	RCW Habitat Future Potentially Suitable
Wetland	Historic Site	RCW Habitat Potentially Suitable
Pond	Hazmat/UST	RCW Habitat Suitable
Stream	Permitted Mine/Quarry	RCW Partitions
HQW / ORW	Hydraulic Site	RCW Cavity Tree

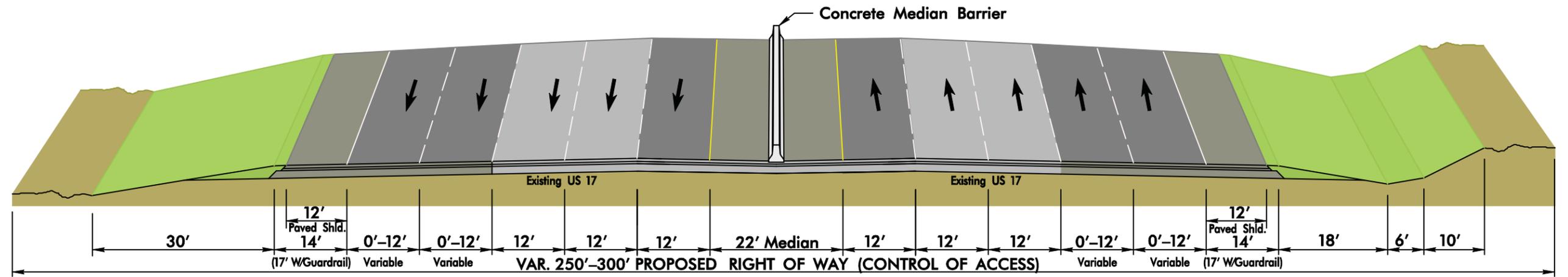
Alternatives

Alternative M1	Alternative E-H
Alternative M2	Alternative R
Alternative O	Alternative U

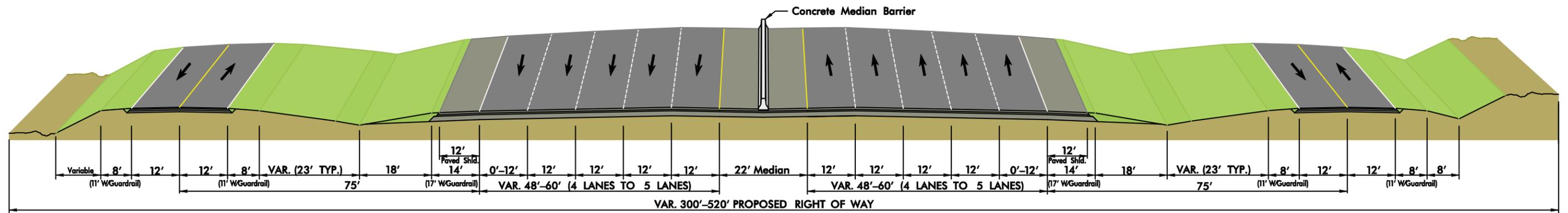
0 600 1,200 2,400 Feet

Data Sources: NCDOT, NC NHP and Mulkey GIS Figure Prepared: 3/14/11
 Wetland, Pond, and Stream features are approximate locations as the work was completed for inventory purposes using a Trimble GeoXT104 with supposed sub-meter accuracy.

Figure No. 10K



Alternative U - From Proposed Interchange with US 17 Wilmington Bypass to Existing US 17 Wilmington Bypass Interchange at Market Street



Alternative U - From Existing US 17 Wilmington Bypass Interchange at Market Street to the Proposed Hampstead Bypass Interchange at Existing US 17

Prepared by:

Prepared for:



Hampstead Bypass Typical Section Nos. 3 and 4

US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

Not to Scale

Figure Prepared 2/15/2011

Figure No.

11B

LEGEND

No. of Vehicles Per Day (VPD) in 100s

— Proposed Roadway

DHV \xrightarrow{PM} D
(d, t)

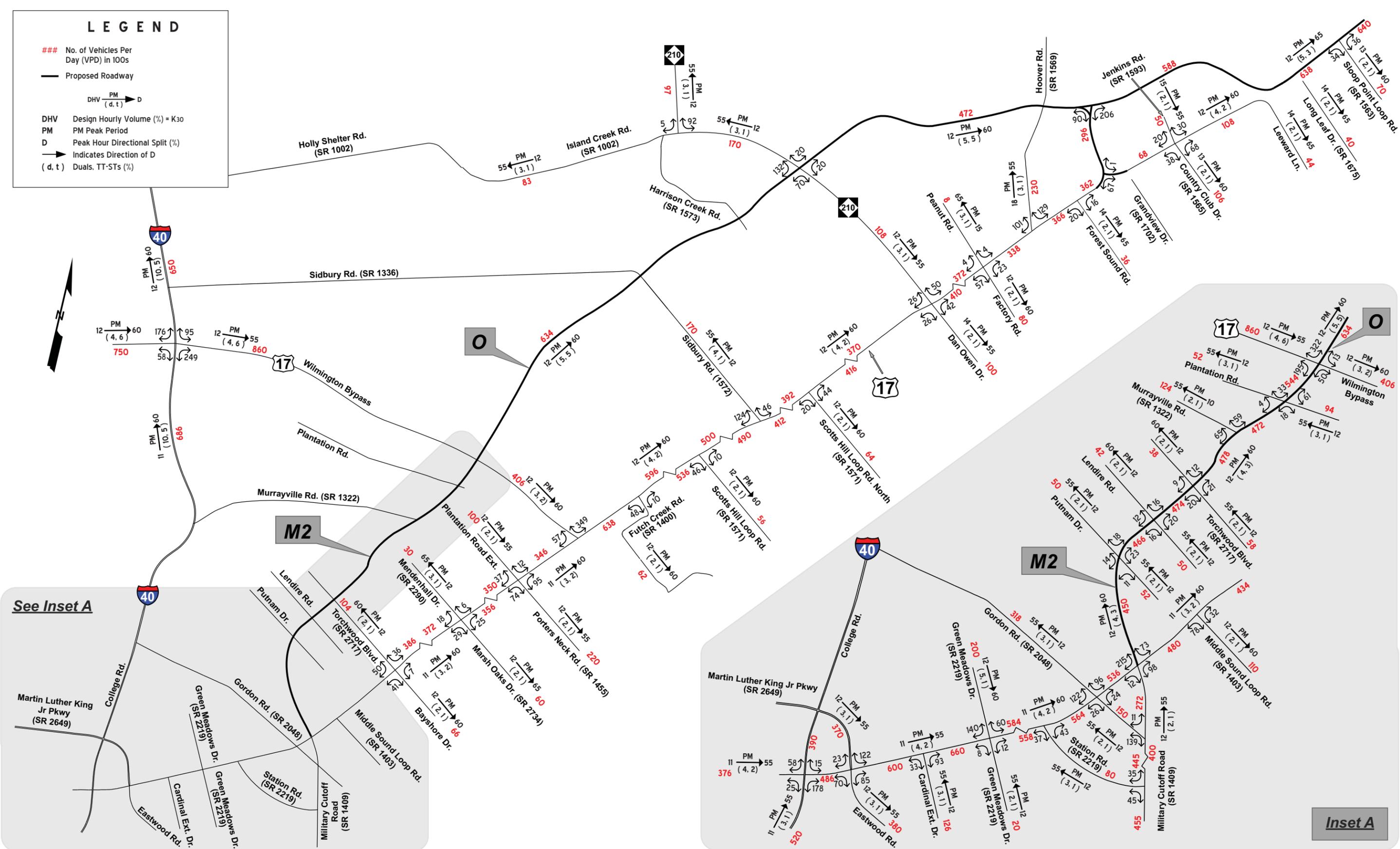
DHV Design Hourly Volume (%) = K30

PM PM Peak Period

D Peak Hour Directional Split (%)

\rightarrow Indicates Direction of D

(d, t) Duals, TT-STs (%)



See Inset A

Inset A

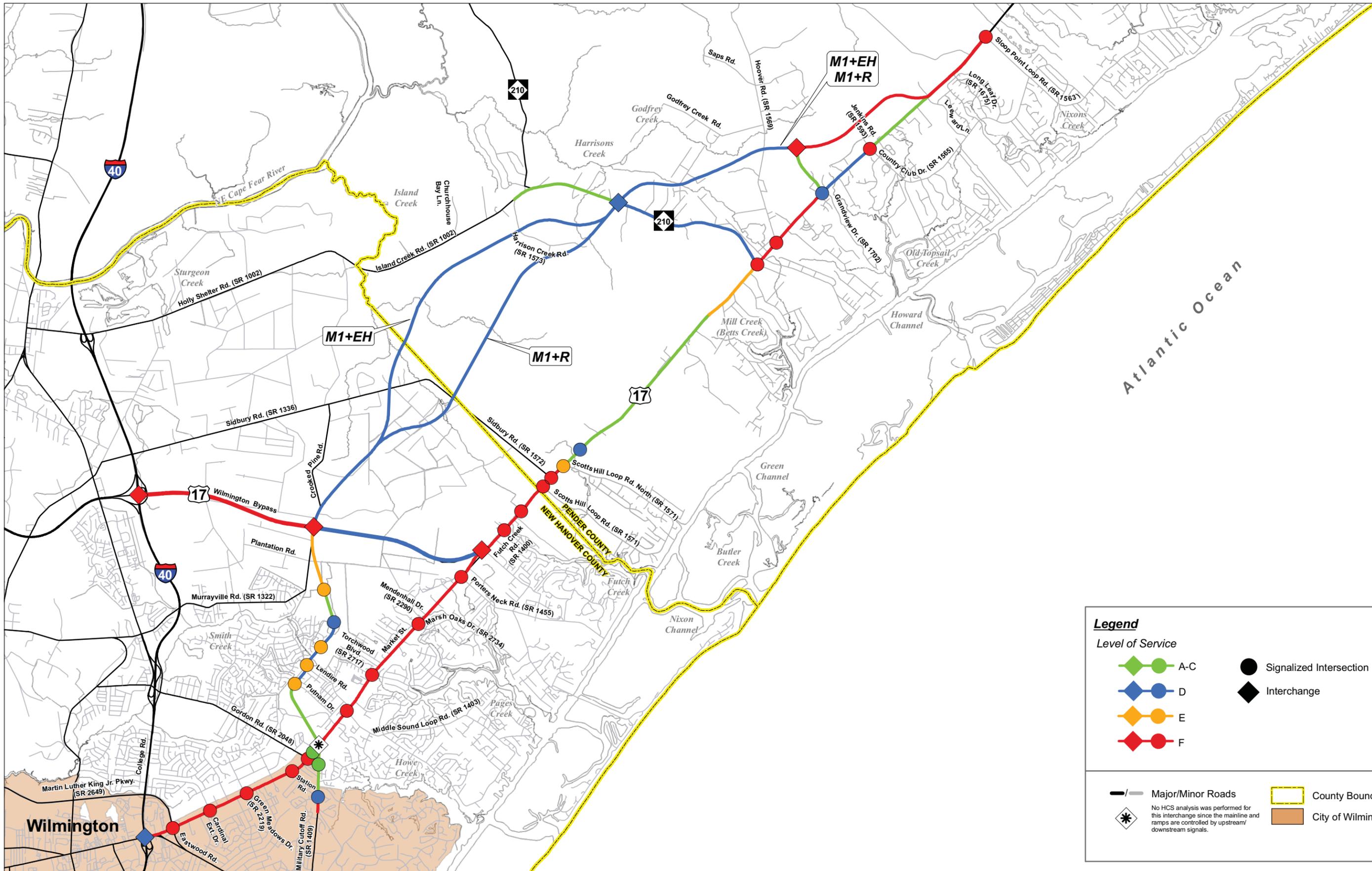
Prepared for:



2035 Build Conditions - Alternatives M2+O
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

Not to Scale
 Figure Prepared 1/17/2011

Figure No. 13B



Legend

Level of Service

- ◆ A-C
- ◆ D
- ◆ E
- ◆ F
- Signalized Intersection
- ◆ Interchange

- / — Major/Minor Roads
- ▭ County Boundary
- ▭ City of Wilmington
- ✱ No HCS analysis was performed for this interchange since the mainline and ramps are controlled by upstream/downstream signals.

Prepared by: MULKEY ENGINEERS & CONSULTANTS

Prepared for:



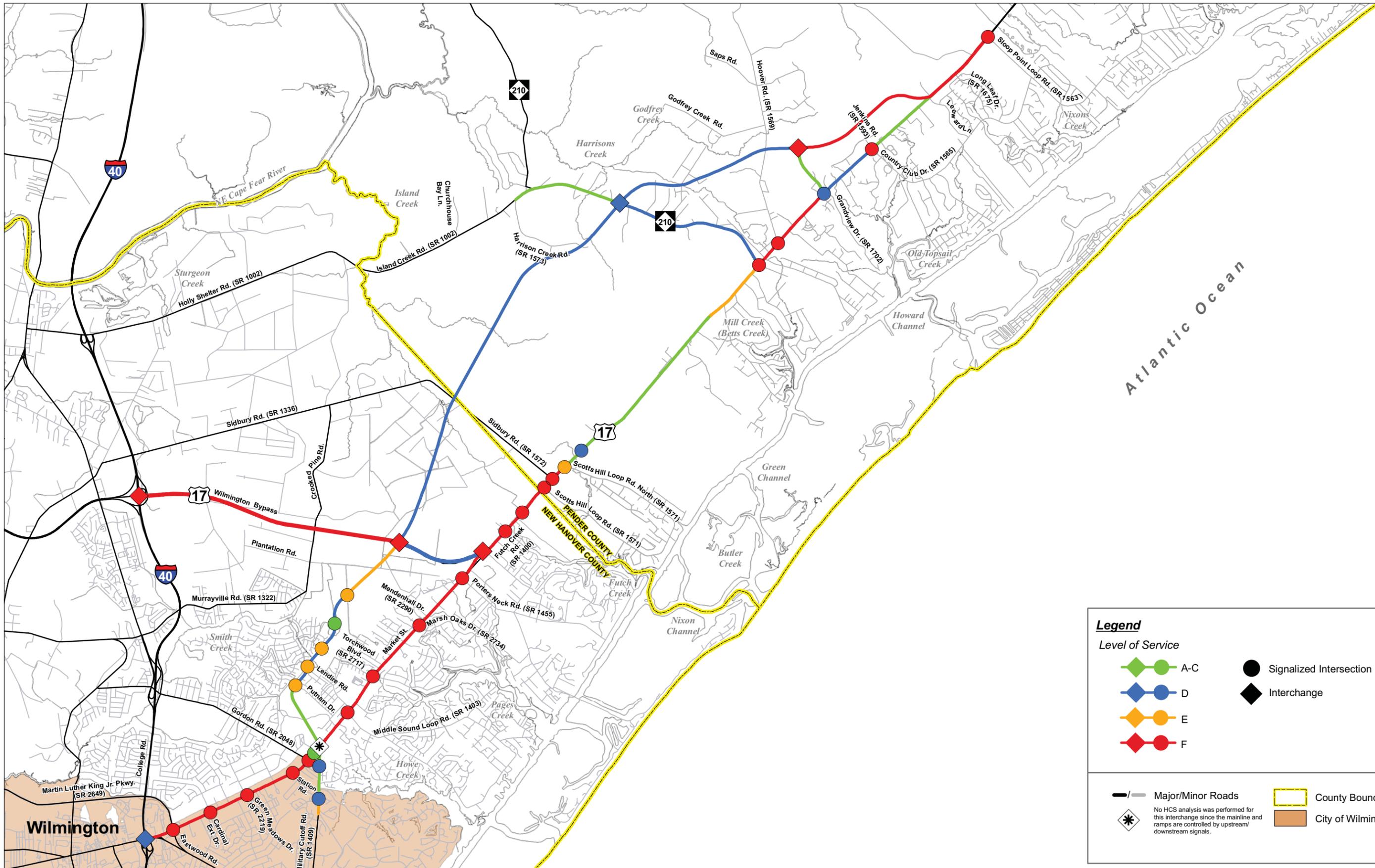
2035 Level of Service
Alternatives M1+EH and M1+R
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

0 3,500 7,000 14,000 Feet

Data Sources: NCDOT and Mulkey GIS
 U-4751/R-3300 Traffic Operations Analysis Report
 Figure Prepared: 4/7/11



Figure No.
14A



Legend

Level of Service

- ◆ ● A-C
- ◆ ● D
- ◆ ● E
- ◆ ● F
- Signalized Intersection
- ◆ Interchange

- / — Major/Minor Roads
- County Boundary
- City of Wilmington
- ◆ * No HCS analysis was performed for this interchange since the mainline and ramps are controlled by upstream/downstream signals.

Prepared by: **MULKEY**
ENGINEERS & CONSULTANTS

Prepared for:



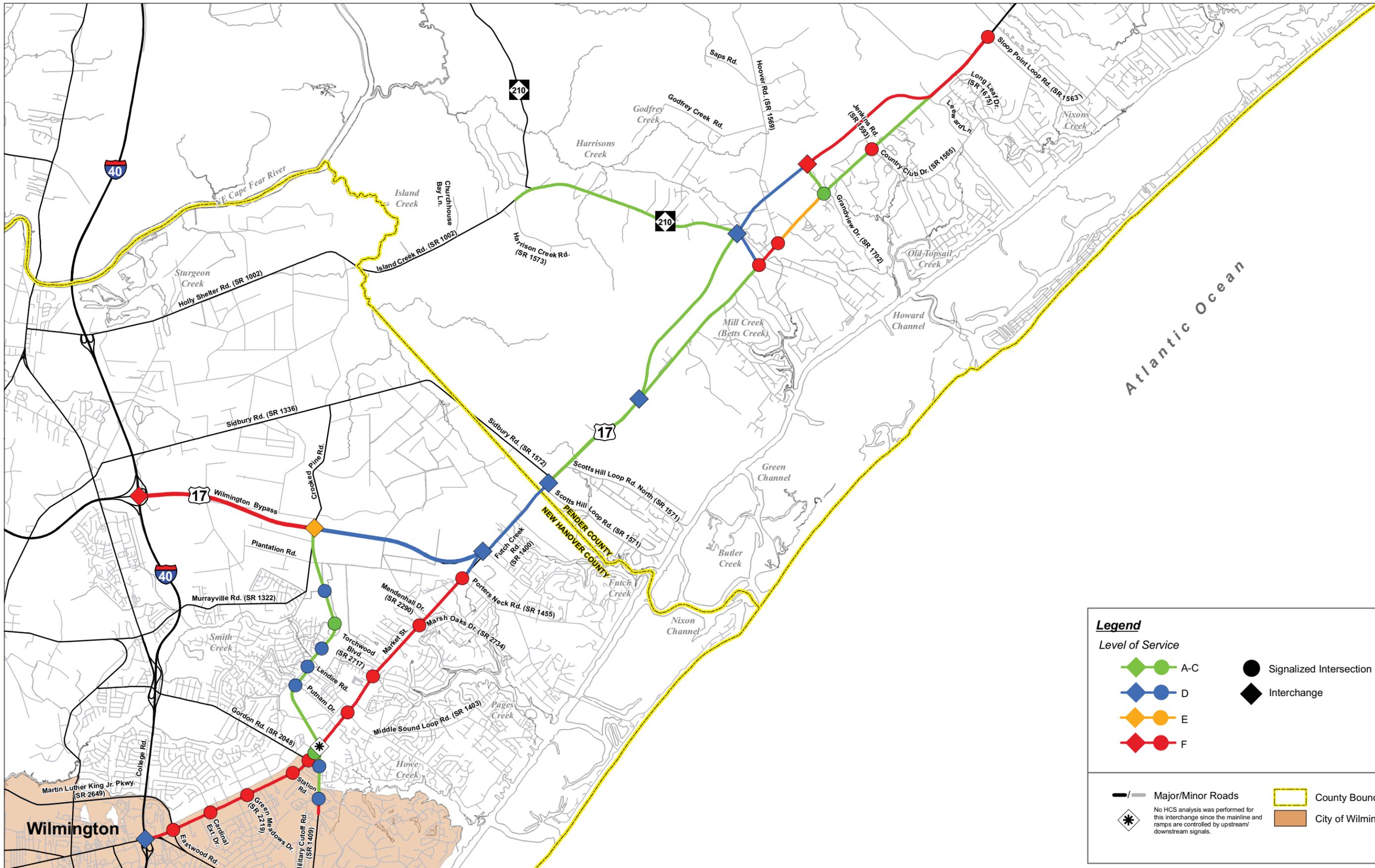
**2035 Level of Service
Alternatives M2+O**
US 17 Corridor Study
NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC



Data Sources: NCDOT and Mulkey GIS
U-4751/R-3300 Traffic Operations Analysis Report
Figure Prepared: 4/7/11



Figure No.
14B



Legend

Level of Service

- ◆ ● A-C
- ◆ ● D
- ◆ ● E
- ◆ ● F
- Signalized Intersection
- ◆ Interchange

- Major/Minor Roads
- County Boundary
- City of Wilmington
- ✱ No HCS analysis was performed for this interchange since the mainline and ramps are controlled by upstream/downstream signals.

Prepared by: MULKEY ENGINEERS & CONSULTANTS

Prepared for:



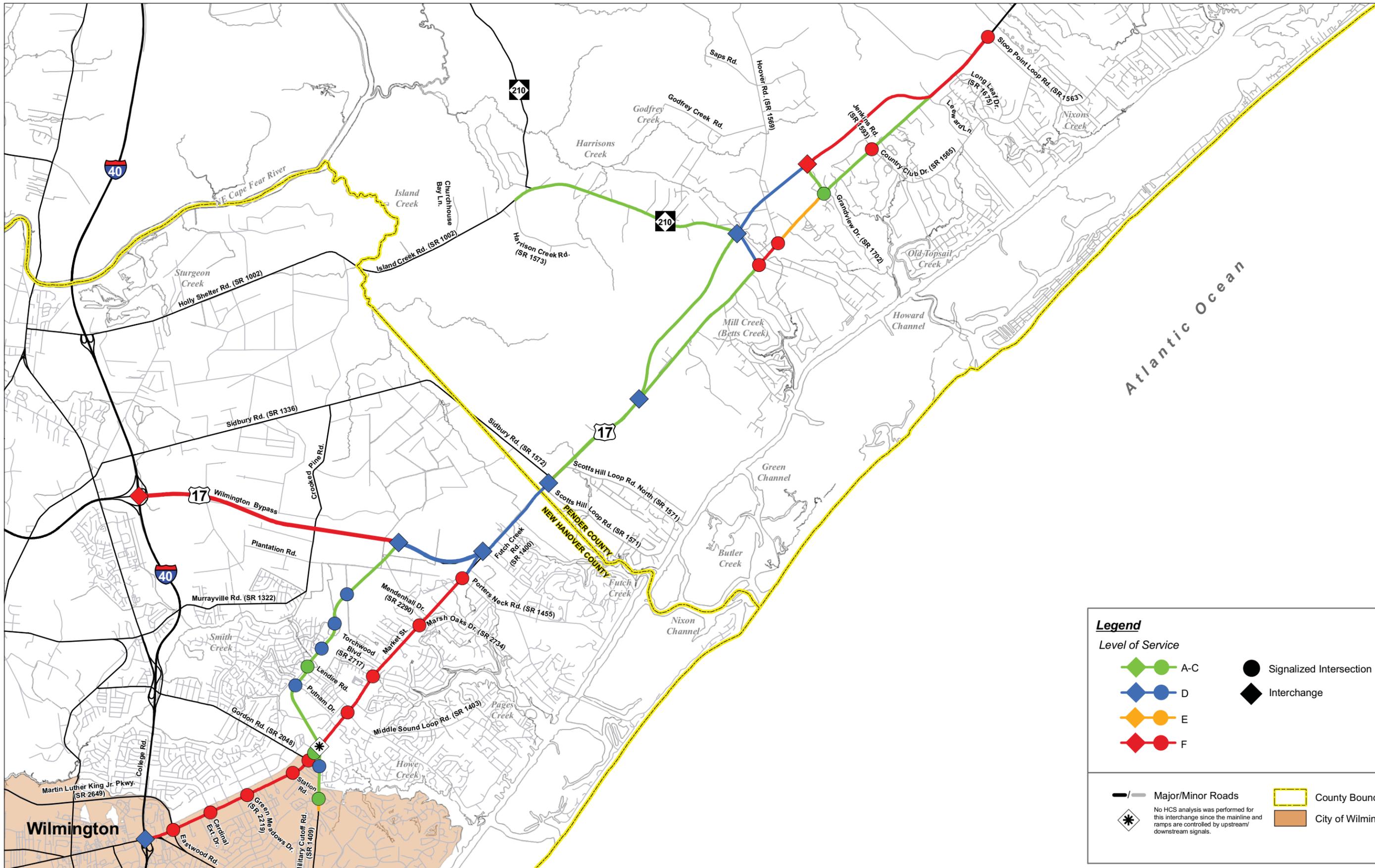
**2035 Level of Service
Alternatives M1+U**
US 17 Corridor Study
NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC



Data Sources: NCDOT and Mulkey GIS
U-4751/R-3300 Traffic Operations Analysis Report
Figure Prepared: 3/14/11



Figure No.
14C



Legend

Level of Service

- ◆ ● A-C
- ◆ ● D
- ◆ ● E
- ◆ ● F
- Signalized Intersection
- ◆ Interchange

- Major/Minor Roads
- County Boundary
- City of Wilmington
- ✱ No HCS analysis was performed for this interchange since the mainline and ramps are controlled by upstream/downstream signals.

Prepared by: MULKEY ENGINEERS & CONSULTANTS

Prepared for:



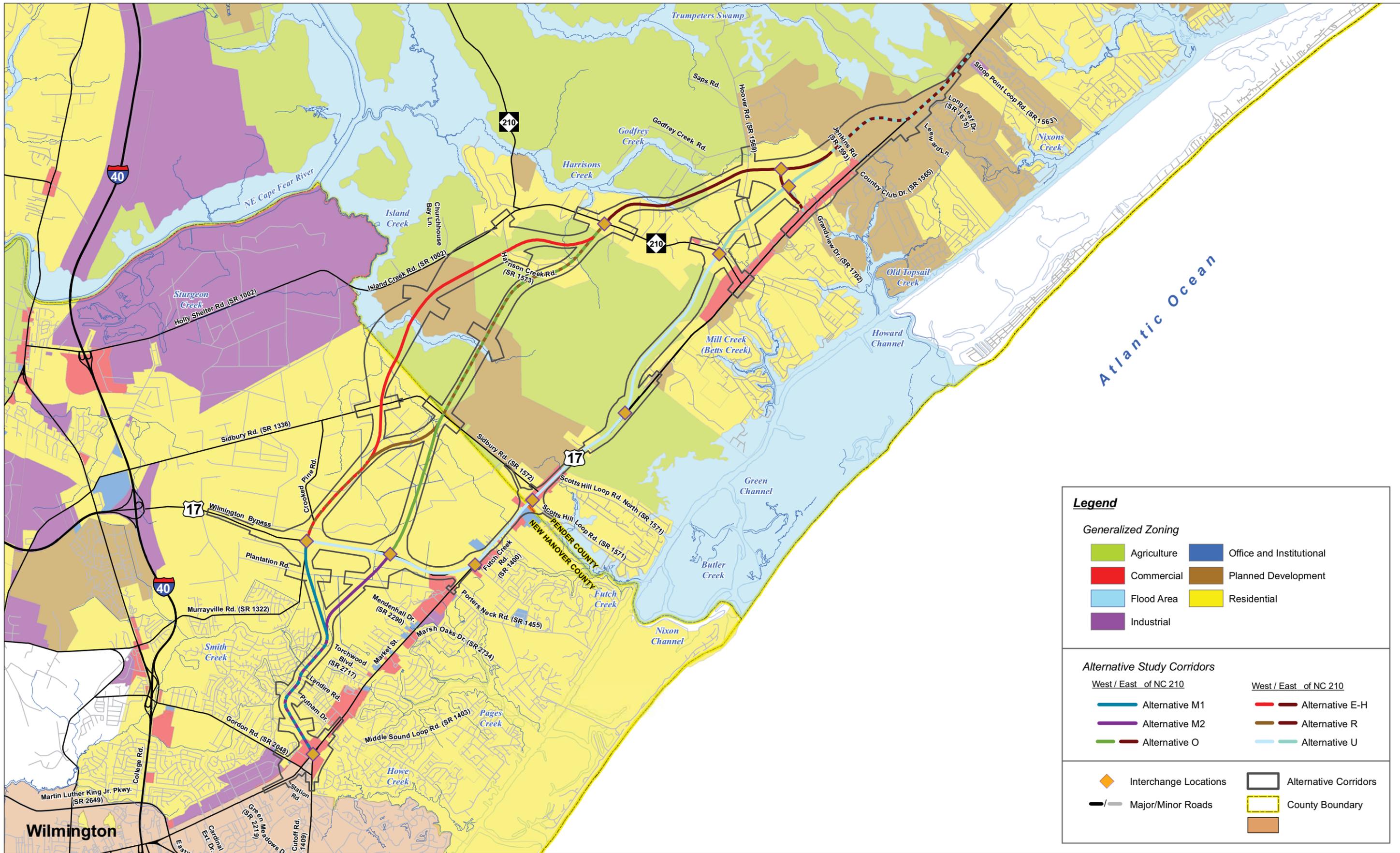
2035 Level of Service Alternatives M2+U
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC



Data Sources: NCDOT and Mulkey GIS
 U-4751/R-3300 Traffic Operations Analysis Report
 Figure Prepared: 3/14/11



Figure No.
14D



Legend

Generalized Zoning

Agriculture	Office and Institutional
Commercial	Planned Development
Flood Area	Residential
Industrial	

Alternative Study Corridors

<u>West / East of NC 210</u>		<u>West / East of NC 210</u>	
Alternative M1	Alternative E-H	Alternative R	Alternative U
Alternative M2	Alternative O		

Interchange Locations	Alternative Corridors
Major/Minor Roads	County Boundary

Prepared by:

Prepared for:



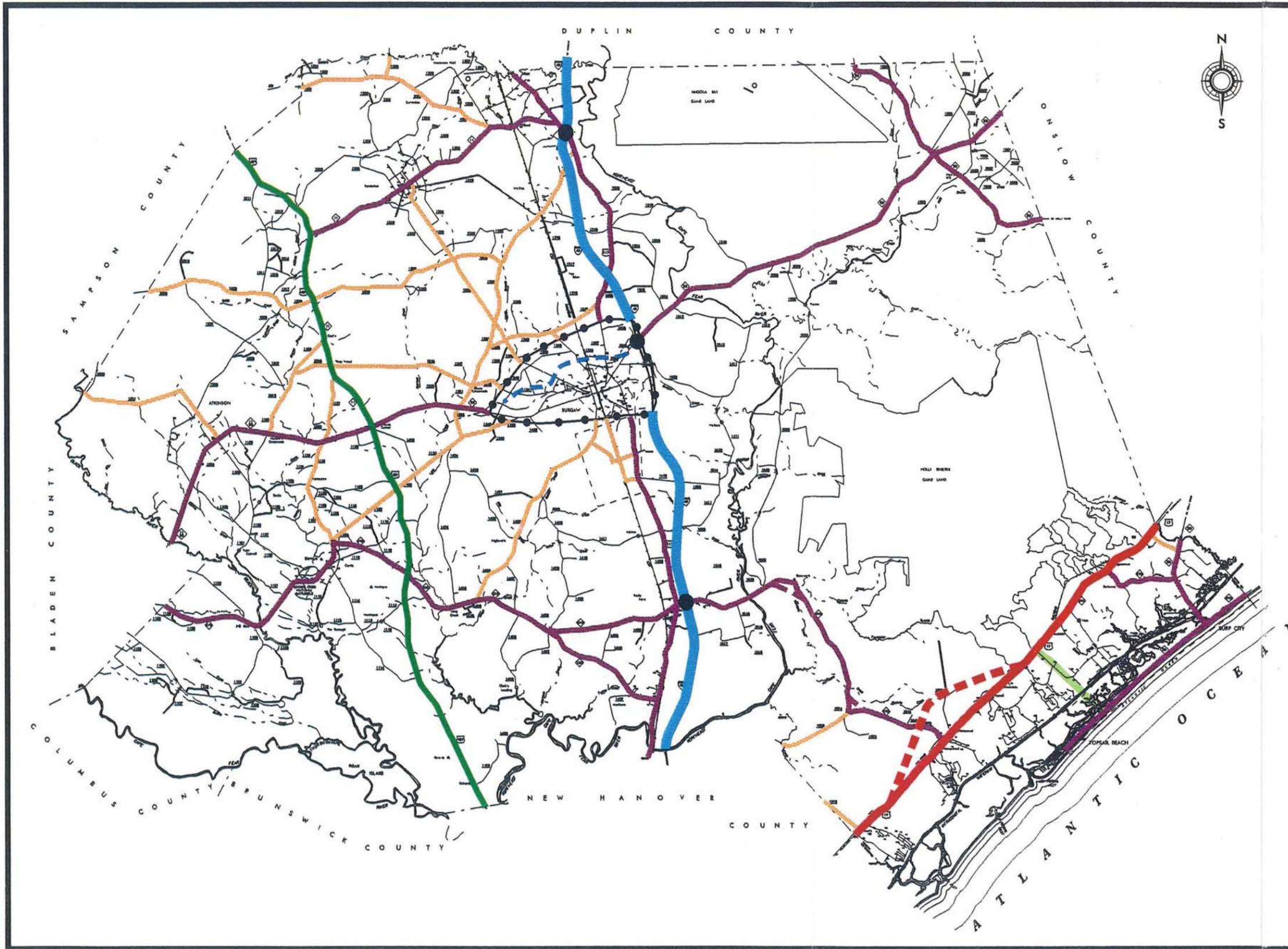
Generalized Zoning
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

0 3,500 7,000 14,000 Feet

Data Sources: NCDOT, Pender Co, New Hanover Co. and Mulkey GIS
 Figure Prepared: 10/21/10



Figure No.
15



LEGEND

	EXISTING	PROPOSED
INTERSTATES		
OTHER PRINCIPAL ARTERIAL		
MINOR ARTERIAL		
MAJOR COLLECTOR		
MINOR COLLECTOR		
URBAN MAJOR		
INTERCHANGE		
URBAN PLANNING AREA BOUNDARY		

ADOPTED BY:

PENDER COUNTY 6-2-97

PUBLIC HEARINGS 6-2-97

RECOMMENDED APPROVAL BY *M.R. Poole*
STATEWIDE PLANNING BRANCH 8-15-97

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION 9-5-97

FIGURE 2 - A

JUNE 2, 1997

**THOROUGHFARE PLAN
FOR
PENDER COUNTY
NORTH CAROLINA**

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS - STATEWIDE PLANNING

IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALES

BASE MAP DATE
MAY 30, 1997

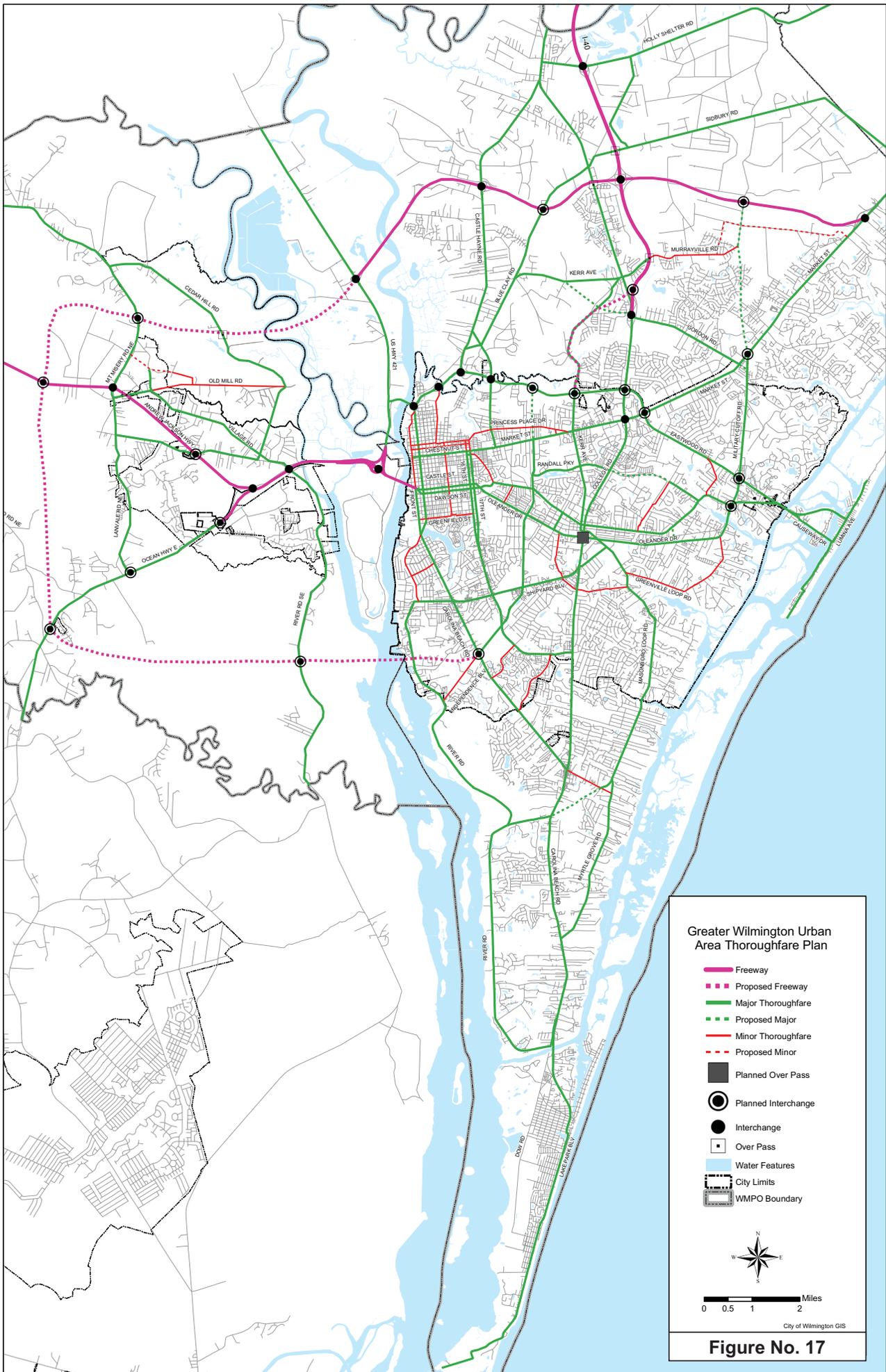
Prepared by:

Prepared for:



Pender County Thoroughfare Plan
US 17 Corridor Study
NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Data Source: Pender County Thoroughfare Plan June 2, 1997
Figure Prepared: 10/21/10



Greater Wilmington Urban Area Thoroughfare Plan

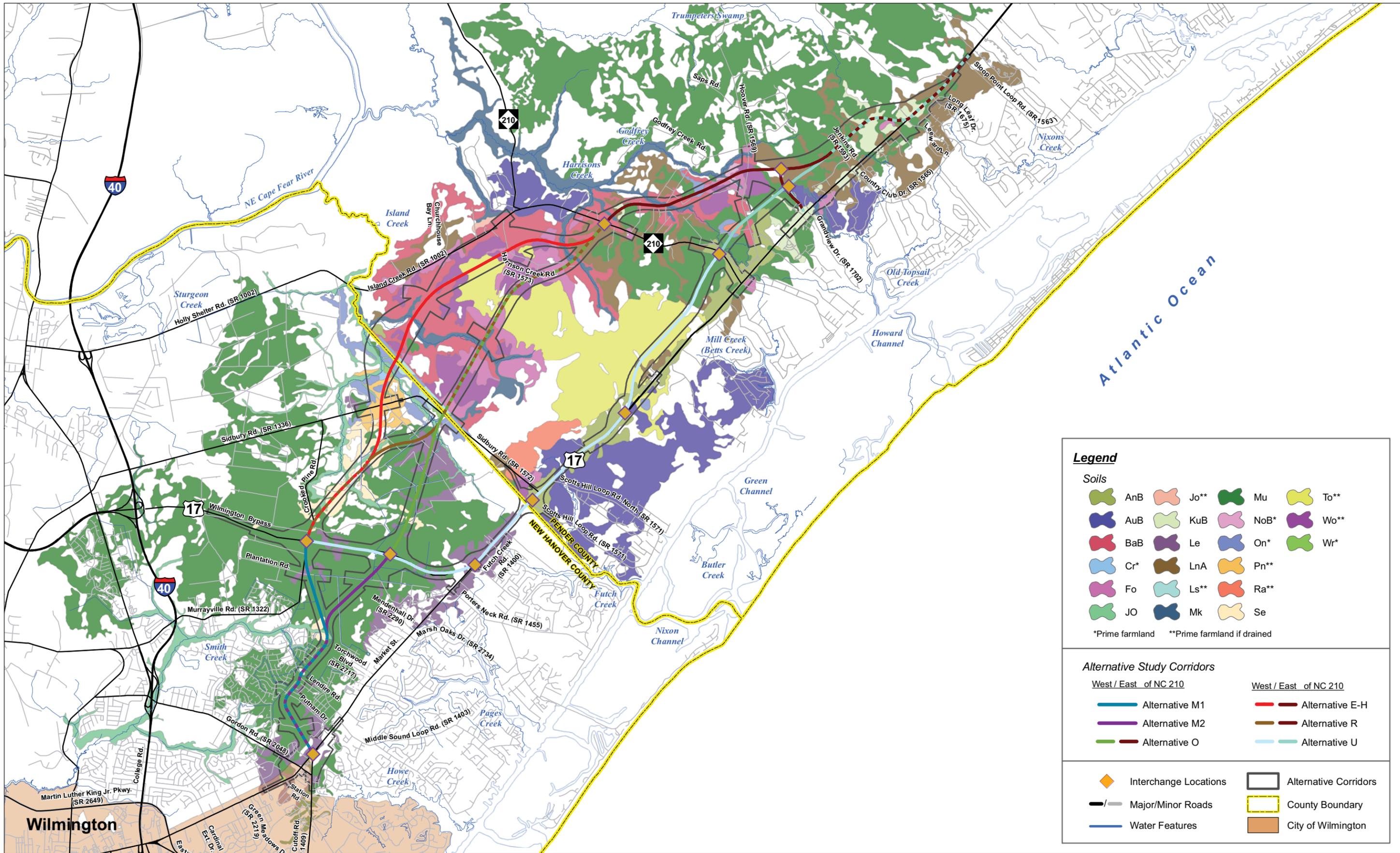
- Freeway
- - - Proposed Freeway
- Major Thoroughfare
- - - Proposed Major
- Minor Thoroughfare
- - - Proposed Minor
- Planned Over Pass
- Planned Interchange
- Interchange
- Over Pass
- Water Features
- City Limits
- WMPO Boundary



0 0.5 1 2 Miles

City of Wilmington GIS

Figure No. 17



Prepared by: MULKEY ENGINEERS & CONSULTANTS

Prepared for:



Predominant Soils and Prime Farmland Soils

US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC



Data Sources: NCDOT, NRCS and Mulkey GIS
 Figure Prepared: 10/21/10



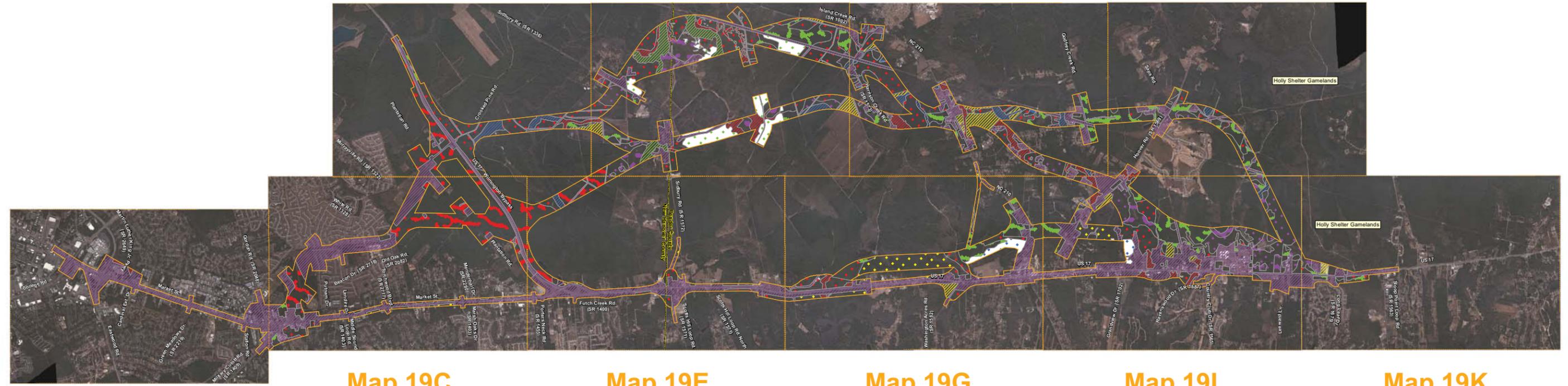
Figure No.
18

Map 19D

Map 19F

Map 19H

Map 19J



Map 19B

Map 19C

Map 19E

Map 19G

Map 19I

Map 19K

Legend

-  County Boundary
-  Map Grids
-  NRTR Study Area
-  Coastal Plain Bottomland Hardwood - Blackwater Subtype
-  Coastal Plain Small Stream Swamp - Blackwater Subtype
-  Cutover
-  Cypress/Gum Swamp - Blackwater Subtype
-  Maintained/Disturbed
-  Mesic Pine Flatwoods
-  Nonriverine Swamp Forest
-  Nonriverine Wet Hardwood Forest
-  Pine Savanna
-  Pocosin
-  Pond Pine Woodland
-  Small Depression Pocosin
-  Small Depression Pond
-  Wet Pine Flatwoods
-  Xeric Sandhill Scrub

Prepared by: 

Prepared for: 



Natural Communities
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC

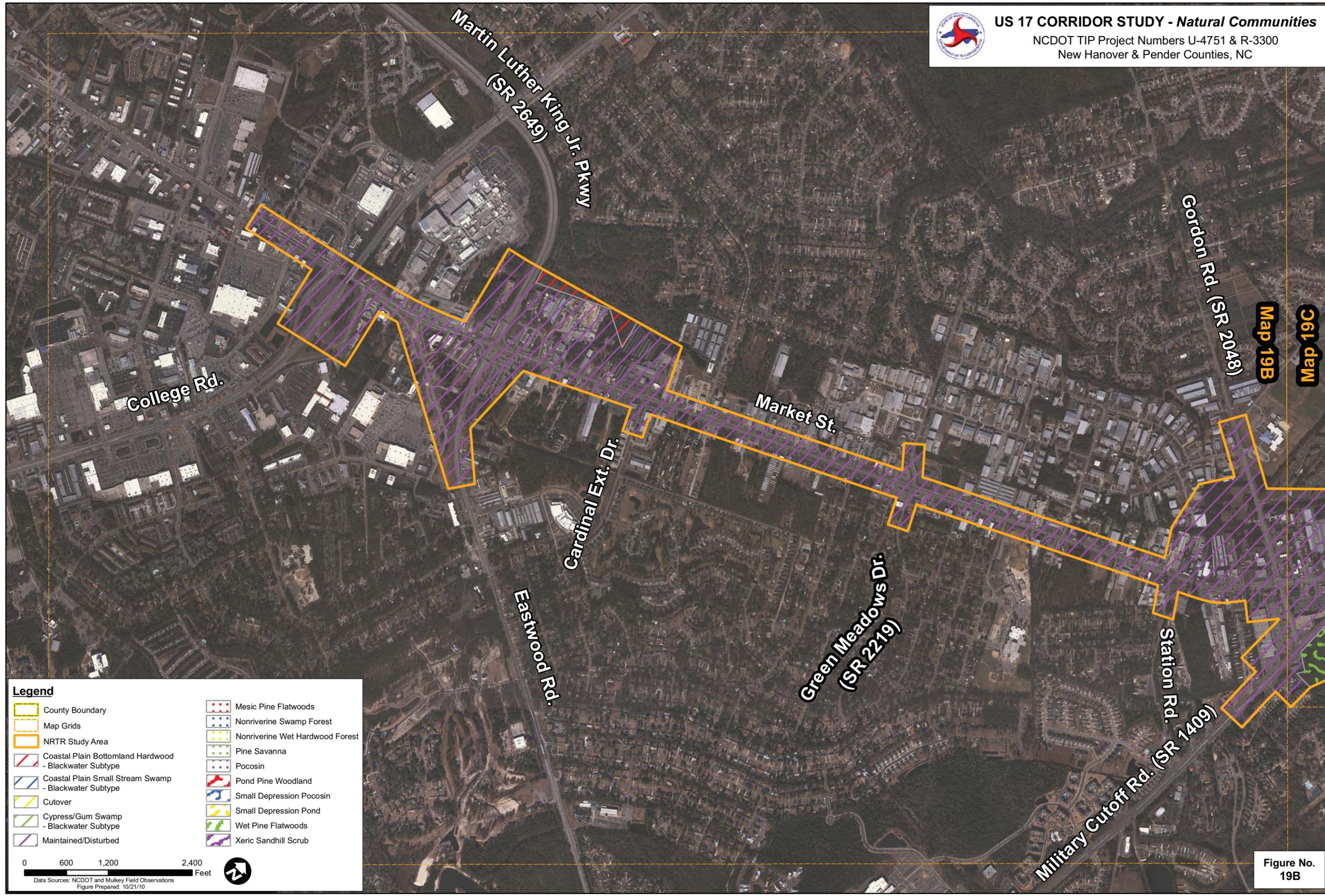


Data Sources: NCDOT and Mulkey Field Observations
 Figure Prepared: 10/21/10



Figure No.

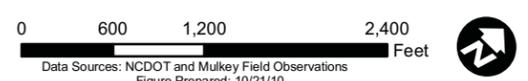
19A



Map 19B
Map 19C

Legend

County Boundary	Mesic Pine Flatwoods
Map Grids	Nonriverine Swamp Forest
NRTR Study Area	Nonriverine Wet Hardwood Forest
Coastal Plain Bottomland Hardwood - Blackwater Subtype	Pine Savanna
Coastal Plain Small Stream Swamp - Blackwater Subtype	Pocosin
Cutover	Pond Pine Woodland
Cypress/Gum Swamp - Blackwater Subtype	Small Depression Pocosin
Maintained/Disturbed	Small Depression Pond
	Wet Pine Flatwoods
	Xeric Sandhill Scrub



Data Sources: NCDOT and Mulkey Field Observations
 Figure Prepared: 10/21/10

Figure No. 19B



US 17 CORRIDOR STUDY - Natural Communities

NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Map 19C

Map 19D

Map 19C

Map 19E

Map 19B

Map 19C

White Rd.
(SR 1328)

US 17 Wilmington Bypass

Plantation Rd.

Beacon Dr. (SR 2718)

Old Oak Rd.
(SR 2082)

Torchwood Blvd.
(SR 2717)

Mendenhall Dr.
(SR 2290)

Putnam Dr.

Lendire Dr.

Market St.

Marsh Oaks Dr. (SR 1403)

Middle Sound
Loop Rd.
(SR 1403)

Legend

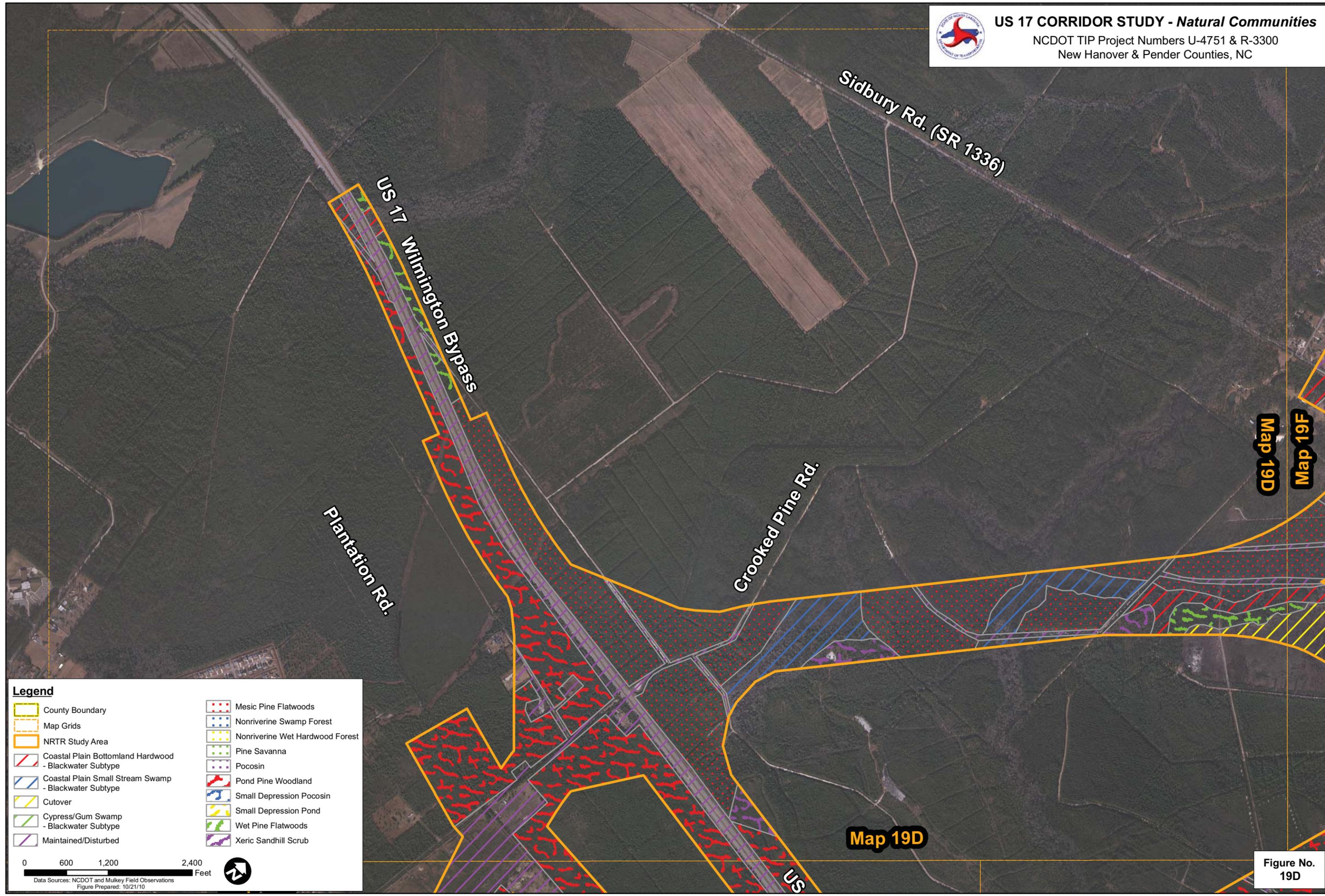
- County Boundary
- Map Grids
- NRTR Study Area
- Coastal Plain Bottomland Hardwood - Blackwater Subtype
- Coastal Plain Small Stream Swamp - Blackwater Subtype
- Cutover
- Cypress/Gum Swamp - Blackwater Subtype
- Maintained/Disturbed
- Mesic Pine Flatwoods
- Nonriverine Swamp Forest
- Nonriverine Wet Hardwood Forest
- Pine Savanna
- Pocosin
- Pond Pine Woodland
- Small Depression Pocosin
- Small Depression Pond
- Wet Pine Flatwoods
- Xeric Sandhill Scrub

0 600 1,200 2,400 Feet



Data Sources: NCDOT and Mulkey Field Observations
Figure Prepared: 10/21/10

Figure No. 19C



Map 19D
Map 19F

Map 19D

Figure No. 19D

Legend

County Boundary	Mesic Pine Flatwoods
Map Grids	Nonriverine Swamp Forest
NRTR Study Area	Nonriverine Wet Hardwood Forest
Coastal Plain Bottomland Hardwood - Blackwater Subtype	Pine Savanna
Coastal Plain Small Stream Swamp - Blackwater Subtype	Pocosin
Cutover	Pond Pine Woodland
Cypress/Gum Swamp - Blackwater Subtype	Small Depression Pocosin
Maintained/Disturbed	Small Depression Pond
	Wet Pine Flatwoods
	Xeric Sandhill Scrub

0 600 1,200 2,400 Feet

Data Sources: NCDOT and Mulkey Field Observations
 Figure Prepared: 10/21/10



Map 19E

Map 19C

Map 19E

Map 19E

Map 19G

New Hanover County

Pender County

Sidbury Rd. (SR 1572)

US 17

Porters Neck Rd. (SR 1455)

Futch Creek Rd. (SR 1400)

Scotts Hill Loop Rd. (SR 1571)

Scotts Hill Loop Rd. North (SR 1571)

Legend

County Boundary	Mesic Pine Flatwoods
Map Grids	Nonriverine Swamp Forest
NRTR Study Area	Nonriverine Wet Hardwood Forest
Coastal Plain Bottomland Hardwood - Blackwater Subtype	Pine Savanna
Coastal Plain Small Stream Swamp - Blackwater Subtype	Pocosin
Cutover	Pond Pine Woodland
Cypress/Gum Swamp - Blackwater Subtype	Small Depression Pocosin
Maintained/Disturbed	Small Depression Pond
	Wet Pine Flatwoods
	Xeric Sandhill Scrub

0 600 1,200 2,400 Feet

Data Sources: NCDOT and Mulkey Field Observations
Figure Prepared: 10/21/10

Figure No. 19E



US 17 CORRIDOR STUDY - Natural Communities

NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Island Creek Rd.
(SR 1002)

Map 19F

Map 19H

Map 19D

Map 19E

Sidbury Rd. (SR 1336)

New Hanover County

Pender County

Map 19F

Map 19E

Legend			
	County Boundary		Mesic Pine Flatwoods
	Map Grids		Nonriverine Swamp Forest
	NRTR Study Area		Nonriverine Wet Hardwood Forest
	Coastal Plain Bottomland Hardwood - Blackwater Subtype		Pine Savanna
	Coastal Plain Small Stream Swamp - Blackwater Subtype		Pocosin
	Cutover		Pond Pine Woodland
	Cypress/Gum Swamp - Blackwater Subtype		Small Depression Pocosin
	Maintained/Disturbed		Small Depression Pond
			Wet Pine Flatwoods
			Xeric Sandhill Scrub

0 600 1,200 2,400 Feet



Figure No. 19F

Data Sources: NCDOT and Mulkey Field Observations
Figure Prepared: 10/21/10



US 17 CORRIDOR STUDY - Natural Communities

NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Map 19H

Map 19G

Map 19G

Map 19I

Map 19E

Map 19G

NC 210

US 17

Hoover Rd. (SR 1582)

Washington Acres Rd. (SR 1582)

Legend	
County Boundary	Mesic Pine Flatwoods
Map Grids	Nonriverine Swamp Forest
NRTR Study Area	Nonriverine Wet Hardwood Forest
Coastal Plain Bottomland Hardwood - Blackwater Subtype	Pine Savanna
Coastal Plain Small Stream Swamp - Blackwater Subtype	Pocosin
Cutover	Pond Pine Woodland
Cypress/Gum Swamp - Blackwater Subtype	Small Depression Pocosin
Maintained/Disturbed	Small Depression Pond
	Wet Pine Flatwoods
	Xeric Sandhill Scrub

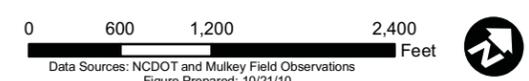


Figure No. 19G

Data Sources: NCDOT and Mulkey Field Observations
Figure Prepared: 10/21/10

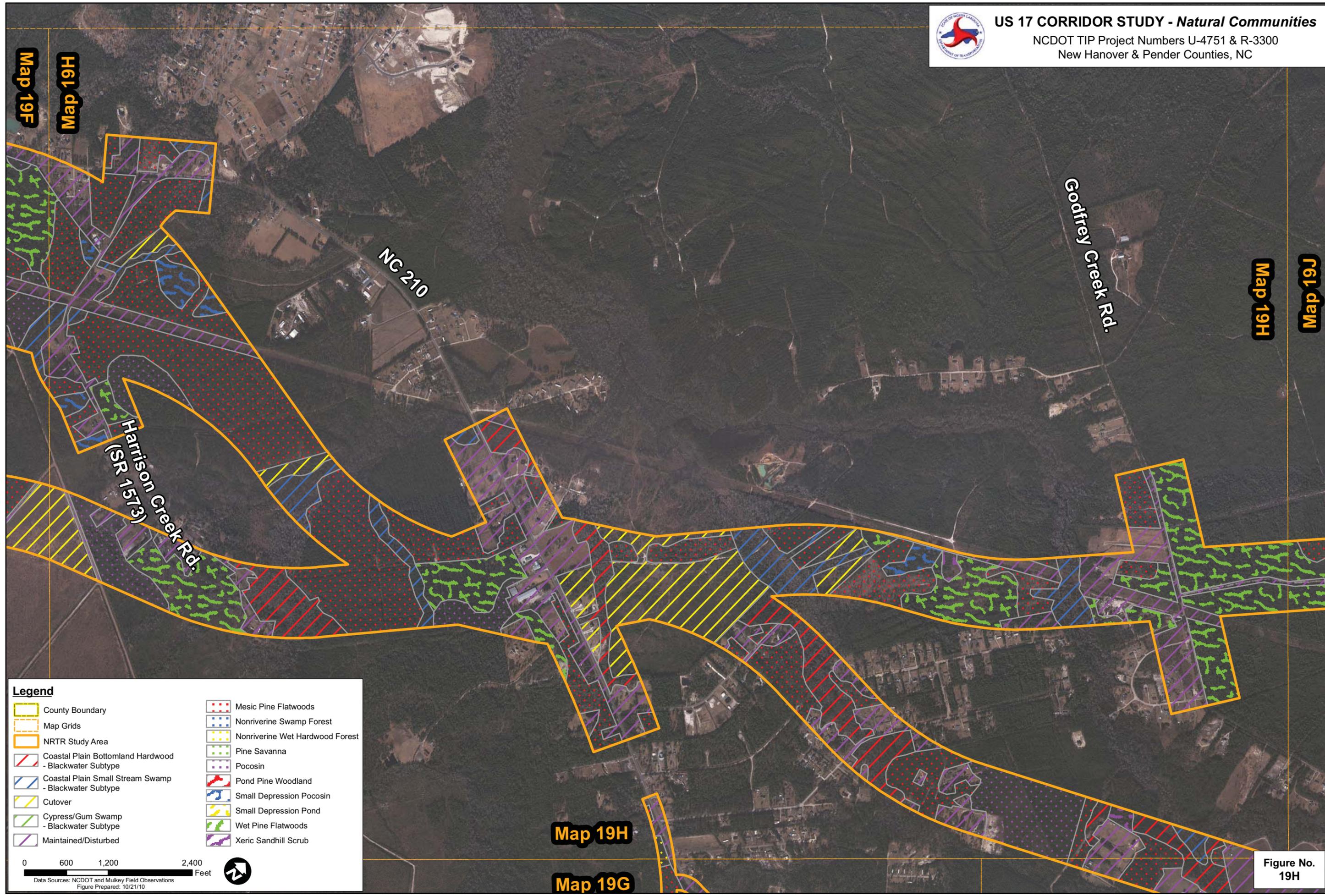


US 17 CORRIDOR STUDY - Natural Communities

NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Map 19F
Map 19H

Map 19H
Map 19J



Legend

County Boundary	Mesic Pine Flatwoods
Map Grids	Nonriverine Swamp Forest
NRTR Study Area	Nonriverine Wet Hardwood Forest
Coastal Plain Bottomland Hardwood - Blackwater Subtype	Pine Savanna
Coastal Plain Small Stream Swamp - Blackwater Subtype	Pocosin
Cutover	Pond Pine Woodland
Cypress/Gum Swamp - Blackwater Subtype	Small Depression Pocosin
Maintained/Disturbed	Small Depression Pond
	Wet Pine Flatwoods
	Xeric Sandhill Scrub

0 600 1,200 2,400 Feet

Data Sources: NCDOT and Mulkey Field Observations
Figure Prepared: 10/21/10

Map 19H

Map 19G

Figure No. 19H

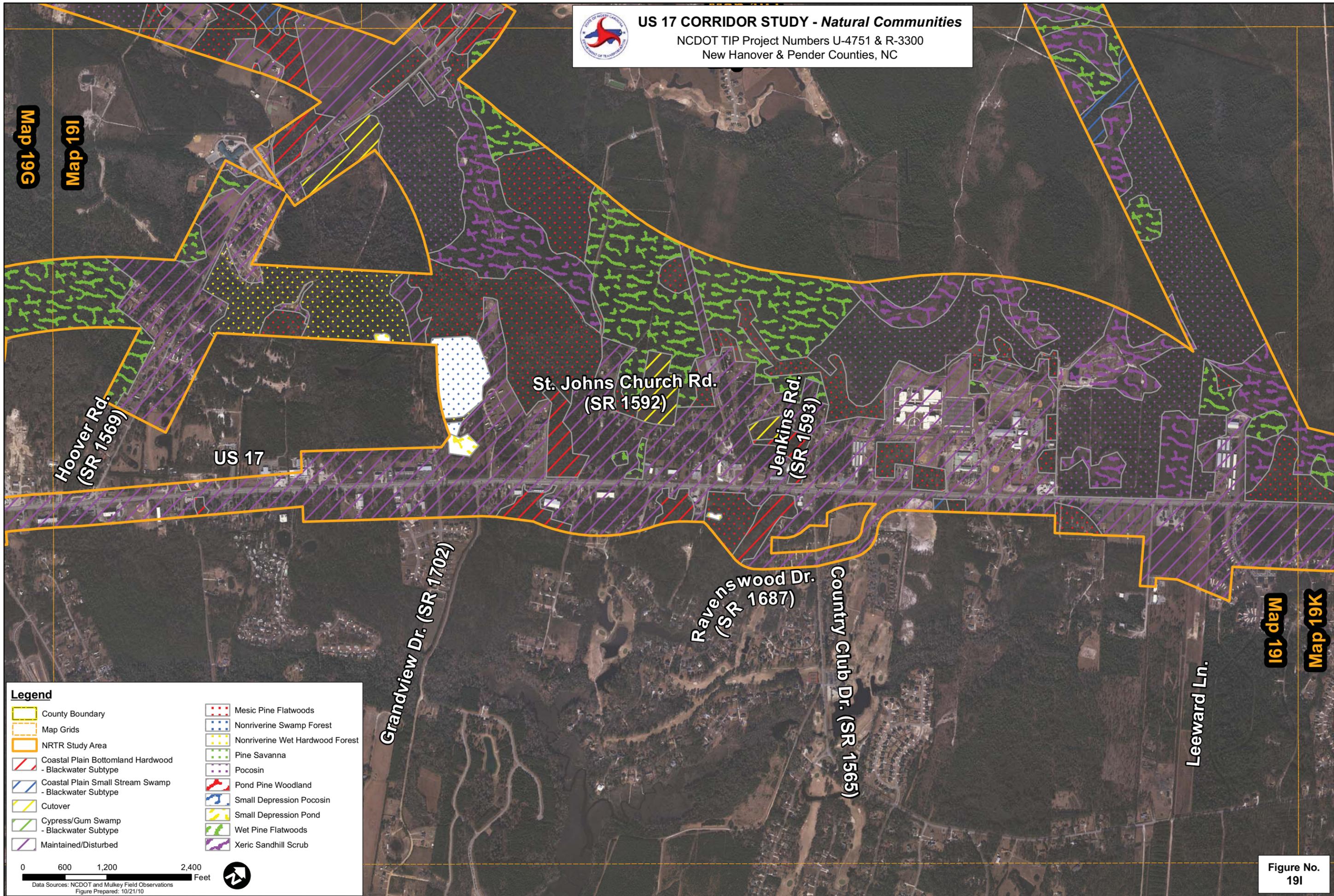


US 17 CORRIDOR STUDY - Natural Communities

NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Map 19G

Map 19I



Map 19I

Map 19K

Legend

- | | |
|--|---------------------------------|
| County Boundary | Mesic Pine Flatwoods |
| Map Grids | Nonriverine Swamp Forest |
| NRTR Study Area | Nonriverine Wet Hardwood Forest |
| Coastal Plain Bottomland Hardwood - Blackwater Subtype | Pine Savanna |
| Coastal Plain Small Stream Swamp - Blackwater Subtype | Pocosin |
| Cutover | Pond Pine Woodland |
| Cypress/Gum Swamp - Blackwater Subtype | Small Depression Pocosin |
| Maintained/Disturbed | Small Depression Pond |
| | Wet Pine Flatwoods |
| | Xeric Sandhill Scrub |

0 600 1,200 2,400 Feet



Data Sources: NCDOT and Mulkey Field Observations
Figure Prepared: 10/21/10

Figure No. 19I



US 17 CORRIDOR STUDY - Natural Communities

NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Map 19H

Map 19J

Satp's Rd.

Holly Shelter Gamelands

Hoover Rd.
(SR 1569)

Map 19J

Map 19I

Legend

- | | |
|--|---------------------------------|
| County Boundary | Mesic Pine Flatwoods |
| Map Grids | Nonriverine Swamp Forest |
| NRTR Study Area | Nonriverine Wet Hardwood Forest |
| Coastal Plain Bottomland Hardwood - Blackwater Subtype | Pine Savanna |
| Coastal Plain Small Stream Swamp - Blackwater Subtype | Pocosin |
| Cutover | Pond Pine Woodland |
| Cypress/Gum Swamp - Blackwater Subtype | Small Depression Pocosin |
| Maintained/Disturbed | Small Depression Pond |
| | Wet Pine Flatwoods |
| | Xeric Sandhill Scrub |

0 600 1,200 2,400 Feet

Data Sources: NCDOT and Mulkey Field Observations
Figure Prepared: 10/21/10



Figure No.
19J



US 17 CORRIDOR STUDY - Natural Communities

NCDOT TIP Project Numbers U-4751 & R-3300
New Hanover & Pender Counties, NC

Holly Shelter Gamelands

US 17

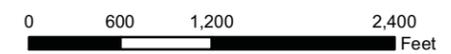
Sloop Point Rd. (SR 1563)

Long Leaf Rd. (SR 1675)

Map 19I

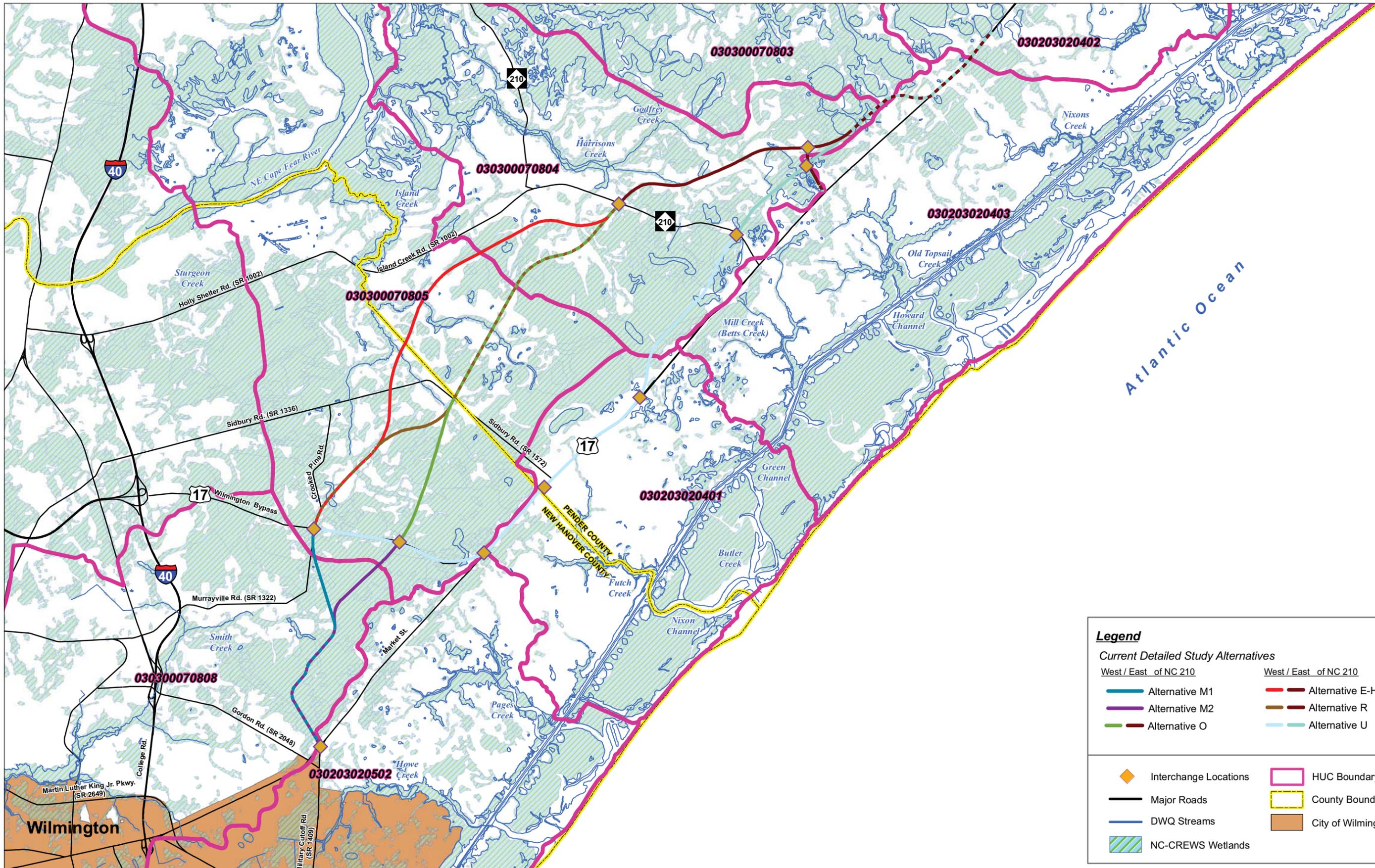
Map 19K

Legend			
	County Boundary		Mesic Pine Flatwoods
	Map Grids		Nonriverine Swamp Forest
	NRTR Study Area		Nonriverine Wet Hardwood Forest
	Coastal Plain Bottomland Hardwood - Blackwater Subtype		Pine Savanna
	Coastal Plain Small Stream Swamp - Blackwater Subtype		Pocosin
	Cutover		Pond Pine Woodland
	Cypress/Gum Swamp - Blackwater Subtype		Small Depression Pocosin
	Maintained/Disturbed		Small Depression Pond
			Wet Pine Flatwoods
			Xeric Sandhill Scrub



Data Sources: NCDOT and Mulkey Field Observations
Figure Prepared: 10/21/10

Figure No. 19K



Legend

Current Detailed Study Alternatives

<u>West / East of NC 210</u>		<u>West / East of NC 210</u>	
	Alternative M1		Alternative E-H
	Alternative M2		Alternative R
	Alternative O		Alternative U

	Interchange Locations		HUC Boundary
	Major Roads		County Boundary
	DWQ Streams		City of Wilmington
	NC-CREWS Wetlands		

Prepared by: **MULKEY**
ENGINEERS & CONSULTANTS

Prepared for:



Current Detailed Study Alternatives
Hydrologic Units
 US 17 Corridor Study
 NCDOT TIP Project Numbers U-4751 & R-3300
 New Hanover & Pender Counties, NC



Data Sources: NCDOT, NCDENR and Mulkey GIS
 Figure Prepared: 6/29/11



Figure No.
20

APPENDIX B

AGENCY CORRESPONDENCE

SECTION 404/NEPA INTERAGENCY AGREEMENT

**CONCURRENCE POINT NO. 1
PURPOSE AND NEED**

PROJECT TITLE: US 17 Corridor Study, New Hanover and Pender Counties, TIP Nos. U-4751 and R-3300, State Project No. 40191.1.1.

PURPOSE AND NEED OF THE PROPOSED ACTION: The purpose of the project is to improve the traffic carrying capacity and safety of the US 17 and Market Street corridor in the project area.

STUDY AREA: The proposed study area is located within portions of northern New Hanover County and southern Pender County. It is roughly bounded on west by I-40, on the north by the Northeast Cape Fear River, Holly Shelter Gamelands to the east, and US 17 to the south.

The project team has concurred with the purpose and need for the proposed project as described above.

<u>NAME</u>	<u>AGENCY</u>	<u>DATE</u>
<i>James A. Fry</i>	USACE	<i>21 Sept. 2006</i>
<i>Bill [unclear]</i>	NCDWQ	<i>9/21/2006</i>
<i>Olivia J. Farr</i>	NCDOT	<i>9-21-06</i>
<i>Chris A. [unclear]</i>	USEPA	<i>9/21/06</i>
<i>S. J. [unclear]</i>	NCWRC	<i>9-21-06</i>
<i>Hary Jordan</i>	USFWS	<i>9/21/2006</i>
<i>[unclear]</i>	NCSHPO	<i>9-21-06</i>
<i>[unclear]</i>	NCDCM	<i>9/21/06</i>
	NCDMF	
<i>[unclear]</i>	WMPO	<i>9/21/06</i>

**SECTION 404/NEPA INTERAGENCY AGREEMENT
CONCURRENCE POINT NO. 2
DETAILED STUDY ALTERNATIVES CARRIED FORWARD**

PROJECT TITLE: US 17 Corridor Study, New Hanover and Pender Counties, TIP Nos. U-4751 (Hampstead Bypass) and R-3300 (Military Cutoff Road Extension), State Project No. 40191.1.1.

PURPOSE AND NEED OF THE PROPOSED ACTION: The purpose of the US 17 Corridor Study is to improve the traffic carrying capacity and safety of the US 17 and Market Street corridor in the project area.

ALTERNATIVES TO STUDY IN DETAIL:

- | | | | | | |
|--------------------|---|--|--------------------|---|--|
| 1. Alternative D-G | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 8. Alternative R | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Alternative E-H | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 9. Alternative S | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| 3. Alternative F-I | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 10. Alternative U | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Alternative N | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 11. Alternative Z | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| 5. Alternative O | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 12. Alternative M1 | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 6. Alternative P | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 13. Alternative M2 | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 7. Alternative Q | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | | | |

The project team has concurred with the alternatives to be carried forward for the proposed project as indicated above. This Concurrence Point 2 form supersedes the Concurrence Point 2 form signed on August 23, 2007.

NAME	AGENCY	DATE
<i>Brad Chase</i>	USACE	4/29/10
<i>Clinton A. [Signature]</i>	USEPA	4/20/10
<i>Harry Jordan</i>	USFWS	4/26/2010
<i>Ron Seidler</i>	NMF	6/22/10
<i>[Signature]</i>	NCDCM	6/22/10
<i>Renee Medkell-Earley</i>	NCSHPO	4/29/10
<i>Jessi O'Neal</i>	NCDMF	5/26/10
<i>[Signature]</i>	NCDWQ	4/20/10
<i>[Signature]</i>	NCWRC	4-20-10
<i>Christi Fan</i>	NCDOT	4-20-2010
<i>[Signature]</i>	WMPO	4/20/10

**SECTION 404/NEPA INTERAGENCY AGREEMENT
CONCURRENCE POINT NO. 2A
BRIDGING AND ALIGNMENT REVIEW**

PROJECT TITLE: US 17 Corridor Study, New Hanover and Pender Counties, TIP Nos. U-4751 (Military Cutoff Road Extension) and R-3300 (Hampstead Bypass), State Project No. 40191.1.1.

PURPOSE AND NEED OF THE PROPOSED ACTION: The purpose of the US 17 Corridor Study is to improve the traffic carrying capacity and safety of the US 17 and Market Street corridor in the project area.

HYDRAULIC RECOMMENDATIONS:

<u>Site No.</u>	<u>Stream Name (I.D.)/Wetland I.D.</u>	<u>Wetland I.D.</u>	<u>Hydraulic Structure</u>
1	UT Futch Creek (ZSB)	EWf	Retain & extend existing 1@12'x8'
2	---	KWD	1@9'x8' RCBC
3	UT Smith Creek (BSP)	BWf	2@7'x12' RCBC
4	---	DWf	1@9'x8' RCBC
5	---	GWA	3@12'x7' RCBC
6	UT Island Creek (ISA, ISB)	IWN	Minimum Hydraulic Bridge
7	UT Harrison's Creek (ISD)	IWF	3@11'x8' RCBC
8	Harrison's Creek (LSC, LSCC, LSCF)	LWD	Dual 565' long bridges <small>Minimum Hydraulic Pipe or Culvert</small>
10	UT Island Creek (CSA, FSA)	---	4@12'x11' RCBC <small>Minimum Hydraulic Pipe or Culvert</small>
11	UT Island Creek (FSH, FSI)	---	1@12'x9' RCBC
15	Island Creek, UT Island Cr. (HBSF, HBSH)	HBWK	Minimum Hydraulic Bridge
16	UT Island Creek (HBSD2)	HBWD	Dual 200' long bridges
17	UT Harrison's Creek (HSX)	HWB	3@10'x9' RCBC
21	UT Island Creek (FSA)	FWB	2@11'x9' RCBC
22	UT Island Creek (FSE)	FWC	2@12'x7' RCBC
23	Godfrey Creek (LSD)	LWf	2@ 9'x7' RCBC
25	UT Island Creek (HBSK)	HBWF	1@9'x8' RCBC

The project team has concurred on the major hydraulic structures and sizes for the proposed project as listed above.

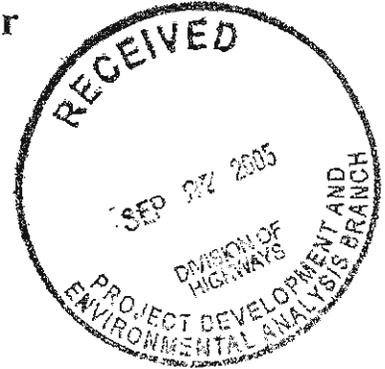
<u>NAME</u>	<u>AGENCY</u>	<u>DATE</u>
<i>Brad L. Hare</i>	USACE	5/27/10
<i>Clayton R. ...</i>	USEPA	5/27/10
<i>Gary Jordan</i>	USFWS	5/27/2010
	NMF	
<i>dt ...</i>	NCDCM	6/22/10
<i>Patricia ...</i>	NC SHPO	6/22/10
<i>Jessie O'Neal</i>	NC DMF	6/24/10
<i>David ...</i>	NC DWQ	5/27/10
<i>...</i>	NC WRC	5-27-2010
<i>...</i>	NC DOT	5-27-2010
<i>...</i>	WMPO	7/8/10



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

September 16, 2005



Gregory J. Thorpe, Ph.D.
North Carolina Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

This letter is in response to your request for comments from the U.S. Fish and Wildlife Service (Service) on the potential environmental effects of the proposed Military Cutoff Road extension from US 17 (Market Street) to the proposed I-140 in New Hanover County (TIP No. U-4751) and the proposed US 17 Bypass of Hampstead in New Hanover and Pender Counties (TIP No. R-3300). These comments provide scoping information in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667d) and section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

A view of recent aerial photographs of the project study area reveals a significant amount of forested wildlife habitat. Much of this forested land is likely wetland. New location projects in undeveloped land can have large negative effects on fish and wildlife habitat through direct habitat loss and fragmentation of remaining habitat. The effects of forest habitat fragmentation usually extend well beyond the project footprint and can lead to local extirpation of forest interior species and wildlife species which require large home ranges or that travel extensive distances for all or part of their life history (e.g. black bear (*Ursus americanus*)). Roads often act as physical barriers to wildlife movement and/or cause significant wildlife mortality in the form of road killed animals. Forest fragmentation can lead to increased predation of some species and increased brown-headed cowbird (*Molothrus ater*) parasitism of the nests of neotropical migrant birds. Habitat fragmentation also often facilitates invasive and/or nonnative species colonization of fragmented lands.

The two proposed projects are especially problematic for federally listed endangered and threatened species. To assist you, a county-by-county list of federally protected species known to occur in North Carolina and information on their life histories and habitats can be found on our web page at <http://nc-es.fws.gov/es/countyfr.html>. The North Carolina Natural Heritage Program (NCNHP) database reveals several relatively recent occurrences of the federally endangered red-cockaded woodpecker (*Picoides borealis*) and rough-leaved loosestrife (*Lysimachia asperulaefolia*) within the project study area and near potential alignments for the two projects. These occurrences are clustered to the west of US 17 and north of the existing

terminus of Military Cutoff Road. There is also a large concentration of red-cockaded woodpecker clusters within the Holly Shelter Game Land. These birds are part of a designated primary core population of the Mid-Atlantic Coastal Plain Recovery Unit. The project study area needs to be thoroughly surveyed for red-cockaded woodpeckers and rough-leaved loosestrife and, if suitable habitat exists, any other species listed for New Hanover and Pender Counties. It is important to note that even if no federally protected species is directly affected by the project, the indirect effects of isolating small populations by roads may be an issue.

Section 7(a)(2) of the Endangered Species Act requires that all federal action agencies (or their designated non-federal representatives), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed threatened or endangered species. A biological assessment/evaluation may be prepared to fulfill the section 7(a)(2) requirement and will expedite the consultation process.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a listed species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on listed species, then you are not required to contact our office for concurrence.

For road improvement projects such as widening, realignment, bridge replacement and culvert replacement, the Service recommends the following general conservation measures to avoid or minimize environmental impacts to fish and wildlife resources:

1. Wetland and forest impacts should be avoided and minimized to the maximal extent practical. Areas exhibiting high biodiversity or ecological value important to the watershed or region should be avoided. Proposed highway projects should be aligned along or adjacent to existing roadways, utility corridors or other previously disturbed areas in order to minimize habitat loss and fragmentation. Highway shoulder and median widths should be reduced through wetland areas;
2. Crossings of streams and associated wetland systems should use existing crossings and/or occur on a bridge structure wherever feasible. Bridges should be long enough to allow for sufficient wildlife passage along stream corridors. Where bridging is not feasible, culvert structures that maintain natural water flow and hydraulic regimes without scouring or impeding fish and wildlife passage should be employed;
3. Bridges and approaches should be designed to avoid any fill that will result in damming or constriction of the channel or flood plain. To the extent possible, piers and bents should be placed outside the bank-full width of the stream. If spanning the flood plain is not feasible, culverts should be installed in the flood plain portion of the approach to restore some of the hydrological functions of the flood plain and reduce high velocities of flood waters within the affected area;

4. Bridge designs should include provisions for roadbed and deck drainage to flow through a vegetated buffer prior to reaching the affected stream. This buffer should be large enough to alleviate any potential effects from run-off of storm water and pollutants;
5. Off-site detours should be used rather than construction of temporary, on-site bridges. For projects requiring an on-site detour in wetlands or open water, such detours should be aligned along the side of the existing structure which has the least and/or least quality of fish and wildlife habitat. At the completion of construction, the detour area should be entirely removed and the impacted areas be planted with appropriate vegetation, including trees if necessary;
6. If unavoidable wetland or stream impacts are proposed, a plan for compensatory mitigation to offset unavoidable impacts should be provided early in the planning process. Opportunities to protect mitigation areas in perpetuity via conservation easements, land trusts or by other means should be explored at the outset;
7. Wherever appropriate, construction in sensitive areas should occur outside fish spawning and migratory bird nesting seasons. In waterways that may serve as travel corridors for fish, in-water work should be avoided during moratorium periods associated with migration, spawning and sensitive pre-adult life stages. The general moratorium period for anadromous fish is February 15 - June 30;
8. Best Management Practices (BMP) for Protection of Surface Waters should be implemented; and
9. Activities within designated riparian buffers should be avoided or minimized.

We reserve the right to review any federal permits that may be required for this project, at the public notice stage. Therefore, it is important that resource agency coordination occur early in the planning process in order to resolve any conflicts that may arise and minimize delays in project implementation. In addition to the above guidance, we recommend that the environmental documentation for this project include the following in sufficient detail to facilitate a thorough review of the action:

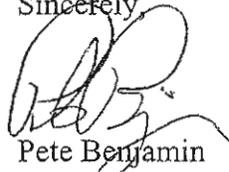
1. A clearly defined and detailed purpose and need for the proposed project, supported by tabular data, if available, and including a discussion of the project's independent utility;
2. A description of the proposed action with an analysis of all alternatives being considered, including the upgrading of existing roads and a "no action" alternative;
3. A description of the fish and wildlife resources, and their habitats, within the project impact area that may be directly or indirectly affected;
4. The extent and acreage of waters of the U.S., including wetlands, that are to be impacted by filling, dredging, clearing, ditching, or draining. Acres of wetland impact should be

differentiated by habitat type based on the wetland classification scheme of the National Wetlands Inventory (NWI). Wetland boundaries should be determined by using the 1987 Corps of Engineers Wetlands Delineation Manual and verified by the U.S. Army Corps of Engineers;

5. The anticipated environmental impacts, both temporary and permanent, that would be likely to occur as a direct result of the proposed project. The assessment should also include the extent to which the proposed project would result in secondary impacts to natural resources, and how this and similar projects contribute to cumulative adverse effects;
6. Design features and construction techniques which would be employed to avoid or minimize impacts to fish and wildlife resources, both direct and indirect, and including fragmentation and direct loss of habitat;
7. Design features, construction techniques, or any other mitigation measures which would be employed at wetland crossings and stream channel relocations to avoid or minimize impacts to waters of the US; and,
8. If unavoidable wetland or stream impacts are proposed, project planning should include a compensatory mitigation plan for offsetting the unavoidable impacts.

The Service appreciates the opportunity to comment on this project. It is understood that a scoping meeting will be held for this project. The Service would like to attend this scoping meeting. Please inform Mr. Gary Jordan of the meeting location and date by phone at (919) 856-4520, ext. 32 or by email at gary_jordan@fws.gov. Also, if you have any questions regarding our response, please contact Mr. Jordan.

Sincerely,



Pete Benjamin
Ecological Services Supervisor

cc: Dave Timpy, USACE, Wilmington, NC
Brian Wrenn, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militsher, USEPA, Raleigh, NC



IN REPLY REFER TO

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS

P. O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

December 3, 2007

RECEIVED
Division of Highways

DEC 10 2007

Preconstruction
Project Development and
Environmental Analysis Branch

Regulatory Division

SUBJECT: Action ID 2007 01386, North Carolina Department of Transportation Projects U-4751 and R-3300, Military Cutoff Road Extension, and Hampstead Bypass

Mr. Matt Wilkerson
Archeology Group Supervisor
North Carolina Department of Transportation
Human Environment Unit
1583 Mail Service Center
Raleigh, North Carolina 27699-1583

Dear Mr. Wilkerson:

Reference is made to your letter dated November 16, 2007, in which you requested that we define the undertaking and establish the Area(s) of Potential Effects (APE) or permit area for both historic structures and archaeology for the construction of the Hampstead Bypass as well as the Military Cutoff Road extension, Wilmington, New Hanover and Pender Counties, North Carolina. These projects are currently being reviewed pursuant to the NEPA/404 Merger process and on which NCDOT and the State Historic Preservation office are participating members.

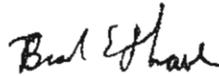
Since the project does not utilize federal funds, the Corps of Engineers will serve as the lead Federal agency with respect to compliance with Section 106 of the National Historic Preservation Act. Based on the information we have available to us at this time, a section 404 permit will be required for construction of the project as it appears that it will require the discharge of fill material into waters of the United States in any of the corridors currently under consideration. However, as this project has only progressed to Concurrence Point 2 and delineations of waters and wetlands have not been conducted on a selected alternative, we are unable to provide specific information regarding the extent of the permit area or define the undertaking pursuant to Appendix C of our regulations.

We have conducted a preliminary review of the latest published version of the National Register of Historic Places and have reviewed the information that was provided in the memo dated October 4, 2005 from Mr. Peter Sandbeck to Mr. Greg Thorpe and have no additional information to provide at this time. As this project moves through the NEPA/404 process and a preferred corridor is selected, we will be able to more accurately define the permit area(s) as requested. Of course, we also would expect that as a member of the NEPA/404 Merger Team

that yours as well as SHPO's input into the evaluation of corridors will allow NCDOT to fully consider any impacts to historic/archeological properties prior to selection of a LEDPA and by copy of this letter are requesting that SHPO provide any additional information concerning such resources they may have to your office.

If additional surveys/studies are warranted as a result of the Merger Process, it is our intention to further coordinate with your office in order to fulfill our obligations in the Section 106 process. If you have further questions, please contact me at (910) 251-4611.

Sincerely,



Brad Shaver, Project Manager
Wilmington Regulatory Field Office

Copy Furnished (w/out enclosure)

Renee Gledhill-Earley
Environmental Review Coordinator
Administration Branch
North Carolina Historic Preservation Office
4617 Mail Service Center
Raleigh NC 27699-4617



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

June 2, 2010

Regulatory Division

Action ID No. 2007 1386

Mr. Jay McInnis
NCDOT, PDEA
1598 Mail Service Center
Raleigh, NC 27699-1598

Dear Mr. McInnis:

Reference is made to Transportation Improvement Project U-4751 and R-3300, also referred to as the Hampstead Bypass, which originates near the current terminus of Military Cutoff Road at US Highway 17, extending to the north of Hampstead as a bypass, north and west of the of the existing Highway 17 corridor, New Hanover and Pender Counties, North Carolina.

Based on coordination within the Merger process and jurisdictional efforts to date it is clear that any proposed improvements along the study corridor will likely impact multiple stream systems, most notably Harrisons Creek, Godfrey Creek, and Island Creek, and their numerous tributaries. These resource areas provide a number of benefits to receiving water including the attenuation and de-synchronization of flood events, improvements to water quality in downstream receiving waters, and the uptake and transformation of many biologically active compounds. These areas also provide valuable wildlife habitat for a variety of birds, mammals, amphibians, and reptiles. In addition, a number of the aforementioned Creeks may provide suitable spawning and foraging habitat for threatened and endangered species. You should be aware that we consider these wetlands and tributaries to be of high quality and therefore believe that all efforts should be undertaken to avoid and minimize impacts. These efforts should include when practicable, bridging to avoid wetland, stream and/or flood plain impacts, utilizing off-site detours, employing temporary work bridges during project construction, and the removal of any approach fills not necessary for this project.

As there is no Federal Highway Administration (FHWA) funding for this project and it will require a permit from the Wilmington District, U.S. Army Corps of Engineers (Corps) under authority of Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act, the Corps will be the lead federal agency for ensuring compliance with National Environmental Policy Act (NEPA). Although FHWA will not be involved, we believe that this project should continue to be carried forward through the Merger Process in accordance with the 2005 Merger

agreement. In addition, we suggest that you review Appendix B of the Corps of Engineers regulations (found at 33 C.F.R. § 325, Appendix B) regarding NEPA compliance and Section 404 of the Clean Water Act to assist in your NEPA planning efforts.

Based on our initial evaluation of the project, we believe that this project will require an Environmental Impact Statement (EIS). Although we will not require that a third party contract be executed for the preparation of this document, we want to stress that it is our intent that this document will become the Corps of Engineers' NEPA document for this project. To this end, we will need to ensure that the contractor preparing the EIS does not have any financial interest in the outcome of the NEPA or 404 permit process. I have enclosed a disclosure statement that must be signed by the lead contractor developing the document and returned to us for our files. In addition, we will need to be invited to any public scoping meetings and/or public hearings you may hold concerning this project, and may need to hold hearings or scoping meetings of our own. In accordance with the Council on Environmental Quality (CEQ) requirements, we have published a Notice of Intent (NOI) to prepare an EIS in the Federal Register and will be responsible for distribution of the draft and final EIS to EPA and the public for review and comment. Finally, it is our intention to prepare our own Record of Decision (ROD) for the project once the EIS has been finalized. As the Corps will be the lead federal agency on the project, and holds ultimate responsibility for the content of the EIS, it will be incumbent upon NCDOT to provide advance copies of the EIS to the Corps for review and approval prior to NC DOT's circulation of the document to any other agency or to the public.

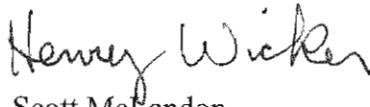
Department of the Army (DA) permit authorization, pursuant to Section 404 of the Clean Water Act of 1977, as amended, will be required for the discharge of excavated or fill material in waters of the United States including streams and wetlands in conjunction with this project, including disposal of construction debris. Under our mitigation policy, impacts to wetlands should first be avoided and minimized. We will then consider compensatory mitigation for unavoidable impacts. When final plans are completed, including the extent and location of any work in wetlands, our regulatory branch would appreciate the opportunity to review these plans for project-specific determinations of DA permit requirements.

During the alternatives analysis phase, the Corps, as lead Federal agency, would recommend that all investigations for Historic Properties, Essential Fish Habitat and Threatened and Endangered species be conducted in accordance with survey level investigations as conducted now on any Federal aid project. In order to ensure that our requirements pursuant to Section 106 of the Historic Preservation Act, the Magnuson-Stevens Fishery Management and Conservation Act, and Section 7 of the Endangered Species Act are met, we must be invited to any coordination and/or consultation meetings with the State Historic Preservation Office (SHPO), National Marine Fisheries Service (NMFS), and/or the US Fish and Wildlife Service. Once the Corps effect(s) determinations have been made, we expect that NC DOT will prepare appropriate documentation (eg, Biological Assessments, Surveys for historic/archeological features, EFH documentation) and forward to the Corps for review prior to transmittal to the appropriate agency.

Environmental Justice (EJ) issues (if any) will need to be clearly identified and adequately addressed in the NEPA document. Depending on the level and severity of impacts, additional public involvement and outreach may be necessary in order to fully satisfy our requirements under the EJ Executive Order.

If you have any question as the project moves forward, please do not hesitate to contact Brad Shaver, Div 3-DOT Project Manager in the Wilmington Regulatory Field Office at 910-251-4611.

Sincerely,



Scott McLendon
Acting Chief, Regulatory Division

Enclosure

Copies furnished (without enclosure):

NCDOT, Division Three
Attn: Mason Herndon
124 Division Drive
Wilmington, NC 28401

Mr. Pete Benjamin
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Chris Militscher
United States Environmental Protection Agency
Office of Environment Assessment
310 New Bern Avenue, Room 206
Raleigh, North Carolina 27601

Mr. Travis Wilson
North Carolina Wildlife Resources Commission
1142 I-85 Service Road
Creedmoor, North Carolina 27522

Mr. Steve Sollod
North Carolina Division of Coastal Management
2728 Capital Blvd.
Raleigh, North Carolina 27604

Mr. Ron Sechler,
NOAA National Marine Fisheries Service
Pivers Island
Beaufort, North Carolina 28516

David Wainwright, North Carolina Division of Water Quality
North Carolina Department of Environment and Natural Resources
1650 Mail Service Center
Raleigh, North Carolina 27699-1650

**U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT**

Action Id. 2007 1386

County: New Hanover/Pender

U.S.G.S. Quad: Multiple Quads

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Applicant: NCDOT – PDEA
Address: attn: Amy James
1598 Mail Service Center
Raleigh, NC 27699-1598

Agent: Mulkey Engineers and Consultants
attn: Mark Mickley
6750 Tryon Road
Cary, NC 27518

Property description:

Size (miles) approximately 13

Nearest Town Hampstead

Nearest Waterway Multiple tributaries

River Basin Cape Fear

USGS HUC 03030007

Coordinates N 34.3500 W 77.7622

Location description The projected corridor originates just north of Wilmington near Military Cutoff Road, New Hanover County and terminates just north of Hampstead adjacent to Holly Shelter game lands, Pender County.

Indicate Which of the Following Apply:

A. Preliminary Determination

Based on preliminary information, there may be wetlands on the above described property. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331).

B. Approved Determination

There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

There are wetlands on the above described property subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

We strongly suggest you have the wetlands on your property delineated. Due to the size of your property and/or our present workload, the Corps may not be able to accomplish this wetland delineation in a timely manner. For a more timely delineation, you may wish to obtain a consultant. To be considered final, any delineation must be verified by the Corps.

The wetland on your property have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

The wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

There are no waters of the U.S., to include wetlands, present on the above described property which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

- The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Washington, NC, at (252) 946-6481 to determine their requirements.

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **Brad Shaver** at **910-251-4611**.

C. Basis For Determination

The subject features had both an ordinary high water mark and characteristics described in the 1987 Corps Delineation Manual.

D. Remarks

The site was reviewed with Mulkey Engineers and Consultants from April 2008 to April 2010. This preliminary determination is based on the delineation package submitted by Mulkey dated June 2010. The CD information which represents the preliminary JD is covered by Figures 3-1 through 3-23 and covers over 500 aquatic resources.

Corps Regulatory Official: _____

Brad Shaver

Date 8/30/2010

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the attached customer Satisfaction Survey or visit <http://www.saw.usace.army.mil/WETLANDS/index.html> to complete the survey online.

Copy furnished:

NC DENR-DWQ attn: Mr. David Wainwright 1650 Mail Service Center Raleigh, NC 27699-1650

NC DENR-DWQ attn: Mason Herndon 225 Green Street, Suite 714 Fayetteville, NC 28301-5043

NC DOT Division 3 attn: Anneliese Westphal 124 Division Drive Wilmington NC 28401

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): *August 30, 2010*

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

*Amy E. James
NCDOT Natural Environment Unit
1598 Mail Service Center
Raleigh, NC 27699-1598*

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: *Wilmington Field office,
Hampstead Bypass (N-4751), 2007 1386*

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: *NC* County/parish/borough: *New Hanover/Pender* City: *Hampstead*

Center coordinates of site (lat/long in degree decimal format):

Lat. *34.350017*°; Long. *-77.762207*°; Universal Transverse Mercator:

Name of nearest waterbody: *Island Creek/Godfrey Creek/Harrison Creek*

Identify (estimate) amount of waters in the review area:

Non-wetland waters: *(Stream) 147,172.9* linear feet: *(Pond) 33.0* acres.

Cowardin Class: *see waters upload table*

Stream Flow:

Wetlands: *2,858* acres.

Cowardin Class: *see waters upload table*

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: *N/A* Non-Tidal: *N/A*

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

Office (Desk) Determination. Date:

Field Determination. Date(s): *multiple dates April 2008 through April 2010*

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable. This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply

- checked items should be included in case file and, where checked and requested, appropriately reference sources below):

Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:

Data sheets prepared/submitted by or on behalf of the applicant/consultant.

Office concurs with data sheets/delineation report.

Office does not concur with data sheets/delineation report.

Data sheets prepared by the Corps:

Corps navigable waters' study:

U.S. Geological Survey Hydrologic Atlas:

USGS NHD data.

USGS 8 and 12 digit HUC maps.

U.S. Geological Survey map(s). Cite scale & quad name:

USDA Natural Resources Conservation Service Soil Survey. Citation:

National wetlands inventory map(s). Cite name:

State/Local wetland inventory map(s):

FEMA/FIRM maps:

100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)

Photographs: Aerial (Name & Date):

or Other (Name & Date):

Previous determination(s). File no. and date of response letter:

Other information (please specify): *Lidar*

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Bradshaw 8-30-10

Signature and date of
Regulatory Project Manager
(REQUIRED)

Ameyam 5/24/10

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining
the signature is impracticable)

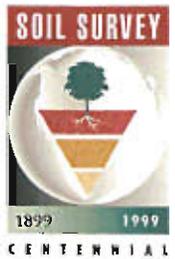


United States
Department of
Agriculture

Natural
Resources
Conservation
Service

4407 Bland Road,
Suite 117
Raleigh, NC 27609
(919) 873-2171

mcorles@nc.nrcs.usda.gov



Subject: Farmland Conversion Impact Rating form NRCS-CPA-106

Date: August 26, 2010

To: Andy Belcher
Planner/GIS Technician
Mulkey Engineers & Consultant
Cary, NC

File Code: 310-11-11

The following information is in response to your request asking for information on farmlands for the US 17 Corridor Study, which includes Military Cutoff Road Extension in New Hanover, and the Hampstead Bypass in New Hanover and Pender Counties.

Prime farmland does not include land already in or committed to urban development or water storage. Prime Farmland "already in" urban development includes all land that has been designated for commercial or industrial use or residential use that is not intended at the same time to protect farmland in a

1. Zoning code or ordinance adopted by the state or local unit of government or,
2. A comprehensive land use plan which has expressly been either adopted or reviewed in its entirety by the unit of local government in whose jurisdiction it is operative within 10 years preceding the implementation of the project.

According to the zoning maps provided, the area in New Hanover County meets the above criteria. NRCS-PA-106 forms have been completed. The area is exempt. No need to evaluate impact on farmland.

The area in Pender County was evaluated following the same procedure. Areas that are not exempt were evaluated. NRCS has completed Parts II, IV and V as required by the Farm Land Policy Act Register.

If you have any question please feel free to call me at (919) 873-2171.



Milton Cortés
Assistant State Soil Scientist

FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency) 3. Date of Land Evaluation Request 3/9/10 4. Sheet 1 of 1

1. Name of Project **Military Cutoff Road Extension, U-4751** 5. Federal Agency Involved **State Funded**

2. Type of Project **Roadway extension on new location** 6. County and State **New Hanover County, NC**

PART II (To be completed by NRCS) 1. Date Request Received by NRCS _____ 2. Person Completing Form Milton Cortez NRCS Ass

3. Does the corridor contain prime, unique statewide or local important farmland? **(If no, the FPPA does not apply - Do not complete additional parts of this form)** YES NO 4. Acres Irrigated _____ Average Farm Size _____

5. Major Crop(s) _____ 6. Farmable Land in Government Jurisdiction Acres: _____ % _____ 7. Amount of Farmland As Defined in FPPA Acres: _____ % _____

8. Name Of Land Evaluation System Used New Hanover 9. Name of Local Site Assessment System _____ 10. Date Land Evaluation Returned by NRCS 6/11/2010

PART III (To be completed by Federal Agency)

	Alternative Corridor For Segment			
	M1	M2		
A. Total Acres To Be Converted Directly	118.62	119.75		
B. Total Acres To Be Converted Indirectly, Or To Receive Services	0	0		
C. Total Acres In Corridor	118.62	119.75	0.00	0.00

PART IV (To be completed by NRCS) Land Evaluation Information

A. Total Acres Prime And Unique Farmland	0	0		
B. Total Acres Statewide And Local Important Farmland	0	0		
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0	0		
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	0	0		

PART V (To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)

PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))

	Maximum Points				
1. Area in Nonurban Use	15				
2. Perimeter in Nonurban Use	10				
3. Percent Of Corridor Being Farmed	20				
4. Protection Provided By State And Local Government	20				
5. Size of Present Farm Unit Compared To Average	10				
6. Creation Of Nonfarmable Farmland	25				
7. Availability Of Farm Support Services	5				
8. On-Farm Investments	20				
9. Effects Of Conversion On Farm Support Services	25				
10. Compatibility With Existing Agricultural Use	10				
TOTAL CORRIDOR ASSESSMENT POINTS	160	0	0	0	0

PART VII (To be completed by Federal Agency)

Relative Value Of Farmland (From Part V)	100				
Total Corridor Assessment (From Part VI above or a local site assessment)	160	0	0	0	0
TOTAL POINTS (Total of above 2 lines)	260	0	0	0	0

1. Corridor Selected: _____ 2. Total Acres of Farmlands to be Converted by Project: _____ 3. Date Of Selection: _____ 4. Was A Local Site Assessment Used? YES NO

5. Reason For Selection: _____

Signature of Person Completing this Part: _____ DATE _____

NOTE: Complete a form for each segment with more than one Alternate Corridor

**FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS**

PART I (To be completed by Federal Agency)	3. Date of Land Evaluation Request 3/9/10	4. Sheet 5 of 5
---	--	------------------------

1. Name of Project Hampstead Bypass, R-3300	5. Federal Agency Involved State Funded
2. Type of Project Bypass of Hampstead on new location	6. County and State New Hanover County, NC

PART II (To be completed by NRCS)		1. Date Request Received by NRCS	2. Person Completing Form <i>M. Han Carter NRCS Asses</i>
3. Does the corridor contain prime, unique statewide or local important farmland? <i>(if no, the FPPA does not apply - Do not complete additional parts of this form).</i>		YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	4. Acres Irrigated Average Farm Size
5. Major Crop(s)	6. Farmable Land in Government Jurisdiction Acres: %	7. Amount of Farmland As Defined in FPPA Acres: %	
8. Name Of Land Evaluation System Used <i>New Hanover</i>	9. Name of Local Site Assessment System	10. Date Land Evaluation Returned by NRCS <i>6/11/2010</i>	

PART III (To be completed by Federal Agency)	Alternative Corridor For Segment			
	EH 3	O 3	R 3	U 3
A. Total Acres To Be Converted Directly	261.07	274.65	245.86	185.60
B. Total Acres To Be Converted Indirectly, Or To Receive Services	0	0	0	0
C. Total Acres In Corridor	261.07	274.65	245.86	185.60

PART IV (To be completed by NRCS) Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
B. Total Acres Statewide And Local Important Farmland	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

PART V (To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)

PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))	Maximum Points				
1. Area in Nonurban Use	15				
2. Perimeter in Nonurban Use	10				
3. Percent Of Corridor Being Farmed	20				
4. Protection Provided By State And Local Government	20				
5. Size of Present Farm Unit Compared To Average	10				
6. Creation Of Nonfarmable Farmland	25				
7. Availability Of Farm Support Services	5				
8. On-Farm Investments	20				
9. Effects Of Conversion On Farm Support Services	25				
10. Compatibility With Existing Agricultural Use	10				
TOTAL CORRIDOR ASSESSMENT POINTS	160	0	0	0	0

PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)	100				
Total Corridor Assessment (From Part VI above or a local site assessment)	160	0	0	0	0
TOTAL POINTS (Total of above 2 lines)	260	0	0	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>
-----------------------	---	-----------------------	--

5. Reason For Selection:

Signature of Person Completing this Part: _____ DATE _____

NOTE: Complete a form for each segment with more than one Alternate Corridor

**FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS**

PART I (To be completed by Federal Agency)	3. Date of Land Evaluation Request 3/9/10	4. Sheet 4 of 5
---	--	------------------------

1. Name of Project Hampstead Bypass, R-3300	5. Federal Agency Involved State Funded
2. Type of Project Bypass of Hampstead on new location	6. County and State Pender County, NC

PART II (To be completed by NRCS)		1. Date Request Received by NRCS	2. Person Completing Form Milton Cortes (State Office)
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>		4. Acres Irrigated	Average Farm Size 172 acres
5. Major Crop(s) Corn	6. Farmable Land in Government Jurisdiction Acres: 427,884 % 76%	7. Amount of Farmland As Defined in FPPA Acres: 348,304 % 62%	
8. Name Of Land Evaluation System Used Pender	9. Name of Local Site Assessment System N/A	10. Date Land Evaluation Returned by NRCS 6/11/2010	

PART III (To be completed by Federal Agency)	Alternative Corridor For Segment			
	EH 2	O 2	R 2	U 2
A. Total Acres To Be Converted Directly	312.84	294.22	294.18	167.46
B. Total Acres To Be Converted Indirectly, Or To Receive Services	0	0	0	0
C. Total Acres In Corridor	312.84	294.22	294.18	167.46

PART IV (To be completed by NRCS) Land Evaluation Information	EH 2	O 2	R 2	U 2
A. Total Acres Prime And Unique Farmland	67.48	58.10	58.12	49.88
B. Total Acres Statewide And Local Important Farmland	72.36	48.50	48.48	8.05
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0.0401	0.0306	0.0306	0.0166
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	61.9	76.1	76.1	76.1

PART V (To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)	EH 2	O 2	R 2	U 2
	32	26	26	32

PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))	Maximum Points	EH 2	O 2	R 2	U 2
1. Area in Nonurban Use	15	7	7	7	4
2. Perimeter in Nonurban Use	10	7	8	8	3
3. Percent Of Corridor Being Farmed	20	2	2	2	1
4. Protection Provided By State And Local Government	20	0	0	0	0
5. Size of Present Farm Unit Compared To Average	10	10	10	10	10
6. Creation Of Nonfarmable Farmland	25	25	25	25	25
7. Availability Of Farm Support Services	5	2	2	2	2
8. On-Farm Investments	20	4	4	4	4
9. Effects Of Conversion On Farm Support Services	25	25	25	25	25
10. Compatibility With Existing Agricultural Use	10	2	1	1	0
TOTAL CORRIDOR ASSESSMENT POINTS	160	0 84	0 84	0 84	0 74

PART VII (To be completed by Federal Agency)	EH 2	O 2	R 2	U 2
Relative Value Of Farmland (From Part V)	100			
Total Corridor Assessment (From Part VI above or a local site assessment)	160	0	0	0
TOTAL POINTS (Total of above 2 lines)	260	0	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>
-----------------------	---	-----------------------	--

5. Reason For Selection:

Signature of Person Completing this Part: _____ DATE _____

NOTE: Complete a form for each segment with more than one Alternate Corridor



North Carolina Department of Cultural Resources
State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
 Lisbeth C. Evans, Secretary
 Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
 Division of Historical Resources
 David Brook, Director

October 4, 2005

MEMORANDUM

TO: Greg Thorpe, Ph.D., Director
 Project Development and Environmental Analysis Branch
 NCDOT Division of Highways

FROM: Peter Sandbeck 

SUBJECT: Military Cutoff Road Extension in New Hanover County and Hampstead Bypass in Pender County, u-4751 and R-3300, New Hanover and Pender Counties, ER 05-2123

Thank you for your letter of September 8, 2005, concerning the above project.

We have conducted a search of our maps and files and located the following structure of historical or architectural importance within the general area of this project:

- ◆ (NH 558) St. Stanislaus Catholic Church, SW corner of NC 133 and SR 1377.
- ◆ (NH 562) (Former) Ft. Fisher Barracks, NW corner of SR 1002 and Orange St.
- ◆ (PD 3) Poplar Grove, SE side US 17, S of jct. with SR 1572.
- ◆ (PD 255) Lillington Cemetery, N of NC 210, on Study List.
- ◆ (PD 254) Governor Samuel Ashe Grave, S side of SR 1411, (Old River Rd.)
- ◆ (PD 224) Jesse Batson House, E side SR 1411, 1.7 miles NE of jct. with US 117.
- ◆ (PD 206) Houses, SR 1418 W of US 117 both sides, on Study List.
- ◆ (PD 36) Sidbury House, E side US 117, 0.3 miles S of jct. with SR 1411, Locally Designated.
- ◆ (PD 223) Roland Batson House, E side US 117.

We recommend that a Department of Transportation architectural historian identify and evaluate any structures over fifty years of age within the project area, and report the findings to us.

We have reviewed the scoping information sheets for the Military Cutoff Road Extension and the Hampstead Bypass and would like to comment.

Concerning the Military Cutoff Road Extension to the Wilmington Bypass, only the area in the immediate vicinity of the Military Cutoff Road and US 17 intersection has been previously surveyed for the presence of archaeological resources.

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-4763/733-8653
RESTORATION	515 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-6547/715-4801
SURVEY & PLANNING	515 N. Blount Street, Raleigh, NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-6545/715-4801

Concerning the US 17 Hampstead Bypass, none of the area indicated on page 3, "Construct Bypass of US17 around Hampstead on new location", has been surveyed for the presence of archaeological resources.

Please be aware that both projects may require archaeological surveys to be performed within the project corridors when they are selected. We would be pleased to assist you in the development and review of any scopes of work, proposals, or other documents relating to this matter. If significant archaeological sites are identified, appropriate measures should be taken to minimize adverse impacts.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment please contact Renee Gledhill-Earley, environmental review coordinator, at 919 733 4763. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT



North Carolina Department of Cultural Resources
State Historic Preservation Office

Peter B. Sandbeck, Administrator

Beverly Eaves Perdue, Governor
Linda A. Carlisle, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

January 21, 2011

MEMORANDUM

TO: Mary Pope Furr
Office of Human Environment
NCDOT Division of Highways

FROM: Claudia Brown *PSE for Claudia Brown*

SUBJECT: Historic Architectural Resources Survey Report Addendum, Military Cutoff Road and
Hampstead Bypass, U-4751 and R-3300, New Hanover and Pender Counties, ER 05-2123

We are in receipt of Kate Husband's letter of November 22, 2010, which transmits the addendum to the survey report for the above project and addresses questions that we raised about three sites: Poplar Grove Plantation, Mount Ararat AME Church, and the Wesleyan Chapel United Methodist Church.

Poplar Grove Plantation

Thank you for the additional information regarding the one-story frame structure located along the southwest boundary of the property, southeast of the Mako's Raw Bar and Grill. We concur with your original finding (in the survey report dated August 25, 2010, by Mattson, Alexander and Associates, Inc.) that the Poplar Grove Plantation remains eligible for listing in the National Register of Historic Places, and your revised finding that the current National Register boundary appears appropriate.

Mount Ararat AME Church

Upon review of the additional information regarding the interior condition of the church and interior photograph, we concur with your original finding that the property is eligible for listing in the National Register under Criterion C for Design/Construction with Criteria Consideration A for Religious Properties.

Wesleyan Chapel United Methodist Church

Upon review of the additional information regarding the interior condition of the church and interior photographs, we concur with your original finding that the property is eligible for listing in the National Register under Criterion C for Design/Construction with Criteria Consideration A for Religious Properties.

We thank you for addressing these issues. We will add the addendum to our survey files.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Kate Husband, PDEA/OHE

Federal Aid #: NA

TIP#: U-4751/R-3300

County: New Hanover & Pender

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Military Cutoff Road Extension and Hampstead Bypass

On March 8, 2011, representatives of the

- North Carolina Department of Transportation (NCDOT)
- Federal Highway Administration (FHWA)
- North Carolina State Historic Preservation Office (HPO)
- Other USACE (phone)

Reviewed the subject project and agreed on the effects findings listed within the table on the reverse of this signature page.

Signed:

Mary Pope
Representative, NCDOT

3/8/2011
Date

Brad Estover
Representative, USACE

3/9/11

Date

Representative, HPO

Date

Renee Medhill-Easley
State Historic Preservation Officer

3-8-11

Date

Federal Aid #: NA

TIP#: U-4751/R-3300

County: New Hanover & Pender

Property and Status	Effect Finding	Alternative	Reasons
Poplar Grove (NR, Criteria B & C) Alternative U	Adverse Eff. Adverse Eff. Adverse Eff.	Current Des. Avoidance Des. Expressway	- taking property & bisecting parcel - impacts to property w/ fill slope for bridge - 3 fronts? - impacts to frontage w/ 14 lane freeway
Scott's Hill Rosenwald School (DE, Criteria A & C) Alternative U	Adverse Eff. Adverse Eff.	Current Des. Avoidance	- service road thru structure - ROW thru structure & access issues
Topsail Consolidated School (DE, Criteria A & C) Alternative has been dropped	No Effect		- no construction - alternative has been dropped.
Mount Ararat AME Church (DE, Criterion C) Alternative M1 & M2	Adverse Eff.		- taking property & control of access & taking cemetery markers.
Wesleyan Chapel United Methodist Church (DE, Criterion C) Alternative U	Adverse Eff. Adverse Eff. Adverse Eff.	Current Des. Avoidance Expressway	- taking structure & cemetery - control of access @ front door. - structure remains - taking structure

Initialed:

NCDOT MPT

USACE

BE

HPO

RE

12:41

PDS
NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

9103952684

P.02/03

STATE NUMBER: 06-E-4220-0107 F02
DATE RECEIVED: 10/10/2005
AGENCY RESPONSE: 11/07/2005
REVIEW CLOSED: 11/10/2005

CLEARINGHOUSE COORD REGION 0
CAPE FEAR COG
1480 HARBOUR DRIVE
WILMINGTON NC

REVIEW DISTRIBUTION

CAPE FEAR COG
CC&PS - DEM, NFIP
DEHNR - COASTAL MGT
DENR LEGISLATIVE AFFAIRS
DEPT OF AGRICULTURE
DEPT OF CUL RESOURCES
DEPT OF TRANSPORTATION

PROJECT INFORMATION

APPLICANT: N.C. Department of Transportation

TYPE: National Environmental Policy Act

ERD: Scoping

DESC: Military cutoff extension from US 17 (Market Street) to the proposed I-14C in New Hanover County & US 17 bypass of Hampstead in New Hanover & Pender counties.

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED:

NO COMMENT

COMMENTS ATTACHED

SIGNED BY:



DATE:



NOV 08 2005

RECEIVED
NOV 07 2005
BY:

DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

Project Number
06-0107
County
New Hanover

Inter-Agency Project Review Response

Project Name NC DOT Type of Project Military Cutoff Road Extension
from US 17 (Market Street) to the
proposed I-140 in New Hanover
County & US 17 Bypass.

Comments provided by:

- Regional Program Person
- Regional Supervisor for Public Water Supply Section
- Central Office program person

Name: Debra Benoy-Wilmington RO Date: 11-02-05

Telephone number: _____

Program within Division of Environmental Health:

- Public Water Supply
- Other, Name of Program: _____

Response (check all applicable):

- No objection to project as proposed
- No comment
- Insufficient information to complete review
- Comments attached
- See comments below



An Authorization to Construct
is req'd from PWS
Prior to relocating water lines.

Return to:
Public Water Supply Section
Environmental Review Coordinator
for the
Division of Environmental Health

DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH

Project Number
06-0107

County
New Hanover

Inter-Agency Project Review Response

Project Name SAME AS ON THE FRONT Type of Project _____

- The applicant should be advised that plans and specifications for all water system improvements must be approved by the Division of Environmental Health prior to the award of a contract or the initiation of construction (as required by 15A NCAC 18C .0300et. seq.). For information, contact the Public Water Supply Section, (919) 733-2321.
- This project will be classified as a non-community public water supply and must comply with state and federal drinking water monitoring requirements. For more information the applicant should contact the Public Water Supply Section, (919) 733-2321.
- If this project is constructed as proposed, we will recommend closure of _____ feet of adjacent waters to the harvest of shellfish. For information regarding the shellfish sanitation program, the applicant should contact the Shellfish Sanitation Section at (252) 726-6827.
- The soil disposal area(s) proposed for this project may produce a mosquito breeding problem. For information concerning appropriate mosquito control measures, the applicant should contact the Public Health Pest Management Section at (919) 733-6407.
- The applicant should be advised that prior to the removal or demolition of dilapidated structures, a extensive rodent control program may be necessary in order to prevent the migration of the rodents to adjacent areas. For information concerning rodent control, contact the local health department or the Public Health Pest Management Section at (919) 733-6407.
- The applicant should be advised to contact the local health department regarding their requirements for septic tank installations (as required under 15A NCAC 18A. 1900 et. sep.). For information concerning septic tank and other on-site waste disposal methods, contact the On-Site Wastewater Section at (919) 733-2895.
- The applicant should be advised to contact the local health department regarding the sanitary facilities required for this project.
- If existing water lines will be relocated during the construction, plans for the water line relocation must be submitted to the Division of Environmental Health, Public Water Supply Section, Technical Services Branch, 1634 Mail Service Center, Raleigh, North Carolina 27699-1634, (919) 733-2321.
- For Regional and Central Office comments, see the reverse side of this form.

Jim McRight

PWS

11-02-05

Reviewer

Section/Branch

Date

PDS
NORTH CAROLINA STATE CLEARINGHOUSE
DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW

STATE NUMBER: 06-E-4220-0107 F02
DATE RECEIVED: 10/10/2005
AGENCY RESPONSE: 11/07/2005
REVIEW CLOSED: 11/10/2005

CLEARINGHOUSE COORD REGION O
CAPE FEAR COG
1480 HARBOUR DRIVE
WILMINGTON NC

REVIEW DISTRIBUTION
CAPE FEAR COG
CC&PS - DEM, NFIP
DEHNR - COASTAL MGT
DENR LEGISLATIVE AFFAIRS
DEPT OF AGRICULTURE
DEPT OF CUL RESOURCES
DEPT OF TRANSPORTATION



PROJECT INFORMATION

APPLICANT: N.C. Department of Transportation
TYPE: National Environmental Policy Act
ERD: Scoping
DESC: Military cutoff extension from US 17 (Market Street) to the proposed I-140 in New Hanover County & US 17 bypass of Hampstead in New Hanover & Pender counties.

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919)807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED:

NO COMMENT

COMMENTS ATTACHED

SIGNED BY:

DATE:

John Wynne

10/20/05



North Carolina Department of Environment and Natural Resources

Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

August 16, 2010

Mark Mickley
Environmental Scientist
Mulkey Engineers and Consultants
6750 Tryon Road
Cary, NC 27518

Subject: NCDOT TIP # U-4751 and R-3300, New Hanover and Pender Counties
Cape Fear River Basin

On-Site Determination for Applicability to the Mitigation Rules (15A NCAC 2H .0506(h))

Dear Mr. Mickley:

Between January 4, 2009 and April 16, 2010, at your request and in your attendance, David Wainwright, NC Division of Water Quality (NCDWQ) staff, conducted numerous on-site determinations to review drainage and isolated wetland features associated with the proposed Hampstead Bypass (US 17 to north of US 17) and SR 1409 (Military Cutoff Road) to US 17 for applicability to mitigation rules (15A NCAC 2H .0506[h]). The drainage and wetland features are approximated on the attached maps initialed and dated August 16, 2010. Please note that only the portion of the feature located within the study area (see attached maps) where evaluated. Drainage features are summarized in the following table:

DRAINAGE FEATURES TABLE						
NUMBER	ATTACHED FEATURE MAP PAGE	JD PACKET FIGURE	FEATURE ID	JURISDICTIONAL STATUS *	MITIGATION REQUIRED	LOCATED ON USGS MAP
1	1	3-1	ASA	Perennial	Yes	Yes
2	2	3-11	BSA	Perennial	Yes	No
3	2	3-2, 3-11	BSJ	Perennial	Yes	No
4	2	3-2, 3-12	BSK	Perennial	Yes	No
5	2	3-11	BSL	Perennial	Yes	No
6	2	3-12	BSM	Perennial	Yes	No
7	2	3-13	BSN	Perennial	Yes	No
8	2	3-14	BSO	Perennial	Yes	No
9	2	3-15	BSP	Perennial	Yes	No
10	2	3-16	BSQ	Perennial	Yes	No
11	1	3-2	BDITCH1	Tributary	No	No
12	2, 3	3-15	CSA	Perennial	Yes	No
13	2, 3	3-15	CSB	Perennial	Yes	No
14	2, 3	3-15	CSC	Tributary	No	No
15	2, 3	3-11, 3-15	CSD	Intermittent	Yes	No
16	2	3-11		Perennial	Yes	No
17	2, 3	3-11	CSE	Tributary	No	No
18	2, 3	3-11	CSF	Tributary	No	No

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 2321 Crabtree Blvd., Suite 250, Raleigh, North Carolina 27604
Phone: 919-733-1786 \ FAX: 919-733-6893
Internet: <http://h2o.enr.state.nc.us/hcwetlands/>



DRAINAGE FEATURES TABLE (continued)

NUMBER	ATTACHED FEATURE MAP PAGE	JD PACKET FIGURE	FEATURE ID	JURISDICTIONAL STATUS *	MITIGATION REQUIRED	LOCATED ON USGS MAP
19	2	3-11	CSG	Intermittent	No	No
20	2	3-11	CSH	Intermittent	No	No
21	2	3-11	CSI	Perennial	Yes	No
22	3	3-15	CSJ	Perennial	Yes	No
23	3	3-15	CSK	Perennial	Yes	No
24	2, 3, 10	3-12	DSA	Perennial	Yes	No
25	9	3-6	ESA	Perennial	Yes	Yes
26	9	3-6	ESB	Perennial	Yes	No
27	3	3-15	FSA	Perennial	Yes	No
28	3	3-15	FSB	Intermittent	Yes	Yes (partially)
29	3	3-15	FSC	Intermittent	Yes	No
30	3	3-15	FSD	Intermittent	Yes	No
31	3	3-16	FSE	Perennial	Yes	No
32	3, 4	3-16	FSF	Tributary	Yes	No
33	3	3-16	FSH	Tributary	No	No
34	3, 10	3-16		Intermittent	Yes	No
35	3, 10	3-16		Perennial	Yes	No
36	3, 10	3-16	FSI	Perennial	Yes	No
37	3	3-15	FSJ	Intermittent	Yes	No
38	4	3-16	FSK	Intermittent	Yes	No
39	4	3-17	GSA	Perennial	Yes	No
40	3, 10	3-16	GSB	Intermittent	Yes	No
41	3, 10	3-16	GSG	Intermittent	Yes	No
42	10	3-16	GSX	Perennial	Yes	No
43	3, 10	3-12	GFSE	Perennial	Yes	No
44	4, 5	3-22	HBSA	Perennial	Yes	No
45	4	3-22, 3-23	HBSAA	Intermittent	Yes	No
46	4	3-22, 3-24		Perennial	Yes	No
47	4, 5	3-23	HBSB	Intermittent	Yes	No
48	4, 5	3-23	HBSC	Perennial	Yes	No
49	4, 5	3-23	HBSD(1)	Intermittent	Yes	No
50	4, 5	3-23		Perennial	Yes	No
51	4, 5	3-23	HBSD(2)	Perennial	Yes	Yes
52	4, 5	3-23	HBSE	Perennial	Yes	No
53	4	3-22	HBSF	Perennial	Yes	Yes
54	4	3-22	HBSG	Perennial	Yes	Yes
55	4	3-22	HBSH	Intermittent	Yes	No
56	5	3-28	HSA	Intermittent	Yes	No
57	5	3-18	HSB	Intermittent	Yes	No
58	5	3-23	HSC	Perennial	Yes	No
59	5	3-23	HSCA	Intermittent	Yes	No
60	5	3-23	HSD	Intermittent	Yes	No
61	4, 5	3-23	HSE	Intermittent	Yes	No
62	5	3-18	HSX	Perennial	Yes	No
63	5	3-23	HSZ	Perennial	Yes	No
64	5	3-23	HDITCH1	Tributary	No	No
65	5	3-23	HDITCH2	Tributary	No	No
66	4	3-17	ISA	Intermittent	Yes	No
67	4	3-17		Perennial	Yes	No
68	4	3-17	ISB	Perennial	Yes	Yes
69	4, 5	3-18	ISC	Intermittent	Yes	No
70	5	3-18		Perennial	Yes	No
71	5	3-18	ISD	Perennial	Yes	No
72	4, 5	3-17	IDITCH1	Tributary	No	No

DRAINAGE FEATURES TABLE (continued)

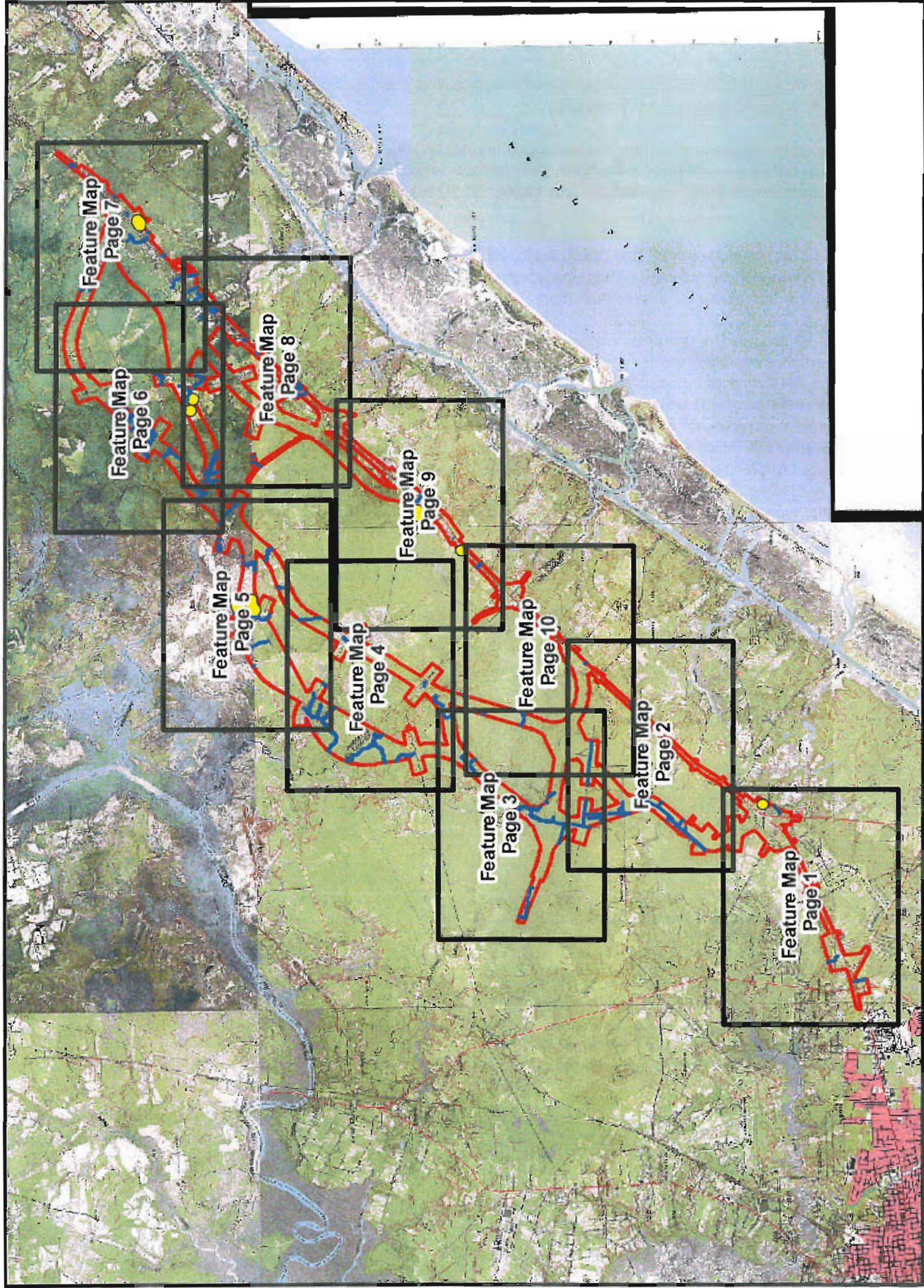
NUMBER	ATTACHED FEATURE MAP PAGE	JD PACKET FIGURE	FEATURE ID	JURISDICTIONAL STATUS *	MITIGATION REQUIRED	LOCATED ON USGS MAP
73	6, 7, 8	3-8	JSA	Tributary	No	No
74	6, 7, 8	3-8		Intermittent	Yes	No
75	6, 8	3-8	JSB	Intermittent	Yes	No
76	7, 8	3-8	JSC	Intermittent	Yes	No
77	7	3-9	JSD	Intermittent	Yes	No
78	7, 8	3-9		Perennial	Yes	No
79	5	3-18	LSA	Perennial	Yes	No
80	5	3-19	LSAA	Perennial	Yes	No
81	5	3-18	LSAB	Tributary	No	No
82	5, 6	3-18	LSB	Perennial	Yes	No
83	6, 8	3-14, 3-19	LSC	Perennial	Yes	Yes
84	6, 8	3-19	LSCA	Intermittent	Yes	No
85	6, 8	3-19		Perennial	Yes	No
86	6, 8	3-19	LSCAA	Perennial	Yes	No
87	6, 8	3-19	LSCB	Perennial	Yes	No
88	6, 8	3-19	LSCBA	Tributary	No	No
89	6, 8	3-14	LSCC	Perennial	Yes	No
90	6, 8	3-19	LSCD	Intermittent	Yes	No
91	6, 8	3-19	LSCE	Intermittent	Yes	No
92	6, 8	3-14	LSCF	Intermittent	Yes	No
93	6, 8	3-8, 3-14	LSD	Perennial	Yes	No
94	6, 8	3-14	LSDA	Intermittent	Yes	No
95	6	3-14	LSE	Perennial	Yes	No
96	6, 8	3-8	LTRIB1	Tributary	No	No
97	7	3-20	MSA	Intermittent	Yes	No
98	7	3-20	MSAA	Tributary	No	No
99	7	3-20	MSB	Perennial	Yes	No
100	6	3-19	MSC	Perennial	Yes	Yes
101	6	3-19	MSCA	Perennial	Yes	Yes
102	6	3-19	MSD	Perennial	Yes	Yes
103	6	3-19	MSDA	Tributary	Yes	No
104	6	3-19		Intermittent	Yes	No
105	6	3-19		Perennial	Yes	No
106	6	3-19	MSE	Perennial	Yes	No
107	5, 6	3-19	MSF	Perennial	Yes	Yes
108	6	3-19	MSFA	Perennial	Yes	No
109	6	3-19	MSFB	Intermittent	Yes	No
110	6	3-19, 3-20	MSI	Tributary	No	No
111	6	3-19, 3-20		Intermittent	Yes	No
112	6	3-19	MDITCH1	Tributary	No	No
113	6	3-19	MDITCH2	Tributary	No	No
114	6	3-19	MDITCH3	Tributary	No	No
115	6	3-19	MDITCH4	Tributary	No	No
116	6	3-19	MDITCH5	Tributary	No	No
117	6	3-19	MDITCH6	Tributary	No	No
118	6	3-19	MDITCH7	Tributary	No	No
119	6	3-19	MDITCH8	Tributary	No	No
120	6	3-19	MDITCH9	Tributary	No	No
121	6	3-19	MDITCH10	Tributary	No	No
122	6	3-19	MDITCH11	Tributary	No	No
123	6	3-19	MDITCH12	Tributary	No	No
124	7	3-10	NSA	Intermittent	Yes	No
125	7	3-10		Perennial	Yes	No
126	7	3-9	NSB	Tributary	No	No

DRAINAGE FEATURES TABLE (continued)						
NUMBER	ATTACHED FEATURE MAP PAGE	JD PACKET FIGURE	FEATURE ID	JURISDICTIONAL STATUS *	MITIGATION REQUIRED	LOCATED ON USGS MAP
127	7	3-9	NSF	Intermittent	Yes	No
128	7	3-9		Perennial	Yes	No
129	7	3-1	NDITCH1	Tributary	No	No
130	1, 2, 10	3-4	ZSA	Intermittent	Yes	No
131	9, 10	3-5	ZSB	Perennial	Yes	No
132	8	3-7	ZSC	Tributary	No	No
133	8	3-7		Intermittent	Yes	No
134	8	3-8	ZSD	Perennial	Yes	No
135	8	3-13	ZSE	Tributary	No	No
136	8	3-13		Intermittent	Yes	No
137	2, 10	3-4	ZSF	Intermittent	Yes	No
138	2	3-3	ZSG	Perennial	Yes	No
139	1	3-1	ZSH	Perennial	Yes	Yes
140	7	3-9	ZSJ	Tributary	No	No
141	3	3-21	ZSK	Perennial	Yes	No
142	3	3-21	ZSL	Perennial	Yes	No
143	6, 7, 8	3-8	ZSM	Intermittent	Yes	No
144	8	3-7	ZDITCH1	Tributary	No	No
145	8	3-7	ZDITCH2	Tributary	No	No
146	8	3-7	ZDITCH3	Tributary	No	No
147	8	3-7	ZDITCH4	Tributary	No	No
148	8	3-7	ZDITCH5	Tributary	No	No
149	8	3-8	ZTRIB1	Tributary	No	No
150	8	3-13	ZTRIB2	Tributary	No	Yes

* Features labeled as "Tributaries" were classified as ditches and/or rated ephemeral; therefore no mitigation is required by the DWQ. This term was retained to be consistent with the JD package.

In addition to the drainage features listed above, the following isolated wetlands were also identified:

ISOLATED WETLANDS TABLE				
NUMBE	ATTACHED FEATURE MAP	JD PACKET FIGURE	FEATURE	DELINEATED SIZE (acres)
1	9	6	EWP	0.39
2	9	6	EWQ	0.07
3	9	6	EWR	0.44
4	9	6	EWS	0.13
5	5	18	HWH	0.15
6	5	18	HWH1	0.09
7	5	18	HWH2	0.03
8	5	18	HWH3	0.07
9	5	18	HWH4	0.02
10	5	18	HWH5	0.23
11	5	18	HWH6	0.10
12	5	18	HWI	0.02
13	5	23	HWJ	0.03
14	5	23	HWK	1.05
15	5	23	HWL	0.32
16	5	23	HWL1	0.06
17	5	23	HWP	0.26
18	6, 8	14	LWH	0.20
19	6, 8	14	LWJA	0.16
20	7	9	NWN	1.64
21	9	5	ZWK	0.08
22	9	6	ZWM	0.04
23	1	2	ZWY	0.08



Please note that sites identified in the jurisdiction verification request package but not reviewed on site by NCDWQ will be considered accurate as presented.

This letter only addresses the applicability to the mitigation rules and does not approve any activity within Waters of the United States or Waters of the State. Any impacts to wetlands or streams must comply with 404/401 regulations, water supply regulations (15A NCAC 2B .0216), and any other required federal, state and local regulations.

The owner (or future owners) or permittee should notify NCDWQ (and other relevant agencies) of this decision in any future correspondences concerning this property and/or project. This on-site determination shall expire five (5) years from the date of this letter.

Landowners or affected parties that dispute a determination made by NCDWQ or Delegated Local Authority that a surface water exists and that it is subject to the mitigation rules may request a determination by the Director. A request for a determination by the Director shall be referred to the Director in writing c/o Brian Wrenn, NCDWQ Wetlands/401 Unit, 1650 Mail Service Center, Raleigh, NC 27699-1650. Individuals that dispute a determination by NCDWQ or Delegated Local Authority that "exempts" a surface water from the mitigation rules may ask for an adjudicatory hearing. You must act within 60 days of the date that you receive this letter. Applicants are hereby notified that the 60-day statutory appeal time does not start until the affected party (including downstream and adjacent landowners) is notified of this decision. NCDWQ recommends that the applicant conduct this notification in order to be certain that third party appeals are made in a timely manner. To ask for a hearing, send a written petition, which conforms to Chapter 150B of the North Carolina General Statutes to the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. This determination is final and binding unless you ask for a hearing within 60 days.

If you have any additional questions or require additional information please contact David Wainwright at (919)715-3415 or David.Wainwright@ncdenr.gov.

Sincerely,



David Wainwright
DWQ, Transportation Permitting Unit

Attachments: Signed and Dated Feature Map Pages 1-10

cc: Brad Shaver, US Army Corps of Engineers – Wilmington Regulatory Field Office
Jay McInnis, NCDOT, Project Development
Mason Herndon, NCDWQ Fayetteville Regional Office
File Copy



**RESOLUTION
REGARDING THE STATE TRANSPORTATION IMPROVEMENT
PROGRAM**

WHEREAS, Pender County has been reported as the 85th fastest growing county in the nation and the 6th fastest growing county in North Carolina; and

WHEREAS, the population of Pender County increased by 42% from 1990 to 2000, and projections are for the increase in the next decade to exceed another 50%.

WHEREAS, the a vast majority of County's growth has occurred in the Hampstead area, where over 60% of the County's building permits were issued in 2006; and

WHEREAS, the Department of Transportation is currently accepting comments on the Draft 2009-2015 State Transportation Improvement Program (TIP); and

WHEREAS, the Draft STIP does not add any additional projects for Pender County, but the existing 2007-2013 STIP currently includes the Hampstead Bypass project; a project that has clearly become increasingly important due to traffic congestion, which creates a public safety concern; and

WHEREAS, the public safety concerns and traffic volume will continue to increase with the opening of the new Topsail High School, the addition of another elementary school, and the construction of numerous housing developments whose residents will rely on Highway 17 as their primary transportation corridor; and

WHEREAS, Highway 17 is a major transportation and economic corridor for Eastern Carolina from the South Carolina border to Virginia; and

NOW, THEREFORE, BE IT RESOLVED that the Pender County Board of Commissioners urges the North Carolina Department of Transportation to 1) fully fund and accelerate the Hampstead Bypass project; 2) Fund a study of the Highway 17 Corridor; and 3) explore alternatives to improve safety before the bypass can be constructed other than the 6-laning of Highway 17.

FURTHER BE IT RESOLVED that copies of this resolution be transmitted to the members of the General Assembly representing Pender County.

Adopted this the 22nd day of January, 2008

J. David Williams, Chairman

Lori A. Brill, Clerk to the Board



**RESOLUTION
IN SUPPORT OF THE HIGHWAY 17 HAMPSTEAD BYPASS PROJECT**

WHEREAS, Pender County has been reported as the 85th fastest growing county in the nation and the 6th fastest growing county in North Carolina; and

WHEREAS, the population of Pender County increased by 42% from 1990 to 2000, and projections are for the increase in the next decade to exceed another 50%.

WHEREAS, the a vast majority of County's growth has occurred in the Hampstead area, where over 60% of the County's building permits were issued in 2006; and

WHEREAS, The N.C. Department of Transportation has proposed 19 alternate routes for this highway bypass project, 17 of which pass through Pender County; and

WHEREAS, the County has limited resources available to prevent development in and to preserve any of the designated alternate routes; and

WHEREAS, this Board of Commissioners does not believe, based on the volume of subdivision applications, rezoning requests and special use permit applications pending for the Hampstead area, that the County can responsibly preserve this area from development for the next two (2) years.

NOW, THEREFORE, BE IT RESOLVED that the Pender County Board of Commissioners urges the North Carolina Department of Transportation to work with the residents of the County and to hasten the selection process of the Hampstead Bypass Corridor, while ensuring this project receives adequate funding as a priority improvement.

FURTHER BE IT RESOLVED that copies of this resolution be transmitted to the members of the General Assembly representing Pender County.

Adopted this the 7th day of May, 2007



F.D. Rivenbark, Chairman



Lori A. Brill, Clerk to the Board



NEW HANOVER COUNTY

Engineering Department / Water and Sewer District
230 Market Place Drive • Suite 160
Wilmington, North Carolina 28403
Telephone (910) 798-7139
Fax (910) 798-7051

Gregory R. Thompson, P.E., P.L.S.
County Engineer
James S. Craig, P.E.
Deputy County Engineer

October 18, 2005

Jay McInnis, P.E.
Project Development Unit Head
1548 Mail Service Center
North Carolina Department of Transportation
Raleigh, North Carolina 27699-1548

RE: Access (limited) from Military Cutoff Road Extension to New Hanover County Well Field and Water Treatment Plant Site. (NCDOT U-4751, NHC Project #185.1)

Dear Mr. McInnis:

Thank you for providing input during our telephone discussion today regarding direct access from the future Military Cutoff Road Extension to the New Hanover County well field and water treatment plant site. The Military Cutoff Road Extension corridor crosses the northwest portion of this County-owned property (parcel R03600-003-187-000). As we discussed, limited access (right in, right out) would be beneficial to the water treatment plant project. This arrangement would also meet the intent of the highway project because it would relieve U.S. 17 (Market Street) from plant related delivery and service traffic.

New Hanover County respects the public review process for the Military Cutoff Road Extension. We understand that your conceptual agreement to provide limited access to the plant site is contingent upon any changes to the project necessitated by this upcoming public comment period. Thank you for your cooperation in this matter. I can be reached at (910) 798-7079.

Sincerely,

Gary D. McSmith, P.E.
Chief Project Engineer
New Hanover County

cc: William Castor, New Hanover County Commissioner
Greg Thompson, P.E., New Hanover County Engineer
Allen Pope, P.E., NC DOT Division Engineer
Dan Dawson, P.E., W. K. Dickson



NEW HANOVER COUNTY

Engineering Department / Water and Sewer District
230 Market Place Drive • Suite 160
Wilmington, North Carolina 28403
Telephone (910) 798-7139
Fax (910) 798-7051

Gregory R. Thompson, P.E., P.L.S.
County Engineer
James S. Craig, P.E.
Deputy County Engineer

RECEIVED
DIVISION ENGINEER
THIRD DIVISION

JUL 20 2005

July 18, 2005

Const.	_____	Maint.	_____
Op. Mgr.	_____	Plas. Tech.	_____
Bus. Ofc.	_____	Stp. Supr.	_____
Prof. Mgr.	_____		_____
Others	_____		_____

Division of Highways

H. Allen Pope, P.E.
Division Engineer
Highway Division 3
North Carolina Department of Transportation
124 Division Drive
Wilmington, North Carolina 28401

RE: Alignment of Proposed Military Cutoff Road Extension at New Hanover County Well Field and Water Treatment Plant Site.

Dear Mr. Pope: [Faint, illegible text]

New Hanover County developed a well field and is in design phase of a water treatment plant at County owned property in Ogden adjacent to Diane Drive (parcel R03600-003-187-000). Currently, there are two new wells on the property and contract award is pending to connect the wells to our water system by construction of a 16-inch water line. One of these wells now appears to be in the path of the proposed corridor of the Military Cutoff Road Extension.

The well construction contract cost was \$45,000 in 2004 (not including mobilization, connection and associated improvement costs). Ali Kouckeki, NCDOT Utilities Engineer Design Services Unit and Greg Stevens, P.E. NCDOT Utilities Squad Leader Project Services Unit previously indicated that it might be possible to adjust the alignment to miss the 100 foot radius wellhead protection zone around the well. Given recent information regarding the proposed road alignment and corridor width, the well will need to be properly abandoned and replaced prior to road construction under the NC DOT Military Road Extension Project.

Additional conflicts with New Hanover County and Sewer District utility assets (water and sewer lines, etc.) are anticipated given the scope of the Road Extension project. Please forward this letter to the appropriate authorities in NC DOT so that

funds will be programmed and available to offset the cost of restoring all New Hanover County Water and Sewer District assets impacted by the project.

Thank you for your cooperation in this matter. I can be reached for questions at (910 798-7079).

Sincerely,

A handwritten signature in black ink, appearing to read "GD McSmith".

Gary D. McSmith, P.E.
Project Engineer
New Hanover County

cc: Greg Thompson, P.E.
Greg Stevens, P.E., NC DOT Utilities Squad Leader
Ali Koucheki, NC DOT, Design Services Unit

46032 8-3-05
ts

RECEIVED
JUL 19 2005



Development Services
Engineering
305 Chestnut Street
PO Box 1810
Wilmington, NC 28402-1810

910 341-7807
910 341-5881 fax
wilmingtonnc.gov
Dial 711 TTY/Voice



N.C. DEPT. OF TRANSPORTATION
OFFICE OF THE SECRETARY

RECEIVED
AUG 02 2005

July 15, 2005

Mr. Lyndo Tippet
Secretary of Transportation
North Carolina Department of Transportation
1501 Mail Service Center
Raleigh, NC 27699-1501

Re: Transportation Corridor Official Map for Military Cutoff Road Extension

Dear Mr. Tippet:

The City of Wilmington entered into a municipal agreement with the North Carolina Department of Transportation to prepare and file the **Transportation Corridor Official Map** for the proposed extension of **Military Cutoff Road** from **Market Street** to the proposed **I-140/US17 Bypass**. The New Hanover County Commissioners voted to approve the City preparing and filing the map at their February 7, 2005 meeting. The City entered into a contract with The LPA Group of North Carolina to prepare the map shortly after this approval.

The map has been prepared and a public hearing has been scheduled for August 2, 2005 at the City Council's regularly scheduled meeting. The meeting begins at 6:30 PM in the City Council Chamber, City Hall, 102 N. Third Street. The public hearing is being advertised in the Star News (the local paper) and letters are being mailed to affected property owners informing them of the public hearing. In addition, a copy of the map has been posted at the door of the New Hanover County Court House in accordance with the North Carolina General Statutes. I am enclosing a reduced size copy of the map for you information.

Please feel free to contact me if you have any questions.

Sincerely,

William C. Penny
William C. Penny, PE
City Engineer

CC: Lanny Wilson
Allen H. Pope, PE



**WILMINGTON URBAN AREA
Metropolitan Planning Organization**

P.O. Box 1810
Wilmington, North Carolina 28402
910 341 3258 910 341 7801 FAX

Members:

October 18, 2005

City of
WILMINGTON
Lead Planning Agency

Ms. Beverly Robinson
North Carolina Department of Transportation
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Town of
CAROLINA BEACH

Town of
KURE BEACH

Town of
WRIGHTSVILLE BEACH

Subject: Military Cutoff Road Extension (U-4751) and Hampstead Bypass (R-3300)

NEW HANOVER
County

The North Carolina Department of Transportation Project Development and Environmental Analysis Branch is working to assemble comments for the proposed Military Cutoff Extension (U-4751) and Hampstead Bypass (R-3300) projects located in New Hanover and Pender Counties.

Town of
BELVILLE

Town of
LELAND

Town of
NAVASSA

BRUNSWICK
County

Although no permits will be required from the Wilmington Metropolitan Planning Organization, the proposed Military Cutoff Extension project and a portion of the Hampstead Bypass project are located within the Wilmington MPO's planning area boundary. Additionally, the Wilmington MPO is exploring the option of expanding the current boundary to encompass the entire Hampstead Bypass and unincorporated area of Hampstead. For these reasons, I would like to participate in the scoping meeting and environmental review process for the Military Cutoff Extension and Hampstead Bypass projects.

North Carolina
BOARD OF
TRANSPORTATION

If you have any questions, please contact me via e-mail at mike.kozlosky@wilmingtonnc.gov or by phone at (910) 342-2781.

Sincerely,

Mike Kozlosky
Sr. Transportation Planner



**WILMINGTON URBAN AREA
Metropolitan Planning Organization**

P.O. Box 1810
Wilmington, North Carolina 28402
910 341 3258 910 341 7801 FAX

February 28, 2007

Members:

City of
WILMINGTON
Lead Planning Agency

Town of
CAROLINA BEACH

Town of
KURE BEACH

Town of
WRIGHTSVILLE BEACH

NEW HANOVER
County

Town of
BELVILLE

Town of
LELAND

Town of
NAVASSA

BRUNSWICK
County

PENDER
County

CAPE FEAR
Public Transportation
Authority

North Carolina
BOARD OF
TRANSPORTATION

Mr. Rob Hanson
North Carolina Department of Transportation
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Re: Request for a multi-use path as part of the Military Cutoff Road Extension (U-4751) project

Dear Mr. Hanson:

The Military Cutoff Extension is currently programmed in the State Transportation Improvement Program (STIP) for *Planning and Environmental Analysis* with funding for right-of-way acquisition in fiscal year 2012 and construction in post year. Military Cutoff Road extension is identified as a "recommended boulevard" on Governor Easley's and the North Carolina Department of Transportation's (NCDOT's) Strategic Highway Corridor's Initiative and is important to the future mobility of the region.

As part of the Military Cutoff Road widening project (U-2734) that is currently under construction, NCDOT will construct a multi-use path within the existing right-of-way. A goal of the 2030 Long Range Transportation Plan is to provide "a continuous and direct system of regional bicycle facilities within the Greater Wilmington Urban Area." The MPO's Transportation Advisory Committee endorsed staff to request the "East Coast Greenway Coastal Corridor" designation on Military Cutoff Road between Wrightsville Avenue and Market Street. The construction of a multi-use path along Military Cutoff Road extension would provide for a continuous and direct regional bicycle facility, could potentially be designated as part of the East Coast NC Greenway Coastal Corridor and would provide an important future connection between the cities of Wilmington and Jacksonville.

The Wilmington MPO requests that the NCDOT Planning, Development and Environmental Analysis Branch consider the construction of a multi-use path as part of the Military Cutoff Road extension project (U-4751). If you have any questions regarding this request or require any additional information, please contact me via e-mail at mike.kozlosky@wilmingtonnc.gov or call me at (910) 342-2781.

Sincerely,

Mike Kozlosky
Senior Transportation Planner

cc: Lanny Wilson, TAC Chairman, Wilmington MPO
Allen Pope, Division Engineer, NCDOT

APPENDIX C

NC DOT RELOCATION ASSISTANCE PROGRAM/RELOCATION REPORTS

DIVISION OF HIGHWAYS RELOCATION PROGRAMS

It is the policy of NCDOT to ensure comparable replacement housing will be available prior to construction of state and federally-assisted projects. Furthermore, the North Carolina Board of Transportation has the following three programs to minimize the inconvenience of relocation:

- Relocation Assistance
- Relocation Moving Payments
- Relocation Replacement Housing Payments or Rent Supplement

As part of the Relocation Assistance Program, experienced NCDOT staff will be available to assist displacees with information such as availability and prices of homes, apartments, or businesses for sale or rent and financing or other housing programs. The Relocation Moving Payments Program, in general, provides for payment of actual moving expenses encountered in relocation. Where displacement will force an owner or tenant to purchase or rent property of higher cost or to lose a favorable financing arrangement (in case of ownership), the Relocation Replacement Housing Payments or Rent Supplement Program will compensate up to \$22,500 to owners who are eligible and qualify and up to \$5,250 to tenants who are eligible and qualify.

The relocation program for the proposed action will be conducted in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646), and/or the North Carolina Relocation Assistance Act (GS-133-5 through 133-18). The program is designed to provide assistance to displaced persons in relocating to a replacement site in which to live or do business. At least one relocation officer is assigned to each highway project for this purpose.

The relocation officer will determine the needs of displaced families, individuals, businesses, non-profit organizations, and farm operations for relocation assistance advisory services without regard to race, color, religion, sex, or national origin. The NCDOT will schedule its work to allow ample time, prior to displacement, for negotiations and possession of replacement housing which meets decent, safe, and sanitary standards. The displacees are given at least a 90-day written notice after NCDOT offers comparable replacement housing. Relocation of displaced persons will be offered in areas not generally less desirable in regard to public utilities and commercial facilities. Rent and sale prices of replacement property will be within the financial means of the families and individuals displaced and will be reasonably accessible to their places of employment. The relocation officer will also assist owners of displaced businesses, non-profit organizations, and farm operations in searching for and moving to replacement property.

All tenant and owner residential occupants who may be displaced will receive an explanation regarding all available options, such as (1) purchase of replacement housing,

(2) rental of replacement housing, either private or public, or (3) moving existing owner-occupant housing to another site (if possible). The relocation officer will also supply information concerning other state and federal programs offering assistance to displaced persons and will provide other advisory services as needed in order to minimize hardships to displaced persons in adjusting to a new location.

The Moving Expense Payments Program is designed to compensate the displacee for the costs of moving personal property from homes, businesses, non-profit organizations, and farm operations acquired for a highway project. Under the Replacement Program for Owners, NCDOT will participate in reasonable incidental purchase payments for replacement dwellings such as attorney's fees, surveys, appraisals, and other closing costs and, if applicable, make a payment for any increased interest expenses for replacement dwellings. Reimbursement to owner-occupants for replacement housing payments, increased interest payments, and incidental purchase expenses may not exceed \$22,500 (combined total), except under the Last Resort Housing provision.

A displaced tenant may be eligible to receive a payment, not to exceed \$5,250, to rent a replacement dwelling or to make a down payment, including incidental expenses, on the purchase of a replacement dwelling. The down payment is based upon what the state determines is required when the rent supplement exceeds \$5,250.

It is a policy of the state that no person will be displaced by the NCDOT's state or federally-assisted construction projects unless and until comparable replacement housing has been offered or provided for each displacee within a reasonable period of time prior to displacement. No relocation payment received will be considered as income for the purposes of the Internal Revenue Code of 1954 or for the purposes of determining eligibility or the extent of eligibility of any person for assistance under the Social Security Act or any other federal law.

Last Resort Housing is a program used when comparable replacement housing is not available, or when it is unavailable within the displacee's financial means, and the replacement payment exceeds the federal/state legal limitation. The purpose of the program is to allow broad latitudes in methods of implementation by the state so that decent, safe, and sanitary replacement housing can be provided. It is not believed that this program will be necessary on the project, since there appears to be adequate opportunities for relocation within the area.

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

E.I.S. CORRIDOR DESIGN

WBS:	40191.1.1	COUNTY	NEW HANOVER	Alternate	MIW	of	2	Alternate
I.D. NO.:	U-4751	F.A. PROJECT	N/A					
DESCRIPTION OF PROJECT:	MILITARY CUTOFF ROAD. EXTENTION WITH CONTROL							

ESTIMATED DISPLACEES					INCOME LEVEL						
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP		
Residential	15	3	18	6		2	8	4	4		
Businesses	39	24	63	6	VALUE OF DWELLING		DSS DWELLING AVAILABLE				
Farms	0	0	0	0	Owners	Tenants	For Sale		For Rent		
Non-Profit	2	0	2	1	0-20M	\$ 0-150	3	0-20M	\$ 0-150		
					20-40M	150-250		20-40M	3	150-250	1
					40-70M	250-400		40-70M	3	250-400	5
					70-100M	400-600		70-100M	10	400-600	10
					100 UP	600 UP		100 UP	50+	600 UP	25+
					TOTAL		15				

ANSWER ALL QUESTIONS		
Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affected by displacement?
X		3. Will business services still be available after project?
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
X		6. Source for available housing (list).
	X	7. Will additional housing programs be needed?
X		8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
X		11. Is public housing available?
X		12. Is it felt there will be adequate DSS housing available during relocation period?
	X	13. Will there be a problem of housing within financial means?
X		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION? 24-36

REMARKS (Respond by number)							
3. There is an ample supply of businesses not affected by this project.							
4. See attached list							
6/14. MLS Services, local realtors, newspapers, etc.							
8. As mandated by law							
11. New Hanover County							
12. Yes, or built as necessary							

Dwayne Draughon Right of Way Agent	10/12/2010 Date	Relocation Coordinator _____ Date _____
---------------------------------------	--------------------	--

EIS RELOCATION REPORT

**North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM**

E.I.S. CORRIDOR DESIGN

WBS:	40191.1.1	COUNTY	NEW HANOVER	Alternate	M2W	of	2	Alternate
I.D. NO.:	U-4751	F.A. PROJECT	N/A					
DESCRIPTION OF PROJECT:	MILITARY CUTOFF ROAD. EXTENTION WITH CONTROL							

ESTIMATED DISPLACEES					INCOME LEVEL						
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP		
Residential	16	4	20	6		6	11	3	1		
Businesses	39	24	63	6	VALUE OF DWELLING			DSS DWELLING AVAILABLE			
Farms	0	0	0	0	Owners		Tenants		For Sale		
Non-Profit	2	0	2	1	0-20M	\$ 0-150	3	0-20M	\$ 0-150		
					20-40M	150-250	1	20-40M	3	150-250	1
					40-70M	250-400		40-70M	3	250-400	5
					70-100M	400-600		70-100M	10	400-600	10
					100 UP	600 UP		100 UP	50+	600 UP	25+
					TOTAL		16				

ANSWER ALL QUESTIONS		
Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affected by displacement?
X		3. Will business services still be available after project?
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
X		6. Source for available housing (list).
	X	7. Will additional housing programs be needed?
X		8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
X		11. Is public housing available?
X		12. Is it felt there will be adequate DSS housing available during relocation period?
	X	13. Will there be a problem of housing within financial means?
X		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION? 24-36

REMARKS (Respond by number)							
3. There is an ample supply of businesses not affected by this project.							
4. See attached list							
6/14. MLS Services, local realtors, newspapers, etc.							
8. As mandated by law							
11. New Hanover County							
12. Yes, or built as necessary							

Dwayne Draughon Right of Way Agent	10/12/2010 Date	_____ Relocation Coordinator	_____ Date
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**U-4751 Business Relocations
ALTERNATIVES M1 and M2**

	GROUPING	NAME	TYPE	NUMBER OF EMPLOYEES	MINORITY
1		Ogden Volunteer Rescue	Business	15-20	
2		BPA	Business	25-30	
3	Pages Creek Marina	Pages Creek Marina	Business	5-10	
4	Pages Creek Marina	Truck Pump	Business	1-3	
5	Pages Creek Marina	Blue Water Works	Business	1-3	
6	Pages Creek Marina	MK Design	Business	1-3	
7		Dentist Office	Business	5-8	
8		Children Daycare	Bus/School	0	
9		BT Imports (Boating)	Business	5-8	
10	Shopping Center	Painters Alley	Business	2-4	
11	Shopping Center	State Farm Insurance	Business	2-4	
12	Shopping Center	Landscape Business	Business	4-6	
13	Shopping Center	Sun Trust Bank	Business	5-10	
14	Shopping Center	Cardinal Bowling Lanes	Business	5-10	
15		Little Cesar's Pizza	Bus/Rest	5-10	
16		Leon and Dick's Rib Shack	Bus/Rest	5-10	
17		Pet Boarding/Care	Business	4-6	Minority
18		Shepps, LLC	Business	2-5	
19		The Pop Shoppe/CITGO	Business	10-15	
20	Live Oak Center	Allure Hair Studio	Business	2-5	
21	Live Oak Center	Port City Closets Solutions	Business	2-5	
22	Live Oak Center	Mamdi's Ice Cream	Business	2-5	
23	Live Oak Center	Lily's Nails	Business	2-4	Minority
24		Hardees's	Business	15-25	
25		Baker's Curiosity Shop	Business	2-4	
26	Zimmer's Center	Food Lion	Business	15-25	
27	Zimmer's Center	Szechuan Buffet	Business	5-10	Minority
28	Zimmer's Center	LA Nails	Business	3-5	
29	Zimmer's Center	Brooklyn Pizza Co	Business	5-10	
30	Zimmer's Center	Cubbies	Business	5-10	
31	Zimmer's Center	Liberty Tax	Business	3-5	
32	Zimmer's Center	Urgent Care	Business	5-10	
33	Zimmer's Center	All Star Subs	Business	5-8	
34	Zimmer's Center	Vacant Unit	Business	0	
35		EXXON Service Station	Business	5-10	
36		Dollar General	Business	8-10	
37		Walgreen's Drug Store	Business	10-15	
38		CVS Drug Store	Business	10-15	
39		O'Leary's Auto Service	Business	5-8	
40		Marine Warehouse	Business	3-5	
41		South Winds	Business	2-3	Minority
42		South Hair Salon	Business	3-5	
43		Mamia's Attic	Business	2-5	
44		Jackson Hewitt Tax Service	Business	2-4	
45		Benjamin Moore Paint	Business	3-5	
46		Coastal Storage, INC	Business	3-5	
47		Stone Garden Landscaping	Business	4-8	
48		Costal Cash Exchange	Business	3-5	
49		Coastline Mower Shop	Business	3-5	Minority
50		Nixon Associates, LLC	Business	2-4	
51		Golf Driving Range	Business	2-4	
52		Fabric Solution	Business	4-6	
53		Priscilla McCall's	Business	4-6	
54		Four Season's Dry Cleaning	Business	3-5	Minority
55		Enoch Chapel	Church	5-8	
56		Enoch Chapel Graveyard (in back)	Graves		
57		Golf Range	Business	2-4	
58		Stone Garden	Business	5-10	
59		Nixon's Oyster's	Business	4-6	
60		Mini-Storage	Business	3-5	
61		KFC Restaurant	Business	5-10	
62		Kingfish Restaurant	Business	10-15	
63		BB&T Bank	Business	5-10	

EIS RELOCATION REPORT

**North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM**

E.I.S. CORRIDOR DESIGN

WBS:	40191.1.2	COUNTY	New Hanover and Pender	Alternate	EH	of	4	Alternate
I.D. NO.:	R-3300	F.A. PROJECT						
DESCRIPTION OF PROJECT:	Extension of SR 1409 to the Wilmington Bypass and Construction of Hampstead Bypass from Wilmington Bypass to US 17 North of Hampstead							

ESTIMATED DISPLACES					INCOME LEVEL								
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP				
Residential	23	20	43	7	0	9	6	12	16				
Businesses	8	8	16	5	VALUE OF DWELLING				DSS DWELLING AVAILABLE				
Farms	0	0	0	0	Owners		Tenants		For Sale		For Rent		
Non-Profit	3	0	3	2	0-20M	0	\$ 0-150	0	0-20M	0	\$ 0-150	0	
ANSWER ALL QUESTIONS					20-40M	0	150-250	4	20-40M	2	150-250	0	
Yes	No	<i>Explain all "YES" answers.</i>			40-70M	2	250-400	9	40-70M	7	250-400	0	
	X	1. Will special relocation services be necessary?			70-100M	9	400-600	6	70-100M	27	400-600	1	
X		2. Will schools or churches be affected by displacement?			100 UP	12	600 UP	1	100 UP	402	600 UP	23	
X		3. Will business services still be available after project?			TOTAL	23		20		438		24	
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.			REMARKS (Respond by number)								
	X	5. Will relocation cause a housing shortage?			<p>2. St. John the Apostle Catholic Church, Angel Food Ministries, and Topsail Baptist Church are all displacees on this alternate.</p> <p>3. Business Services will remain in the area.</p> <p>4. Atlantic Tool and Die Co. Noelle Holdings, LLC Carolina Storage D & D Glass Carolina Outboard Tri-County Electric Inc.</p> <p>Kid's Korner Daycare Bug Off Termite and Pest Control Ocean Breeze Heating and Air Hidden Pond Mulch Co. Images Salon and Spa Last Request Properties, LLC Coastal Mini Storage along with 630 +/- storage units Cypress Pond Tree Nursery Pender County Offices – 10 Different Departments Small Auto Sales Business (name unknown)</p> <p>6. & 14. Realtor.com, MLS, newspaper, local ads</p> <p>8. As mandated by Law</p> <p>11. New Hanover and Pender County</p>								
	X	6. Source for available housing (list).											
	X	7. Will additional housing programs be needed?											
X		8. Should Last Resort Housing be considered?											
	X	9. Are there large, disabled, elderly, etc. families?											
	X	10. Will public housing be needed for project?											
X		11. Is public housing available?											
X		12. Is it felt there will be adequate DSS housing available during relocation period?											
	X	13. Will there be a problem of housing within financial means?											
X		14. Are suitable business sites available (list source).											
		15. Number months estimated to complete RELOCATION?											24

12. Plenty of houses listed on Realtor.com alone.

****PLEASE NOTE: A Cell Tower will be isolated by this alternate, as well as the Utility Water Tanks for Belvedere Plantation subdivision. The water tanks service the entire subdivision.**

 _____ Right of Way Agent	6/2/11 _____ Date		 _____ Relocation Coordinator	6/2/11 _____ Date
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FRM15-E Revised 09-02

Original & 1 Copy: Relocation Coordinator
2 Copy Division Relocation File

EIS RELOCATION REPORT

**North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM**

E.I.S. CORRIDOR DESIGN

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DESCRIPTION OF PROJECT:	Extension of SR 1409 to the Wilmington Bypass and Construction of Hampstead Bypass from Wilmington Bypass to US 17 North of Hampstead							

ESTIMATED DISPLACES					INCOME LEVEL								
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP				
Residential	29	11	40	5	0	4	7	13	16				
Businesses	8	8	16	5	VALUE OF DWELLING				DSS DWELLING AVAILABLE				
Farms	0	0	0	0	Owners		Tenants		For Sale		For Rent		
Non-Profit	3	0	3	2	0-20M	0	\$ 0-150	0	0-20M	0	\$ 0-150	0	
ANSWER ALL QUESTIONS					20-40M	1	150-250	4	20-40M	2	150-250	0	
Yes	No	<i>Explain all "YES" answers.</i>			40-70M	0	250-400	7	40-70M	7	250-400	0	
	X	1. Will special relocation services be necessary?			70-100M	4	400-600	0	70-100M	27	400-600	1	
X		2. Will schools or churches be affected by displacement?			100 UP	24	600 UP	0	100 UP	402	600 UP	23	
X		3. Will business services still be available after project?			TOTAL	29		11		438		24	
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.			REMARKS (Respond by number)								
	X	5. Will relocation cause a housing shortage?			<p>2. St. John the Apostle Catholic Church, Angel Food Ministries, and Topsail Baptist Church are all displacees on this alternate.</p> <p>3. Business Services will remain in the area.</p> <p>4. Atlantic Tool and Die Co. Noelle Holdings, LLC Carolina Storage D & D Glass Carolina Outboard Tri-County Electric Inc.</p> <p>Kid's Korner Daycare Bug Off Termite and Pest Control Ocean Breeze Heating and Air Hidden Pond Mulch Co. Images Salon and Spa Last Request Properties, LLC Coastal Mini Storage along with 630 +/- storage units Cypress Pond Tree Nursery Pender County Offices – 10 Different Departments Small Auto Sales Business (name unknown)</p> <p>6. & 14. Realtor.com, MLS, newspaper, local ads</p> <p>8. As mandated by Law</p> <p>11. New Hanover and Pender County</p>								
	X	6. Source for available housing (list).											
	X	7. Will additional housing programs be needed?											
X		8. Should Last Resort Housing be considered?											
	X	9. Are there large, disabled, elderly, etc. families?											
	X	10. Will public housing be needed for project?											
X		11. Is public housing available?											
X		12. Is it felt there will be adequate DSS housing available during relocation period?											
	X	13. Will there be a problem of housing within financial means?											
X		14. Are suitable business sites available (list source).											
		15. Number months estimated to complete RELOCATION?											24

12. Plenty of houses listed on Realtor.com alone.

****PLEASE NOTE: A Cell Tower will be isolated by this alternate, as well as the Utility Water Tanks for Belvedere Plantation subdivision. The water tanks service the entire subdivision.**

 _____ Right of Way Agent	6/2/11 _____ Date		 _____ Relocation Coordinator	6/2/11 _____ Date
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Original & 1 Copy: Relocation Coordinator
2 Copy Division Relocation File

EIS RELOCATION REPORT

**North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM**

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WBS:	40191.1.2	COUNTY	New Hanover and Pender	Alternate	R	of	4	Alternate
I.D. NO.:	R-3300	F.A. PROJECT						
DESCRIPTION OF PROJECT:	Extension of SR 1409 to the Wilmington Bypass and Construction of Hampstead Bypass from Wilmington Bypass to US 17 North of Hampstead							

ESTIMATED DISPLACEES					INCOME LEVEL								
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP				
Residential	26	15	41	7	0	7	7	7	20				
Businesses	8	8	16	5	VALUE OF DWELLING				DSS DWELLING AVAILABLE				
Farms	0	0	0	0	Owners		Tenants		For Sale		For Rent		
Non-Profit	3	0	3	2	0-20M	0	\$ 0-150	0	0-20M	0	\$ 0-150	0	
ANSWER ALL QUESTIONS					20-40M	1	150-250	7	20-40M	2	150-250	0	
Yes	No	<i>Explain all "YES" answers.</i>			40-70M	1	250-400	5	40-70M	7	250-400	0	
	X	1. Will special relocation services be necessary?			70-100M	2	400-600	3	70-100M	27	400-600	1	
X		2. Will schools or churches be affected by displacement?			100 UP	22	600 UP	0	100 UP	402	600 UP	23	
X		3. Will business services still be available after project?			TOTAL	26		15		438		24	
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.			REMARKS (Respond by number)								
	X	5. Will relocation cause a housing shortage?			<p>2. St. John the Apostle Catholic Church, Angel Food Ministries, and Topsail Baptist Church are all displacees on this alternate.</p> <p>3. Business Services will remain in the area.</p> <p>4. Atlantic Tool and Die Co. Noelle Holdings, LLC Carolina Storage D & D Glass Carolina Outboard Tri-County Electric Inc.</p> <p>Kid's Korner Daycare Bug Off Termite and Pest Control Ocean Breeze Heating and Air Hidden Pond Mulch Co. Images Salon and Spa Last Request Properties, LLC Coastal Mini Storage along with 630 +/- storage units Cypress Pond Tree Nursery Pender County Offices – 10 Different Departments Small Auto Sales Business (name unknown)</p> <p>6. & 14. Realtor.com, MLS, newspaper, local ads</p> <p>8. As mandated by Law</p> <p>11. New Hanover and Pender County</p>								
	X	6. Source for available housing (list).											
	X	7. Will additional housing programs be needed?											
X		8. Should Last Resort Housing be considered?											
	X	9. Are there large, disabled, elderly, etc. families?											
	X	10. Will public housing be needed for project?											
X		11. Is public housing available?											
X		12. Is it felt there will be adequate DSS housing available during relocation period?											
	X	13. Will there be a problem of housing within financial means?											
X		14. Are suitable business sites available (list source).											
		15. Number months estimated to complete RELOCATION? 24											

12. Plenty of houses listed on Realtor.com alone.

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 _____ Right of Way Agent	6/2/11 _____ Date		 _____ Relocation Coordinator	6/2/11 _____ Date
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**North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM**

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WBS:	40191.1.2	COUNTY	New Hanover and Pender	Alternate	U	of	4	Alternate
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DESCRIPTION OF PROJECT:	Extension of SR 1409 to the Wilmington Bypass and Construction of Hampstead Bypass from Wilmington Bypass to US 17 North of Hampstead							

ESTIMATED DISPLACES					INCOME LEVEL								
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP				
Residential	52	23	75	30	0	20	19	13	23				
Businesses	16	16	32	16	VALUE OF DWELLING				DSS DWELLING AVAILABLE				
Farms	0	0	0	0	Owners		Tenants		For Sale		For Rent		
Non-Profit	9	0	9	5	0-20M	0	\$ 0-150	0	0-20M	0	\$ 0-150	0	
ANSWER ALL QUESTIONS					20-40M	0	150-250	5	20-40M	2	150-250	0	
Yes	No	<i>Explain all "YES" answers.</i>			40-70M	12	250-400	17	40-70M	7	250-400	0	
	X	1. Will special relocation services be necessary?			70-100M	13	400-600	1	70-100M	27	400-600	1	
X		2. Will schools or churches be affected by displacement?			100 UP	27	600 UP	0	100 UP	402	600 UP	23	
X		3. Will business services still be available after project?			TOTAL	52		23		438		24	
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.			REMARKS (Respond by number)								
	X	5. Will relocation cause a housing shortage?			2. SEE ATTACHED SHEET FOR DISPLACED NON-PROFITS 3. Business Services will remain in the area. 4. SEE ATTACHED SHEET FOR LIST OF DISPLACED BUSINESSES 6. & 14. Realtor.com, MLS, newspaper, local ads 8. As mandated by Law 11. New Hanover and Pender County 12. Plenty of houses listed on Realtor.com alone.								
	X	6. Source for available housing (list).											
	X	7. Will additional housing programs be needed?											
X		8. Should Last Resort Housing be considered?											
	X	9. Are there large, disabled, elderly, etc. families?											
	X	10. Will public housing be needed for project?											
X		11. Is public housing available?											
X		12. Is it felt there will be adequate DSS housing housing available during relocation period?											
	X	13. Will there be a problem of housing within financial means?											
X		14. Are suitable business sites available (list source).											
		15. Number months estimated to complete RELOCATION?											30

****PLEASE NOTE: A Cell Tower will be isolated by this alternate, as well as the Utility Water Tanks for Belvedere Plantation subdivision. The water tanks service the entire subdivision.**



6/2/11

Date

Right of Way Agent



6/2/11

Relocation Coordinator

Date

Displaced Non-Profits (9 Total)

- 1) St. Stephen AMG Zion Church
- 2) Wesley Chapel United Methodist Church including 395+/- graves
- 3) Creative Minds Pre-School
- 4) Scotts Hill Baptist Church and Administrative Office
- 5) 1st Baptist Church
- 6) "Old" Scotts Hill AMG Zion Church
- 7) St. John the Apostle Catholic Church
- 8) Angel Food Ministries
- 9) Topsail Baptist Church

Please note that in addition to the graves shown above, the McClammy and King Family Cemetary containing 17+/- graves, as well as the Pollock's Cemetary containing 235+/- graves will have to be relocated due to this alternate, for a total of 647+/- graves.

Displaced Businesses (32 Total)

- 1) A. Gil Pettit, DDS
- 2) Stone Development and Restoration
- 3) Martin Self Storage – Storage Units
- 4) Eden's Produce Stand (Seasonal)
- 5) Fred's Beds
- 6) City Electric Supply
- 7) Humphrey Heating and Air
- 8) Carolina Financial Solutions
- 9) Scotts Hill Pet Resort
- 10) Dr. Christina Baram Gray, Chiropractor
- 11) www.ScottsHill.org Computer Office
- 12) Black Dog Fence Co.
- 13) Port City Doors and Windows
- 14) Atlantic Surgi-Center
- 15) Sullivan Design Co.
- 16) Chas F. Riggs and Assoc. Inc.
- 17) Scotts Hill Grille
- 18) Poplar Grove Historic Plantation
- 19) Tasteful Creations
- 20) Elite Pure Spa and Boutique
- 21) HELP (Healing, Encouraging, Loving, People)
- 22) The Good Samaritan House Thrift Store
- 23) Cottage Crafts (inside historic Browntown School / Scotts Hill Rosenwald School)
- 24) New Business under construction
- 25) Small Businees (name unknown)
- 26) Kid's Korner Daycare
- 27) Images Salon and Spa
- 28) Last Resort Properties, LLC
- 29) Coastal Mini Storage (630+/- units)
- 30) Cypress Pond Nursery

- 31) Pender County Offices – 10 Different Departments
- 32) Small Auto and Boat Sales business

****PLEASE NOTE: A Cell Tower will be isolated by this alternate, as well as the Utility Water Tanks for Belvedere Plantation subdivision. The water tanks service the entire subdivision.**

APPENDIX D

LIST OF REFERENCES

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