SECTION 3

AFFECTED ENVIRONMENT

This section describes the economic, social, and natural environments within the project study area. The descriptions are general in nature and address the entire project area rather than providing a separate description of the area as it relates to each bypass alternate. Data were collected from existing sources, such as local planning documents, databases, and other publications; through agency scoping comments and coordination; and from field surveys of the project area. This information will be used to evaluate the possible environmental impacts of each of the detailed study alternatives. The environmental consequences of the detailed study alternatives are discussed in Section 4.

3.1 HUMAN CHARACTERISTICS

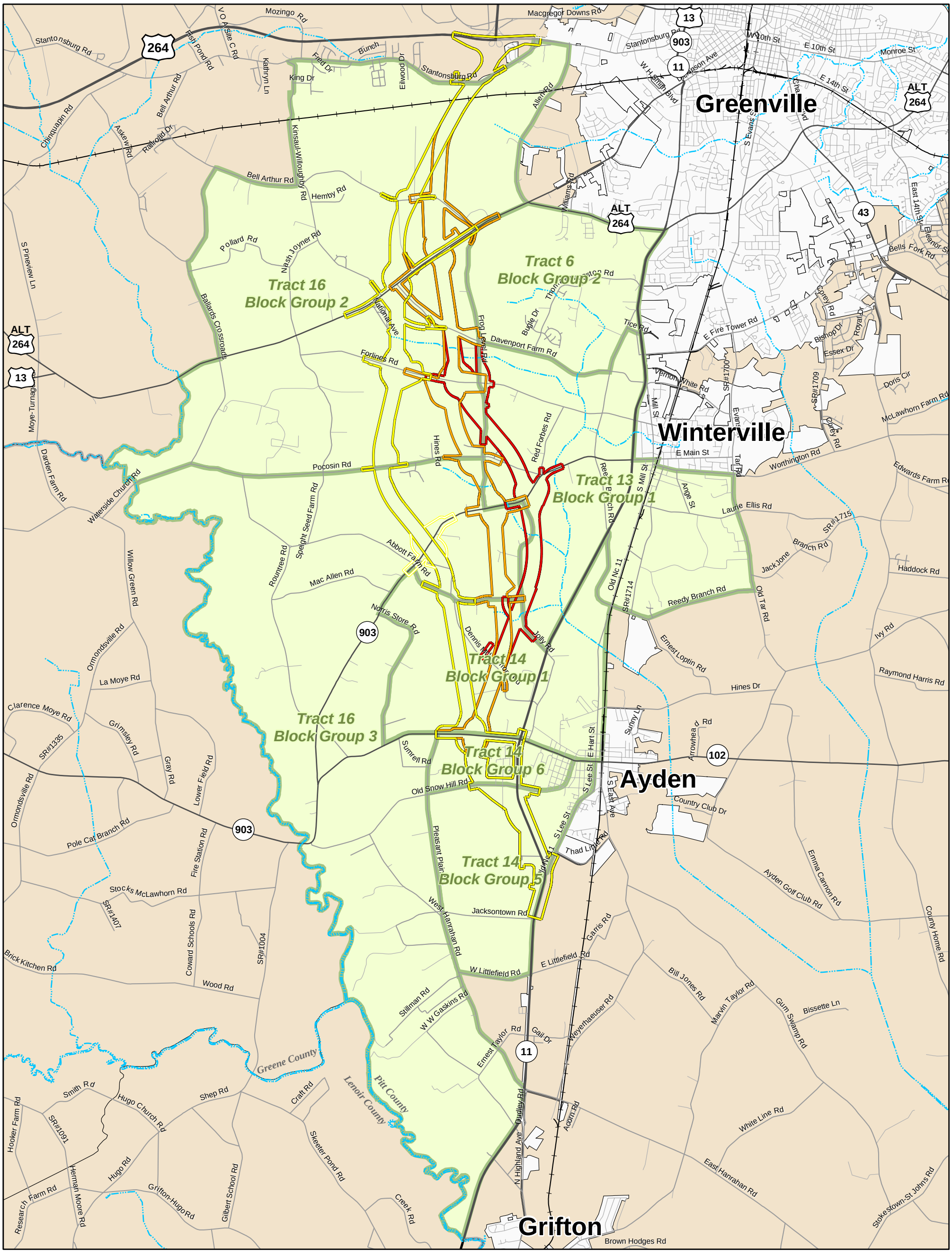
For purposes of discussing socioeconomic conditions, the study area is comprised of Census Tracts 6, 13, 14, and 16 based on the 2000 Census (see Figure 3-1). For comparison, socioeconomic data is also presented for the city of Greenville and the towns of Winterville and Ayden.

3.1.1 Population Characteristics

3.1.1.1 Population and Demographics

Population growth in the study area, as well as in Greenville, Winterville, and Pitt County, has outpaced that of North Carolina (see Table 3-1). Growth in the study area during the 1990 to 2000 time period was more than double that of Pitt County and North Carolina. According to the *Pitt County Comprehensive Land Use Plan*, population growth in Pitt County has grown substantially but not equitably countywide. The unincorporated areas of the county have continued to grow and have kept pace with municipal growth, while population growth in the towns has not been as consistent, with the town of Ayden losing population from 1990 to 2000.

Much of the economic and resultant residential growth in the Greenville/Pitt County area can be traced to the growth of the health care industry, specifically Pitt County Memorial Hospital, the Brody School of Medicine, and the presence of East Carolina University. North Carolina State Data Center statistics show that Pitt County is expected to reach a population in excess of 191,000 by the year 2030, an increase of approximately 57,500 persons or 43 percent between 2000 and 2030. The most significant areas of residential growth within the study area are found on large tracts of converted agricultural lands and other previously vacant parcels. This area is continuing to see rapid population growth fueled by other factors including; available water and sewer infrastructure; and the desire of homeowners to “move away” from the city core and “move up” to newer and larger homes. The portions of the area that are serviced by Greenville Utilities



North Carolina
Department of Transportation

Greenville Southwest Bypass Study
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Figure 3-1 **Census Tracts**

Commission are being developed at higher densities while the further western portions of the study area (serviced by well and septic service) are being developed at much lower densities

TABLE 3-1: POPULATION GROWTH, 1990-2000

Area	Population		Growth	
	1990	2000	#	%
Study Area	24,086	35,905	11,819	49.1%
Greenville	46,305	61,209	14,904	32.1%
Winterville	3,069	4,794	1,725	56.2%
Ayden	4,883	4,622	-261	-5.6%
Pitt County	107,924	133,813	25,889	24.0%
North Carolina	6,632,448	8,046,485	1,414,037	21.36%

Source: US Census Bureau American Fact finder.

3.1.1.2 Ethnicity and Race

The racial composition of the project area and surrounding communities was examined in order to provide insight into the presence or absence of traditionally-underserved populations (see Table 3-2). According to the 2000 Census, the racial make-up of the study area, the city of Greenville, the town of Winterville, and Pitt County are all very similar with a majority white population. The study area, the city of Greenville, Pitt County, and the towns of Winterville and Ayden all have larger percentages of minority populations than the state of North Carolina yet have a smaller percentage of Hispanic residents. Within the study area, Census Tract 6, located west of NC 11 and north of Davenport Farm Road in proximity to downtown Greenville, has the highest percentage of minority residents. The town of Ayden has the largest overall minority population with 49.5 percent black and 2.9 percent other.

TABLE 3-2: ETHNICITY AND RACE, 2000

	White	Non-White	Hispanic
Census Tract 6	58.3%	41.7%	1.8%
Census Tract 13	69.8%	30.2%	28.8%
Census Tract 14	56.2%	43.8%	3.1%
Census Tract 16	71.2%	28.8%	3.1%
Greenville	61.4%	38.6%	2.1%
Winterville	59.2%	40.8%	1.0%
Ayden	47.6%	52.4%	2.2%
Pitt County	62.1%	37.9%	3.2%
NC	72.1%	27.9%	4.7%

Source: US Census Bureau American Fact finder.

3.1.1.3 Age of Population

Age distribution provides insight into the available work force, which is an indicator of population trends, employee availability and provides information relative to service provision needs. In addition, the absence of individuals of working age can reflect the availability of jobs. Table 3-3 shows the relative ages of populations in the study area and surrounding communities. In terms of age distribution, the town of Ayden had the highest median age (38.8) while the City

of Greenville had the lowest at 26 years of age. The younger median age in Greenville is indicative of the presence of East Carolina University and Pitt Community College. The burgeoning 20 to 54 age group is demonstrative of the presence of job opportunities within the area. In addition, according to city and county planners a great deal of ECU students choose to remain within the Greenville area after graduation, thus adding to presence of this age group. The town of Ayden has a much larger percentage of senior citizens (aged 55 and over) than the demographic study area, the municipalities, Pitt County, and the state of North Carolina. The smaller percentage of younger people in the 20 to 54 age group is reflective of the fact that people are leaving the area after high school to find work or pursue higher education elsewhere.

TABLE 3-3: AGE DISTRIBUTION, 2000

Area	Under 5	5-19	20-54	55+	Median Age
Study Area	9.2%	21.7%	55.2%	15.9%	32.9
Greenville	5.6%	21.8%	58.2%	14.4%	26.0
Winterville	8.3%	22.1%	52.0%	17.6%	33.4
Ayden	6.1%	21.9%	44.1%	27.9%	38.8
Pitt County	6.5%	22.4%	54.4%	16.7%	30.4
North Carolina	6.7%	20.5%	16.7%	21.1%	35.3

Source: US Census Bureau American Fact finder.

3.1.2 Economic Characteristics

3.1.2.1 Unemployment Rates

An important determinant of the overall economic well-being of an area is the unemployment rate. Between 1990 and 2000, the unemployment rate in Pitt County rose from 5.4 percent to 6.8 percent (see Table 3-4). All study areas had a higher unemployment rate in 2000 than the state. The highest 2000 unemployment rate was Ayden at 8.1 percent. The increase in unemployment rates between 1990 and 2000 can be attributed to an economic slow-down as well as job elimination in key industries, such as manufacturing.

TABLE 3-4: UNEMPLOYMENT RATE, 1990-2000

Area	Unemployment Rate		Change 1990 to 2000
	1990	2000	
Study Area	3.9%	6.8%	2.9%
Greenville	6.7%	8.7%	2.0%
Winterville	3.7%	5.8%	2.1%
Ayden	6.1%	8.1%	2.0%
Pitt County	5.4%	6.8%	1.4%
North Carolina	4.6%	5.3%	0.7%

US Census Bureau American Fact finder.

3.1.2.2 Income

The only area under study to have a higher median household income than the state of North Carolina was the city of Greenville at $44,491, over $5,000 higher than the state figure of just over $39,100 per year (see Table 3-5). This higher dollar value is indicative of the strong

employment base related to East Carolina University and the medical community. However, it is important to note that while professors and senior staff at ECU; doctors, administrators, and technical staff at Pitt County Memorial Hospital; and other skilled workers in the county enjoy a high income there are many that exist on minimum or slightly-above minimum wage.

TABLE 3-5: MEDIAN HOUSEHOLD INCOME, 1989 AND 1999

Area	Median Household Income		Change	
	1989	1999	$ Increase 1989 to 1999	% Increase 1989 to 1999
Study Area	$27,797	$35,451	$7,654	27.5%
Greenville	$22,661	$44,491	$21,830	96.3%
Winterville	$19,222	$37,230	$18,008	93.7%
Ayden	$18,485	$24,004	$5,519	29.9%
Pitt County	$23,324	$32,868	$9,544	40.9%
North Carolina	$26,647	$39,184	$12,537	47.0%

Source: US Census Bureau American Fact finder.

While the overall study area had a lower median household income than the state, Winterville, and Greenville; Census Tracts 13 and 16 had median household incomes higher than Pitt County, Winterville, and the state. The area with the lowest median household income in 1999 was the town of Ayden at just over $24,000.

3.1.2.3 Poverty Status

Between 1990 and 2000, all of the areas under study, with the exception of the town of Ayden, experienced a decrease in the percentage of individuals living below the poverty line. Ayden experienced a 1.6 percent increase in individuals living within poverty. Census Tract 14, located in the southeastern portion of the study area, east and south of the southern terminus of the project including the town limits of Ayden, had the highest percentage of residents below the poverty level at 26.3 percent, more than double the state figure of 12.3 percent. Table 3-6 summarizes poverty status in the project study area and surrounding communities.

Thus, the pattern in Pitt County is one of a strong economy with many middle and upper-middle income individuals but also with a substantial number below or just above the poverty line. Many of these individuals or families are “the working poor,” people whose relatively large family size and low income put them below the federal poverty level. There also seems to be some relation between age of the population and poverty status in Pitt County and the study area. Ayden, with the highest percentage of persons below the poverty level, has the largest relative population of individuals over the age of 55. Similarly, the project study area and the town of Winterville have a large percentage of working age residents (ages 20 to 54) and relatively low poverty levels compared with surrounding communities. The high rate of poverty in Greenville can be partly attributed to the large population of non-working college age residents.

TABLE 3-6: INDIVIDUALS BELOW POVERTY LEVEL, 1990-2000			
Area	Below Poverty Level		Change
	1990	2000	% Change 1990 to 2000
Study Area	17.4%	16.2%	-1.2%
Greenville	26.6%	26.1%	-0.5%
Winterville	17.1%	11.6%	-5.5%
Ayden	24.7%	26.3%	+1.6%
Pitt County	22.1%	20.3%	-1.8%
North Carolina	12.5%	12.3%	-0.2%

Source: US Census Bureau American Fact finder.

3.1.2.4 Housing

Similar to population growth, household growth in the study area rapidly grew by 62 percent between 1990 and 2000, easily surpassing the household growth rates of the city of Greenville, town of Ayden, Pitt County, and the state of North Carolina. The town of Winterville experienced an 82.5 percent increase in its total number of households, adding 868 between 1990 and 2000. As number of study area households grew at a slightly faster pace than population between 1990 and 2000, the average household size decreased from 2.62 persons to 2.41 persons. The same is true for all other comparison areas, where average household sizes also decreased during the same time period. This statistic is indicative of the overall national trend towards smaller household sizes. Table 3-7 shows change in households in the project area.

TABLE 3-7: HOUSEHOLDS, 1990-2000				
Area	Number of Households		Household Size	
	1990	2000	1990	2000
Greenville	16,878	25,187	2.38	2.18
Winterville	1,052	1,920	2.63	2.57
Ayden	1,802	1,871	2.63	2.36
Pitt County	40,432	52,603	2.54	2.43
North Carolina	2,517,098	3,133,282	2.54	2.49

Source: NC State Data Center

As shown in Table 3-8, nearly 40 percent of housing units in the study area have been constructed since 1990. Since 1980, growth in the study area has outpaced that of other towns in the area, Pitt County, and the state. Growth has increased over time in Greenville, Winterville, and Pitt County, while growth in Ayden has slowed since the 1970s.

TABLE 3-8: HOUSING UNITS, 1990-2000									
Area	Total Units	1990-2000		1980-1989		1970-1979		1969 or Earlier	
		Units Built	% of Total	Units Built	% of Total	Units Built	% of Total	Units Built	% of Total
Study Area	15,397	6,034	39.2	3,722	24.2	2,744	17.8	2,897	18.8
Greenville	28,276	9,365	33.1	6,600	23.3	4,594	16.2	7,717	27.3
Winterville	1,965	640	32.6	333	16.9	479	24.4	513	26.1
Ayden	2,069	194	9.4	266	12.9	505	24.4	1,104	53.4
Pitt County	58,408	19,555	33.5	12,432	21.3	10,350	17.7	16,071	27.5
North Carolina	3,523,944	949,985	26.9	692,633	19.7	641,117	18.2	1,240,209	35.2

Source: US Census Bureau American Fact finder.

3.1.3 Community Facilities

Community facilities and services that serve the greater Greenville area as well as the immediate study area include schools, institutions of higher learning, libraries, recreational facilities, parks and greenways, churches, and emergency services.

3.1.3.1 Schools

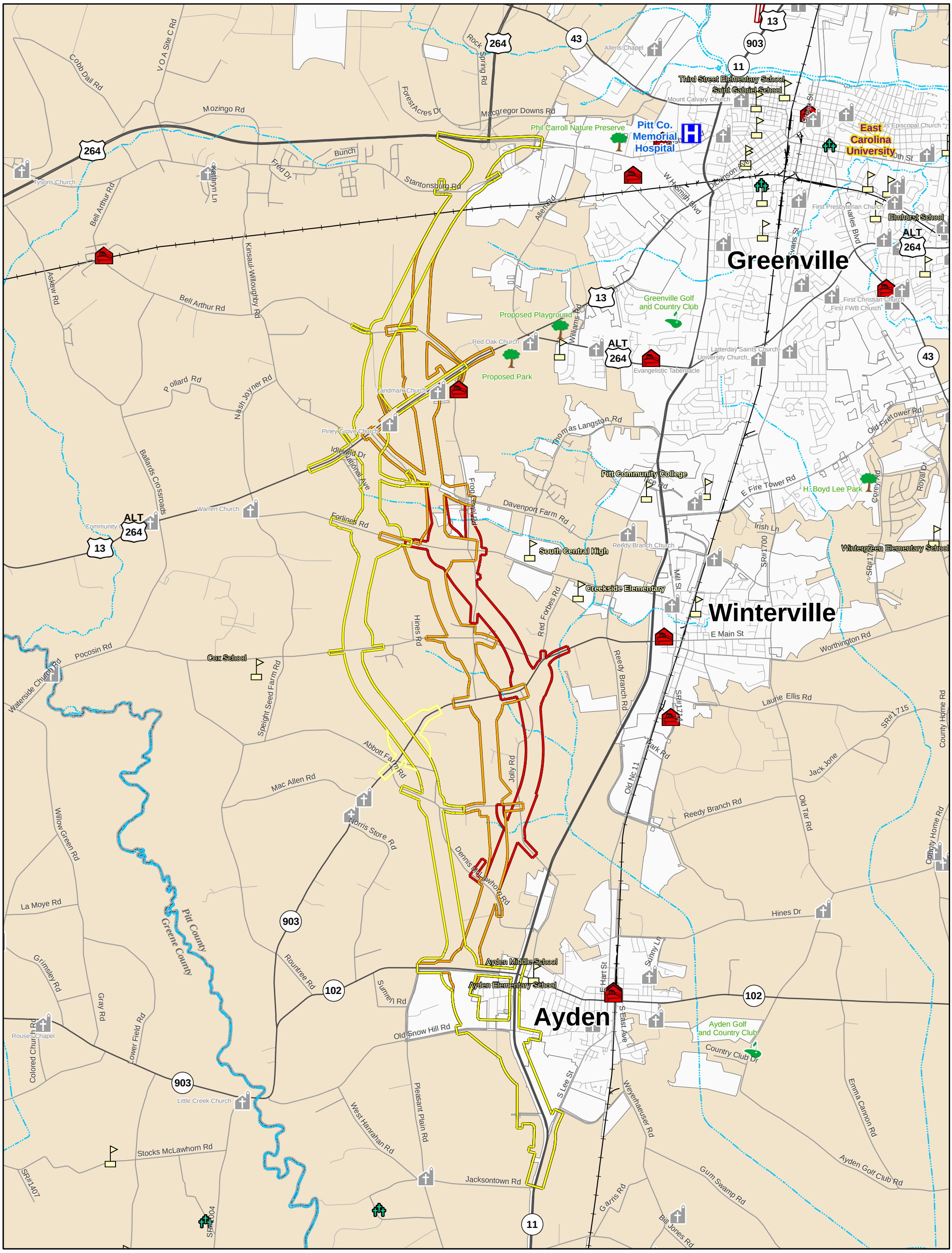
Several Pitt County School System facilities are located within the proposed project area. The Pitt County School System includes schools within the limits of Greenville, Winterville, and Ayden. Schools in the vicinity of the project are shown on Figure 3-2 and listed in Table 3-9.

TABLE 3-9: SCHOOLS IN VICINITY OF PROJECT AREA	
School	Location
South Central High School	Forlines Road (SR 1129) west of Reedy Branch Road (SR 1131)
Creekside Elementary	Forlines Road (SR 1129) west of Reedy Branch Road (SR 1131)
Ayden-Grifton High School	NC 11 approximately 3 miles south of the town of Ayden
Ayden Middle School	Third Street east of NC 11 in Ayden
Ayden Elementary School	Third Street east of NC 11 in Ayden
A.G. Cox Middle School	Church Street in Winterville
W.H. Robinson Elementary	Railroad Street in Winterville

Students living within the project area may also attend Sam D. Bundy Elementary School, Farmville Middle School, and Farmville Central High School. These schools are located in the town of Farmville, approximately 10 miles west of the study area.

3.1.3.2 Institutions of Higher Learning

Pitt Community College, located at the intersection of Pitt Tech Road and NC 11 in Winterville within the study area, serves an on-campus enrollment of 5,848 students and 4,234 continuing education students. East Carolina University, located in Greenville east of the demographic study area, has an enrollment of over 22,500 students, 1,406 full-time faculty, and over 2,900 staff



Legend

- Preferred Alternative
- Build Alternate 4-EXT
- Build Alternate 1B-EXT
- Build Alternate 5-EXT
- School
- Church
- Cemetery
- Hospital
- Firehouse
- Golf Course
- Park Within Study Area

N W E S

0 0.5 1 2 Miles

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Greenville Southwest Bypass Study
(Improvements to NC 11 & US 264 Bus)

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Figure 3-2 Community Facilities

members and serves as a major stimulus to the economy of Pitt County as well as eastern North Carolina.

3.1.3.3 Libraries

Several different library services are available near the study area (as shown on Figure 3-2). Sheppard Memorial Library is located in Greenville on Evans Street, and has branches in Greenville, Bethel, and Winterville. The Quinerly-Olschner Library in Ayden is located on Second Street. None of these libraries are within the study area. Additional library service is available through the Pitt County bookmobile, which travels throughout the study area.

East Carolina University operates several library facilities within or near the study area including the Joyner Library on East Fifth Street in Greenville, and the William E. Laupus Health Sciences Library near Pitt County Memorial Hospital.

3.1.3.4 Parks and Recreational Facilities

In the town of Winterville, the Winterville Recreation Park offers softball/baseball fields, picnic shelters, and a playground. Hillcrest Park provides basketball courts, baseball field, picnic shelters, and playground. Ayden has a Community Center that provides basketball courts and facilities for aerobic classes.

Pitt County is a member of the three-county Coastal Carolina Trail Committee, which has developed a master plan and feasibility study for the development of a 30-mile recreational trail along an abandoned rail corridor. The Coastal Carolina Trail project follows the former rights-of-way of the historic Wilmington & Weldon Railroad from Beaufort County, through northeastern Pitt County and into Martin County. The trail will link to the NC Mountains to the Sea Trail.

The *Pitt County Greenway Plan* (2006) is intended to serve as a guide for the establishment of a countywide network of greenways and trails. This plan is the first greenway plan for Pitt County; it recommends the formation of approximately 96 linear miles of greenway network primarily along some of the major, critical streams and rivers in the county. The plan proposes several greenways within the study area, including trails in the city of Greenville, town of Winterville, and town of Ayden.

Pitt County does not currently operate any parks and recreation facilities. Three established and/or proposed parks and/or recreation facilities owned and operated by the city of Greenville lie within the study area, and are shown on Figure 3-2. The Phil Carroll Nature Preserve is located north of Highway 43 West/Fifth Street and contains 163 acres of undeveloped park land. This facility is not currently open to the public. H. Boyd Lee Park is located on Coney Road (off Firetower Road) and offers many recreational opportunities. It includes a recreation center, gymnasium, playground, walking trail softball fields and a picnic area. The Red Oak property on Oakdale Road is currently under development. When completed, this park will offer a playground and picnic facilities.

3.1.3.5 Churches

There are twelve churches located within the project study area (Table 3-10). These churches are shown on Figure 3-2.

TABLE 3-10: CHURCHES IN PROJECT AREA

Church	Location
Landmark Church	US 13 near the intersection with Hollowell Road (SR 1512)
Piney Grove Church	US 13 east of Davenport Farm Road (SR 1128)
Bethany Free Will Baptist Church	NC 903 in the Renston Rural Historic District
Zion Hill Free Will Baptist Church	NC 903 in the Renston Rural Historic District
Pleasant Plains Church	Pleasant Plains Road
Wamen Church	Speight Seed Farm Road
Community Christian Church	Memorial Drive (NC 11)
Red Oak Christian Church	Allen Road (SR 1203)
Unity Free Will Baptist Church	Allen Road (SR 1203)
Evangelistic Tabernacle	Allen Road (SR 2103)
Reedy Branch Free Will Baptist Church	Reedy Branch Road (SR 1131) near Davenport Farm Road (SR 1128)
Christ's Church	Davenport Farm Road (SR 1128)

3.1.3.6 Emergency Services

Pitt County Memorial Hospital, located at 2100 Stantonsburg Road, east of the northern terminus of the project, is the flagship hospital for University Health Systems of Eastern Carolina and serves nearly 1.2 million people in 29 counties. The hospital hosts one of only four Level 1 Trauma Centers in the state of North Carolina. The presence of the medical community in Greenville, including the Brody School of Medicine at ECU, is such that a medical district has been developed that covers the area from Wellness Drive east to Memorial Drive (NC 11) north to West 5th Street.

Pitt County has a central 911 Communications Center which serves as the public safety answering point for all agencies in Pitt County. All portions of the county are served by Pitt County paramedic services. Individuals living within the municipal boundaries of the city of Greenville, town of Winterville, and town of Ayden are protected by city/town police services; while residents living within the unincorporated portions of Pitt County are served by the Pitt County Sheriff's Department.

Residents living in the city of Greenville, the town of Winterville, and the town of Ayden are protected by municipal fire service. The Greenville Fire and Rescue Department is home to the Urban Search and Rescue Task Force #10. This team is funded by the state, and has a large amount of equipment and expertise in the specialized areas of building collapse and other technical rescue incidents. The Greenville Fire and Rescue Department currently has six fire

stations. Station #2 and Station #5 provide service to the portions of Greenville nearest the study area.

Citizens living in the unincorporated areas of Pitt County area served by four volunteer Fire Service Districts: Bell Arthur, Red Oak, Winterville, and Ayden. The Red Oak Community Rural Fire Department is located within the project study area on Frog Level Road (SR 1127) east of US 13.

3.1.4 Community Cohesion

Residential growth within the study area has been brisk in recent years with over 500 new lots/units approved and under construction in five subdivisions. The following subdivisions are within the project study area and are depicted on Figure 3-3:

- Springdale Apartments
- The Pines
- Summit Village
- Abbott Farms South
- Abbott Farms
- The Woods at Magnolia Ridge
- Brevard
- Magnolia Ridge
- Sandy Meadows
- Emerald Chase
- Randall Estates
- Tallwood
- Westwind
- Sutters Place
- Gatewood
- Manchester
- Shady Acres
- Mayfield
- Hampton Creek
- Pinecrest
- Field Stream at Sawgrass Pointe
- Brighton Place
- Bristolmoor
- Taberna
- Augusta Trails
- Meadow Woods
- Forest Pines
- Teakwood

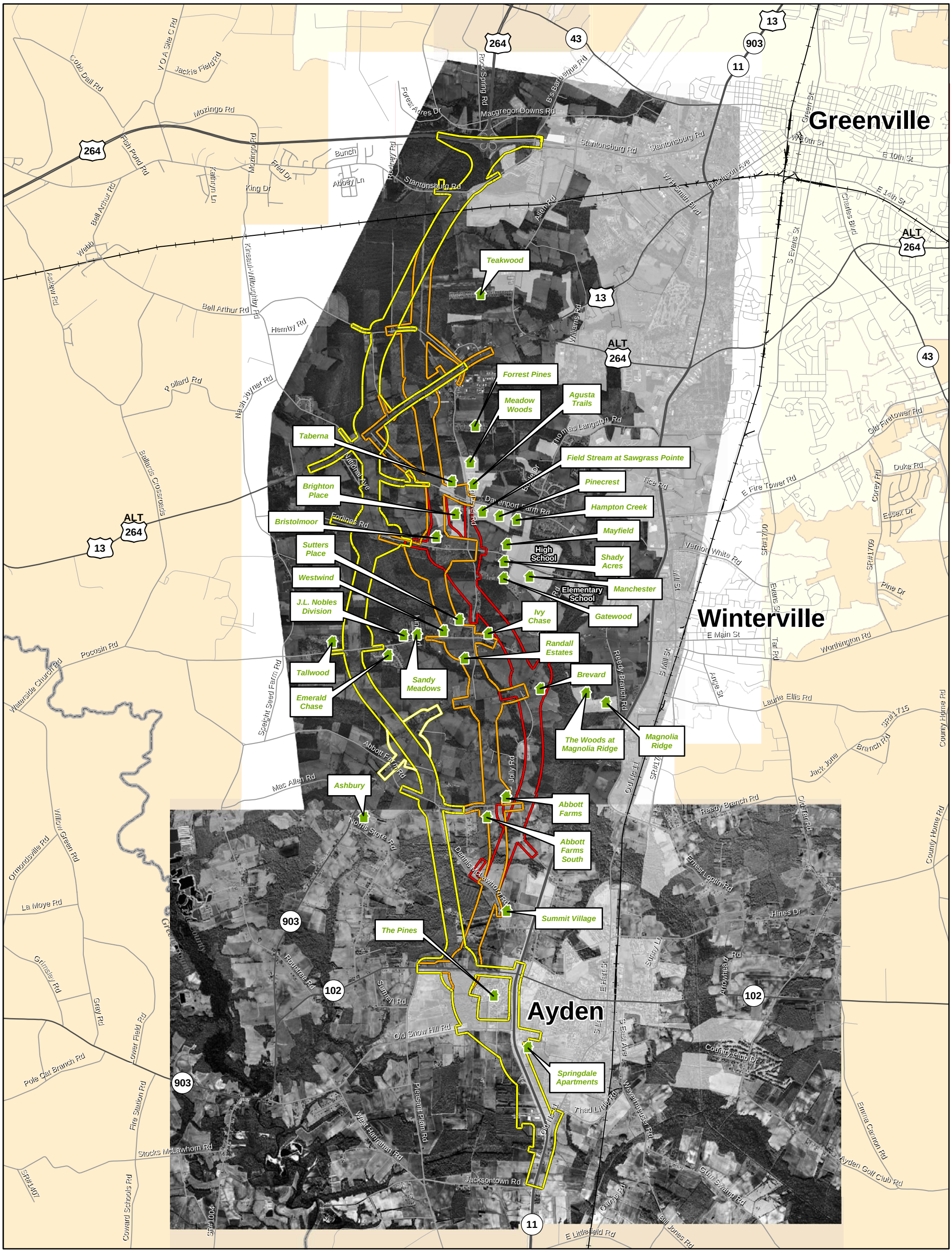
In addition, the following new subdivisions have recently been approved within the project study area:

- Ivy Chase
- Ashbury

3.2 LAND USE AND TRANSPORTATION PLANNING

3.2.1 Existing Land Use Characteristics

The study area is located in the southwestern section of Pitt County. The study area traverses portions of three incorporated municipalities – Greenville, Winterville, and Ayden – as well as



Legend

- Preferred Alternative
- Build Alternate 4-EXT
- Build Alternate 1B-EXT
- Build Alternate 5-EXT
- Neighborhood

N W E S

0 0.5 1 2 Miles

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Greenville Southwest Bypass Study
(Improvements to NC 11 & US 264 Bus)

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Figure 3-3 **Neighborhoods in Study Area**

unincorporated portions of Pitt County. The map of the project study area shown in Figure 1-1 includes the municipal boundary lines.

The land use characteristics described in the sections below are based upon the following:

- Field surveys of the study area;
- Adopted policy documents from Pitt County and the municipalities of Greenville, Ayden, and Winterville; and
- US Census Data.

Land use within the study area varies greatly in type and intensity from typical suburban development (including single and multi-family residential, retail, and commercial uses) in the northern and eastern portions of the study area to rural agricultural and large-lot residential in the western and southern portions.

The northern portion of the study area, near Stantonsburg Road (US 264 Business), contains a mixture of institutional, retail, and residential development. Examples of this development include: Pitt County Memorial Hospital, doctors' offices, multi-family residential, restaurants, and small commercial establishments. There is extensive development along Memorial Drive (NC 11) from US 264 to the town of Ayden. This development includes strip-center development, highway-retail establishments, big-box retail, car dealerships, motels, restaurants, residential, office, institutional (Pitt County Community College), and commercial uses.

The southern portion of the area, near the town of Ayden, contains retail and light industrial development. Examples of these businesses include: a shopping center (tenants include a Food Lion, restaurant, and video rental store), fast food restaurants, gas stations, and car dealerships. The western portion of the study area is predominantly rural with scattered large-lot subdivisions, single-family homes, mobile homes, and active farming operations.

3.2.2 Land Use Plans

3.2.2.1 City of Greenville – Greenville Horizons Comprehensive Plan (2004)

Recognizing the need for a long range plan to guide development decisions, Greenville's first comprehensive plan was written in 1980 and adopted by the City Council in 1981. The plan established goals and policies regarding physical growth issues including water and sewer improvements, transportation, annexation, and future land use for developing areas. The plan was updated in 1992 with the 1992 Horizons Plan, which was amended in 1997 and updated in 2004. The Horizons Plan is a vision statement by the City Council and the citizens of Greenville as to how the community should look and function in the future. It created a set of goals, objectives, policies, and actions to guide local planning, development, and redevelopment issues.

To help achieve the long-term vision, the city and its planning jurisdictions have been divided into nine planning regions, called Vision Areas. Each Vision Area is a collection of districts, nodes, paths and landmarks separated by natural and man-made edges such as rivers, railroad

tracks, and major thoroughfares. The project study area for the Greenville Southwest Bypass project is included in the West and Southwest Vision Areas.

The majority of the growth occurring within the study area is occurring just west of the city limits of Greenville in an area deemed "Vision Area E" in the 2004 *Greenville Horizons Comprehensive Plan*. This area is located south of Greenville Boulevard and Dickinson Avenue Extension, north of Forlines Road, west of Memorial Drive (NC 11), and east of the western extent of Greenville's jurisdictional boundary in the vicinity of Frog Level Road. According to the city of Greenville Planning Department, this area has experienced a high level of rezoning, development, and annexation activity in the past several years due to the availability of municipal, county, and Greenville Utilities Commission (GUC) services and facilities, including water and sewer infrastructure. The new South Central High School is a major feature in the area, and that in addition to the availability of sanitary sewer service, has been a contributing factor in public and private development decisions. Although substantial growth has taken place to date within Vision Area E, considerable acreage remains undeveloped farmland or woodlands. According to the 2004 *Report of Development Activities in the Southwest Quadrant of Greenville* vacant lands susceptible to residential development comprise approximately 900 acres that at full development will yield upwards of 4,000 additional dwelling units. In addition, the area immediately west of Memorial Drive has emerged as a growth area with expansions to existing subdivisions, as well as new single and multi-family development and the construction of new office and retail establishments occurring over the past few years. Total build-out of all vacant lands is not expected to occur until at least 2025.

3.2.2.2 Town of Winterville

The town of Winterville updated its *Land Use Plan* in January 2005; however, the plan only includes a Land Use Map detailing existing land use. Property along NC 11 is classified as "Agricultural/Residential" allowing for a compatible mixture of low-density residential and agricultural uses, cultivated farmlands, and vacant/wooded areas. The minimum lot size for this district is 20,000 square feet or greater.

3.2.2.3 Town of Ayden – Building on our Heritage: A Comprehensive Plan (1996)

The town of Ayden adopted *Building on our Heritage: A Comprehensive Plan* in 1996; however, this plan is not currently in use, and development within the town is guided through the application of the subdivision and zoning codes. In 2004, the town of Ayden created a future land use map detailing proposed uses within the town and its extraterritorial jurisdiction (ETJ) limits. Property along NC 11 near its intersection with NC 102 slated for industrial uses, while the proposed Pines Neighborhood will be medium-density residential. The areas between the Pines Neighborhood and the ETJ line are slated for low-density residential.

3.2.2.4 Pitt County – Pitt County Comprehensive Land Use Plan (2002)

The *Pitt County Comprehensive Land Use Plan* was adopted in 2002 to help address the challenges of meeting future population growth demand within the county. Land use development goals include: (1) promoting a mixture of residential and non-residential land uses while protecting prime agricultural areas from the adverse effects of intensive development and (2) protecting future development from natural hazards by identifying and limiting development within flood prone areas. Figure 3-4 shows future land use in areas of Pitt County outside of municipal ETJ areas.

3.2.3 Transportation Planning

3.2.3.1 Greenville Urban Area Thoroughfare Plan

The *Greenville Urban Area Thoroughfare Plan* (also referred to as the 2030 Long Range Transportation Plan) was adopted by the Greenville Urban Area MPO in December 2004 and by the NC Board of Transportation in February 2005. The plan covers the city of Greenville, town of Winterville, town of Ayden, village of Simpson, and portions of Pitt County. Thoroughfare plans, designed to guide the development of the overall street and highway system, were initially developed via a mutually adopted sketch plan in Greenville in 1959 with periodic updates since then. Winterville, Ayden, and Pitt County (including Simpson) have also adopted thoroughfare plans over the years. The 2004 *Greenville Urban Area Thoroughfare Plan* combines these thoroughfare plans into one metropolitan area plan and updates the thoroughfare planning horizon to the year 2025. The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with managing traffic demands.

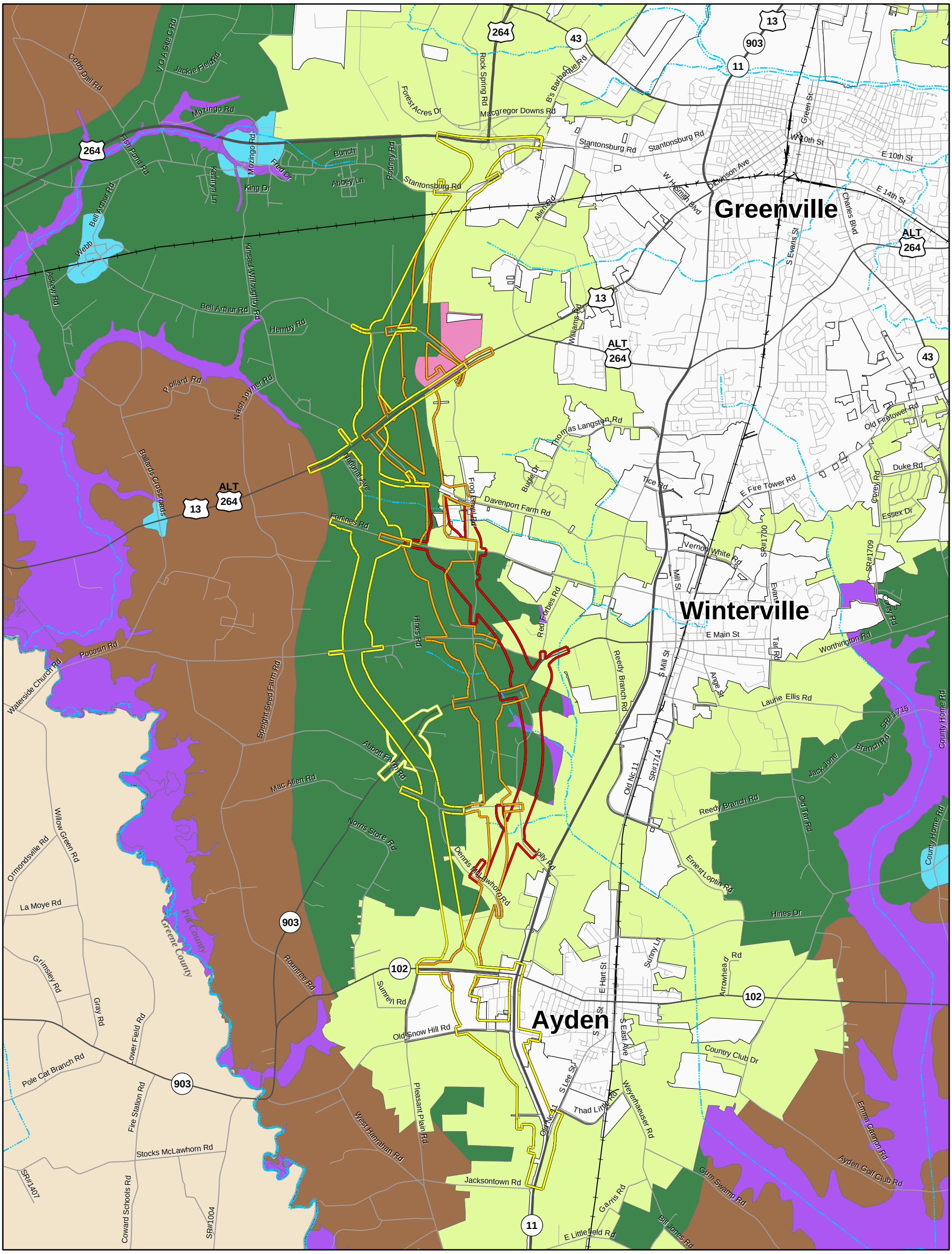
The Southwest Bypass is included in the thoroughfare plan for the purpose of providing easier travel from the south to the north and to the regional medical facilities and to relieve congestion on NC 11 and Stantonsburg Road.

3.2.3.2 Greenville Horizons Comprehensive Plan – Transportation Component

The goal of the transportation component is to achieve a system of safe, efficient, reliable, environmentally sound, and economically feasible transportation within Greenville. The objectives include: (1) ensure that streets in new developments are properly designed, built, and maintained; (2) coordinate highway planning and improvements to ensure that adequate transportation is provided to existing, developing, and proposed activity centers, and residential areas; and, (3) reduce traffic congestion and safety problems.

3.2.3.3 Pitt County Comprehensive Transportation Plan

Pitt County, in coordination with NCDOT, completed the first *Pitt County Thoroughfare Plan* in 1993. The plan was updated in 2005 and recommends the transportation improvements necessary to provide an efficient transportation system within the 2005-2030 planning period.



Legend

- Preferred Alternative
- Build Alternate 4-EXT
- Build Alternate 1B-EXT
- Build Alternate 5-EXT
- Current City Limits and ETJ
- Projected City Limits and ETJ
- Commercial Light Industry
- Rural Agricultural
- Rural Residential
- Suburban Residential
- Community Crossroads

N W E S

0 0.5 1 2 Miles

North Carolina
Department of Transportation

Greenville Southwest Bypass Study
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Figure 3-4 Future Land Use Plans

3.3 PHYSICAL ENVIRONMENT CHARACTERISTICS

3.3.1 Noise Characteristics

A Noise Study and Evaluation was prepared for this project (Lochner 2006) and summarized in the following sub-sections.

3.3.1.1 Characteristics of Noise

The noise impacts for the proposed improvements were assessed in accordance with FHWA guidelines published in 23 Code of Federal Regulations, Part 772. Though not federally funded these procedures are followed when conducting noise highway measures for all NCDOT projects. In order to determine the degree of impact of Highway traffic noise on human activity, the Noise Abatement Criteria (NAC) established by Part 772 were used. The NAC, listed in Table 3-11 for various activities, represent the upper limit of acceptable traffic noise conditions, as well as a measure of that which may be desirable with that which may be achievable. The NAC apply to areas having regular human use and where lowered noise levels are desired. They do not apply to the entire tract of land on which the activity is based, but only to that portion where the activity takes place.

TABLE 3-11: FHWA NOISE ABATEMENT CRITERIA

Activity Category	Leq (h) dB(A)	Description of Activity
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 is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreational areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed land, 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.

The NAC are given in terms of the hourly, A-weighted, equivalent sound level in decibels or dB(A). The A-weighted sound level is a single number measure of sound intensity with weighted frequency characteristics that correspond to human subjective response to noise. However, since most environmental noise fluctuates from moment to moment, it is common practice to condense all of this information into a single number called the equivalent sound level (Leq). The Leq is the value of a steady sound level that would represent the same sound energy as the actual time-varying sound levels evaluated over the same period. For highway traffic noise assessment, Leq is typically evaluated over a one-hour period, and is denoted as Leq(h).

3.3.1.2 Existing Noise Measurements

Noise monitoring was performed at eleven locations in or near the study area to validate the noise model and to establish a background noise level. As shown in Table 3-12, existing noise levels ranged from 43 dB(A) to 69 dB(A).

TABLE 3-12: EXISTING NOISE MEASUREMENTS

Site	Location	Description	Monitored Level (dBA)*
A	Pine Forest Road and Cedar Lane (Near NC 11)	Measurement of traffic noise on NC 11	64
B	Abbott Farm Road	Measurement of background noise levels away from traffic	67
C	NC 903	50 feet from road – measurement of traffic noise on NC 903	68
D	cul de sac on Davenport Place	Measurement of background noise levels away from traffic	58
E	Pocosin Road	50 feet from road – measurement of traffic noise on Pocosin Road	67
F	Forlines Road	50 feet from road – measurement of traffic noise on Forlines Road	64
G	Davenport Farm Road	50 feet from road – measurement of traffic noise on Davenport Farm Road	60
H	Dickinson Road (US 264A/US 13)	50 feet from road – measurement of traffic noise on Dickinson Road	68
I	Frog Level Road	50 feet from road – measurement of traffic noise on Frog Level Road	62
J	End of Teakwood Road	Measurement of background noise away from traffic	43
K	Stantonsburg Road near US 264 Bypass interchange	50 feet from road – measurement of traffic noise on Stantonsburg Road	69

* Measurements were taken in December 2003. Equipment used included an integrated Sound Level Meter, Larson-Davis Model 824, with a half inch random incidence microphone (accuracy ± 2.0 dB(A) for normal frequency range).

In order to accurately establish the existing noise level for each analysis area for use in the noise impact study, a background level was added to the results from the existing noise model. The measured background levels are 43 dB(A), 58 dB(A) and 67 dB(A). Upon review of the measurements which resulted in readings of 58 dB(A) and 67 dB(A), it was determined that unusual noise events and atmospheric conditions may have influenced the results. Therefore, the measurement which recorded a 43 dB(A) level was used as a background level for the entire project area.

3.3.2 Air Quality

An *Air Quality Technical Memorandum* was prepared for the project in 2005 (Lochner 2005) and describes existing air quality conditions in the project area. The air quality analysis was performed in accordance with the Federal-Aid Policy Guide.

The principal air pollutants of automotive emissions are Carbon Monoxide (CO), Hydrocarbons (HC), and Nitrogen Oxides. Other pollutants, such as sulfur dioxide and particulates, are produced to a lesser degree. A wide range of photochemical oxidants (ozone) also result through a complex series of light-induced reactions between emitted hydrocarbons and nitrous oxides. Automobiles are not regarded as significant source of particulate matter and sulfur dioxide. Nationwide, highway sources account for less then seven percent of particulate matter emissions and less than two percent of sulfur dioxide emissions.

All areas within North Carolina are designated as either attainment, non-attainment, or unclassifiable with respect to each of the six pollutants under the National Ambient Air Quality Standards (NAAQS). Areas that have pollutant concentrations below the NAAQS are designated as attainment. Areas where the NAAQS are exceeded are designated non-attainment. Pitt County and Greenville, including the project area, is designated as attainment.

Highway vehicles are considered to be the major source of CO in the project area. For this reason, and because CO is a relatively non-reactive pollutant, CO was used in the analysis as an indicator of the air pollutants produced by traffic activities on the proposed roadway. CO 1-hour and 8-hour concentration of 2.9 parts per million (ppm) and 2.3 ppm, respectively, were used for background concentration in the analysis. These values were recommended for background concentrations in the Greenville area by the Division of Air Quality, North Carolina Department of Environment and Natural Resources.

3.3.3 Farmlands

The Farmland Protection Policy Act of 1981 (7 CFR 658) requires all federal agencies and federally permitted actions to consider the impact of their activities on prime, unique, statewide and locally important farmland soils, as defined by the US Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) (Public Law 97-98, Subtitle 1, Section 1540). The NRCS, in cooperation with the state and local agencies, developed a listing of Prime and Statewide Important Farmland of North Carolina.

Prime Farmland is defined as soils best suited for producing food, feed, fiber, forage, and oil seed crops. These soils are favorable for all major crops common to the County, have a favorable growing season, and receive the available moisture needed to produce high yields on an average of eight out of every ten years. Land already in or committed to urban development or water storage is not included.

Unique Farmland is used for production and specific high-value food or fiber crops. It has the special combinations of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed.

State and Locally Important is defined by the appropriate state or local government agency as soils important in the agriculture of an individual county. These definitions are based on measures of the soil's capacity to support productive farm activity, not of current cultivation.

The NRCS completed a soil survey in Pitt County. Soils in the study area considered to be prime or of statewide importance are listed in Table 3-13 and mapped in Figure 3-5. There are no soils designated Unique Farmland in Pitt County.

TABLE 3-13: PRIME FARMLAND SOILS IN PITT COUNTY

Map Symbol	Map Unit Name	Farmland Classification
AIB	Altevista sandy loam, 0-4 % slopes	All areas are prime farmland
AyA*	Aycock fine sand loam, 0-1 % slopes	All areas are prime farmland
AyB	Aycock fine sand loam, 1-6 % slopes	All areas are prime farmland
AyB2	Aycock fine sand loam, 1-6 % slopes, eroded	All areas are prime farmland
CrA	Craven fine sandy loam, 0-1% slopes	All areas are prime farmland
CrB*	Craven fine sandy loam, 1-6% slopes	All areas are prime farmland
ExA*	Exum fine sandy loam, 0-1% slopes	All areas are prime farmland
ExB*	Exum fine sandy loam, 1-6% slopes	All areas are prime farmland
GoA*	Goldsboro sandy loam, 0-1% slopes	All areas are prime farmland
GoB*	Goldsboro sandy loam, 1-6% slopes	All areas are prime farmland
MaB	Masada sandy loam, 0-1% slopes	All areas are prime farmland
NrA*	Norfolk sandy loam, 0-1% slopes	All areas are prime farmland
NrB*	Norfolk sandy loam, 1-6% slopes	All areas are prime farmland
NrB2*	Norfolk sandy loam, 1-6% slopes, eroded	All areas are prime farmland
WkB	Wickham sandy loam, 0-6% slopes	All areas are prime farmland
Ly*	Lynchburg fine sandy loam	Prime farmland if drained
Na*	Nahunta silt loam	Prime farmland if drained
Pg*	Pantego loam	Prime farmland if drained
Po*	Portsmouth loam	Prime farmland if drained
Ra*	Rains fine sandy loam	Prime farmland if drained
Tu*	Tuckerman fine sandy loam	Prime farmland if drained

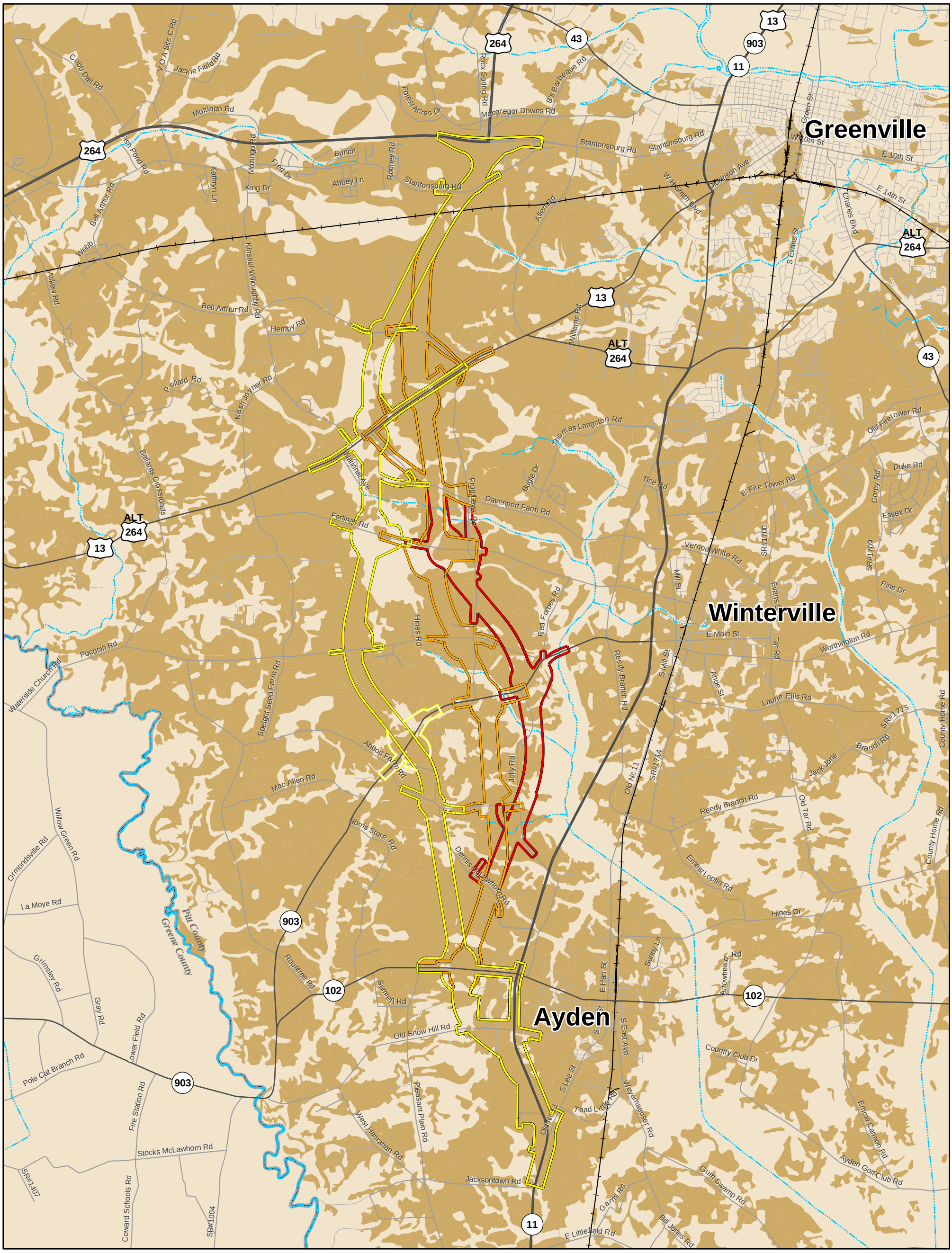
* Soil type found within the project area

3.3.4 Utilities

There are various utility systems operated throughout Pitt County, including electrical, water, sewer, and gas services.

3.3.4.1 Electric Power Transmission

Several companies provide electrical service to the Pitt County/Greenville Area. These include: Greenville Utilities Commission (GUC), Progress Energy, the town of Ayden, and Pitt-Greene Electric Membership Corporation. GUC is the primary provider within the city and ETJ limits of Greenville and Winterville. It has a broad base of customers, including Pitt County Memorial Hospital and numerous residences in the project area. In the project area, the following electrical power substations provide service:



Legend

- Preferred Alternative
- Build Alternate 4-EXT
- Build Alternate 1B-EXT
- Build Alternate 5-EXT
- Pitt Co. Prime Farmland Soils

N W E S

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Figure 3-5 Prime Farmland Soils

- Westside – serves the western portions of the city including the hospital and medical district along Stantonsburg Road (US 264 Business) and B's Barbecue Road (SR 1204)
- Frog Level – serves southwest areas of the county including Frog Level Road (SR 1127), Dickinson Avenue Ext (US 13), Lake Ellsworth, Red Oak, Ballards Crossroads, Bell Arthur, Davenport Farm Road (SR 1128), and Rountree
- Winterville – serves areas in the southwestern city/county including West Firetower Road (SR 1708), Old Tar Road (SR 1700), Pitt Community College and Landmark Street
- MacGregor Downs – serves western areas of the county including Stantonsburg Road (US 264 Business) and NC 43 from US 264 Bypass to Falkland

A GUC power transmission easement crosses the northern end of the project area. The easement extends from a substation approximately 1,000 feet west of the intersection of Frog Level Road (SR 1127) and US 13/264ALT northward to the CSX railroad tracks near the northern end of the project area.

3.3.4.2 Water and Sewer

Pitt County and the project study area are served by a variety of municipal and rural community water systems. The Greenville Utilities Commission operates two wastewater treatment plants: one with a capacity of 22.5 million gallon per day (mgd) and one with a capacity of 17.5 mgd. The water treatment plants use water from the Tar River with supplemental deep wells. All water and sewer services for the city of Greenville are owned, operated, and maintained by the Greenville Utilities Commission. Contentnea Metropolitan Sewerage District (CMSD) serves the towns of Ayden and Winterville. In rural areas, septic tanks and private wells provide sewage disposal and water for residents.

3.3.4.3 Natural Gas

Piedmont Natural Gas and the GUC supply natural gas within Pitt County and Greenville. Piedmont Natural Gas supplies natural gas to Pitt County via a 4-inch high pressure transmission line, which runs east-west through the central portion of the county. GUC receives gas from Piedmont Natural Gas for distribution to more than 19,500 customers in Greenville, Ayden, and Winterville.

3.3.5 Visual Quality

The study area is rural with sporadic development consisting mainly of residential properties and farm complexes. Some commercial properties exist along the project area, consisting of a few small businesses.

The introduction of any large facility in an area alters the local perception of the visual environment. A location may be deemed visually sensitive for its visual quality, uniqueness, cultural importance, and viewer characteristics. According to Federal Highway Administration Guidelines, high visual quality is obtained when area landscape components have impressive

characteristics that convey visual excellence. Striking landscapes are not limited to the natural environment and can be associated with urban areas as well. Visual quality is subjective in that it is also determined by a viewer's perception of an area.

A field review was conducted in order to investigate the area for its overall visual quality. The review did not yield any significant findings of special or unique natural areas, officially designated recreation areas, or officially designated scenic overlooks within the immediate project area. The open fields and flat terrain are characteristic of much of Pitt County and eastern North Carolina. A historic district and several private historic properties do exist within the project area. These properties were investigated further for their visual sensitivity (see Section 4.3.5).

3.3.6 Hazardous Materials

In September 2005, NCDOT conducted a study to identify properties within the project study area that are or may be contaminated. Such properties may include, but are not limited to: active and abandoned underground storage tank (UST) sites, hazardous waste sites, regulated landfills, and unregulated dumpsites. Based on the study no hazardous waste sites or landfills were identified within the project corridor limits.

Thirteen possible UST facilities, one automotive salvage yard, and one above ground storage tank facility were identified within the proposed project corridor. These sites are described in Table 3-14 and shown on Figure 3-6.

TABLE 3-14: POTENTIAL HAZARDOUS MATERIALS SITES

Site #	Type	UST Facility ID	Anticipated Contamination	Anticipated Severity
1	UST	None	Petroleum contaminated soils and water	Low
2	UST	0-036537	Petroleum contaminated soils and water	Low
3	UST	None	Petroleum contaminated soils and water	Low
4	Salvage Yard	None	Petroleum contaminated soils and water	Low
5	UST	None	Petroleum contaminated soils and water	Low
6	UST	None	Petroleum contaminated soils and water	Low
7	UST	None	Petroleum contaminated soils and water	Low
8	UST	None	Petroleum contaminated soils and water	Low
9	UST	None	Petroleum contaminated soils and water	Low
10	UST	None	Petroleum contaminated soils and water	Low
11	UST	None	Petroleum contaminated soils and water	Low
12	UST	None	Petroleum contaminated soils and water	Low
13	UST	None	Petroleum contaminated soils and water	Low
14	UST	None	Petroleum contaminated soils and water	Low
15	UST	None	Petroleum and herbicide contaminated soils and water	Low

The project area also crosses a borrow site formerly used by the Pitt County Landfill for daily cover and cap material. The borrow site is located on the western side of an inactive landfill. Since the closure of the landfill, Pitt County has backfilled the borrow site with yard waste,

Greenville

Winterville

Ayden

ALT 264 / 13 / 264 / 11 / 903 / 102 / 11

Rock Spring Rd · Macgregor Downs Rd · B's Barbeque Rd · Forest Acres Dr · Stantonsburg Rd · US-264 · Rodney Rd · Abbey Ln · Allen Rd · H Smith Blvd · Williams Rd · Frog Level Rd · Thomas Langston Rd · National Ave · Bugle Dr · Tice Rd · Davenport Farm Rd · Forlines Rd · Red Forbes Rd · Hines Rd · Mill St · E Main St · Reedy Branch Rd · S Mill St · Old Nc 11 · SR#1714 · Abbott Farm Rd · Jolly Rd · Mac Allen Rd · Norris Store Rd · Dennis Mclawhorn Rd · Hines Dr · E Hart St · S Lee St · Sumrell Rd · Old Snow Hill Rd · King St · S East Ave · Pleasant Plain Rd · Thad Little Rd · Weyerhaeuser Rd · Gum Swamp Rd · Jacksontown Rd · Garris Rd · Bill Jones Rd · E Littlefield Rd · W Littlefield Rd · West Hardy Rahan Rd · Coward Schools Rd · SR#1004 · SR#1407 · Ormondsville Rd · Brick Kitchen Rd · Wood Rd · Old Snow Hill Rd · Davenport Farm Rd · Frog Level Rd · Pennant Dr · Half Moon Rd · Willow Green Rd · Streeter · SR#1335 · Speight S

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Legend

- Preferred Alternative
- Build Alternate 4-EXT
- Build Alternate 1B-EXT
- Build Alternate 5-EXT
- Underground Storage Tank
- Above Ground Storage Tank
- Auto Salvage Yard
- Landfill

N W E S

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Figure 3-6 **Hazardous Materials Sites**

leaves, and scrap concrete blocks. The borrow pit does not contain any contaminated materials; however, the presence of concrete blocks within the site could cause foundation problems if a structure were built on them.

3.3.7 Mineral Resources

While there are more than 30 sand and gravel mines in Pitt County, there are no mining operations or quarries within the project study area.

3.3.8 Flood Hazard Zones

A floodplain evaluation was conducted in accordance with Executive Order 11988 "Floodplain Management" and with 23 CFR 650 Subpart A "Location and Hydraulic Design of Encroachments on Floodplains." This evaluation is based on the results of the Federal Emergency Management Agency's (FEMA) 2004 detailed flood insurance study and FEMA's Federal Insurance Rate Mapping (FIRM) for the incorporated and unincorporated areas of Pitt County. The community panels used to determine the 100-year floodplain and floodway boundaries covered Pitt County (370372, revised January 2, 2004) and the town of Ayden (370189, effective January 2, 2004). The project study area contains portions of the floodway and floodplain for Swift Creek and Horsepen Swamp. The locations of the floodplain crossings associated with the proposed project are shown in Figure 3-7. The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water surface elevations above FEMA's published floodway elevation.

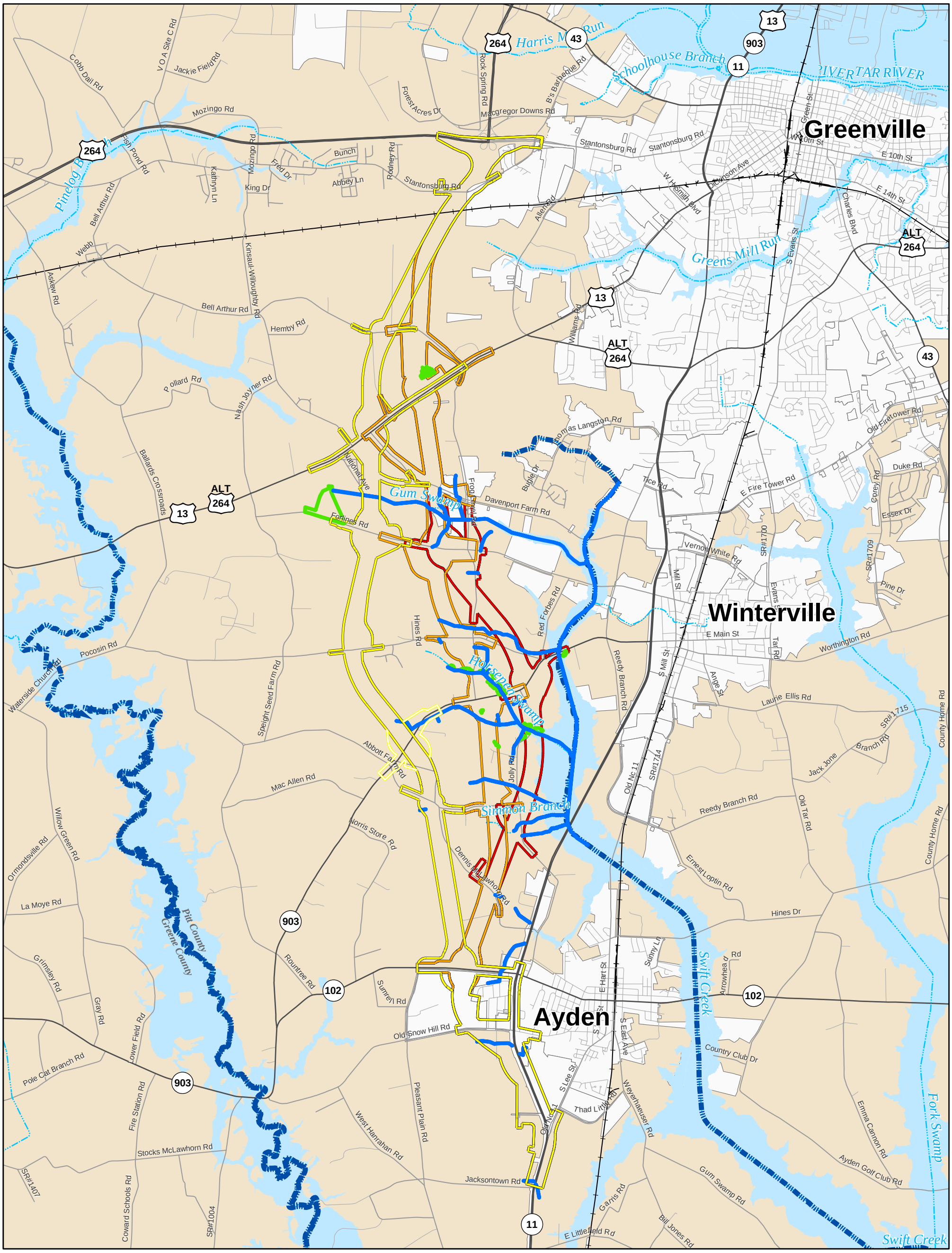
Relic floodplains are located along many of the streams within the study area. All of the streams in the study area are channelized, at least for a portion of their lengths, and extend in nearly straight lines along their courses. They are also deeply entrenched, reducing the amount of over-bank flooding and floodplain access.

3.3.9 Protected Lands

There are no federal or state protected lands within the study area. There are also no waters within the study are that are considered by the National Park Service to be Wild and Scenic Rivers (USDA, FS 2005).

3.4 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800), requires the identification of all properties listed in the National Register of Historic Places (NRHP). Districts, sites, buildings, structures, and objects associated with American history, architecture, archaeology, engineering and culture are considered eligible for the NRHP if they possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:



Legend

- Preferred Alternative
- Build Alternate 4-EXT
- Build Alternate 1B-EXT
- Build Alternate 5-EXT
- Jurisdictional Stream
- Wetland
- Streams On 303(d) List
- 100 Year Floodzone

N W E S

0 0.5 1 2 Miles

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Figure 3-7 **Water Resources**

- Criterion A – resources associated with events that have made a significant contribution to the broad pattern of our history; or
- Criterion B – resources associated with the lives of persons significant in our past; or
- Criterion C – resources that embody the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D – resources that have yielded or may be likely to yield information important in prehistory or history.

The following sections summarize the cultural resources identified within the project study area.

3.4.1 Historic Architectural Resources

In 1995, NCDOT conducted a survey (NCDOT 1995) to determine the project's Area of Potential Effects (APE), defined as the geographic area or areas within which a project may cause changes in the character or use of historic properties. The survey identified all significant resources within the APE and evaluated these resources according to the National Register of Historic Places criteria. Three properties were determined eligible for listing on the NRHP: Charles McLawhorn Houses, Alfred McLawhorn House, and William Amos Shivers House. In 2002, two eligible historic properties were identified within the APE, one of which, the Cox-Ange House, is listed on the NRHP. The other is the A.W. Ange and Company Store Building. These properties are depicted on Figure 3-8.

Charles McLawhorn Houses

The Charles McLawhorn property contains two houses once occupied by Charles McLawhorn and his family: Windy Oaks and Charles McLawhorn House.

The two Charles McLawhorn Houses are part of a larger farm complex that has been continuously owned by the same family since its establishment and retains a number of period outbuildings, as well as its historic field patterns. The HPO determined that the property is eligible for the NRHP under Criterion A for agriculture as well as Criterion C for architecture. The National Register boundaries include the two houses and their immediate settings, two tenant houses, six tobacco barns, and a frame stable across NC 903 from the houses, as well as open agricultural fields still associated with the property.

Alfred McLawhorn House

The Alfred McLawhorn House is located on the east side of Reedy Branch Road (SR 1131), approximately 0.35 mile south of the intersection of NC 903. The house, constructed ca. 1875, is a frame three-bay, two-story, center-hall plan house.

The house is an example of a vernacular house form with outstanding applied Victorian ornamentation. The Alfred McLawhorn House is part of a larger farm complex that has been

Greenville
Winterville
Ayden
Stantonsburg Rd
Mozingo Rd
Bell Arthur Rd
Webb
E Wilson St
Moye-Turnage Rd
Ghimquapin Rd
Askew Rd
Kinsaul-Willoughby Rd
Hemby Rd
Fish Pond Rd
Kathryn Ln
King Dr
Fred Dr
Bunch
Abbey Ln
Rodney Rd
Allen Rd
W H Smith Blvd
Rock Spring Rd
Macgregor Downs Rd
B's Barbeque Rd
Forest Acres Dr
US-264
Cobb Dail Rd
V O A Site C Rd
Jackie Field Rd
Wesley Church Rd
Kittrell Hill Rd
S Pineview Ln
Arch Flannagan Rd
Ballards Crossroads
P ollard Rd
Nash Joyner Rd
National Ave
Frog Level Rd
Bugle Dr
Davenport Farm Rd
Forlines Rd
Tice Rd
E Fire Tower Rd
Vernon White Rd
Red Forbes Rd
Hines Rd
Speight Seed Farm Rd
Abbott Farm Rd
Cheek Farm Rd
Mac Allen Rd
Norris Store Rd
Dennis McLawhorn Rd
Jolly Rd
Reedy Branch Rd
Ernest Loptin Rd
Hines Dr
Rountree Rd
Summerl Rd
Old Snow Hill Rd
S Lee St
E Hart St
S East Ave
Arrowhead Rd
Thad Little Rd
Weyerhaeuser Rd
Gum Swamp Rd
Garris Rd
Bill Jones Rd
Pleasant Plain Rd
West Hanrahan Rd
Jacksontown Rd
E Littlefield Rd
W Littlefield Rd
Stillman Rd
SR#1004
SR#1744
Old NC 11
Mill St
Ange St
Williams Rd
Thomas Langston Rd
264
ALT 264
13
903
11
102

Key

1. **Cox - Ange House** *(Listed on National Register)*
2. **A. W. Ange & Company Store** *(National Register Eligible)*
3. **Alfred McLawhorn House** *(National Register Eligible)*
4. **William Shivers Historic House** *(National Register Eligible)*
5. **Charles McLawhorn Houses** *(National Register Eligible)*
   (Contributing Feature to Renston Rural Historic District)

Legend

- Preferred Alternative
- Build Alternate 4-EXT
- Build Alternate 1B-EXT
- Build Alternate 5-EXT
- Renston Rural Historic District
  (Listed on National Register)
- Contributing Feature

N W E S

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Figure 3-8 **Historic Architectural Resources**

home to three generations of the same family. The HPO determined the property to be eligible for the NRHP under Criterion A (agriculture) and Criterion C (architecture). In addition to the house, the property includes a grouping of domestic and agricultural outbuildings to the rear of the house, a stand of frame tobacco barns, and open agricultural fields.

William Amos Shivers House
This is a ca. 1900 T-shaped, frame, one-story dwelling. The original structure had a detached kitchen and dining room, connected by a breezeway. Also located on the property are a smokehouse, a packhouse, a barn, and one former tobacco barn.

The William Amos Shivers House remains relatively intact. The property is considered an example of a modest, turn-of-the-century Pitt County farmstead and was determined eligible for the NRHP under Criterion A for agriculture and Criterion C for architecture. The National Register boundaries include the 43-acre home tract that was created with the farm and subdivided following the death of William Amos Shivers.

Cox-Ange House
The Cox-Ange House, one of the best surviving examples of Victorian architecture in the town of Winterville, was built ca. 1901 for Fountain Cox. Mr. Cox and his wife lived in the house for only one year and then sold it to A.W. Ange in 1902. The Cox-Ange House was added to the National Register in 2000 under Criterion A for social history and Criterion C for architecture.

A.W. Ange and Company Store
Located on the corner of West Main Street and Mill Street in the town of Winterville, the building is a two-story, brick commercial building with large plate glass display windows. The store was constructed in 1922 and was the first commercial building in Winterville to be oriented toward the highway (NC 11) rather than the railroad. Some of the building's original interior features, such as display cases, were removed during the recent conversion of the store into a restaurant, but others, such as the decorative pressed-tin ceiling, remain. The A.W. Ange and Company Store Building is eligible for the National Register under Criterion C as an intact example of early 20th-century commercial architecture.

Renston Rural Historic District
The Renston Rural Historic District was listed on the National Register of Historic Places in 2003 under Criterion A for agriculture and Criterion C for architecture with a period of significance of 1840 to 1953. The Historic District is comprised of approximately 1,395 acres of farms, residences, churches, and cemeteries along a 2.5-mile section of NC 903 in Pitt County. The boundaries of the Historic District are defined by Horsepen Swamp Creek at the northeast end and by Callie Stokes Road at the southwest end. Flat, open agricultural fields punctuated by 19th- and 20th-century residences and their corresponding farm buildings remain, with crops and cattle occupying the fields as it has for the past 200 years. The landscape reflects the prevalence of tobacco cultivation beginning in the 1890s and peaking in the early 1950s. Historic buildings line both sides of NC 903, which developed as a connection between the farms, houses, and churches

and served as the route between the towns of Winterville in Pitt County and Snow Hill in Greene County.

According to the district's National Register nomination (Van Dolsen 2003), the Historic District contains 166 resources, 111 of which are contributing elements to the historic appearance of the area. Ninety-six buildings, seven sites, seven structures, and one object date from the period of significance and retain sufficient integrity to support the district's agricultural and architectural heritage. The Charles McLawhorn property, an individually NRHP-eligible property described above, is within the Renston Rural Historic District. The Dennis T. and Madge McLawhorn House and Farm, located on the northwest side of NC 903 northeast of the intersection with Abbott Farm Road and Cheek Farm Road, is a contributing feature to the Historic District which was individually added to the HPO North Carolina Study List by the North Carolina National Register Advisory Committee in 2003. The committee determined that the property is potentially eligible for individual listing on the NRHP and warrants further study.

3.4.2 Archaeological Resources

The NCDOT has consulted with the State Historic Preservation Office (HPO) about the archaeological potential of this project since November 30, 1993 (see letter in Appendix A.2), when HPO recommended an archaeological survey prior to initiation of construction activities. NCDOT prepared an historical background research report that analyzed the archaeological potential of the three alternatives for the project in April 1996. HPO concurred with the report's findings and recommended that an archaeological survey be conducted along the preferred alternative when it was selected (see letter in Appendix A.2). On September 19, 2006 HPO reviewed the Draft Environmental Impact Statement and recommended archaeological survey of the preferred alternative when it was selected (see letter in Appendix A.2).

When the preferred alternative was selected on November 16, 2006, the HPO and the U.S. Army Corps of Engineers (USACE) requested an intensive archaeological survey of the entire corridor. Maps of the preferred alternative were provided to HPO on November 30, 2006 (see letter in Appendix A.2). The HPO was consulted regarding the archaeological survey strategy on January 3, 2007 (see letter in Appendix A.2). The Area of Potential Effects (APE) consists of a corridor approximately 20 kilometers (12 miles) long and 76 meters (250 feet) wide, and includes new location for entrance/exit ramps, access roads, and interchanges at (from north to south) the US 264 Bypass, US 13/264A, Forlines Road (SR 1126), NC 903, and NC 102.

An archaeological survey of the preferred Alternative (Alternative 4-EXT) was conducted from March 12 through April 23, 2007. The survey identified 47 archaeological sites and one historic cemetery. All of the sites were recommended ineligible for the National Register of Historic Places (NRHP), and no further work was recommended. The HPO agreed with the preliminary results of the survey on June 7, 2007 (see letter in Appendix A.2) but has not yet reviewed the archaeological survey report. The archaeological survey report was submitted to the USACE on

November 6, 2007. The USACE will submit the archaeological report to HPO for their comments.

TABLE 3-15: PREVIOUSLY IDENTIFIED (1996) ARCHAEOLOGICAL SITES LOCATED WITHIN OR NEAR THE PROJECT STUDY AREA

Site Number	Type of Site
31PT79	Prehistoric and historic
31PT82	Prehistoric
31PT85	Prehistoric
31PT86	Prehistoric
31PT87	Prehistoric
31PT88	Prehistoric
31PT266	Historic
31PT272	Prehistoric
31PT287	Prehistoric and historic
31PT288	Historic
31PT289	Prehistoric and historic

3.5 NATURAL ENVIRONMENT CHARACTERISTICS

3.5.1 Soils, Topography, and Geology

3.5.1.1 Soils

Soil development is dependent upon biotic and abiotic factors which include past geologic activities, nature of the parent material, environmental and human influences, plant and animal activity, the age of sediments, climate, and topographic position. General soil associations incorporate areas with distinctive patterns of soils, relief, and drainage.

The proposed project study area is reported to contain 16 soil series in 20 soil mapping units (USDA 1974). Of these soil mapping units, nine are classified as hydric, and three of the other soils may contain inclusions of a hydric soil in depressions. Soils mapped in the project area are listed in Table 3-16.

Norfolk-Exum-Goldsboro is the general soil association for the northern and southern portions of the project study area. This association is dominated by moderately well drained and well drained soils that have subsoil dominated by friable sandy clay loam or clay loam. These soils are typically found on uplands.

Lynchburg-Rains-Goldsboro is the general soil association for the center uplands area of the project. This association consists of moderately well drained to poorly drained soils that have subsoil dominated by friable sandy clay loam. These soils are typically found on uplands.

Bibb-Portsmouth is the general soil association found on the flood plains and stream terraces of the natural drainages. This association consists of poorly drained and very poorly drained soils

that are underlain by very friable fine sandy loam or have a subsoil of friable sandy loam and sandy clay loam.

TABLE 3-16: SUMMARY OF NATURAL RESOURCE CONSERVATION SERVICE (NRCS) MAPPED SOILS FOUND WITHIN THE STUDY AREA

Map Code	Soil Series Name	Taxonomic Classification	Hydric Soil
AgB	Alaga loamy sand, banded substratum, 0 to 6 percent slopes	Thermic, coated Typic Quartzipsamments	Yes
Bb	Bibb complex	Coarse-loamy, siliceous, active, acid, thermic Typic Fluvaquents	Yes
Bd	Bladen fine sandy loam	Fine, mixed semiactive, thermic Typic Albaquults	Yes
By	Byars loam	Fine. kaolinitic, thermic Umbric Paleaquults	Yes
Co	Coxville fine sandy loam	Fine, kaolinitic, thermic Typic Paleaquults	Yes
CrB2	Craven fine sandy loam, 1 to 6 percent slopes, eroded	Fine, mixed, subactive, thermic Aquic Hapludults	No
ExA	Exum fine sandy loam, 0 to 1 percent slopes	Fine-silty, siliceous, subactive, thermic Aquic Paleudults	No
ExB	Exum fine sandy loam, 1 to 6 percent slopes	Fine-silty, siliceous, subactive, thermic Aquic Paleudults	No
GoA	Goldsboro sandy loam, 0 to 1 percent slopes	Fine-loamy, siliceous, subactive, thermic Aquic Paleudults	*
GoB	Goldsboro sandy loam, 1 to 6 percent slopes	Fine-loamy, siliceous, subactive, thermic Aquic Paleudults	No
Le	Leaf silt loam	Fine, mixed, active, thermic Typic Albaquults	Yes
Ly	Lynchburg fine sandy loam	Fine-loamy, siliceous, semiactive, thermic Aquic Paleaquults	*
Na	Nahunta silt loam	Fine-silty, siliceous, subactive, thermic Aeric Paleaquults	Yes
NrA	Norfolk sandy loam, 0 to 1 percent slopes	Fine-loamy, kaolinitic, thermic Typic Kandiudults	No
NrB	Norfolk sandy loam, 1 to 6 percent slopes	Fine-loamy, kaolinitic, thermic Typic Kandiudults	No
NrB2	Norfolk sandy loam, 1 to 6 percent slopes	Fine-loamy, kaolinitic, thermic Typic Kandiudults	No
OcB	Ocilla loamy fine sand, 0 to 4 percent slopes	Loamy, siliceous, semiactive, thermic Aquic Arenic Paleudults	*
Pg	Pantego loam	Fine-loamy, siliceous, semiactive, thermic Umbric Paleaquults	Yes
Ra	Rains fine sandy loam	Fine-loamy, siliceous, semiactive, thermic Typic Paleaquults	Yes
WaB	Wagram loamy sand, 0 to 6 percent slopes	Loamy, kaolinitic, thermic Arenic Kandiudults	No

*May have hydric inclusions of Rains (Ra) in depressions.
(USDA,SCS 1991; USDA,SCS 1974)

Bibb (Bb) and Rains (Ra) soils are the most common soil types along drainage ways within the study area. Norfolk sandy loam soils (NrA, NrB) are the most abundant type in upland areas.

3.5.1.2 Climate and Topography

The climate of Pitt County is influenced by elevation, distance from the Atlantic Ocean and Pamlico Sound, and by latitude and location of the county. It is also somewhat influenced by the Tar River. The lowest temperature ever recorded was 0 degrees and the highest on record was 106 degrees. The temperature reaches 90 degrees or higher on about half the days during an average summer. The average length of the freeze-free growing period is approximately 220 days, lasting from late March through early November.

Thunderstorms account for a large part of the rainfall received during the growing season. During this time of year precipitation is highly variable from month to month, day to day, and place to place within the county. By autumn, rainfall amounts frequently increase overall. Tropical storms in late summer and fall sometimes contribute to this increase. Rainfall in winter is usually associated with large low-pressure systems moving over the Eastern seaboard. Snow and sleet usually occur annually, but amounts are small and usually melt within a day.

The sun shines, on average, more than half the total number of daylight hours in winter and nearly two-thirds of the total number of daylight hours in other seasons. The average relative humidity is approximately 85 percent, dropping to about 50 percent by mid-afternoon (USDA 1974).

Pitt County is in the Middle and Upper Coastal Plain physiographic province of the Atlantic Coastal Plain (NCCGIA 1997) and slopes gently to the east, southeast, and west. The project spans the interstream divide separating the Tar-Pamlico and Neuse River Basins, and the interstream divide separating the Middle Neuse and Contentnea subbasins of the Neuse River Basin. The broad, flat interstream areas are the dominant topographic features. Marked topographic variations are lacking. Slopes generally are less than 4 percent.

In the portion of the study area within the Tar-Pamlico River Basin (Stantonsburg Road to US 264A), elevations range from 39 to 82 feet above mean sea level (msl). Drainage is to the northeast and east with the lowest elevation along Greens Mill Run as it exits the study area. The highest elevations are along US 264A (USGS 1981, 1982).

In the portion of the study area within the Neuse River Basin (US 264A to NC 102), elevations also range from 39 to 82 feet. Lowest elevations here are in the Middle Neuse subbasin where Swift Creek exits the study area. Highest elevations are along the interstream divide with the Tar-Pamlico River Basin, and along the divide separating the Middle Neuse and Contentnea subbasins (USGS 1981, 1982).

3.5.1.3 Geology

Pitt County is underlaid by unconsolidated beds of sand, clay, and calcareous sediment. Inclined south-southeasterly at a rate slightly greater than the land's surface, the beds thicken as they near the coast and reach their greatest thickness offshore. For the most part, these beds were deposited

in sea water as the sea advanced and retreated during the geologic development of the Atlantic Coastal Plain. To a much lesser extent, streams deposited layers of sediment which mixed with that deposited on the sea floor. About 750 feet underneath the sedimentary cover underlying Greenville is a basement rock floor consisting of weathered granite, gneiss, schist, and slate. Load bearing capabilities of soils vary widely; many areas of the county can support heavy industrial loads without the need for pilings.

3.5.2 Biotic Communities and Wildlife

Terrestrial and aquatic communities are included in this description of biotic resources. Living systems described in the following sections include communities of associated plants and animals. These descriptions refer to the dominant flora and fauna in each community and the relationships of these biotic components. Descriptions of the terrestrial systems are presented in the context of plant community classifications. These classifications follow Schafale and Weakley (1990) where possible. Representative faunal species that are likely to occur in these habitats (based on published range distributions) are also cited. Scientific nomenclature and common names (when applicable) are used for the floral species described. Subsequent references to the same species are by the common name only.

3.5.2.1 Terrestrial Plant Communities

Distribution and composition of plant communities throughout the project study area reflect landscape-level variations in topography, soils, hydrology, and past and present land use practices. Agriculture, development, and forestry practices have resulted in the present vegetative patterns. There is often some degree of overlap, or intergrade, between biotic communities, where characteristics of multiple community types are present. All community types have had some degree of past or continued human disturbance and do not reflect, in totality, the characteristics of "natural communities" described in Schafale and Weakley (1990). Seven plant communities occur within the study area: Pine Flatwoods, Cutover, Pine Plantation, Mixed Pine-Hardwood Forest, Hardwood Swamp, Bottomland Forest, and Disturbed-Maintained Community. Four of these communities (Pine Flatwoods, Mixed-Pine Hardwood Forest, Hardwood Swamp, and Bottomland Forest) can be classified as natural communities by Schafale and Weakley (1990). A description of each community type follows.

Pine Flatwoods

In the project study area this plant community type is dominated by loblolly pine (*Pinus taeda*). The understory varies, but is generally sparse or absent. When present, the understory consists of sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), blackjack oak (*Quercus marilandica*), American holly (*Ilex opaca*) and red maple (*Acer rubrum*).

The shrub layer is dominated by inkberry (*Ilex glabra*), dangleberry (*Gaylussacia frondosa*), stagger bush (*Lyonia mariana*), doghobble (*Leucothoe racemosa*) and highbush blueberry (*Vaccinium corymbosum*). Red bay (*Persea borbonia*) and sweetbay (*Magnolia virginiana*) are abundant in the wetter areas of this community type, and in many cases are also minor

components of the canopy and understory layers. Horsesugar (*Symplocos tinctoria*) occurs in the understory/shrub layer, most commonly at community edges.

The herbaceous component is dominated mainly by wiregrass (*Aristida stricta*) and bracken fern (*Pteridium aquilinum*), with several other species abundant locally. These species include broomstraw (*Andropogon* spp.), panic grass (*Panicum virgatum*) and goldenrod (*Solidago* spp.), and in the wetter areas sphagnum moss (*Sphagnum* spp.), cinnamon fern (*Osmunda cinnamomea*) and netted chain fern (*Woodwardia areolata*). Vines such as yellow jessamine (*Gelsemium sempervirens*), greenbrier (*Smilax* spp.) and poison ivy (*Toxicodendron radicans*) are common.

This vegetative association most closely resembles the Wet Pine Flatwoods community described by Schafale and Weakley (1990).

Cutover

This community includes recently cleared forested areas that are in early but varying stages of regeneration. This classification makes no attempt to categorize the community type by the previous unconfirmed community or the expected mature community. Some of the cutover areas have been replanted with loblolly pine, while others have been allowed to regenerate naturally. The composition of naturally colonizing species is dependent on adjacent community types, the previous community type and hydrologic conditions among other factors.

The majority of the cutover tracts are in a successional scrub/shrub stage, with sweetgum, loblolly pine, red maple and giant cane (*Arundinaria gigantea*) being the most dominant species. Other shrub species such as doghobble, fetterbush (*Lyonia lucida*), inkberry, and blueberry are also prevalent. The high density of shrubs, along with greenbrier, blackberry (*Rubus* sp.), and poison ivy create nearly impenetrable thickets in some areas. Dominant herbaceous species include broomstraw, soft rush (*Juncus effusus*), sedges (*Carex* spp.) and bracken fern. Seedboxes (*Ludwigia* spp.) and meadow beauties (*Rhexia* spp.) are prevalent in the wetter areas. A comparable community type is not described by Schafale and Weakley (1990).

Pine Plantation

Various tracts within the study area are being used for commercial forestry operations. These operations include the establishment and management of loblolly pine plantations. This practice generally involves harvesting the current vegetation and clearing the debris, bedding the site, and then planting seedlings on the beds. Typically these plantations are also ditched and drained. Most of the pine plantations range in age from a few to 15 years old (estimated). Older pine dominated stands are also present, but it is not clear whether they originated as planted plantations. These mature pine stands vary from closed to open canopies, with stagger bush and giant cane occurring sporadically underneath. The understory and shrub layer is typically sparse, and the herbaceous layer is usually absent. A comparable community type is not described by Schafale and Weakley (1990).

Mixed Pine-Hardwood Forest

Variations of this community type, based on topography (flat and rolling), landscape position, and past levels of disturbance, occur in the study area. Differences in vegetation between the two subtypes are too subtle to warrant separate community classification. Slight topographic differences and species dominance result in some of this community type being classified as jurisdictional wetlands.

Dominant canopy species include loblolly pine, water oak, red maple, and sweetgum. Laurel oak (*Quercus laurifolia*) and southern magnolia (*Magnolia grandifolia*) are common in some areas but are absent from others. Understory species include red bay, ironwood (*Carpinus caroliniana*), sweetbay and American holly. The percentage and distribution of individual pine trees varies widely from one forested area to another.

A dense shrub layer dominated by doghobble, stagger bush, horsesugar, highbush blueberry, giant cane and inkberry occurs throughout, but is most prevalent in the lower-lying areas of this community type. Vines include greenbrier, poison ivy, grape (*Vitis* spp.), yellow jessamine, and Virginia creeper (*Parthenocissus quinquefolia*). The herbaceous component is sparse, with bracken fern, partridge berry (*Mitchella repens*), and sweet goldenrod (*Solidago odora*) most abundant. Royal fern (*Osmunda regalis*) and netted chain fern are present in some of the low-lying wetter areas. This vegetative association most closely resembles the Mesic Mixed Hardwood Forest (Coastal Plain Subtype) described by Schafale and Weakley (1990).

Hardwood Swamp

Although the majority of the water bodies in the Swift Creek subbasin are channelized, and the adjacent floodplain communities have been impacted by draining/ditching and clearing, some swamp forest still exists in the study area. This community type is located in floodplain areas adjacent to Swift Creek, Horsepen Swamp and Greens Mill Run, and is characterized by permanently to semi-permanently flooded conditions. This community is a marginal example of the Coastal Plain Small Stream Swamp (Blackwater Subtype) as described by Schafale and Weakley (1990); however, components of the Cypress-Gum Swamp (Blackwater Subtype) are also present.

The uneven aged canopy is dominated by red maple, swamp chestnut oak (*Quercus michauxii*), swamp tupelo (*Nyssa biflora*), sweetgum, and Carolina ash (*Fraxinus caroliniana*). The presence of bald cypress (*Taxodium distichum*) knees and a few scattered sub-canopy size trees indicates that this species was once a component of this swamp system. The understory consists of red maple, sweetgum, ironwood, red bay, and Carolina ash. Sweet pepperbush (*Clethra alnifolia*), Chinese privet (*Ligustrum sinense*), giant cane, and Hercules'-club (*Zanthoxylum clava-herculis*) comprise the shrub strata.

The herb layer is dense and consists of lizard's tail (*Saururus cernuus*), jewelweed (*Impatiens capensis*) netted chain fern, cinnamon fern, sensitive fern (*Onoclea sensibilis*), smartweed

(*Polygonum spp*.), pennywort (*Hydrocotyle spp*.), and arum (*Peltandra virginica*). Vines are very prevalent and include greenbrier, cross vine (*Anisostichus capreolata*), poison ivy, and grape.

Bottomland Forest

This community type typically occurs in low-lying areas associated with some of the streams in the project area. Along Swift Creek this community grades into the Hardwood Swamp community. This community is flooded less often than the swamp community, and in some areas it appears that the hydrology has been altered to the extent that jurisdictional wetland criteria are not met.

Canopy species include laurel oak, water oak, yellow poplar (*Liriodendron tulipifera*), red maple, sweetgum and loblolly pine. The understory consists of red bay, sweetbay, American holly and ironwood. The well developed shrub layer is dominated by titi (*Cyrilla racemiflora*), sweet pepperbush, Hercules'-club and Virginia willow (*Itea virginica*). Prevalent vines include greenbrier, poison ivy and grape. This community is a marginal example of the Mesic Mixed Hardwood Forest (Coastal Plain Subtype) as described by Schafale and Weakley (1990).

Disturbed-Maintained Communities

Disturbed-Maintained Communities are located on tracts of land where the vegetation is kept in a low growing, or early successional stage. This community includes roadside shoulders, utility corridors, agricultural fields, residential lots, and urban landscapes. This managed community type varies greatly with land use and past history, and contains various kinds of man-made structures and other hard surfaces (roads, driveways). A comparable community type is not described by Schafale and Weakley (1990).

The shoulders of the existing roadway are maintained in a low growing condition by mowing. Dominant species include crab grass (*Digitaria sanguinalis*), coastal bermuda (*Cynodon dactylon*), finger grass (*Chloris petraea*), henbit (*Lamium amplexicaule*), trumpet-creeper (*Campsis radicans*), and wild onion (*Allium canadense*). Various shrubs including silverling (*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), and inkberry occur at the border of this community and the forested communities present in the project area.

A large utility corridor occurs within the northern section of the study area. Much of this corridor meets jurisdictional wetland criteria. The vegetation is kept in a low-growing stage by routine mowing. Dominant species include those early successional species found in the roadside habitats, as well as yellow-eyed grass (*Xyris* sp.), cinnamon fern, and saplings of red maple, sweetgum, and yellow poplar.

Residential lots are covered with a variety of grasses such as winter ryes (*Lolium* spp.), coastal bermuda, fescue (*Festuca* spp.) and crab grass. Native and exotic herbs, shrubs and trees are abundant landscape species, and many lawns have large native trees such as loblolly pine, sweetgum, and red maple, which are residual from previous forested communities. Ornamental species are also prevalent.

Agricultural fields are the most abundant land use in the study area. Most of the fields are actively farmed for tobacco (*Nicotiana tabacum*), cotton (*Gossypium hirsutum*), soybeans (*Glycine max*), and corn (*Zea mays*), with few tracts left fallow. Vegetative diversity is low. Species common to disturbed habitats, particularly cocklebur (*Xanthium strumarium*), morning glory (*Ipomoea purpurea*), and rabbit tobacco (*Gnaphalium obtusifolium*) frequently occur along field edges.

3.5.2.2 Terrestrial Wildlife

Most of the mammals that may occur within the project study are conspicuous larger and medium-sized species that have wide habitat tolerances and commonly occur in anthropogenic landscapes. These species include white-tailed deer*[1] (*Odocoileus virginianus*), grey squirrel* (*Sciurus carolinensis*), and raccoon* (*Procyon lotor*). Other medium-sized mammals with wide habitat tolerances expected to occur within the project study area include bobcat (*Felis rufus*), grey fox (*Urocyon cinereoargenteus*), beaver (*Castor canadensis*), Virginia opossum* (*Didelphis virginiana),* and eastern cottontail* (*Sylvilagus floridanus*). Several species of bats are also likely to inhabit the study area, including silver-haired bat (*Lasionycteris noctivigans*), eastern pipistrelle (*Pipistrellus subflavus*), and red bat (*Lasiurus borealis*).

No quantitative surveys were conducted to document the small mammal populations within the project study area. The forested communities in the area are expected to provide habitat for small mammals including insectivores such as southeastern shrew (*Sorex longirostris*) and southern short-tailed shrew (*Blarina carolinensis*), and rodents such as white-footed mouse (*Peromyscus leucopus*), and golden mouse (*Ochrotomys nuttalli*). Early successional habitats and weedy disturbed areas likely provide habitat for different insectivores, such as least shrew (*Cryptotis parva*) and eastern mole (*Scalopus aquaticus*), and for rodents such as the hispid cotton rat (*Sigmodon hispidus*).

The avian component of the respective biotic communities is the most dynamic, since many species are migratory, and thus species composition varies seasonally. Bird sightings within the project study area include a combination of permanent residents and summer breeders or visitors. Some birds are habitat-specific, while others have more general habitat requirements.

Birds observed in the study area include species commonly occurring in both natural and anthropogenic habitats throughout eastern North Carolina. These include northern bobwhite quail (*Colinus virginianus*), mourning dove* (*Zenaida macroura*), blue jay* (*Cyanocitta cristata*), American crow* (*Corvus brachyrhynchos*), Carolina wren* (*Thyrothorus ludovicianus*), northern mockingbird* (*Mimus polyglottos*), and northern cardinal* (*Cardinalis cardinalis*). Eastern bluebird (*Sialia sialis*), American robin* (*Turdus migratorius*), downy woodpecker* (*Picoides pubescens*), tufted titmouse* (*Parus bicolor*), eastern phoebe (*Sayornis phoebe*), and song sparrow* (*Melospiza melodia*) are other common species that likely inhabit the project area.

[1] An asterisk (*) indicates that the species, or evidence of the species, was observed during field surveys in the project area.

Forested areas are important habitat for many wildlife species, providing crucial foraging, nesting, and/or denning/roosting areas. Neotropical migratory birds, in particular, are dependent on these areas. Species such as Acadian flycatcher (*Empidonax virescens*) and Louisiana waterthrush* (*Seiurus motacilla*) thrive in wooded riparian areas, while summer tanager* (*Piranga rubra*), pine warbler (*Dendroica pinus*), and red-eyed vireo* (*Vireo olivaceus*) prefer the upland woods. Red-shouldered hawk* (*Buteo lineatus*) and barred owl (*Strix varia*) hunt their prey in wooded riparian areas, while red-tailed hawk (*Buteo jamaicensis*) and great-horned owl (*Bubo virginianus*) forage in upland forests and adjacent open areas. Species such as downy woodpecker*, pileated woodpecker (*Dryocopus pileatus*), Carolina chickadee* (*Parus carolinensis*), and the tufted titmouse* are found in wooded areas throughout the year.

Two aquatic avian species, great blue heron* (*Ardea herodias*) and wood duck (*Aix sponsa*), were also seen during the study. Other water birds expected to occur within the project study area include great egret (*Casmerodius albus*), mallard (*Anas platyrhynchos*), and Canada goose* (*Branta canadensis*).

Two reptiles were observed within the project area: an eastern box turtle* (*Terrapene carolina*) and a 3-foot long snake skin of unidentified species. Reptiles expected to occur within the study area include rat snake (*Elaphe obsoleta*), black racer (*Coluber constrictor*), northern copperhead (*Agkistrodon contortrix*), eastern cottonmouth (*Agkistrodon piscivorus*), Carolina anole (*Anolis carolinensis*), and broad-headed skink (*Eumeces laticeps*). Common terrestrial or arboreal amphibians expected to occur within the project study area include American toad* (*Bufo americanus*) and spring peeper* (*Pseudacris crucifer*). Small ponds, semi-permanently inundated floodplain wetlands, and ephemeral pools located throughout the project study area are expected to provide suitable breeding habitat for an array of other amphibians as well as for turtles.

3.5.2.3 Aquatic Communities

Aquatic habitats within the project study area range from ephemeral waters present in intermittent, channelized, first order streams to permanent, riverine habitat within Swift Creek. Swift Creek and Horsepen Swamp are the largest streams within study area. The diversity of streams within the project study area provide habitat for a variety of aquatic species. Large streams with good water quality and a diversity of aquatic habitats are expected to support a more diverse assemblage of fish and other aquatic organisms than smaller tributaries.

No recent sampling for fish has been conducted within the project study area. The NC 102 crossing of Swift Creek was sampled in 1995, and the following species were reported: eastern mosquitofish (*Gambusia holbrooki*), tessellated darter (*Etheostoma olmstedi*), tadpole madtom (*Noturus gyrinus*), yellow bullhead (*Ameiurus natalis*), margined madtom (*Noturus insignis*), redfin pickerel (*Esox americanus*), chain pickerel (*Esox niger*), comely shiner (*Notropis amoenus*), satinfin shiner (*Cyprinella analostana*), dusky shiner (*Notropis cummingsae*), redbreast sunfish (*Lepomis auritus*), pumpkinseed (*Lepomis gibbosus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), creek chubsucker (*Erimyzon*

oblongus), and pirate perch (*Aphredoderus sayanus*) (NCDWQ 2003f). Little Contentnea Creek was also sampled in 1995 at the US 264 crossing, and the following species were recorded there: eastern mudminnow (*Umbra pygmaea*), eastern mosquitofish, yellow bullhead, redfin pickerel, golden shiner (*Notemigonus crysoleucas*), flier (*Centrarchus macropterus*), mud sunfish (*Acantharchus pomotis*), pumpkinseed, warmouth (*Lepomis gulosus*), bluegill, pirate perch, and American eel (*Anguilla rostrata*) (NCDWQ 2003f).

The National Marine Fisheries Service (NMFS) indicated that anadromous fish are present in the major tributaries of the Neuse and Tar-Pamlico river basins. Likely species present include Alewife (*Alosa pseudoharengus*), American Shad (*Alosa sapidissima*), Hickory shad (*Alosa mediocris*), Blueback herring (*Alosa aestivalis*), and American eel (*Anguila rostrata*). The NMFS was advised that during the field meeting on October 31, 2005, the USEPA, NCWRC, and USFWS concurred with the decision for no bridging since the streams are small. NMFS believes that the potential impacts to these fisheries are likely minimal due to the presence of small streams in the corridors. According to North Carolina Wildlife Resources Commission (NCWRC), no in-water work moratoriums are required for fisheries concerns, including anadromous fish, at any of the proposed stream crossings in the study area.

Streams within the project study area provide riparian and benthic habitat for a variety of amphibians and aquatic reptiles. Ephemeral pools and other flooded wetlands provide additional aquatic habitat, especially for breeding amphibians. No aquatic amphibians or reptiles were observed within the project area, although unidentified frogs or toads were heard near Swift Creek. Amphibians and reptiles expected to occur within aquatic habitats throughout the project study area include green frog (*Rana clamitans*), southern leopard frog (*Rana utricularia*), Fowler's toad (*Bufo woodhousei*), redback salamander (*Plethodon cinereus*), and southern dusky salamander (*Desmognathus auriculatus*).

Evidence of aquatic macroinvertebrates was observed during other field work. Numerous crayfish chimneys were observed along streams. All stream banks within the project study area were visually surveyed for mussel shells; however, no signs of freshwater mussels were observed. Earlier field studies (NCDOT 1993) documented numerous aquatic macroinvertebrates. Also, water striders (Family Gerridae), damselflies and dragonflies (Order Odonata), water beetles (Order Coleoptera), and mosquitoes (*Anopheles* spp.) were seen on several of the ponds.

Within the study area, one type of wetland system exists: palustrine. The palustrine system (denoted in the classification system by a "P") consists of all nontidal wetlands dominated by trees, shrubs, and persistent emergents. Subclasses for this system and the corresponding definitions include:

- Forested (FO) – Characterized by woody vegetation over 20 feet in height
- Emergent (EM) – Characterized by erect, herbaceous vegetation present for most of the growing season.

All wetlands identified within the study corridors were palustrine forested (PFO) wetlands. One wetland also contained an emergent wetland (PEM) component. No high quality wetlands were identified in the project area. Detailed descriptions of each wetland are included in the *Jurisdictional Waters Report* (NCDOT 2006).

3.5.2.4 Natural Heritage Areas, Natural Area, and Natural Communities

Natural Heritage Areas are North Carolina registered protected areas with known occurrences of protected plant or animal species. Natural Areas are areas with no current protection status but with known occurrences of protected plant or animal species. Natural Communities represent exceptional examples of a particular natural community. There are no Natural Heritage Areas, Natural Areas, or Natural Communities within the study area.

3.5.3 Water Resources

This section summarizes information contained in the *Hydraulic Technical Memorandum* (Lochner 2003), the *Natural Resources Technical Report* (NCDOT 2004), and the *Natural Resources Technical Memorandum* (NCDOT 2006) prepared for the project.

3.5.3.1 Groundwater

Underground aquifers in eastern North Carolina provide water for municipalities, industries, and agriculture. The Black Creek and Upper Cape Fear Aquifers extend from Pitt and Lenoir counties through Craven and Onslow counties. The aquifers yield between 250 and 800 gallons per minute through wells at depths of 350 to 550 feet. Average yields are 450 gallons per minute.

Throughout eastern North Carolina, extensive land-drainage networks installed to increase farmable land have lowered the water table and reduced the rate of recharge to deeper aquifers. Additionally, withdrawals by municipalities and rural water systems have increased pressure on these aquifers. Water levels in aquifers in Pitt County are declining at a rate of 6 feet per year due to withdrawals.

3.5.3.2 Surface Waters

The project is located in subbasins of the Neuse and Tar-Pamlico River watersheds. These river basins are classified by Hydrologic Cataloging Units, to which Hydrologic Unit Codes (HUC) are assigned; HUC number 03020103 for the Tar-Pamlico River Basin and HUC numbers 03020202 and 03020203 for the Neuse River Basin (USGS 1987). Approximately one third of the project study area, on the north end, is in the Tar-Pamlico River drainage. Greens Mill Run is the only named tributary to the Tar-Pamlico River within the study area. Harris Mill Run, a Tar-Pamlico River tributary farther north, receives drainage from a small portion of the study area but is not crossed by any of the alternatives.

The southern two-thirds of the project study area are located in the Neuse River basin. The study area crosses the interstream divide separating the Middle Neuse (03020202) and Contentnea

(03020203) HUCs. Most of the study area falls into Middle Neuse HUC and is drained to the south and east by Swift Creek and its named and unnamed tributaries. Major named Swift Creek tributaries include Horsepen Swamp, Gum Swamp, and Simmon Branch. The remaining area, a small portion of the western edge of the study area, drains to unnamed tributaries and into Little Contentnea Creek.

Best Usage Classification

A Best Usage Classification is assigned to waters of the state of North Carolina based on the existing or contemplated best usage of various streams or segments of streams in the basin. Four named streams within the project study area are crossed by the project alternatives, and five other named streams receive drainage from the project area. The unnamed tributaries (UT) present within the project area have not been individually classified by NCDWQ; therefore, they carry the same classification as their receiving streams.

Table 3-17 lists the Stream Index Numbers (SIN) for the named streams that are either crossed by the alternatives or that receive drainage from the project study area. The eight-digit hydrologic unit code, Best Usage Classifications, and Subbasin Numbers are also listed (NCDWQ 2003b, NCDWQ 2003c).

All of the streams that receive drainage from the study area have been assigned a Best Usage Classification of C. Class C waters are freshwaters protected for secondary recreation, fishing, aquatic life (including propagation and survival), and wildlife. Secondary recreation is any activity involving human bodily contact with water on an infrequent or incidental basis (NCDWQ 2003c).

TABLE 3-17: SUMMARY OF RIVER BASIN CLASSIFICATION DATA

River Basin	Stream Name	USGS 8-Digit Hydrologic Cataloging Unit Number (HUC)	Stream Index Number (SIN)*	Best Usage Classification (BUC)*	Subbasin Number (SBN)*
Tar-Pamlico		Lower Tar			
	Harris Mill Run	03020103	28-92	C; NSW	03-03-05
	Greens Mill Run		28-96	C; NSW	03-03-05
Neuse		Middle Neuse			
	Swift Creek	03020202	27-97-(0.5)	C; Sw; NSW	03-04-09
	Gum Swamp		27-97-1	C; Sw; NSW	03-04-09
	Nobel Canal		27-97-2	C; NSW	03-04-09
	Horsepen Swamp		27-97-3	C; Sw; NSW	03-04-09
	Simmon Branch		27-97-3.5	C; Sw; NSW	03-04-09
	Fork Swamp		27-97-4	C: Sw; NSW	03-04-09
Neuse		Contentnea			
	Little Contentnea Creek	03020203	27-86-26	C; Sw; NSW	03-04-07

*NCDWQ 2003b

Swift Creek, Simmon Branch, Gum Swamp, Fork Swamp, Little Contentnea Creek, and Horsepen Swamp all carry the supplemental classifications of Sw (Swamp waters). Swamp waters are defined as those waters that have low velocities and other natural characteristics that

are different from adjacent streams. All streams that receive drainage from the study area are supplementally designated Nutrient Sensitive Waters (NSW). (The entire Neuse River Basin is designated as NSW.) Nutrient Sensitive Waters are those waters that require additional nutrient management, because of their susceptibility to excessive growth of microscopic and macroscopic vegetation.

No waters classified as High Quality Waters (HQW), Outstanding Resource Waters (ORW), Water Supplies (WS I or WS II), which are waters that are afforded special protection, occur within 1 mile of the project area.

Benthic Macroinvertebrate Ambient Network

Basinwide water quality assessments are conducted by the Environmental Sciences Branch, Water Quality Section of the NCDWQ through the Benthic Macroinvertebrate Ambient Network (BMAN). BMAN is part of an ongoing ambient water quality monitoring program which addresses long term trends in water quality. The program assesses water quality by sampling for selected benthic macroinvertebrate organisms at fixed monitoring sites. Macroinvertebrates are sensitive to very subtle changes in water quality; thus, the species richness and overall biomass of these organisms are interpreted as reflections of water quality. The samples are evaluated on the number of intolerant taxa groups (i.e., Ephemeroptera, Plecoptera, and Trichoptera (EPT)) present and a taxa richness value, or EPT S. A biotic index value is also calculated for the sample that summarizes tolerance data for all species of each collection. The taxa richness and biotic index values are given equal weight in final site classification. Both values primarily reflect the effects of chemical pollution. The values poorly measure the effects of physical water pollutants such as sediment. Streams can then be given a bioclassification ranging from Poor to Excellent.

According to the *Basinwide Assessment Report, Neuse River Basin* (NCDWQ 2001) and the *Basinwide Assessment Report, Tar-Pamlico River Basin* (NCDWQ 2003a), there are no BMAN monitoring stations within the study area. In the Neuse River subbasin 03-04-07, the benthic macroinvertebrate monitoring station closest to the project area is on Little Contentnea Creek, approximately 4.0 miles west of the project study area. This monitoring site (B-8) was sampled in 2000, and received a bioclassification of Fair. In the Neuse River subbasin 03-04-09, Site B-1, located on Swift Creek approximately 18 miles downstream of the study area, where it crosses NC 188 in Craven County, received bioclassification ratings of Fair in both 1995 and 2000.

Section 303(d) Waters

North Carolina's §303(d) List is a comprehensive public accounting of all impaired waterbodies. An impaired waterbody is one that is damaged by pollutants, such as nitrogen, phosphorus, fecal coliform bacteria, or by pollution such as hydromodification or habitat degradation. The source of impairment might be from point sources, non-point sources, and atmospheric deposition. The standards violation might be due to an individual pollutant, multiple pollutants, or an unknown cause of impairment. This list is compiled by the North Carolina Division of Water Quality and submitted to the EPA by April 1 of every even year.

Little Contentnea Creek (SIN 27-86-26), west of the study area, is on North Carolina's 2000, 2002, 2004 and 2006 Section 303(d) lists for biologically impaired waters due to low dissolved oxygen (NCDWQ 2007). Non-point source pollution is the likely cause of impairment to this stream. Swift Creek (SIN 27-97-[0.5]), from its headwaters near Thomas Langston Road to its confluence with the Neuse River, is on the 2002, 2004, and 2006 Section 303(d) lists as biologically impaired. The probable causes of impairment are channelization and agricultural runoff. These segments are shown on Figure 3-7.

Best Management Practices (BMPs) should be employed by the construction contractor to first avoid and then minimize impacts to impaired waters. Erosion and sediment should be controlled by implementation of a Sediment and Erosion Control Plan.

Permitted Dischargers

Discharges that enter surface waters through a pipe, ditch, or other well-defined point of discharge are broadly referred to as "point sources." Wastewater "point source" discharges include municipal (city and county) and industrial wastewater treatment plants, and small domestic wastewater treatment systems serving schools, commercial offices, residential subdivisions, and individual homes. Storm water "point source" discharges include storm water collection systems for municipalities and storm water discharges associated with certain industrial activities. "Point source" dischargers in North Carolina must apply for and obtain a National Pollutant Discharge Elimination System (NPDES) permit. Discharge permits are issued under the NPDES program and delegated to NCDWQ by the Environmental Protection Agency (EPA).

There are six permitted point source discharges (three major and three minor), located within the subbasins that receive drainage from the project area (NCDWQ 2003e). However, none are located within the project study area.

Non-Point Source Discharges

Unlike pollution from industrial and sewage treatment, non-point source (NPS) pollution comes from many non-discrete sources. As rainfall or snowmelt runoff moves over the earth's surface, natural and man-made pollutants are collected, carried, and ultimately deposited into lakes, rivers, wetlands, coastal waters, and groundwater. Non-point source pollution includes fertilizers, herbicides, and insecticides from farms and residential areas; hydrocarbons and chemicals from urban runoff; sediments from construction sites, land clearing, and eroding stream banks; bacteria and nutrients from livestock, animal wastes, and faulty septic systems; and atmospheric deposition. The effects of NPS pollutants on water resources vary, and in many instances, may not be known. These pollutants generally have harmful effects on drinking water supplies, recreation, wildlife, and fisheries.

Biologists conducted a visual observation of potential NPS discharges located within and near the project study area. Atmospheric deposition from passing vehicles; fertilizers, herbicides, and insecticides from nearby residential and agricultural areas; and hydrocarbon and chemical runoff from nearby residential driveways were identified as potential sources of NPS pollution near the

project area. Overall, the threat of non-point source discharge is moderate due to the small to moderate width of the riparian buffer along many of the streams in the project area, and the large expanses of agricultural lands.

According to the *Basinwide Assessment Report, Neuse River Basin* (NCDWQ 2001), there is moderate nonpoint source pollution potential in the 03-04-09 subbasin. This is likely due to the many hog farms that are located in the subbasin, especially in the northwestern region. Within the 03-04-07 subbasin, most of the subbasin has a high nonpoint source pollution potential, including runoff from cropland, forageland, and animals operations.

3.5.4 Jurisdictional Issues

3.5.4.1 Wetlands, Streams, and Ponds

Water bodies such as rivers, lakes, and streams are subject to jurisdictional consideration under the Section 404 program of the Clean Water Act (CWA). Additionally, wetlands are also classified as "Waters of the United States" and are subject to jurisdictional consideration by the USACE. Wetlands have been defined by EPA and USACE as:

> "Those areas that are inundated or saturated by groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" [33 CFR §328.3(b)(1986)].

Wetlands subject to review under Section 404 of the CWA (33 USC 1344) are defined by the presence of three primary criteria: hydric soil; hydrophytic vegetation; and evidence of wetland hydrology at or near the surface for a portion (12.5 percent) of the growing season (Environmental Laboratory 1987). Wetlands and streams within the project study area are depicted on Figure 3-7.

3.5.4.2 Riparian Buffers

North Carolina Riparian Area Rules are in place for the protection and maintenance of Vegetated Riparian Buffers in the Tar-Pamlico River Basin (15A NCAC 02B .0259) and Neuse River Basin (15 NCAC 2B .0233). The buffer protection rules require that up to 50 feet (16 meters) of riparian area be protected and maintained on the banks of waterways in the basins. The rules apply to perennial and intermittent channels, lakes, ponds, and estuarine waters that are shown on the most recent version of either the County Soil Survey or USGS topographical map. These rules do not require establishment of new vegetated buffers unless the existing use of the buffer changes. Streams within the study area were evaluated for applicability of the buffer rules. In particular, completion of the NCDWQ Stream Classification Forms aided in determining whether a stream is subject to riparian buffer rules. Only a NCDWQ representative can determine whether a stream is exempt from buffer requirements.

3.5.4.3 Protected Species

Species with the federal classification of Endangered (E), Threatened (T), or officially Proposed (P) for such listing, are protected under provisions of Section 7 and Section 9 the Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.) as amended. Federally protected species listed as occurring in Pitt County (USFWS 2003a) are shown in Table 3-18. Descriptions of these federally protected species along with habitat requirements are presented in the following table. Note that although these species are listed for Pitt County, none are listed as occurring within the area depicted by either of the USGS 7.5 minute quadrangle maps that cover the study area. Impacts to these species, including Biological Conclusions, are discussed in Section 4.5.4.5.

TABLE 3-18: FEDERALLY LISTED SPECIES LISTED FOR PITT COUNTY [a]

Common Name	Scientific Name	Federal Status	State Status	Potential Habitat Present
Vertebrates				
West Indian manatee	*Trichechus manatus*	E	E	Yes
Red-cockaded woodpecker	*Picoides borealis*	E	E	No
Invertebrates				
Tar River spinymussel	*Elliptio steinstansana*	E	E	Yes

a The bald eagle, previously listed for Pitt County, was delisted by USFWS on August 8, 2007; however, it is still protected under separate federal regulations.

West Indian Manatee *(Trichechus manatus)*
Family*: Trichechidae*
Federally Listed: 1967
The West Indian manatee is a native of the warm waters of sub-tropical south Florida (USFWS 1993). They prefer shallow saltwater bays, slow-moving rivers, canals, estuaries, and coastal waters. Manatees spend most of their time feeding, resting, or traveling. They are completely herbivorous marine mammals, feeding on turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filliforme*), various species of marine algae, and water hyacinths (*Eichhornia crassipes*). They can consume up to 10 percent of their body weight daily in vegetation. Manatees are a sub-tropical, air breathing species that can grow to over 13 feet in length and weigh up to 3,500 pounds. West Indian manatees have very little fat and are susceptible to cold.

Manatees are able to use shallow channels that may not seem suited for such a large mammal. O'Shea and Ludlow (1992) wrote that the primary habitat requirements for this species are access to vascular aquatic plants, freshwater sources, and proximity to a channel 3.3 to 6.6 feet deep.

Manatees are migratory animals which may use marine, brackish, or freshwater habitats, moving freely between salinity extremes. In coastal areas of the United States, West Indian manatees congregate in Florida in winter. During the summer season, when waters are warmer, manatees

may be found as far west as Alabama and as far north as Virginia and the Carolinas. Very rarely are they found further north.

In November 1989, a manatee was reported in the Tar River, approximately 54.7 miles from the Pamlico Sound, and near the city of Greenville. Another manatee traversed 36 miles up the Tar River from the Pamlico Sound, to the town of Washington. This sighting occurred in September 1985 (Schwartz 1995).

Red-cockaded woodpecker *(Picoides borealis)*
Family*: Picidae*
Federally Listed: 1970
This small, non-migratory woodpecker measures 7 to 8.5 inches long, has a black head, prominent white cheek patch, and black-and-white barred back (USFWS 2001). Males often have red markings (cockades) behind the eye, but the cockades may be absent or difficult to see (Potter et al. 1980). Primary habitat consists of mature to over-mature southern pine forests dominated by loblolly, long-leaf (*P. palustris*), slash (*P. elliottii*), pond (*P. serotina*), or other southern pine species. Foraging habitat is comprised of open pine or pine/mixed hardwood stands 30 years of age or older (Henry 1989). Primary habitat consists of mature to over-mature southern pine forests dominated by loblolly, long-leaf, slash, pond, or other southern pine species.

Nest cavities are constructed in the heartwood of living pine trees, generally older than 60 years that have been infected with red-heart disease. Excavation of a cavity usually initiates through an old dead branch opening in the bole of the tree. An aggregate of cavity trees is called a cluster and may include 1 to 20+ cavity trees on 3.0 to 60 acres. The average size of a cluster is about 10 acres. The typical cluster is occupied by a related group of individuals called a clan. The woodpecker drills holes into the bark around the excavated cavity entrance, resulting in a shiny, resinous buildup around the entrance that allows for easy detection of active nest trees.

The typical territory for a clan will range from 60 to 600 acres in size. Red-cockaded woodpecker prefers mature, open, pine forests and will not generally range greater than about 130 feet over cleared ground or hardwood stands. The clan will only exploit those pine stands for food that are contiguous with their nesting habitat. Pine flatwoods and pine-dominated savannas, which have been maintained by frequent natural fires, serve as ideal nesting and foraging sites for this woodpecker. Development of a thick understory may result in abandonment of cavity trees.

Tar River Spinymussel *(Elliptio steinstansana)*
Family*: Unionidae*
Federally Listed: 1985
The Tar River spinymussel is a recently described (Johnson and Clarke 1983) species endemic to North Carolina and the Tar-Pamlico and Neuse River watersheds (NCNEWP 2003). This species is most closely associated with unconsolidated beds of coarse sand and gravel in relatively fast flowing water. It prefers streams with banks that are shaded by mature trees, which form a closed canopy over smaller streams, creeks, and headwater river habitats. It also prefers areas with

stable stream banks held in place by extensive root systems, and with good to excellent water quality. The species breeds from late May to the end of June.

3.5.4.4 Federal Species of Concern and State Listed Species

Federal Species of Concern (FSC) are those plant and animal species that may or may not be listed in the future. These species are not legally protected under the Endangered Species Act and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as threatened or endangered.

Table 3-20 includes FSC and state-listed species for Pitt County and their state classifications (Franklin and Finnegan 2004 and LeGrand, et al. 2004). The table also includes information on whether suitable habitat is present for each species. Organisms that are listed as Endangered (E), Threatened (T), or Special Concern (SC) on the North Carolina Natural Heritage Program list of Rare Plant and Animal Species are afforded state protection under the State Endangered Species Act (GS 113-331) and the North Carolina Plant Protection and Conservation Act of 1979 (GS 106-202.12 et seq.). However, the level of protection given to state-listed species does not apply to NCDOT activities. Species with the status of Candidate (C), Significantly Rare (SR), Watch List (WL), and Proposed (P) do not receive State protection.

A review of the NCNHP records on June 22, 2006 indicate that the Southern hognose snake (*Heterodon simus*) is the only FSC reported in the project vicinity, but this record is based on an obscure record of uncertain date. The location of the sighting is currently an agricultural field south of US 13/264 BUS, in an area with newer subdivisions. The NHP does not have records of any other state-listed species within the project study area, other than the records previously discussed under Federal Species of Concern.

TABLE 3-19: FEDERAL SPECIES OF CONCERN (FSC) AND STATE-LISTED SPECIES FOR PITT COUNTY

Common Name	Scientific Name	Federal Status	State Status[a]	Natural Heritage Program Record Type[b]	Potential Habitat Present
Vertebrates					
Henslow's sparrow	*Ammodramus henslowii*	FSC	SR	Current	Yes
Neuse madtom	*Noturus furiosius*	FSC	---	Historic	Yes
Pinewoods shiner	*Lythrurus matutinus*	FSC	SR	Obscure	Yes
Star-nosed Mole - Coastal Plain Population	*Condylura cristata pop 1*	---	SC	Current	Yes
Loggerhead Shrike	*Lanius ludovicianus ludovicianus*	---	SC	Current	Yes
Timber Rattlesnake	*Crotalus horridus*	---	SC	Obscure	Yes
Southern Hognose Snake	*Heterodon simus*	---	SC	Obscure	No
Pigmy Rattlesnake	*Sistrurus miliarius*	---	SC	Current	No
Neuse River Waterdog	*Necturus lewisi*	---	SC	Historic	Yes
Least Brook Lamprey	*Lampetra aepyptera*	---	T	Historic	Yes
Carolina Madtom	*Noturus furiosus*	---	SC (PT)	Historic	Yes
Invertebrates					
Atlantic pigtoe	*Fusconaia masoni*	FSC	E	Historic	Yes
Triangle Floater	*Alasmidonta undulata*	---	T	Historic	Yes
Yellow Lampmussel	*Lampsilis cariosa*	---	E	Historic	Yes
Eastern Lampmussel	*Lampsilis radiata radiata*	---	T	Current	Yes
Eastern Pondmussel	*Ligumia nasuta*	---	T	Historic	No
Green floater	*Lasmigona subviridis*	FSC	E	None[c]	No
Tar River crayfish	*Procambarus medialis*	FSC	---	---[d]	---
North Carolina Spiny Crayfish	*Orconectes carolinensis*	---	SC	Historic	Yes
Vascular Plants					
Carolina asphodel	*Tofeildia glabra*	FSC	---	---[d]	---

a E=Endangered, T=Threatened, SC=Special Concern, (PT)=Proposed Threatened, SR=Significantly Rare
b Current: The element was seen in the county within the last 20 years.
Historic: The element was last observed in the county more that 20 years ago.
Obscure: The date the element was last observed in the county is uncertain.
c This range of this species covers Pitt County, however NCNHP has no records of this species in Pitt County
d This species is no longer tracked by NCNHP
NCNHP records reviewed June 19, 2006 (http://207.4.179.50/nhp/county.html)

3.5.4.5 Bald Eagle

Bald eagle *(Haliaeetus leucocephalus)*
Family*: Accipitridae*
First Listed: 1967
Delisted by USFWS: 2007
The bald eagle was a federally listed species at the time the Draft Environmental Impact Statement for this project was prepared. USFWS delisted this species on August 8, 2007, although the species is still protected under the Bald and Golden Eagle Protection Act.

The bald eagle is a large raptor with a wingspan reaching seven feet. Adults have a dark brown body with a pure white head and tail, whereas the juvenile plumage is chocolate brown to blackish with white mottling on the tail, belly, and underwings. Adult plumage is fully acquired by the fifth or sixth year.

The bald eagle is primarily associated with coasts, rivers, and lakes, usually nesting near large bodies of water where it feeds. It preys primarily on fish, but will feed on birds, mammals, turtles, and carrion when fish are unavailable.

In the southeast, the nesting and breeding season runs from September to December. Large nests up to six feet across and weighing hundreds of pounds are constructed from large sticks, weeds, cornstalks, grasses, and sod. Preferred nesting sites are usually within one-half mile of water, have an open view of the surrounding area, and are in the largest living tree, usually a pine or cypress. Excessive human activity may exclude an otherwise suitable site from use. Wintering areas generally have the same characteristics as nesting sites, but may be farther from shores (USFWS 2003b).

The bald eagle ranges throughout all of North America. Breeding sites in the southeast are concentrated in Florida, coastal South Carolina, and coastal Louisiana, and sporadically located elsewhere (USFWS 1987).