United States Department of Agriculture

Soil Conservation Service

In cooperation with North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Johnston Soil and Water Conservation District; and Johnston County Board of Commissioners

Soil Survey of Johnston County, North Carolina

How To Use This Soil Survey

General Soil Map

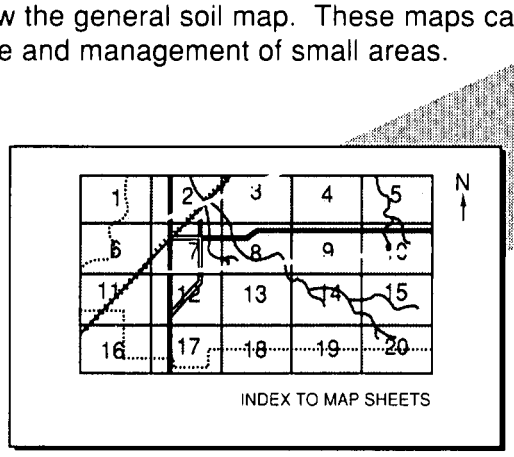
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

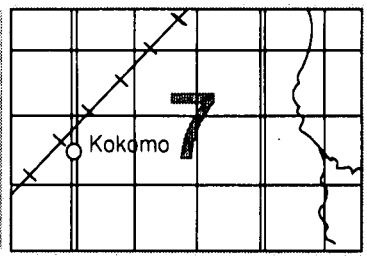
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



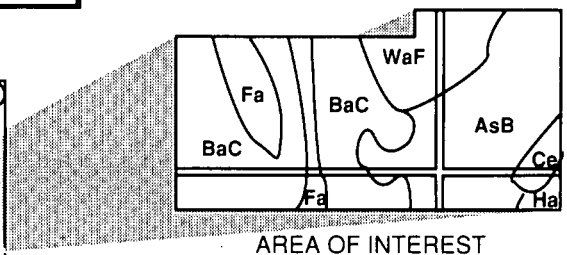
INDEX TO MAP SHEETS



MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the North Carolina Agricultural Research Service, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1983. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This soil survey was made cooperatively by the Soil Conservation Service; the North Carolina Department of Environment, Health, and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Cooperative Extension Service; the Johnston Soil and Water Conservation District; and the Johnston County Board of Commissioners. It is part of the technical assistance furnished to the Johnston County Soil and Water Conservation District. The Johnston County Board of Commissioners provided financial assistance for the survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

The first soil survey for Johnston County was published in 1911 by the U.S. Department of Agriculture. This survey updates the first survey, provides more detailed maps on aerial photographs, and contains more interpretative information *(15)*.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Tobacco growing in Johnston County. It is one of the major cash crops. Agriculture is very important to the economy of the county.

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Issued October 1994

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Johnston County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the North Carolina Cooperative Extension Service.

Coy A. Garrett
State Conservationist
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Soil Survey of Johnston County, North Carolina

By Daniel J. Bliley, Soil Conservation Service

Soils surveyed by Daniel J. Bliley, Joel W. Cawthorn, Marcus R. Bostian, and G. Craig Turner, Soil Conservation Service, and Susan B. Southard, North Carolina Department of Environment, Health, and Natural Resources

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Johnston Soil and Water Conservation District; and the Johnston County Board of Commissioners

JOHNSTON COUNTY is in the east-central part of North Carolina (fig. 1). In 1980, it had a population of 70,599, mostly in rural areas. One-third of the population was in the nine towns in the county. Smithfield, the largest town and county seat, had a population of 7,288. Selma had a population of 4,762; Clayton, 4,091; Benson, 2,792; Kenly, 1,433; Four Oaks, 1,049; Princeton, 1,034; Pine Level, 935; and Micro, 438 *(21)*. Raleigh, the State capitol, is about 30 miles west in Wake County.

The county has a total area of 510,138 acres, or 797 square miles. This total includes 1,075 acres of bodies of water larger than 40 acres. About half of the land area is used as farmland. About 52 percent of the county, or 265,344 acres, meets the requirements for prime farmland. Areas of prime farmland are scattered throughout the county but are mainly in the Norfolk-Goldsboro-Rains general soil map unit.

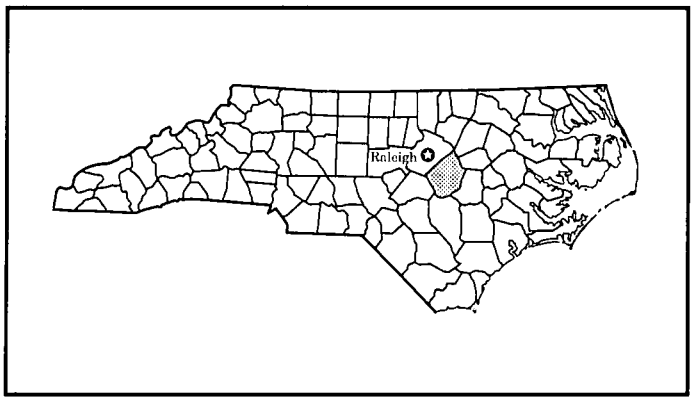

Figure 1.—Location of Johnston County in North Carolina.

General Nature of the County

This section gives general information concerning Johnston County. It describes history and development; physiography, relief, and drainage; water supply; and climate.

History and Development

The Tuscarora Indians were the original inhabitants of the Johnston County area. Settlers from England did not arrive in significant numbers until after the Tuscarora were defeated in battle by the British in the early part of the 18th century. The county was organized in 1746 from Craven County. It was named in honor of Gabriel Johnston, a former royal governor of the colony. Originally, it had a much larger land area than it does now. It extended as far east as Kinston and as far west as Reidsville *(13)*.

In 1777, the town of Smithfield was established by an act of legislature on the site of the farm of Captain John Smith. The farm had been an important center for the tobacco trade. Tobacco was shipped by barge down the

Neuse River to New Bern and then was shipped to England. The town is still an important center for the tobacco industry.

Johnston County was the scene of the last major battle of the Civil War. The battle was fought in the Bentonville area, which is in the southern part of the county.

Until the middle of the 19th century, Smithfield was the only significant town in the county. The other towns developed later, mainly as stops along the railroad. Construction of the railroad began prior to the Civil War.

Until the 20th century, agriculture and lumber were the only industries in the county. During the early part of the 20th century, a few textile mills were established in some of the towns. Agriculture did not become highly mechanized until after World War II. This mechanization caused a sharp decrease in the number of persons employed on farms. It did not, however, cause a significant decrease in the population of the county because new industries moved into the county. These industries created new jobs for those people that were displaced from farm work.

The population of the county has increased by over 17,000 since 1960. About 80,425 people lived in the county in 1987. Urbanization is increasing in the county and will undoubtedly continue to increase. It is the result of increased industrial employment; the convenient location of major transportation corridors, such as Interstate 95, Interstate 40, and U.S. Highway 70; and the close proximity of the county to Raleigh and the Research Triangle Park. Many persons who live in Johnston County commute to work in Raleigh or at the Research Triangle Park. Most of the new housing in the county is in the northern and western parts of the county near the Wake County line.

Physiography, Relief, and Drainage

About 65 percent of Johnston County is in the middle and upper parts of the Southern Coastal Plain physiographic region. The northern 20 percent of the county is in the Southern Piedmont physiographic region. The area of transition between the two regions is known as the "Fall Line." About 15 percent of the county is on the flood plains and terraces along the Neuse River and its tributaries.

Soils in the Piedmont region formed in the residues of crystalline bedrock. Soils in the Coastal Plain region formed in sediments deposited several million years ago by the ocean and streams. The flood plains along the Neuse River consist of relatively recent deposits of sediments that are not as highly weathered as the sediments in the Coastal Plain region.

Most of the county is in the Neuse River basin. A considerable part of the county, however, is actually drained by the major tributaries of the river. Some of the tributaries have head waters outside of the county. Most of the county is well drained. Several areas, however, are generally poorly drained. They include areas east of Smithfield, between Stancil's Chapel and Kenly, east of Benson, and in the Neuse River valley and other large stream valleys.

Elevation ranges from 75 feet above sea level, where the Neuse River leaves the county at the Wayne County line, to more than 370 feet at the North Carolina State University Experiment Station, which is near the Wake County line. Relief varies considerably. The Neuse River bottom has very little relief. The large interstream areas in the eastern and southern parts of the county also are nearly level and have low relief. Relief varies from 20 to 60 feet along the edges of the stream valleys that dissect these areas. In the northern and western parts of the county, the interstream divides are relatively narrow and relief in the adjoining stream valleys varies from 50 feet to more than 150 feet.

Water Supply

Ground water in the county is used for domestic and industrial purposes and for irrigation. Water supplies for homes and industries are generally adequate. Most households in rural areas get their water from wells, which are sunk into sediments in the Coastal Plain region or into the crystalline bedrock in the Piedmont region. Generally, the water from these wells is good quality. The water from wells bored into slate or phyllite rocks, however, has a high content of iron and sulfur *(12)*.

Water for industry and for most of the towns in the county is supplied by deep wells or by the Smithfield water plant, which obtains water from the Neuse River. Water is not as plentiful for irrigation. Most of the water for irrigation is obtained from excavated pond reservoirs or from embankment ponds. These sources are not adequate to supply water to all of the cropland in the county and are expensive to develop. As a result, only high-value crops, such as tobacco, small fruits, and vegetables, are irrigated.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Smithfield, North Carolina, in the period 1962 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 44 degrees F and the average daily minimum temperature is

32 degrees. The lowest temperature on record, which occurred at Smithfield on January 17, 1977, is 2 degrees. In summer, the average temperature is 78 degrees and the average daily maximum temperature is 90 degrees. The highest recorded temperature, which occurred at Smithfield on July 21, 1952, is 106 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 48 inches. Of this, 26 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 8.02 inches at Smithfield on August 24, 1955. Thunderstorms occur on about 46 days each year. Every few years in late summer or autumn, a tropical storm moving inland from the Atlantic Ocean causes extremely heavy rain for 1 to 3 days.

The average seasonal snowfall is about 2 inches. The greatest snow depth at any one time during the period of record was 7 inches.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 60 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in Johnston County. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They studied many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Soils occur in an orderly pattern that results from the combined influence over time of climate, parent material, relief, and plants and animals. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. This model enables the soil scientists to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify the soils. After describing the soils and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. The data from these analyses and tests and from field-observed characteristics and soil properties are used to predict behavior of the soils under different uses. Interpretations are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists.

For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a relatively high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will be at a specific level in the soil on a specific date.

Soil boundaries are drawn on aerial photographs and each delineation is identified as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in accurately locating boundaries.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called minor soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are identified in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Dominantly Nearly Level and Gently Sloping, Well Drained to Poorly Drained Soils; on Uplands of the Coastal Plain

These soils are mainly on the broad or moderately broad interstream divides on the Coastal Plain. The Norfolk, Wagram, and Blanton soils are near the dissected edge of the mapped areas or in the narrower interstream areas. The Goldsboro, Lynchburg, Rains, and Bonneau soils are in the flatter, central part of the interstream areas. Slopes range from 0 to 6 percent. This group makes up about 53 percent of the county.

1. Norfolk-Goldsboro-Rains

Nearly level and gently sloping, well drained, moderately well drained, and poorly drained soils that have a sandy or loamy surface layer and a predominantly loamy subsoil; on uplands of the Coastal Plain

This map unit is at the edge of broad interstream areas or on moderately broad or broad ridges in the uplands. The interstream areas are dissected by a few intermittent and perennial drainageways. The largest areas of this map unit are in the west-central and northeastern parts of the county. Most of the unit is used as cropland. Small, scattered areas are used as woodland or pasture.

This map unit makes up about 36 percent of the county. It is 31 percent Norfolk soils, 10 percent Goldsboro soils, 9 percent Rains soils, and 50 percent minor soils (fig. 2).

The nearly level and gently sloping Norfolk soils are well drained. They are in the slightly elevated broad areas, on low ridges, and on short side slopes along drainageways. They have a sandy surface layer and subsurface layer. The subsoil is loamy.

The nearly level Goldsboro soils are moderately well drained. They are on broad flats away from the drainageways. They have a loamy surface layer. The subsoil is predominantly loamy.

The nearly level Rains soils are poorly drained. They occur mainly as woodland in broad interstream areas and slight depressions. They have a loamy surface layer and a predominantly loamy subsoil.

The minor soils in this map unit are Marlboro, Lynchburg, Faceville, Varina, Cowarts, Wagram, and Gilead soils. Marlboro, Faceville, and Wagram soils are intermingled with areas of the Norfolk soils. Marlboro soils have a thinner and browner surface layer than that of the major soils. Wagram soils are sandier than the major soils. Varina soils are on level or convex, moderately wide interstream divides in the western and southwestern parts of the county. They are at an elevation of more than 275 feet. Cowarts and Gilead soils are on the lower parts of side slopes. Lynchburg soils are in gentle depressions and in transitional areas between the Norfolk and Rains soils.

The major soils are well suited to most of the crops grown in the county. Seasonal wetness may be a problem for moisture-sensitive crops, such as tobacco, on the Goldsboro and Rains soils. The major soils are well suited to woodland.

The major soils are suited or well suited to most urban uses. The Goldsboro and Rains soils are poorly suited to septic tank absorption fields because of the wetness. In areas of the Norfolk soils, the wetness is a problem on sites for dwellings with basements. The Norfolk and Goldsboro soils are well suited to recreational uses, but the Rains soils are poorly suited because of the wetness.

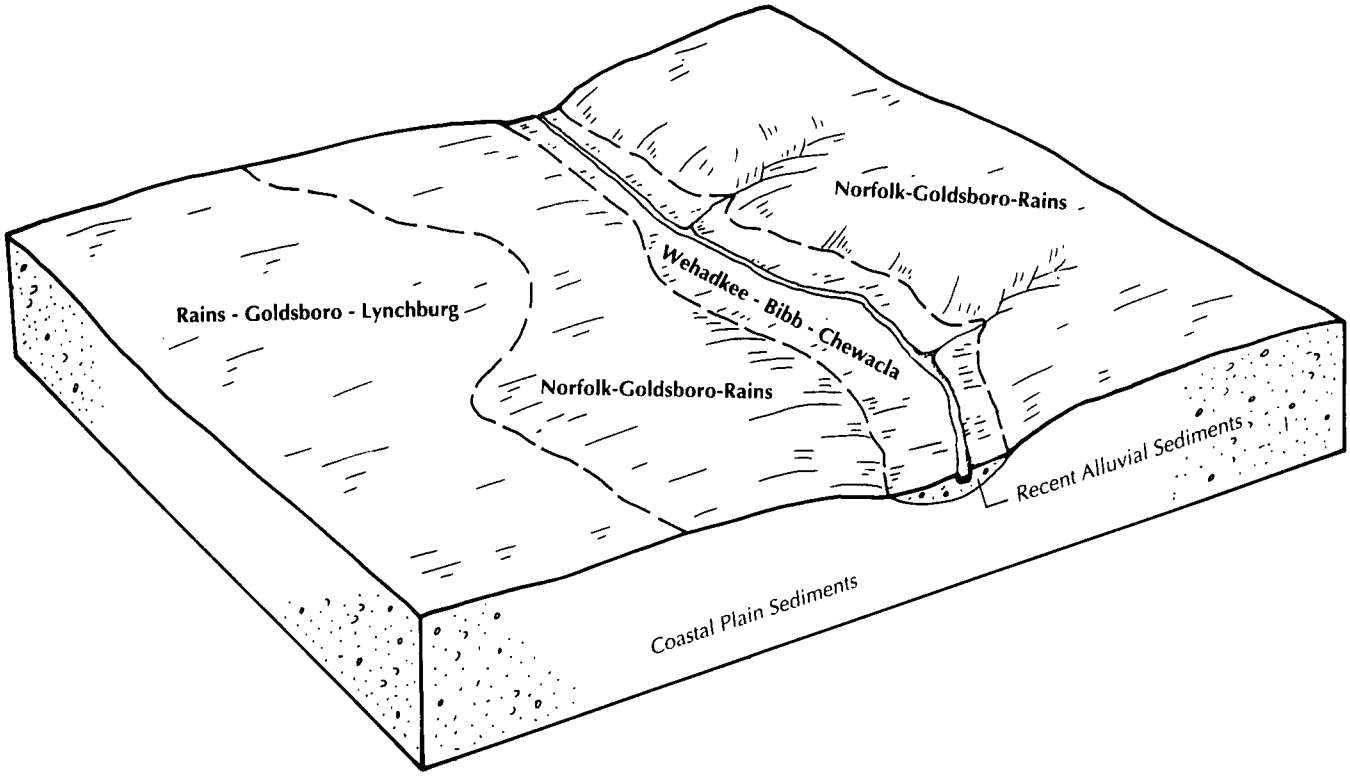

Figure 2.—The relationship of soils and landscapes in the Norfolk-Goldsboro-Rains map unit, the Rains-Goldsboro-Lynchburg map unit, and the Wehadkee-Bibb-Chewacla map unit.

2. Wagram-Blanton-Bonneau

Nearly level and gently sloping, well drained and moderately well drained soils that have a thick, sandy surface layer and subsurface layer and a loamy subsoil; on uplands of the Coastal Plain

This map unit is on moderately wide or wide ridges in the uplands and interstream divides in the western part of the county and in broad interstream areas in the southern part of the county. The landscape is level or gently undulating and is widely dissected by intermittent streams. Slopes range from 0 to 6 percent. Most of the acreage is used as cropland. A few scattered areas are used as woodland or pasture. The wooded areas generally have a thin understory. The soils in the map unit commonly can be recognized by the light color of the surface layer when they are bare of vegetation.

This map unit makes up about 8 percent of the county. It is 25 percent Wagram soils, 18 percent Blanton soils, 15 percent Bonneau soils, and 42 percent minor soils (fig. 3).

The nearly level and gently sloping Wagram soils are well drained. They are on slightly elevated, broad flats and on ridges. They have a sandy surface layer and subsurface layer that have a combined thickness of 20 to 40 inches. The subsoil is loamy.

The nearly level Blanton soils are moderately well drained. They are on broad flats and in slightly depressed areas. They have a sandy surface layer and subsurface layer that have a combined thickness of more than 40 inches. The subsoil is loamy.

The nearly level Bonneau soils are well drained. They are on broad flats and in slightly depressed areas. They have a sandy surface layer and subsurface layer that have a combined thickness of 20 to 40 inches. The subsoil is loamy.

The minor soils in this map unit are Uchee, Norfolk, Fuquay, and Autryville soils. Uchee soils are gently sloping and are along small hillsides. Norfolk and Autryville soils are intermingled with areas of the major soils. Fuquay soils are on the moderately wide ridges in the western and southwestern parts of the county at elevations of more than 275 feet.

The major soils are suited to most of the crops grown in the county. Droughtiness and the leaching of plant nutrients are the main management concerns. These

soils are subject to soil blowing if they are left unprotected. They are well suited to hybrid bermudagrass. They are suited to woodland. The droughtiness is the main limitation affecting woodland.

These soils are well suited to most urban uses. The wetness in the lower part of the subsoil in the Blanton and Bonneau soils is a limitation on sites for dwellings with basements. The major soils are poorly suited to most recreational uses because of the sandy surface layer and subsurface layer.

3. Rains-Goldsboro-Lynchburg

Nearly level, moderately well drained to poorly drained soils that have a loamy surface layer and a predominantly loamy subsoil; on uplands of the Coastal Plain

This map unit is in broad, level interstream areas that are relatively undissected by streams. Most areas are in the central part of the county between Smithfield and Micro. Other areas are near Kenly, Stancil's Chapel, Benson, and along the Sampson County line. Most areas support loblolly pine or mixed pines and hardwoods. A few smaller, scattered areas throughout the unit are used as cropland or pasture.

This map unit makes up about 9 percent of the county. It is 36 percent Rains soils, 17 percent Goldsboro soils, 13 percent Lynchburg soils, and 34 percent minor soils (fig. 2).

The nearly level Rains soils are poorly drained. They are mainly in broad interstream areas and in slight depressions. They have a loamy surface layer and a predominantly loamy subsoil.

The nearly level Goldsboro soils are moderately well drained. They are mainly in broad interstream areas. The surface layer is loamy, and the subsoil is predominantly loamy.

The nearly level Lynchburg soils are somewhat poorly drained. They are mainly in areas of transition between well drained or moderately well drained soils and poorly drained soils. The surface layer and subsoil are loamy.

The minor soils in this map unit are Grantham, Toisnot, and Nahunta soils. Grantham and Nahunta

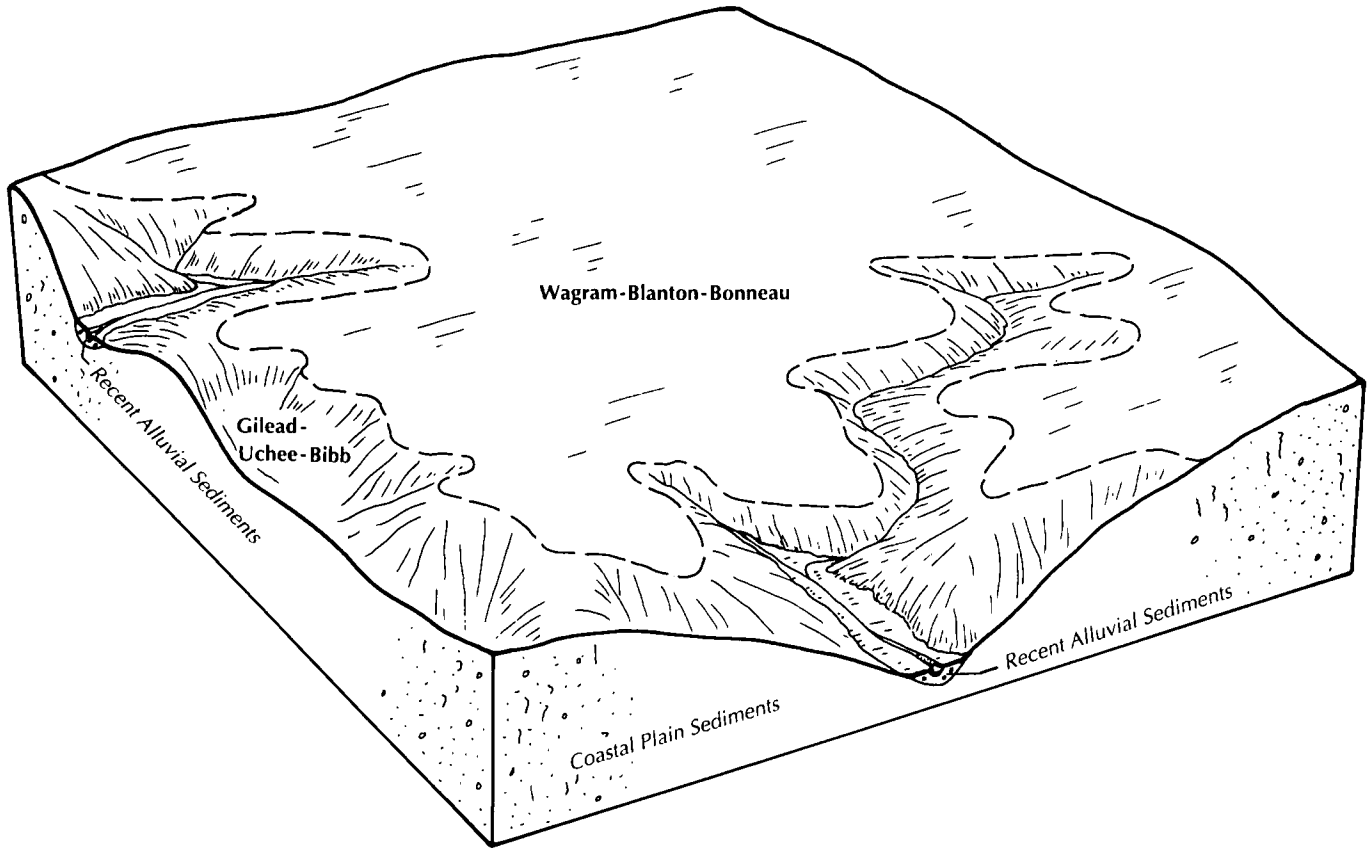

Figure 3.—The relationship of soils and landscapes in the Wagram-Blanton-Bonneau map unit and the Gilead-Uchee-Bibb map unit.

soils are in broad, wooded flat areas, in the area between Selma and Brogden, and directly east of Stancil's Chapel. Toisnot soils are in broad, wooded flat areas near the head of intermittent shallow drainageways. They are mainly near Micro and Wilson's Mills.

The Rains and Lynchburg soils are suited to cropland. The Goldsboro soils are well suited to cropland. The wetness is the main limitation affecting agricultural uses on the Rains and Lynchburg soils. The wetness may be a problem on the Goldsboro soils and for moisture-sensitive crops, such as tobacco. The major soils are well suited to woodland. The wetness is the main limitation on the Rains and Lynchburg soils.

The major soils are poorly suited to most urban uses. The wetness is the main limitation. It can partly be overcome in areas where suitable drainage measures can be installed. The Goldsboro soils are well suited to recreational uses.

Dominantly Gently Sloping to Moderately Steep, Well Drained, Moderately Well Drained, and Poorly Drained Soils; on Uplands of the Piedmont and the Coastal Plain

These soils are on gently sloping or undulating uplands and gently sloping to moderately steep hillslopes. The Gilead and Uchee soils are underlain by unconsolidated marine and fluvial sediments. The Bibb soils are underlain by stratified loamy and sandy material. The Cecil, Pacolet, Wedowee, and Nason soils are underlain by saprolite that weathered from crystalline metamorphic and igneous rocks. Slopes are dominantly 2 to 25 percent. This group makes up about 31 percent of the county.

4. Gilead-Uchee-Bibb

Nearly level to moderately steep, moderately well drained, well drained, and poorly drained soils that have a loamy and sandy surface layer and a clayey and loamy subsoil; mainly on uplands of the Coastal Plain

This map unit is in the southwestern and southern parts of the county, mainly along the hillslopes of the major stream valleys. Numerous intermittent drainageways dissect the landscape. Slopes are irregular in shape and vary in length. They range from 0 to 15 percent. Relief is prominent. About half of the unit is used as cropland. The rest is used as woodland or pasture. In areas of cropland, terraces have commonly been installed to control erosion.

This map unit makes up about 12 percent of the county. It is 60 percent Gilead soils, 13 percent Uchee soils, 12 percent Bibb soils, and 15 percent minor soils (fig. 3).

The gently sloping to moderately steep Gilead soils are on rolling uplands. They are moderately well drained. The surface layer is loamy. The subsoil is clayey and loamy.

The gently sloping and strongly sloping Uchee soils are on ridges and side slopes. They are well drained. The surface layer is sandy, and the subsoil is predominantly loamy.

The nearly level Bibb soils are on flood plains. They are poorly drained. The surface layer and the subsoil are loamy.

The minor soils in this map unit are Goldsboro, Nankin, and Norfolk soils. Goldsboro soils are on terraces adjacent to perennial streams. Nankin soils are in the western and southwestern parts of the county, at an elevation of more than 260 feet. The nearly level and gently sloping Norfolk soils are on ridges.

The Gilead and Uchee soils are suited to most of the crops grown in the county. The Bibb soils are poorly suited to crops because of the wetness. The irregular slopes and the hazard of erosion are the main management concerns affecting cropland in areas of the Gilead and Uchee soils. The major soils are suited to woodland.

The Gilead and Uchee soils are suited to most urban and recreational uses. They are poorly suited to septic tank absorption fields because of the restricted permeability in the subsoil. The Bibb soils are poorly suited to urban and recreational uses because of the wetness and flooding.

5. Cecil-Pacolet-Nason

Gently sloping to steep, well drained soils that have a loamy surface layer and a predominantly clayey subsoil; on uplands of the Piedmont

This map unit is mainly in the northern and northwestern parts of the county on moderately wide or narrow ridges in the uplands and on hillsides in valleys adjacent to perennial streams. Relief is moderate to prominent. Slopes range from 2 to 25 percent. Most of the steeper areas are used as woodland. A few are used as pasture. About half of the more gently sloping areas are used as cropland. In most of the areas used as cropland, the surface layer has a reddish color and scattered cobbles are on the surface.

This map unit makes up about 12 percent of the county. It is 25 percent Cecil soils, 22 percent Pacolet soils, 11 percent Nason soils, and 42 percent minor soils.

The gently sloping and strongly sloping Cecil soils are on ridges and interstream divides. The surface layer is loamy. The subsoil is predominantly clayey.

The strongly sloping to steep Pacolet soils are on

hillsides. The surface layer is loamy. The subsoil is predominantly clayey. Multicolored schist or gneiss saprolite is within a depth of 40 inches.

The gently sloping to steep Nason soils are on ridges in the uplands and on hillsides. The surface layer is loamy, and the subsoil is predominantly clayey. Multicolored phyllite saprolite is within a depth of 45 inches. The content of silt is relatively high throughout the Nason soils.

The minor soils in this map unit are Wehadkee, Marlboro, Norfolk, and Appling soils. Wehadkee soils are along the perennial and intermittent streams that dissect the unit. The nearly level and gently sloping Marlboro and Norfolk soils are on smooth landscapes and have a sandier surface layer than that of the major soils. Appling soils have a gravelly surface layer. They are mainly in areas between Wilson's Mills and Bethesda Church about 6 miles west of Smithfield.

The gently sloping and strongly sloping Cecil and Nason soils are suited to cropland. The clayey subsoil and the slope are the main limitations affecting cropland. The Pacolet soils and the strongly sloping and moderately steep Nason soils are poorly suited to cropland, mainly because of an equipment limitation and the hazard of erosion. The major soils are suited to woodland. The slope is the major limitation affecting woodland.

The gently sloping soils in this map unit are suited to most urban and recreational uses. Restricted permeability in the subsoil and the slope are the main limitations. The strongly sloping to steep soils are poorly suited to urban and recreational uses because of the slope and the restricted permeability.

6. Wedowee

Gently sloping to moderately steep, well drained soils that have a loamy surface layer and a predominantly clayey subsoil; on uplands of the Piedmont

This map unit is in the western and northwestern parts of the county in the vicinity of Clayton and Archer Lodge and along the Wake County line. The landscape consists of gently sloping to sloping soils on moderately wide ridges in the uplands and strongly sloping and moderately steep soils on hillsides. It is dissected by many perennial and intermittent drainageways. Slopes range from 2 to 15 percent. Nearly all of the strongly sloping soils are used as woodland or pasture. About half of the gently sloping soils are used as cropland. In the areas used as cropland, the surface is light colored and contains a large amount of coarse sand. A few boulders are in scattered areas on the surface throughout the unit.

This map unit makes up about 7 percent of the county. It is 65 percent Wedowee soils and 35 percent minor soils.

The gently sloping and strongly sloping Wedowee soils are well drained. They are on uplands and hillsides. The surface layer is dark brown coarse sandy loam. The subsoil is strong brown clay that has yellowish red mottles. The underlying material is multicolored saprolite that weathered from granitic rocks.

The minor soils in this map unit are Rion, Vance, Wehadkee, Cowarts, and Cecil soils. The steep Rion soils are on hillsides along stream valleys. Vance and Cecil soils are intermingled with areas of the Wedowee soils, mainly near the Wake County line. Wehadkee soils are poorly drained and are along drainageways and perennial streams. Cowarts soils are on ridges in the uplands and on side slopes formed from sediments on the Coastal Plain.

The Wedowee soils are suited to most of the crops grown in the county. The hazard of erosion, the slope, and the clayey subsoil are the main management concerns affecting cropland. These soils are well suited to pasture and suited to woodland.

The Wedowee soils are suited to most urban and recreational uses. The restricted permeability in the subsoil is a limitation on sites for septic tank absorption fields.

Dominantly Nearly Level, Well Drained to Poorly Drained Soils That Are Subject to Flooding; on Flood Plains and Stream Terraces

These soils are in broad, flat wooded areas that contain narrow, meandering, intermittent stream channels, or they are on low ridges and in broad, very gently undulating areas that have scattered open fields. This group makes up about 14 percent of the county.

7. Wehadkee-Bibb-Chewacla

Poorly drained and somewhat poorly drained soils that have a loamy surface layer and have a loamy subsoil or loamy and sandy underlying material; on flood plains

This map unit is along the major streams and creeks throughout the county. The largest area is along the Neuse River south of Smithfield. The landscape is characterized by low relief and a predominance of hardwoods. Slopes are less than 2 percent. The unit is dominantly poorly drained but is better drained near the edge of stream channels and on low ridges. It is frequently flooded.

This map unit makes up about 11 percent of the county. It is 34 percent Wehadkee soils, 21 percent Bibb soils, 12 percent Chewacla soils, and 33 percent minor soils (fig. 2).

Wehadkee soils are poorly drained. They are mainly on flood plains along streams that have their headwaters in the Piedmont region. They are loamy throughout.

Bibb soils are poorly drained. They are mainly on flood plains along streams that drain the Coastal Plain. They have a loamy surface layer. The underlying material is stratified sandy and loamy deposits.

Chewacla soils are somewhat poorly drained. They are on low ridges and near the edge of channels in the meander zone of the larger streams. They have a loamy surface layer and subsoil.

The minor soils in this map unit are the poorly drained Chastain, Tomotley, and Roanoke soils. Chastain soils are clayey and are mainly on the flood plains along the Neuse River, south of Smithfield. They are on broad flats away from the stream channels. Tomotley and Roanoke soils are on low stream terraces.

The major soils are well suited to wetland hardwoods. They are poorly suited to the production of loblolly pine because of the frequent flooding and the competition from hardwoods. They are poorly suited to cropland and pasture because of the flooding and the wetness.

These soils are poorly suited to urban and recreational uses because of the wetness and the flooding.

8. Altavista-State-Augusta

Well drained, moderately well drained, and somewhat poorly drained soils that have a loamy surface layer and subsoil; on stream terraces

This map unit is on terraces along the Neuse River south of Smithfield and along the Little River between Kenly and Princeton. The landscape consists dominantly of broad stream terraces that are 5 to 8 feet higher than the adjacent flood plains. In some areas, it consists of low, gently convex ridges. Slopes range from 0 to 3 percent. Nearly half of the unit is used as cropland. The rest is used as woodland. Locally, areas of this unit are known as the "Neuse Islands." The unit is occasionally flooded.

This map unit makes up about 3 percent of the county. It is 26 percent Altavista soils, 18 percent State soils, 9 percent Augusta soils, and 47 percent minor soils.

Altavista soils are moderately well drained. They are on terraces and convex ridges. They have a loamy surface layer and subsoil.

State soils are well drained. They are on terraces and convex ridges in the slightly higher areas. They have a loamy surface layer and subsoil.

Augusta soils are somewhat poorly drained. They are in flat, wooded areas in the lower positions on terraces. They have a loamy surface layer and subsoil.

The minor soils in this map unit are Wahee, Tarboro, and Roanoke soils. Wahee soils are somewhat poorly drained. They are in flat, wooded areas that support mixed hardwoods and pines. Tarboro soils are well drained and sandy. They are in very gentle convex areas on the highest parts of the landscape. Roanoke soils are poorly drained. They are in flat, wooded areas and gentle swales. They dominantly support hardwoods.

The major soils are well suited or suited to small grain, corn, and soybeans. Intermittent wetness is a problem for moisture-sensitive crops, such as tobacco. These soils are well suited to pasture and woodland.

These soils are poorly suited to urban uses because of the occasional flooding. The flooding and the wetness are limitations affecting most recreational uses.

Dominantly Nearly Level and Gently Sloping, Excessively Drained, Moderately Well Drained, and Poorly Drained Soils; on Stream Terraces

These soils are on flat terraces and gently sloping or undulating low ridges, mainly along the southwestern edge of the Neuse River valley. Slopes range from 0 to 6 percent. This group makes up less than 3 percent of the county.

9. Leaf-Dogue

Nearly level, poorly drained and moderately well drained soils that have a loamy surface layer and a predominantly clayey subsoil; on stream terraces

This map unit is along the edge of the Neuse River valley, between Smithfield and the Wayne County line. The largest area is on the south side of the Neuse River valley. The landscape consists of broad, undissected terraces that mainly support mixed pines and hardwoods. A few scattered areas throughout the unit have been cleared of trees and are used as cropland or pasture. Slopes are 0 to 2 percent.

This map unit makes up about 2 percent of the county. It is 55 percent Leaf soils, 21 percent Dogue soils, and 24 percent minor soils.

Leaf soils are poorly drained. They are on low stream terraces. They have a loamy surface layer and a predominantly clayey subsoil.

Dogue soils are moderately well drained. They are on flats and very gentle convex knolls on stream terraces. They have a loamy surface layer and a predominantly clayey subsoil.

The minor soils in this map unit are Rains and Lynchburg soils. Rains soils are poorly drained, and

Lynchburg soils are somewhat poorly drained. The minor soils are near the edge of the higher uplands.

The major soils are well suited to woodland. They are suited to corn, soybeans, and small grain. The seasonal wetness is the main limitation affecting cropland and woodland.

These soils are poorly suited to urban and recreational uses because of the wetness and the restricted permeability.

10. Lakeland

Nearly level and gently sloping, excessively drained soils that have a sandy surface layer and substratum; on stream terraces

This map unit is mainly on the northeast side of Hannah's Creek, which is on the south side of the Neuse River valley. A few smaller areas are farther up Hannah's Creek valley and adjacent to the flood plain along the Neuse River. The landscape consists of moderately wide, low ridges that are gently undulating. About half of the unit is used as cropland or pasture. The rest supports mixed pines and scrub oaks. The understory is distinctively open. Slopes range from 0 to 6 percent.

This map unit makes up less than 1 percent of the county. It is 86 percent Lakeland soils and 14 percent minor soils.

Lakeland soils are excessively drained. They have a sandy surface layer and substratum.

The minor soils in this map unit are Autryville and Bibb soils. Autryville soils are intermingled with areas of the Lakeland soils, are well drained, and have a loamy subsoil. Bibb soils are poorly drained and are on flood plains.

The Lakeland soils are poorly suited to most of the crops grown in the county. They are suited to hybrid bermudagrass. Droughtiness and the leaching of plant nutrients are the main limitations affecting agricultural uses. These soils are suited to woodland. The droughtiness is the main limitation affecting woodland.

These soils are well suited to most urban uses. They are, however, poorly suited to septic tank absorption fields because they are a poor filter for sewage. They are poorly suited to recreational uses because they are too sandy.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under the heading "Use and Management of the Soils."

The map units on the detailed soil maps represent areas on the landscape and consist mainly of one or more soils for which the units are named.

Symbols identifying the soil precede the map unit names in the map unit descriptions. The descriptions include general facts about the soils and give the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Wedowee sandy loam, 2 to 8 percent slopes, is a phase of the Wedowee series.

Some map units are made up of two or more major soils. These map units are called soil complexes or soil associations.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Appling-Marlboro complex, 1 to 6 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion the soils are somewhat similar. Wehadkee-Chastain association, frequently flooded, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The "Glossary" defines many of the terms used in describing the soils.

AaA—Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded. This moderately well drained soil is on low ridges on stream terraces. Mapped areas are either 25 to 75 acres in size and round or irregular in shape or 5 to 25 acres in size and long and narrow.

Typically, the surface layer is brown fine sandy loam 7 inches thick. The subsurface layer is light yellowish brown fine sandy loam 4 inches thick. The upper 7 inches of the subsoil is yellowish brown clay loam. The next 6 inches is yellowish brown clay loam that has brown and red mottles. The next 10 inches is strong brown sandy clay loam that has brown and gray mottles. The lower 13 inches is light gray sandy loam that has yellow and brown mottles. The underlying material extends to a depth of more than 60 inches. It is mottled light gray and light yellowish brown sandy loam in the upper part and very pale brown loamy sand in the lower part.

Permeability and available water capacity are moderate. The seasonal high water table is at a depth of about 1.5 to 2.5 feet. This soil is occasionally flooded

Figure 4.—A flooded area of an Altavista soil. Occasional flooding in late winter and early spring often delays spring planting in areas of this soil.

for very brief periods. Surface runoff is slow.

Included with this soil in mapping are a few areas of Augusta and State soils. Augusta soils are somewhat poorly drained and are in depressions. State soils are well drained and are in the slightly higher areas. Also included are areas of soils that have a sandy subsoil. Included soils make up about 10 percent of the map unit.

Most areas of the Altavista soil are used as woodland. Some areas are used as cropland or pasture.

This soil is well suited to corn, soybeans, and small grain. The occasional flooding is the main hazard (fig. 4). The wetness can be a limitation affecting moisture-sensitive crops, such as tobacco. The soil is well suited to pasture.

This soil is well suited to woodland. The common canopy species are loblolly pine, longleaf pine, sweetgum, white oak, willow oak, yellow-poplar, and red maple. The main understory species are hornbeam, red maple, and American holly. The wetness is the main limitation.

This soil is poorly suited to most urban uses because of the flooding and the seasonal wetness.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

AmB—Appling-Marlboro complex, 1 to 6 percent slopes. This map unit consists of areas of the well drained Appling and Marlboro soils. These soils occur as areas so intricately mixed that mapping them

separately was not feasible at the scale selected. They are on uplands along the contact zone between the Piedmont and the Coastal Plain. The unit is about 45 percent Appling soils and 30 percent Marlboro soils. The Appling soil has a gravelly surface layer and commonly is on the higher parts of the landscape. The Marlboro soil is in the more level areas and the slightly concave areas that are on the lower parts of the landscape. Mapped areas are oblong and vary in width. They range from about 15 to 125 acres in size.

Typically, the surface layer of the Appling soil is brown gravelly fine sandy loam about 5 inches thick. The subsurface layer is light yellowish brown gravelly sandy loam 5 inches thick. The upper 8 inches of the subsoil is yellowish brown clay. The next 8 inches is strong brown clay that has red mottles. The next 35 inches is mottled yellowish red, yellowish brown, and strong brown clay. The lower 25 inches is yellowish red clay loam that has yellow mottles. The underlying material to a depth of 104 inches also is yellowish red clay loam that has yellow mottles.

Typically, the surface layer of the Marlboro soil is grayish brown sandy loam 8 inches thick. It has about 10 percent gravel. The subsoil is more than 60 inches thick. The upper part is yellowish brown sandy clay that has brown and red mottles. The next part is strong brown sandy clay that has red and brown mottles. The lower part is mottled red, strong brown, and light gray sandy clay.

Permeability is moderate in both soils. Available water capacity is moderate in the Appling soil and high in the Marlboro soil. The Marlboro soil has a seasonal high water table at a depth of 4 to 6 feet during winter and spring. Surface runoff is medium on both soils.

Included with these soils in mapping are soils that have a subsoil that is loamy in the upper part and clayey in the lower part and soils that have a thick, sandy surface layer and subsurface layer. Included soils make up about 25 percent of the map unit.

Most of this unit is used as cropland. Some areas are used for pasture. A few are used as woodland.

The Appling and Marlboro soils are well suited to most of the crops commonly grown in the county. The main crops are soybeans, corn, and tobacco. The hazard of erosion is moderate. In some areas the gravel in the surface layer restricts tillage and inhibits seed germination; however, it also protects the surface against erosion. Chisel plowing and shallow subsoiling are common. Crop residue management, conservation tillage, crop rotations, grassed waterways, and field borders help to control erosion, sedimentation, and surface runoff. These soils are well suited to pasture.

These soils are suited to woodland. Loblolly pine, longleaf pine, shortleaf pine, southern red oak, white oak, sweetgum, yellow-poplar, and hickory are the common canopy species. The understory species are dogwood, sourwood, American holly, sassafras, lowbush blueberry, and eastern redcedar.

These soils are well suited to most urban and recreational uses. The moderate permeability of both soils is a limitation on sites for septic tank absorption fields because of the clayey subsoil. The water table in the lower part of the subsoil in the Marlboro soil is a limitation on sites for septic tank absorption fields and dwellings with basements. The content of gravel in the surface layer is a limitation affecting the establishment and maintenance of lawns and golf fairways.

The Appling soil is in capability subclass IIs. The Marlboro soil is in capability subclass IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A for both soils.

AsA—Augusta sandy loam, 0 to 2 percent slopes, occasionally flooded. This somewhat poorly drained soil is on stream terraces. Mapped areas are long and narrow. They range from 5 to 25 acres in size.

Typically, the surface layer is grayish brown sandy loam 7 inches thick. The upper 4 inches of the subsoil is pale brown sandy loam that has brown and gray mottles. The next 14 inches is light yellowish brown sandy clay loam that has gray mottles. The next 7 inches is light gray sandy clay loam that has brown mottles. The lower 11 inches is light gray sandy loam that has brown mottles. The underlying material to a depth of 60 inches is white coarse sand that has brown mottles.

Permeability and available water capacity are moderate. The seasonal high water table is 1 to 2 feet below the surface. This soil is occasionally flooded for brief periods by overflow from streams. Surface runoff is slow.

Included with this soil in mapping are small areas of Roanoke, Tomotley, and Altavista soils and some small areas of Wahee and Wehadkee soils. Altavista soils are moderately well drained and are in the highest areas. Roanoke, Tomotley, and Wehadkee soils are poorly drained and are in depressions and narrow drainageways. Wahee soils have more clay in the subsoil than the Augusta soil. Also included are some areas of soils that have a surface layer of loam or silt loam and other areas of soils that have less clay in the subsoil than is typical for the Augusta soil. Included soils make up about 15 percent of the map unit.

Most areas of the Augusta soil are used as woodland. Some areas are used as pasture. A few are used as cropland.

This soil is suited to corn, soybeans, and small grain. The hazard of erosion is slight. The main management

concerns are the seasonal wetness and the hazard of flooding. The soil is suited to pasture. Grazing when the soil is wet causes compaction and damages plants.

This soil is well suited to woodland. The common canopy species are loblolly pine, sweetgum, American sycamore, white oak, water oak, yellow-poplar, and willow oak. The common understory species are hornbeam and American holly. The wetness is the main limitation.

This soil is poorly suited to urban and recreational uses. The high water table and the hazard of flooding are the main management concerns.

The capability subclass is IIIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

AuA—Autryville sand, 0 to 2 percent slopes. This well drained soil is in broad upland areas on the Coastal Plain. Most mapped areas are rounded or oblong in shape and range from about 75 to 200 acres in size.

Typically, the surface layer is brown sand 8 inches thick. The subsurface layer is light yellowish brown loamy sand 14 inches thick. The subsoil is more than 48 inches thick. The upper 9 inches is yellowish brown sandy loam. The next 27 inches is light yellowish brown loamy sand. The lower 12 inches is yellowish brown sandy loam that has brown and gray mottles.

Permeability is moderately rapid, and available water capacity is low. The seasonal high water table is at a depth of about 4 to 6 feet. Surface runoff is slow.

Included with this soil in mapping are small areas of the sandier Blanton soils and areas of soils where the combined thickness of the surface layer and subsurface layer is less than 20 inches. Also included are small areas of the moderately well drained Goldsboro soils. Included soils make up about 20 percent of the map unit.

Most areas of the Autryville soil are used as cropland or pasture. A few areas are used as woodland.

This soil is suited to crops, such as tobacco and sweet potatoes. Leaching of plant nutrients and the low available water capacity are the main limitations. Soil blowing is a hazard. It often damages young plants in the early spring. Winter cover crops, conservation tillage, and crop residue management help to maintain the content of organic matter, conserve soil moisture, and control erosion. Split applications of fertilizer can maintain nutrient levels during the growing season and minimize losses caused by leaching. Windbreaks and conservation tillage reduce the hazard of wind erosion and conserve soil moisture. The soil is well suited to hybrid bermudagrass.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, post oak, blackjack oak, red oak, and hickory. The main understory species are dogwood, holly, and blueberry. The main limitation is the thick, sandy surface layer and subsurface layer.

This soil is well suited to most urban and recreational uses. The wetness in the lower part of the subsoil is a limitation on sites for excavations and dwellings with basements.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7S.

Bb—Bibb sandy loam, frequently flooded. This poorly drained soil is on flood plains and in narrow drainageways throughout the Coastal Plain. Slopes are 0 to 2 percent. Mapped areas are mostly long and narrow and follow the drainage pattern for long distances along the flood plain. They are generally several hundred acres in size.

Typically, the surface layer is very dark grayish brown sandy loam 5 inches thick. The underlying material to a depth of more than 60 inches is stratified light gray sand or loamy sand and grayish brown sandy loam.

Permeability and available water capacity are moderate. The seasonal high water table is at a depth of about 0.5 foot to 1.5 feet. This soil is frequently flooded for brief or long periods. Surface runoff is very slow.

Included with this soil in mapping are small areas of Rains, Grantham, and Toisnot soils. These soils commonly are near the head of drainageways or near the outer edge of mapped areas. Rains and Grantham soils have more clay in the subsoil than the Bibb soil. Toisnot soils have a dense, root-restricting layer in the subsoil. Also included in small depressions are soils that have a thick, black surface layer. Included soils make up about 20 percent of the map unit.

Most areas of the Bibb soil are used as woodland. A few areas are used as pasture.

This soil is poorly suited to cropland and pasture because of the flooding and the wetness.

This soil is suited to the production of hardwoods. The main canopy species are sweetgum, blackgum, water oak, and willow oak. The understory species are sweetbay and greenbrier. The wetness and the frequent flooding are the main limitations. The wetness restricts the use of heavy equipment.

This soil is poorly suited to urban and recreational uses because of the wetness and the flooding.

The capability subclass is Vw. Based on loblolly pine

as the indicator species, the woodland ordination symbol is 9W.

BnA—Blanton sand, 0 to 3 percent slopes. This moderately well drained soil is in broad upland areas on the Coastal Plain. Mapped areas are wide and irregular in shape and range from about 25 to more than 150 acres in size.

Typically, the surface layer is brown sand 10 inches thick. The upper 26 inches of the subsurface layer is light yellowish brown sand. The lower 16 inches is very pale brown sand. The subsoil is 29 inches thick. The upper 9 inches is mottled yellowish brown and strong brown sandy clay loam. The next 13 inches is mottled light brownish gray, strong brown, and yellowish red sandy clay loam. The lower 7 inches is mottled brownish yellow and yellowish red sandy loam. The underlying material to a depth of 97 inches is mottled yellowish brown, light yellowish brown, and dark reddish brown sandy loam.

Permeability is moderately rapid, and available water capacity is low. The seasonal high water table is at a depth of about 4 to 6 feet. Surface runoff is slow.

Included with this soil in mapping are small areas that have a gravelly subsurface layer. Also included are small areas of Autryville and Bonneau soils. The combined thickness of the sandy surface layer and subsurface layer in these soils is thinner than in the Blanton soil. All of the included soils are intermingled in landscape positions similar to those of the Blanton soil. Included soils make up about 15 percent of the map unit.

Most areas of the Blanton soil are used as cropland or woodland. A few areas are used as pasture.

This soil is suited to some crops, such as asparagus, tobacco, and sweet potatoes. Leaching of plant nutrients and the low available water capacity are the main limitations. Soil blowing is a hazard. It often damages young plants in the early spring. Winter cover crops, windbreaks, and crop residue management help to maintain the content of organic matter, conserve soil moisture, and control erosion. Split applications of fertilizer help to maintain nutrient levels and minimize losses caused by leaching. The soil is suited to bermudagrass. Droughtiness is a limitation. Special care should be taken to avoid overgrazing during dry periods.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, post oak, black oak, blackjack oak, and southern red oak. The main understory species are dogwood, sourwood, holly, and blueberry. The main limitation is the thick, sandy surface layer and subsurface layer.

This soil is well suited to most urban and recreational uses. Because of the sandy layers, however, seepage is a limitation on sites for landfills and sewage lagoons. The droughtiness is a limitation affecting the establishment of lawns.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 11S.

BoA—Bonneau sand, 0 to 3 percent slopes. This well drained soil is in broad upland areas on the Coastal Plain. Mapped areas are long and irregular in shape and range from about 75 to 200 acres in size.

Typically, the surface layer is dark grayish brown sand 10 inches thick. The subsurface layer is light yellowish brown loamy sand 18 inches thick. The subsoil extends to a depth of 71 inches. It is yellowish brown sandy clay loam that has brown mottles in the upper 13 inches and mottled light yellowish brown, strong brown, red, and light brownish gray sandy clay loam in the lower 30 inches.

Permeability is moderate, and available water capacity is low. The seasonal high water table is at a depth of about 3.5 to 5.0 feet. Surface runoff is slow.

Included with this soil in mapping are small areas of Blanton, Goldsboro, and Norfolk soils. The combined thickness of the sandy surface layer and subsurface layer is thicker in Blanton soils than in the Bonneau soil and thinner in Norfolk and Goldsboro soils. Norfolk soils are well drained and are in the higher areas. Also included are some small areas of the well drained Wagram and Autryville soils in the higher areas. Included soils make up about 10 percent of the map unit.

The Bonneau soil is suited to some crops, such as asparagus, tobacco, and sweet potatoes. It does not have sufficient moisture during the growing season for many crops. The low available water capacity and leaching of plant nutrients are the major limitations. Soil blowing is a hazard (fig. 5). It often damages young plants in the early spring. Windbreaks, cover crops, and crop residue management can help to control wind erosion and conserve moisture. Split applications of fertilizers may offset the effects of leaching. This soil is suited to hybrid bermudagrass. Special care must be taken to avoid overgrazing during dry periods.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, southern red oak, blackjack oak, and white oak. Common understory species are dogwood, sassafras, sourwood, and blueberry. The main limitation is the thick, sandy surface layer and subsurface layer.

This soil is well suited to most urban and recreational uses. The seasonal high water table is a limitation on

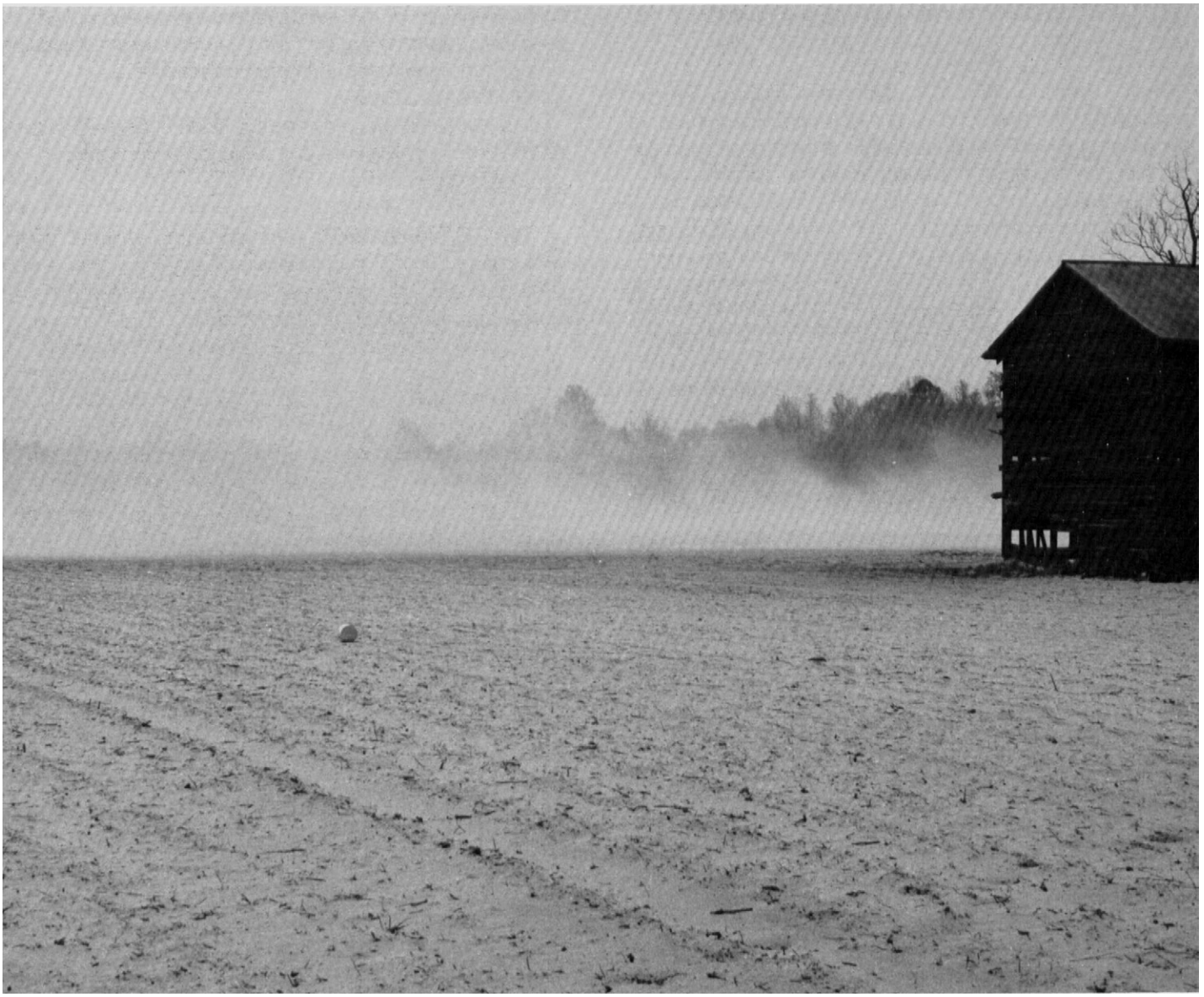

Figure 5.—Soil blowing in an area of a Bonneau soil. It is a major problem if the surface is left bare or unprotected.

sites for dwellings with basements and on sites for shallow excavations.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9S.

CeB—Cecil loam, 2 to 6 percent slopes. This well drained soil is on broad uplands and gentle hillslopes on the Piedmont. Mapped areas are broad and elongated, long and narrow, or irregular in shape. They range from about 20 to 300 acres in size.

Typically, the surface layer is dark brown loam 5 inches thick. The subsurface layer is dark yellowish brown loam 4 inches thick. The subsoil is more than 63 inches thick. The upper 43 inches is red clay that has brown and red mottles. The lower 20 inches is red clay loam that has red mottles.

Permeability and available water capacity are moderate. Surface runoff is medium.

Included with this soil in mapping are small areas of soils that have a gravelly surface layer and areas that are eroded. The eroded soils have a thin surface layer of clay loam that is redder than the surrounding area. Also included are small areas of Marlboro and Nason

soils. Marlboro soils have a sandier surface layer than that of the Cecil soil, and Nason soils have a higher content of silt. Included soils make up about 15 percent of the map unit.

About half of the areas of the Cecil soil are used as cropland. The rest are used as woodland or pasture.

This soil is suited to cropland. The major crops are soybeans, small grain, and corn. The main limitations affecting cropland are surface runoff and the clayey subsoil. The hazard of erosion is moderate. Conservation tillage, crop residue management, contour farming, crop rotations, grassed waterways, and field borders help to control erosion, runoff, and sedimentation. The soil is well suited to pasture.

This soil is suited to woodland. The common canopy species are loblolly pine, shortleaf pine, white oak, northern red oak, sweetgum, and black oak. The main understory species include dogwood, holly, sourwood, winged elm, and wild grape. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. Some types of sanitary facilities and shallow excavations may be affected by the clayey subsoil.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

CeC—Cecil loam, 6 to 10 percent slopes. This well drained soil is on hillsides on the Piedmont. Mapped areas are long, narrow, and winding. They follow the contour of ridges. They range from about 10 to 100 acres in size.

Typically, the surface layer is dark brown loam 7 inches thick. The subsurface layer is yellowish brown loam 8 inches thick. The subsoil is 37 inches thick. The upper 4 inches is yellowish red clay loam. The next part is red clay. The lower part is red clay loam. The underlying material to a depth of 60 inches is mottled red, yellow, and weak red saprolite that has a texture of loam.

Permeability and available water capacity are moderate. Surface runoff is rapid.

Included with this soil in mapping are small areas of soils that have a gravelly surface layer and areas that are eroded. The eroded soils have a thin surface layer of clay loam that is redder than the surrounding area. Also included are soils that have a brown subsoil and soils that have a slope of more than 10 percent. Included soils make up about 20 percent of the map unit.

Most areas of the Cecil soil are used as woodland. Some areas are used as pasture. A few are used as cropland.

This soil is suited to cropland. The main crops are soybeans and small grain. The main limitations are the slope, the rapid surface runoff, and the clayey subsoil. The hazard of erosion is severe. Conservation tillage, crop residue management, crop rotations, contour farming, terraces, diversions, grassed waterways, and field borders help to control erosion, runoff, and sedimentation. The soil is well suited to pasture.

This soil is suited to woodland. The common canopy species are loblolly pine, white oak, northern red oak, and shortleaf pine. The main understory species are dogwood, sourwood, winged elm, holly, and wild grape. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. The slope and the restricted permeability in the subsoil are the main limitations affecting urban uses.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

Ch—Chewacla loam, frequently flooded. This somewhat poorly drained soil is on broad flood plains. Slopes are 0 to 2 percent. Mapped areas are several hundred feet to about 0.5 mile wide and extend for long distances along streams. They range from 100 to more than 2,000 acres in size.

Typically, the surface layer is dark brown loam 6 inches thick. The upper 5 inches of the subsoil is dark yellowish brown loam. The next 21 inches is dark yellowish brown loam that has brown or gray mottles. The lower 12 inches is light brownish gray clay loam that has brown mottles. The underlying material to a depth of 60 inches is mottled light gray and strong brown clay loam.

Permeability is moderate, and available water capacity is moderate or high. The seasonal high water table is about 0.5 foot to 1.5 feet below the surface. This soil is frequently flooded for brief periods. Surface runoff is very slow.

Included with this soil in mapping are small areas of the poorly drained Wehadkee soils in sloughs and the slightly more depressional areas. Also included are better drained soils along the stream channels. Included soils make up about 25 percent of the map unit.

Almost all areas of the Chewacla soil are used as woodland. A few small areas are used as pasture.

This soil generally is not cropped because of the wetness and the flooding. Where protected from flooding and drained, it is well suited to corn, soybeans, and small grain. The soil is suited to pasture grasses. Grazing when the soil is wet causes compaction and damages the plants.

This soil is well suited to woodland. The wetness and the flooding are the main management concerns. The

main canopy species are yellow-poplar, sweetgum, water oak, American sycamore, willow oak, and eastern cottonwood. The main understory species are hornbeam, greenbrier, river birch, and winged elm.

This soil is poorly suited to urban and recreational uses because of the wetness and the flooding.

The capability subclass is IVw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 7W.

CoB—Cowarts loamy sand, 2 to 6 percent slopes. This well drained soil is in the uplands on the Coastal Plain. Mapped areas are generally narrow and oblong and range from about 5 to 35 acres in size.

Typically, the surface layer is yellowish brown loamy sand 6 inches thick. The upper 10 inches of the subsoil is yellowish brown sandy clay loam. The next 12 inches is yellowish brown sandy clay loam that has brown and red mottles. The lower 6 inches is strong brown sandy clay loam that has red, light yellowish brown, and light gray mottles. The underlying material to a depth of 69 inches is coarsely mottled red, yellowish brown, and light gray sandy clay loam.

Permeability is moderately slow or slow, and available water capacity is moderate. Surface runoff is medium.

Included with this soil in mapping are small areas of Norfolk, Gilead, and Uchee soils. Norfolk and Gilead soils are intermingled with areas of the Cowarts soil. Norfolk soils have a thicker subsoil than that of the Cowarts soil, and Gilead soils have more clay in the subsoil. Uchee soils have a thick, sandy surface layer and subsurface layer and are around the lower part of the hillslopes. Also included are soils that have a gravelly surface layer. Included soils make up about 25 percent of the map unit.

Most areas of the Cowarts soil are used as cropland. A few areas are used as woodland or pasture.

This soil is well suited to cropland. The slope and the surface runoff are the main limitations. The hazard of erosion is moderate. Conservation tillage, crop residue management, contour farming, crop rotations, terraces, diversions, grassed waterways, and field borders help to control erosion, surface runoff, and sedimentation. The soil is well suited to pasture.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, white oak, red oak, hickory, sweetgum, and yellow-poplar. The common understory species are dogwood, sourwood, sassafras, wild grape, and holly. Few limitations affect woodland use and management.

This soil is suited to most urban uses. The restricted permeability in the lower part of the subsoil is the main limitation on sites for septic tank absorption fields. The soil is well suited to recreational uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

CoC—Cowarts loamy sand, 6 to 10 percent slopes. This well drained soil is on hillsides in the uplands on the Coastal Plain. Mapped areas are narrow and oblong. They range from about 5 to 30 acres in size.

Typically, the surface layer is yellowish brown loamy sand 6 inches thick. The upper 10 inches of the subsoil is yellowish brown sandy clay loam. The next 12 inches is yellowish brown sandy clay loam that has brown and red mottles. The lower 6 inches is strong brown sandy clay loam that has red, light yellowish brown, and light gray mottles. The underlying material to a depth of 69 inches is coarsely mottled red, yellowish brown, and light gray sandy clay loam.

Permeability is moderately slow or slow, and available water capacity is moderate. Surface runoff is rapid.

Included with this soil in mapping are small areas of Gilead and Uchee soils. Gilead soils have more clay in the subsoil than the Cowarts soil and are intermingled with areas of the Cowarts soil. Uchee soils have a thick, sandy surface layer and subsurface layer and are generally on the upper parts of the slope. Also included are some soils that have a red subsoil and soils that have a subsoil that is more permeable than that of the Cowarts soil. Included soils make up about 25 percent of the map unit.

Most areas of the Cowarts soil are used as cropland. A few areas are used as woodland or pasture.

This soil is suited to cropland. The slope and the rapid surface runoff are the main limitations. The hazard of erosion is severe. Conservation tillage, crop residue management, contour farming, crop rotations, terraces, grassed waterways, and field borders help to control erosion and sedimentation. The soil is suited to pasture. Proper stocking rates, pasture rotation, and restricted use during wet periods help to maintain the condition of the pasture and prevent excessive erosion.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, white oak, red oak, hickory, sweetgum, and yellow-poplar. The common understory species are dogwood, sourwood, sassafras, wild grape, and holly. Few limitations affect woodland use and management.

This soil is suited to most urban uses. The slope and the restricted permeability in the lower part of the subsoil are the main limitations on sites for septic tank absorption fields. The soil is suited to most recreational uses.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

DoA—Dogue fine sandy loam, 0 to 2 percent slopes. This moderately well drained soil is on terraces. Mapped areas are small and circular or long and irregular in width. They range from about 5 to 10 acres in size.

Typically, the surface layer is grayish brown fine sandy loam 8 inches thick. The subsurface layer is light yellowish brown fine sandy loam 2 inches thick. The upper 7 inches of the subsoil is yellowish brown clay loam. The next 10 inches is yellowish brown clay loam that has brown mottles. The lower 28 inches is mottled strong brown, light gray, and red clay. The underlying material to a depth of 75 inches is light gray sandy clay loam that has yellow and red mottles.

Permeability is moderately slow, and available water capacity is moderate. The seasonal high water table is at a depth of about 1.5 to 3.0 feet. The shrink-swell potential is moderate. Surface runoff is slow.

Included with this soil in mapping are small areas of the poorly drained Leaf soils in small depressions and other soils that are less clayey than is typical for the Dogue soil. Included soils make up about 15 percent of the map unit.

Most areas of the Dogue soil are used as cropland. A few areas are used as woodland.

This soil is well suited to corn, soybeans, and small grain. The wetness is a limitation affecting tobacco. The soil is well suited to pasture.

This soil is well suited to woodland. The common canopy species are loblolly pine, southern red oak, willow oak, sweetgum, yellow-poplar, and white oak. The major understory species are American holly, dogwood, sourwood, greenbrier, and red maple. An equipment limitation caused by seasonal wetness is the main management concern.

This soil is poorly suited to most urban and recreational uses. The moderately slow permeability, the seasonal high water table, flooding, and the moderate shrink-swell potential are the main limitations affecting urban uses.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

FaA—Faceville sandy loam, 0 to 2 percent slopes. This well drained soil is in smooth upland areas on the Coastal Plain. Mapped areas are generally irregular in shape and range from about 5 to 50 acres in size.

Typically, the surface layer is brown sandy loam 8 inches thick. The subsurface layer is very pale brown sandy loam 5 inches thick. The upper 9 inches of the subsoil is reddish yellow sandy clay loam. The next 23 inches is red clay loam. The lower 20 inches is red clay loam that has yellow and brown mottles. The underlying material to a depth of 70 inches is mottled red, yellow, and strong brown sandy loam.

Permeability and available water capacity are moderate. Surface runoff is slow.

Included with this soil in mapping are small areas of Marlboro and Norfolk soils. These soils have a browner subsoil than that of the Faceville soil. Also included are areas of soils that have a thick surface layer of loamy sand. All of these included soils are intermingled with areas of the Faceville soil. They make up about 10 percent of the map unit.

Most areas of the Faceville soil are used as cropland. Some areas are used as pasture. A few are used as woodland.

This soil is well suited to the crops that are commonly grown in the county. Corn, tobacco, sweet potatoes, and soybeans are the major crops. Few limitations affect cropland use and management. In areas where the subsurface layer is light colored and loamy, a plowpan can develop. Occasional subsoiling or chisel plowing can break up the plowpan. The soil is well suited to pasture.

This soil is well suited to woodland. The common canopy species are loblolly pine, white oak, red oak, hickory, and sweetgum. The common understory species are dogwood, sourwood, red maple, and American holly. Few limitations affect woodland use and management.

This soil is well suited to urban and recreational uses.

The capability class is I. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

FaB—Faceville sandy loam, 2 to 6 percent slopes. This well drained soil is in the uplands on the Coastal Plain. Mapped areas are oblong, long, or irregular in shape. They range from about 5 to 100 acres in size.

Typically, the surface layer is grayish brown sandy loam 7 inches thick. The subsoil is more than 53 inches thick. The upper part is yellowish red sandy clay. The lower part is yellowish red sandy clay that has red, reddish yellow, and strong brown mottles.

Permeability and available water capacity are moderate. Surface runoff is medium.

Included with this soil in mapping are a few small areas of soils that are eroded. The eroded soils have a surface layer that is redder and has a higher content of clay than the surrounding areas. Also included are small areas of Marlboro and Norfolk soils. These soils

have a browner subsoil than that of the Faceville soil. They are intermingled with areas of the Faceville soil. Also included are areas of Cecil and Nason soils. These soils commonly have a gravelly surface layer. Included soils make up about 15 percent of the map unit.

Most areas of the Faceville soil are used as cropland. Many areas are used as pasture. Some are used as woodland.

This soil is well suited to crops, such as soybeans, tobacco, small grain, and corn. The slope and runoff are the main limitations. The hazard of erosion is moderate. Conservation tillage, crop residue management, crop rotations, grassed waterways, and field borders help to control erosion and sedimentation. The soil is well suited to pasture.

This soil is well suited to woodland. The common canopy species are loblolly pine, sweetgum, red oak, white oak, and hickory. The understory species are dogwood, sourwood, and red maple. Few limitations affect woodland use and management.

This soil is well suited to urban and recreational uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

FuA—Fuquay sand, 0 to 3 percent slopes. This well drained soil is in the uplands on the Coastal Plain. Mapped areas are commonly oblong and are irregular in width. They range from about 10 to 100 acres in size.

Typically, the surface layer is a grayish brown sand 8 inches thick. The subsurface layer is 26 inches of light yellowish brown sand that has light gray mottles. The upper 11 inches of the subsoil is brownish yellow sandy loam that has brown mottles. The next 5 inches is light yellowish brown sandy clay loam that has strong brown, very firm and brittle material. The lower 46 inches is mottled strong brown, brownish yellow, yellowish red, and light gray sandy clay loam that has common red nodules of very firm and brittle material. The underlying material to a depth of 108 inches is yellowish red loamy sand that has red and yellow mottles.

Permeability is moderate in the upper part of the subsoil and slow in the lower part. Available water capacity is low. During late winter and early spring, a perched water table is at a depth of about 4 to 6 feet. Surface runoff is slow.

Included with this soil in mapping are some small areas of Varina soils, which have a surface layer that is less than 20 inches thick. Also included are soils in which the combined thickness of the surface layer and subsurface layer is more than 40 inches and soils that do not have very firm and brittle nodules in the subsoil. Included soils make up about 15 percent of the map unit.

Most areas of the Fuquay soil are used as cropland. Some areas are used as pasture. A few are used as woodland.

This soil is suited to cropland. The main crops are sweet potatoes and tobacco. Soybeans are grown as a rotation crop. Because of the thick, sandy surface layer and subsurface layer, the soil is subject to wind erosion and tends to be droughty in dry periods. Windbreaks, cover crops, crop residue management, and conservation tillage control wind erosion. Leaching of plant nutrients is a limitation. Losses caused by leaching can be reduced by cover crops during winter and by split or controlled applications of fertilizer during the growing season. The soil is suited to hybrid bermudagrass. Special care should be taken to avoid overgrazing during dry periods.

This soil is suited to woodland. The main canopy species are loblolly pine, longleaf pine, red oak, hickory, blackjack oak, and black oak. The sandy surface layer is the main limitation. Droughtiness is a limitation affecting seedling development.

This soil is well suited to most urban and recreational uses. The droughtiness is a limitation affecting the establishment and maintenance of lawns and golf fairways. The perched water table is a limitation on sites for dwellings with basements.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

GeB—Gilead sandy loam, 2 to 8 percent slopes. This moderately well drained soil is in the uplands on the Coastal Plain. The larger areas are irregular in shape, and the smaller areas are long and narrow. Mapped areas range from about 10 to 300 acres.

Typically, the surface layer is pale brown sandy loam 5 inches thick. The upper 4 inches of the subsoil is strong brown sandy clay loam. The next 6 inches is yellowish brown sandy clay loam. The next 5 inches is yellowish brown clay loam that has gray and red mottles. The next 9 inches is reddish yellow clay that has red and gray mottles. The lower 9 inches is light gray clay loam that has red and brown mottles. The underlying material to a depth of 75 inches is light gray sandy clay loam that has red and yellow mottles.

Permeability is moderately slow or slow. Available water capacity is moderate. A perched water table is at a depth of about 1.5 to 2.5 feet during early spring. Surface runoff is medium.

Included with this soil in mapping are small areas of the well drained Cowarts, Nankin, and Uchee soils. These soils are generally in the higher areas. Also

included are small areas of eroded soils that have a surface layer of sandy clay loam, areas of soils that have a surface layer that is more than 10 inches thick, areas of soils that have a moderately permeable subsoil, and small areas of soils that have a gravelly surface layer. Included soils make up about 15 to 30 percent of the map unit.

Most areas of the Gilead soil are used as pasture. Many areas are used as woodland or cropland.

This soil is suited to most of the crops commonly grown in the county. The major crops are corn, soybeans, and tobacco. In some areas sweet potatoes are grown. The slope, surface runoff, and the clayey subsoil are the main limitations. The hazard of erosion is moderate. Conservation tillage, crop residue management, crop rotations, terraces, diversions, grassed waterways, and field borders help to control erosion, surface runoff, and sedimentation. The soil is well suited to pasture. During droughty periods the production of fescue may be limited because of the low available water capacity in the areas that have a thick surface layer.

This soil is well suited to woodland. The common canopy species are loblolly pine, longleaf pine, white oak, red oak, sweetgum, and hickory. The main understory species are dogwood, sourwood, holly, and sassafras. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. Wetness and the slow permeability in the clayey subsoil are the main limitations. The soil is poorly suited to septic tank absorption fields.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

GeD—Gilead sandy loam, 8 to 15 percent slopes. This moderately well drained soil is on side slopes in the uplands on the Coastal Plain. Mapped areas are long and narrow. They generally follow the contour of the hillslopes. They range from about 10 to 100 acres in size.

Typically, the surface layer is pale brown sandy loam 5 inches thick. The upper 4 inches of the subsoil is strong brown sandy clay loam. The next 6 inches is yellowish brown sandy clay loam. The next 5 inches is yellowish brown clay loam that has gray and red mottles. The next 9 inches is reddish yellow clay that has red and gray mottles. The lower 9 inches is light gray clay loam that has red and brown mottles. The underlying material to a depth of 75 inches is light gray sandy clay loam that has red and yellow mottles.

Permeability is slow or moderately slow, and available water capacity is moderate. A perched water table is at a depth of about 1.5 to 2.5 feet during early spring. Surface runoff is rapid.

Included with this soil in mapping are small areas of the well drained Cowarts, Nankin, and Uchee soils. These soils are generally in the higher areas. Also included are small seepy areas that commonly are at the bottom of slopes or at the edge of intermittent drains, areas of soils that have a gravelly surface layer, small areas of eroded soils that have a thin surface layer of sandy clay loam, and areas of soils that have a moderately permeable subsoil. Included soils make up about 20 to 30 percent of the map unit.

Most areas of the Gilead soil are used as woodland or pasture. Very few areas are used as cropland.

This soil is poorly suited to cultivated crops. The slope, the rapid surface runoff, and the clayey subsoil are the main limitations. The hazard of erosion is severe. Because of the slope, erosion is very difficult to control if cultivated crops are grown. Growing grasses or legumes for hay or pasture is a good alternative. Proper stocking rates, pasture rotation, and restricted use during wet periods help to maintain the condition of the pasture and prevent excessive erosion.

This soil is well suited to woodland. The common canopy species are loblolly pine, longleaf pine, white oak, red oak, sweetgum, and hickory. The main understory species are dogwood, sourwood, holly, and sassafras. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. The slope, the slow permeability, and seepage on side slopes during wet periods are the main limitations.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

GoA—Goldsboro sandy loam, 0 to 2 percent slopes. This moderately well drained soil is in the uplands on the Coastal Plain. Mapped areas are irregular in shape and range from 5 to about 400 acres in size.

Typically, the surface layer is brown sandy loam 8 inches thick. The upper 8 inches of the subsoil is yellowish brown sandy clay loam. The next 10 inches is yellowish brown sandy clay loam that has brown mottles. The next 16 inches is yellowish brown clay loam that has red and gray mottles. The lower 23 inches is light gray sandy clay that has red and brown mottles. The underlying material to a depth of 70 inches is light gray sandy clay loam that has brown and red mottles.

Permeability and available water capacity are moderate. The seasonal high water table is at a depth of about 2 to 3 feet. Surface runoff is slow.

Included with this soil in mapping are small areas of Norfolk and Marlboro soils in the highest areas. Norfolk soils are well drained. Marlboro soils have a clayey subsoil. Also included are small areas of the somewhat poorly drained Lynchburg soils and the poorly drained Rains soils in gentle depressions or around the edge of mapped areas and small areas of soils that have a surface layer of loamy sand. Included soils make up about 10 percent of the map unit.

Most areas of the Goldsboro soil are used as cropland. A few small areas are used as woodland or pasture.

This soil is well suited to cultivated crops, such as corn, soybeans, small grain, tobacco, and pasture. Wetness can be a limitation affecting moisture-sensitive crops, such as tobacco. A drainage system may be needed for the optimum production of tobacco. The soil is well suited to pasture.

This soil is well suited to hardwoods and pines. The common canopy species are loblolly pine, longleaf pine, white oak, southern red oak, hickory, yellow-poplar, sweetgum, and red maple. The common understory species are dogwood, red maple, holly, and blueberry. The wetness restricts the use of some equipment.

This soil is suited to most urban and recreational uses. The wetness is the main limitation.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

Gr—Grantham silt loam. This poorly drained soil is in broad, smooth areas or in slight depressions in the uplands on the Coastal Plain. Slopes are 0 to 2 percent. Mapped areas are oblong or irregular in shape and range from about 20 to 600 acres in size.

Typically, the surface layer is dark grayish brown silt loam 4 inches thick. The upper 7 inches of the subsoil is light brownish gray silt loam. The next 13 inches is light brownish gray silt loam that has brown mottles. The next 37 inches is gray loam that has brown and gray mottles. The lower 24 inches is gray clay loam that has yellow, brown, and gray mottles. The underlying material to a depth of 94 inches is gray clay that has yellow and brown mottles.

Permeability is moderately slow, and available water capacity is high. The seasonal high water table is within a depth of 1 foot. Surface runoff is slow or very slow.

Included with this soil in mapping are small areas of Rains, Nahunta, and Lynchburg soils. Nahunta and Lynchburg soils are somewhat poorly drained and are in the slightly higher areas. Rains soils have less silt and more sand throughout than the Grantham soil and are in similar landscape positions. Also included are areas of soils that contain more clay than the Grantham soil. Included soils make up about 10 to 20 percent of the map unit.

Most areas of the Grantham soil are used as woodland. A few areas have been cleared of trees and are used as cropland.

Where drained, this soil is suited to cultivated crops, such as corn and soybeans. It is suited to grasses and legumes. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This soil is suited to woodland. The common canopy species are loblolly pine, sweetgum, water oak, willow oak, and red maple. The main understory species include greenbrier, holly, sweetbay, sourwood, sassafras, and giant cane. The wetness restricts the use of equipment.

This soil is poorly suited to most urban and recreational uses. The seasonal high water table and the moderately slow permeability are the main limitations.

The capability subclass is VIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

LaB—Lakeland sand, 0 to 6 percent slopes. This excessively drained soil is on low ridges in the uplands on the Coastal Plain and on stream terraces. Mapped areas are elongated or rounded and range from about 10 to 200 acres in size.

Typically, the surface layer is dark brown sand 6 inches thick. The underlying material to a depth of 73 inches is yellowish brown, strong brown, and pale yellow sand.

Permeability is very rapid, and available water capacity is very low. Surface runoff is slow.

Included with this soil in mapping are small areas of moderately well drained soils and soils that have a loamy or clayey layer in the lower part. These included soils are commonly near the outer edge of mapped areas. The moderately well drained soils are in shallow depressions. Included soils make up about 10 percent of the map unit.

Most areas of the Lakeland soil are used as woodland or cropland. A few areas are used as pasture.

This soil is poorly suited to row crops, such as corn and soybeans. Droughtiness and leaching of plant nutrients are the main limitations. Soil blowing is a hazard. It often damages young plants in the early spring. Conservation tillage, winter cover crops, windbreaks, and crop residue management help to maintain the content of organic matter, conserve moisture, control wind erosion, and minimize leaching. Split applications of fertilizer help to maintain nutrient levels and minimize losses caused by leaching. The soil

is suited to hybrid bermudagrass. The main limitation is droughtiness. Special care should be taken to avoid overgrazing during dry periods.

This soil is suited to woodland. Loblolly pine and longleaf pine are the main canopy species. Turkey oak, blackjack oak, and post oak are the main understory species. Droughtiness is the main limitation. The loose sandy surface can limit the use of equipment.

This soil is suited to most urban and recreational uses. Lawns and shrubs require irrigation and frequent application of lime and fertilizer. The rapid permeability is a limitation affecting onsite sewage disposal. The soil is a good source of sand for construction material.

The capability subclass is IVs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7S.

Le—Leaf silt loam. This poorly drained soil is on broad stream terraces. Slopes are 0 to 2 percent. Mapped areas are irregular in shape and range from about 100 to 2,000 acres in size.

Typically, the surface layer is dark grayish brown silt loam 4 inches thick. The upper 3 inches of the subsoil is light gray silty clay loam. The next 32 inches is grayish brown or light brownish gray clay that has brown and yellow mottles. The lower 28 inches is mottled light brownish gray and strong brown clay or light gray clay that has yellow mottles. The underlying material to a depth of 75 inches is light gray clay loam that has brown mottles.

Permeability is slow, and available water capacity is high. The seasonal high water table is at a depth of about 0.5 foot to 1.5 feet. The shrink-swell potential is high. Surface runoff is slow or very slow.

Included with this soil in mapping are small areas of the moderately well drained Dogue soils. Also included are small areas of soils that are less clayey than is typical for the Leaf soil, soils that are ponded briefly during wet periods, and soils that have a thick, black surface layer. Dogue soils are on low ridges or the slightly higher mounds near open fields. The ponded soils are in depressions. The soils that have a thick, black surface layer are near drainageways that flow from the higher uplands. Included soils make up about 20 percent of the map unit.

Most areas of the Leaf soil are used as woodland. A few areas are used as pasture.

This soil is poorly suited to cropland and pasture. The seasonal high water table and the high content of clay in the subsoil are the major limitations.

This soil is well suited to woodland. The common canopy species are loblolly pine, sweetgum, willow oak, white oak, chestnut oak, red maple, and water oak. The understory species are American holly, blueberry, waxmyrtle, and summersweet clethra. The wetness is the main limitation.

This soil is poorly suited to urban and recreational uses because of the wetness, the slow permeability, and the high shrink-swell potential.

The capability subclass is IVw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

Ly—Lynchburg sandy loam. This somewhat poorly drained soil is on broad smooth flats and in shallow depressions in the uplands on the Coastal Plain. Slopes are 0 to 2 percent. Mapped areas are irregular in shape and generally range from about 10 to 50 acres in size.

Typically, the surface layer is very dark gray sandy loam 7 inches thick. The upper 9 inches of the subsoil is light yellowish brown sandy clay loam that has gray and brown mottles. The next 38 inches is light gray sandy clay loam that has brown, red, and gray mottles. The lower 17 inches is light brownish gray sandy clay loam that has yellow, brown, and gray mottles. The underlying material to a depth of 82 inches is light gray sandy loam and sandy clay loam that has brown mottles.

Permeability and available water capacity are moderate. The seasonal high water table is at a depth of about 0.5 foot to 1.5 feet. Surface runoff is slow.

Included with this soil in mapping are areas of Goldsboro, Toisnot, Nahunta, Rains, and Grantham soils. These soils make up less than 20 percent of most mapped areas. Goldsboro soils are moderately well drained and are in the higher areas. Toisnot, Nahunta, Rains, and Grantham soils are poorly drained and are in the lower areas.

Most areas of the Lynchburg soil are used as woodland. Some areas are used as cropland. A few are used as pasture.

Where drained, this soil is well suited to corn, soybeans, and small grain. The wetness is the main limitation. A drainage system is needed for the optimum production of tobacco and other moisture-sensitive crops. Conservation tillage, cover crops, and a cropping sequence that includes grasses and legumes help to maintain tilth and productivity. The soil is suited to pasture. Grazing when the soil is wet causes compaction and damages plants. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This soil is well suited to woodland. The common canopy species are loblolly pine, red maple, sweetgum, yellow-poplar, water oak, willow oak, and white oak. The common understory species are holly, blueberry,

greenbrier, switchcane, and sweetbay. The wetness is the main limitation.

This soil is poorly suited to most urban and recreational uses because of the wetness.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

MaA—Marlboro sandy loam, 0 to 2 percent slopes. This well drained soil is on broad, smooth uplands on the Coastal Plain. Mapped areas are oblong, rounded, or irregular in shape and range from 10 to about 100 acres in size.

Typically, the surface layer is dark brown sandy loam 5 inches thick. The upper 8 inches of the subsoil is strong brown sandy clay. The next 15 inches is yellowish brown sandy clay. The next 11 inches is yellowish brown sandy clay that has strong brown mottles. The lower 23 inches is mottled red, light gray, yellowish brown, and strong brown sandy clay. The underlying material to a depth of 73 inches is mottled red, strong brown, and light gray sandy clay loam.

Permeability is moderate, and available water capacity is moderate or high. The seasonal high water table is at a depth of about 4 to 6 feet. Surface runoff is slow.

Included with this soil in mapping are areas of Norfolk, Faceville, and Goldsboro soils. Norfolk soils have a sandy surface layer and a loamy subsoil. Faceville soils are in the highest areas. Goldsboro soils are moderately well drained and are in shallow depressions and near the edge of mapped areas. They are adjacent to Lynchburg or Rains soils. Also included are a few small areas of soils that have gravel in the surface layer. Included soils make up less than 10 percent of the map unit.

Most areas of the Marlboro soil are used as cropland. Some areas are used as pasture. A few are used as woodland.

This soil is well suited to most cultivated crops. The major crops are tobacco, sweet potatoes, corn, and soybeans. A few areas are planted to vegetables. No major limitations affect use and management. Conservation tillage, cover crops, and the use of close-growing grasses and legumes in a conservation cropping system help to maintain tilth and conserve moisture. The soil is well suited to pasture.

This soil is well suited to woodland. The common canopy species are loblolly pine, longleaf pine, red oak, white oak, hickory, and sweetgum. The main understory species include dogwood, sourwood, sassafras, and holly. Few limitations affect woodland use and management.

This soil is suited to most urban uses. Wetness in the lower part of the subsoil is a limitation on sites for dwellings with basements and on some sites for septic tank absorption fields.

The capability class is I. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

MaB—Marlboro sandy loam, 2 to 8 percent slopes. This well drained soil is on ridges and smooth side slopes in the uplands on the Coastal Plain. Individual areas on ridges are generally oval and range from about 5 to 50 acres in size. On hillslopes, they are long and narrow with smooth to slightly convex slopes and range from 10 to about 200 acres in size.

Typically, the surface layer is yellowish brown sandy loam 7 inches thick. The subsurface layer is light olive brown sandy loam 4 inches thick. The subsoil is more than 61 inches thick. The upper part is yellowish brown clay loam that has brown and red mottles. The lower part is mottled strong brown, red, gray, and yellow sandy clay.

Permeability is moderate, and available water capacity is moderate or high. The seasonal high water table is at a depth of about 4 to 6 feet. Surface runoff is medium.

Included with this soil in mapping are small areas of the redder Faceville soils and soils that have a gravelly surface layer on small knolls. Also included are soils that have a thinner subsoil than that of the Marlboro soil. They generally are on the steeper slopes. Included soils make up less than 25 percent of most mapped areas.

Most areas of the Marlboro soil are used as cropland. Some areas are used as pasture. A few are used as woodland.

This soil is well suited to cultivated crops. The major crops are soybeans, small grain, corn, and sweet potatoes. The slope and the surface runoff are the main limitations. The hazard of erosion is moderate. Conservation tillage, crop residue management, contour farming, crop rotations, grassed waterways, and field borders help to control erosion, runoff, and sedimentation. The soil is well suited to pasture.

This soil is well suited to woodland. The common canopy species are loblolly pine, longleaf pine, white oak, red oak, hickory, and sweetgum. The main understory species include dogwood, sourwood, sassafras, and holly. Few limitations affect woodland use and management.

This soil is well suited to most urban and recreational uses. Wetness is a limitation affecting excavations for basements and on sites for septic tank absorption fields.

The capability subclass is IIe. Based on loblolly pine

as the indicator species, the woodland ordination symbol is 8A.

McB—Marlboro-Cecil complex, 2 to 8 percent slopes. This map unit consists of areas of the well drained Marlboro and Cecil soils. These soils occur as areas so intricately mixed that mapping them separately was not feasible at the scale selected. They are on uplands along the contact zone between the Piedmont and the Coastal Plain. The unit is about 40 percent Marlboro soils and 35 percent Cecil soils. Mapped areas vary in shape and range from about 20 to 200 acres in size.

Typically, the surface layer of the Marlboro soil is yellowish brown sandy loam 13 inches thick. The subsoil is more than 75 inches thick. The upper part is yellowish brown sandy clay. The lower part is mottled red, light gray, and yellowish red clay.

Typically, the surface layer of the Cecil soil is brown gravelly loam about 8 inches thick. The subsoil is 42 inches of red clay that has strong brown mottles. The underlying material to a depth of 72 inches is mottled weak red and red saprolite that has a texture of loam.

Permeability is moderate in both soils. Available water capacity is moderate or high in the Marlboro soil and moderate in the Cecil soil. The Marlboro soil has a seasonal high water table at a depth of about 4 to 6 feet. Surface runoff is medium on both soils.

Included with these soils in mapping are small areas of soils that are loamy in the upper part of the subsoil and soils that have a gravelly or sandy surface layer that is 2 to 3 feet thick. Also included are Norfolk, Gilead, and Faceville soils. Norfolk soils have a loamy subsoil. Faceville soils have a subsoil that is redder than that of the Marlboro soil and thicker than that of the Cecil soil. Gilead soils are moderately well drained. Included soils make up about 25 percent of the map unit.

Most areas of this unit are used as cropland or woodland. Some areas are used as pasture.

The Marlboro and Cecil soils are well suited to cultivated crops. The main crops are soybeans, small grain, tobacco, and corn. The slope and the surface runoff are the main limitations. The hazard of erosion is moderate. Conservation tillage, crop rotations, crop residue management, grassed waterways, and field borders help to control erosion, sedimentation, and surface runoff. If these soils are used for pasture, proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. These soils are well suited to pasture.

These soils are well suited to woodland. The common canopy species are loblolly pine, shortleaf pine, white oak, red oak, scarlet oak, post oak, sweetgum, yellow-poplar, and hickory. The common understory species are dogwood, wild grape, American holly, sourwood, sassafras, red maple, and eastern redcedar. Few limitations affect woodland use and management.

These soils are suited to most urban and recreational uses. The restricted permeability is a limitation on sites for septic tank absorption fields because of the clayey subsoil. The water table in the lower part of the subsoil of the Marlboro soils is a limitation on sites for dwellings with basements.

The capability subclass is IIe for both soils. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

Na—Nahunta silt loam. This somewhat poorly drained soil is in broad interstream areas in the uplands on the Coastal Plain. Slopes are 0 to 2 percent. Mapped areas are irregular in shape and range from about 20 to 200 acres in size.

Typically, the surface layer is dark gray silt loam 6 inches thick. The subsoil is more than 69 inches thick. The upper 6 inches is light yellowish brown loam that has brown and gray mottles. The next 12 inches is yellowish brown clay loam that has gray mottles. The next 28 inches is gray clay loam that has yellow, brown, and red mottles. The lower 23 inches is light brownish gray silty clay loam that has yellow and brown mottles.

Permeability is moderately slow, and available water capacity is high. The seasonal high water table is at a depth of about 1.0 to 2.5 feet. Surface runoff is slow.

Included with this soil in mapping are small areas of the poorly drained Grantham soil and the sandier Rains, Lynchburg, and Goldsboro soils. Rains and Grantham soils are poorly drained and are in the slightly lower areas along the edges of drainageways. Lynchburg soils are interspersed throughout the mapped area. Goldsboro soils are moderately well drained and are in the slightly higher areas. Also included are small areas of soils that have a hardpan in the subsoil. Included soils make up about 10 percent of the map unit.

Most areas of the Nahunta soil are used as woodland. The rest are used as cropland or pasture.

Where drained, this soil is suited to crops. The main crops are corn, soybeans, and small grain. The wetness is the main limitation. Clods form if this soil is plowed or disked when wet. A system of open ditches and tile drainage may be necessary for proper drainage. Crop residue management, seed beds, conservation tillage, and the use of cover crops are common management practices. The soil is suited to pasture. Grazing when the soil is wet causes compaction and damages plants.

This soil is well suited to woodland. The common

canopy species are loblolly pine, sweetgum, willow oak, water oak, and yellow-poplar. The main understory species are greenbrier, holly, red maple, switchcane, and blueberry. The wetness restricts the use of equipment.

This soil is poorly suited to most urban and recreational uses. The wetness and permeability are the main limitations affecting urban uses.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

NkB—Nankin fine sandy loam, 2 to 6 percent slopes. This well drained soil is on ridges in the uplands on the Coastal Plain. Elevations range from 270 feet above sea level to more than 300 feet. Most mapped areas are irregular in shape and range from about 8 to 60 acres in size.

Typically, the surface layer is brown fine sandy loam 6 inches thick. The subsurface layer is light yellowish brown fine sandy loam 3 inches thick. The upper 27 inches of the subsoil is yellowish red and strong brown sandy clay that has yellow mottles. The lower 14 inches is strong brown sandy clay loam that has yellow and gray mottles. The underlying material to a depth of 63 inches is mottled brownish yellow, strong brown, and light gray sandy clay loam.

Permeability is moderately slow, and available water capacity is moderate. Surface runoff is medium.

Included with this soil in mapping are small areas of Gilead, Cecil, and Cowarts soils. Also included are small areas of soils that have a thick, sandy surface layer. Gilead soils are moderately well drained, and Cecil soils formed in material weathered from granitic bedrock. Both of these soils are along the lower edge of the mapped areas. Cowarts soils are intermingled with areas of the Nankin soil. They have no distinguishable pattern of occurrence. Included soils make up about 25 percent of the map unit.

Most areas of the Nankin soil are used as cropland. Some areas are used as pasture. A few are used as woodland.

This soil is well suited to most of the crops commonly grown in the county. Surface runoff and the clayey subsoil are the main limitations. The hazard of erosion is moderate. Conservation tillage, crop rotations, contour farming, grassed waterways, and crop residue management reduce erosion and conserve moisture. The soil is well suited to grasses and legumes for pasture.

This soil is well suited to woodland. The common canopy species are loblolly pine, longleaf pine, southern red oak, white oak, hickory, and red maple. The main understory species are dogwood, sassafras, sourwood, and black cherry. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. It is poorly suited to septic tank absorption fields because of the moderately slow permeability.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NnB—Nason silt loam, 2 to 8 percent slopes. This well drained, gently sloping soil is on ridges and hillslopes in the uplands on the Piedmont. Mapped areas generally are oblong and about 10 to 70 acres in size.

Typically, the surface layer is yellowish brown silt loam 4 inches thick. The upper 31 inches of the subsoil is strong brown and yellowish red silty clay. The lower 10 inches is yellowish red silty clay loam. The underlying material to a depth of 56 inches is multicolored pink, purple, brown, and white silt loam. Soft, fractured, multicolored phyllite extends to a depth of more than 60 inches.

Permeability is moderate, and available water capacity is moderate or high. The shrink-swell potential is moderate. Surface runoff is medium. Fractured bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of soils that have bedrock at a depth of more than 60 inches, soils that have a surface layer of sandy loam or gravelly sandy loam, and soils that have less clay in the subsoil than is typical for the Nason soil. All of these included soils are in landscape positions similar to those of the Nason soil. Also included are some small, low areas of the moderately well drained Gilead soils. Included soils make up about 20 percent of the map unit.

Most areas of the Nason soil are used as woodland. A few areas are used as cropland or pasture.

This soil is suited to some of the crops commonly grown in the county. The main row crops are small grain and soybeans. Surface runoff is the main limitation. The hazard of erosion is moderate. Conservation tillage, contour farming, crop residue management, crop rotations, grassed waterways, and field borders are common. The soil is well suited to pasture.

This soil is well suited to woodland. The common canopy species are loblolly pine, longleaf pine, white oak, red oak, sweetgum, and hickory. The main understory species are dogwood, sourwood, holly, sassafras, and red maple. Few limitations affect woodland use and management.

This soil is suited to urban and recreational uses. The depth to bedrock, the restricted permeability, and

the moderate shrink-swell potential are the main limitations affecting urban uses. Standard septic systems generally require modifications to ensure proper functioning.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NnD—Nason silt loam, 8 to 15 percent slopes. This well drained soil is on side slopes adjacent to major drainageways in the uplands on the Piedmont. Mapped areas are long and narrow. They range from about 20 to 100 acres in size.

Typically, the surface layer is brown silt loam 4 inches thick. The subsurface layer is brown silt loam 3 inches thick. The subsoil is 23 inches of strong brown and yellowish red silty clay loam. The underlying material to a depth of 45 inches is multicolored silt loam. Soft, fractured, multicolored phyllite extends to a depth of more than 50 inches.

Permeability is moderate, and available water capacity is moderate or high. The shrink-swell potential is moderate. Surface runoff is rapid. Fractured bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of soils that are less than 40 inches deep over bedrock, soils that have a surface layer of sandy loam or gravelly sandy loam, and soils that have less clay in the subsoil than is typical for the Nason soil. All of these included soils are in landscape positions similar to those of the Nason soil. Also included are some small, low areas of the moderately well drained Gilead soils and a few areas that have a slope of more than 15 percent. Included soils make up about 20 percent of the map unit.

Most areas of the Nason soil are used as woodland. A few areas are used as pasture or cropland.

This soil is suited to cropland. The main crops are small grain and soybeans. The slope and the rapid surface runoff are the main limitations. The hazard of erosion is severe. Conservation tillage, crop residue management, contour farming, crop rotations, grassed waterways, and field borders help to control erosion, runoff, and sedimentation. The soil is suited to pasture. Controlled grazing helps to prevent excessive erosion.

This soil is well suited to woodland. The common native canopy species are loblolly pine, longleaf pine, white oak, red oak, sweetgum, and hickory. The main understory species are dogwood, sourwood, holly, sassafras, and red maple. Few limitations affect woodland use and management.

This soil is suited to urban and recreational uses. The restricted permeability, the slope, the moderate shrink-swell potential, and the depth to bedrock are the main limitations affecting urban uses.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NnE—Nason silt loam, 15 to 25 percent slopes. This well drained soil is on hillslopes in the uplands on the Piedmont. It is in deeply dissected areas adjacent to stream valleys. Mapped areas are long and narrow or irregularly shaped. They range from about 15 to 100 acres in size.

Typically, the surface layer is grayish brown silt loam 2 inches thick. The subsurface layer is pale yellow silt loam 4 inches thick. The subsoil is 30 inches of yellowish brown silty clay and silty clay loam. It has red and yellow mottles. The underlying material to a depth of 42 inches is multicolored silt loam that has many fragments of phyllite. Soft, fractured phyllite extends to a depth of more than 50 inches.

Permeability and available water capacity are moderate. The shrink-swell potential also is moderate. Surface runoff is very rapid. Fractured bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of soils that are less than 40 inches deep over bedrock, soils that have a gravelly surface layer, and soils that have less clay in the subsoil than is typical for the Nason soil. Also included are small areas that have a slope of more than 25 percent. The included soils are intermingled with areas of the Nason soil. They make up about 25 percent of the map unit.

Most areas of the Nason soil are used as woodland. A few small areas are used for pasture.

This soil is poorly suited to cropland and pasture. The slope and the very rapid surface runoff are the main limitations. The hazard of erosion is very severe. Proper stocking rates, pasture rotation, and restricted use during wet periods help to maintain the condition of the pasture and prevent excessive erosion.

This soil is suited to woodland. The main canopy species are loblolly pine, longleaf pine, hickory, white oak, beech, yellow-poplar, hickory, and sweetgum. The main understory species are dogwood, sourwood, holly, and red maple. The slope is the main limitation.

This soil is poorly suited to most urban and recreational uses, mainly because of the slope.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

NoA—Norfolk loamy sand, 0 to 2 percent slopes. This well drained soil is on broad interstream divides in the uplands on the Coastal Plain. Mapped areas are broad and range from several hundred feet to 0.5 mile

in width. They range from about 10 to more than 300 acres in size.

Typically, the surface layer is brown loamy sand 9 inches thick. The subsurface layer is light yellowish brown loamy sand 5 inches thick. The subsoil is more than 56 inches thick. The upper 12 inches is yellowish brown sandy clay loam. The next 32 inches is yellowish brown sandy clay loam that has red mottles. The lower 12 inches is mottled yellowish red and yellowish brown sandy clay loam.

Permeability and available water capacity are moderate. A seasonal high water table is at a depth of 4 to 6 feet. Surface runoff is slow.

Included with this soil in mapping are small areas of Bonneau and Goldsboro soils. The combined thickness of the sandy surface layer and subsurface layer in Bonneau soils is thicker than in the Norfolk soil. Bonneau soils are in landscape positions similar to those of the Norfolk soil. The moderately well drained Goldsboro soils are in shallow depressions. Also included are areas of the clayey Marlboro and Faceville soils in landscape positions similar to those of the Norfolk soil. Included soils make up about 10 percent of the map unit.

Most areas of the Norfolk soil are used as cropland. Some areas are used as pasture. A small acreage is used as woodland.

This soil is well suited to cropland. The major crops are tobacco, sweet potatoes, corn, and soybeans. Few limitations affect use and management. Some areas are subject to wind erosion. Crop residue management controls wind erosion. The soil is well suited to pasture.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, white oak, red oak, hickory, and black oak. The main understory species are holly, dogwood, sassafras, and sourwood. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. Wetness in the lower part of the subsoil and the moderate permeability are the main limitations affecting urban uses.

The capability class is I. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NoB—Norfolk loamy sand, 2 to 6 percent slopes. This well drained soil is on slightly rounded ridges and side slopes in the uplands on the Coastal Plain. Mapped areas generally are irregular in shape or elongated. They range from about 10 to 100 acres in size.

Typically, the surface layer is dark brown loamy sand 11 inches thick. The subsurface layer is light yellowish brown loamy sand 5 inches thick. The subsoil is more than 44 inches of yellowish brown sandy clay loam. The upper part has strong brown mottles. The lower part has strong brown and red mottles.

Permeability and available water capacity are moderate. The seasonal high water table is at a depth of 4 to 6 feet. Surface runoff is medium.

Included with this soil in mapping are small areas of the clayey Marlboro, Faceville, and Gilead soils and the sandier Bonneau and Wagram soils. Marlboro, Faceville, and Wagram soils are in landscape positions similar to those of the Norfolk soil. The moderately well drained Gilead and the well drained Bonneau soils are in the lower areas. Where the Coastal Plain and the Piedmont meet, the clayey Cecil, Nason, and Wedowee soils are the most common included soils. Also included are small areas of soils that have a gravelly surface layer. These soils are commonly adjacent to Cecil, Nason, and Wedowee soils. Usually only one or two of the named included soils are in any mapped area. Included soils make up about 15 percent of the map unit.

Most areas of the Norfolk soil are used as cropland. A few areas are used as woodland or pasture.

This soil is well suited to cropland. The main crops are soybeans, small grain, corn, and sweet potatoes. The main limitations are the slope and the surface runoff. The hazard of erosion is moderate. Conservation tillage, crop residue management, contour farming, crop rotations, grassed waterways, and field borders control erosion, surface runoff, and sedimentation. The soil is well suited to pasture.

This soil is well suited to woodland. The major canopy species are loblolly pine, longleaf pine, white oak, red oak, black oak, hickory, and sweetgum. The main understory species are holly, dogwood, sourwood, sassafras, and lowbush blueberry. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. Wetness in the lower part of the subsoil and the moderate permeability are the main limitations affecting urban uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NuA—Norfolk-Urban land complex, 0 to 3 percent slopes. This map unit consists of the well drained Norfolk soils and Urban land. The Norfolk soils and Urban land occur as areas so intricately mixed that mapping them separately was not feasible at the scale selected. The areas mainly are in the towns of Clayton and Smithfield. This unit is about 50 percent Norfolk soil and 30 percent Urban land. Most mapped areas are

irregular in shape. The areas range from about 10 to 500 acres in size.

Typically, the surface layer of the Norfolk soil is brownish gray loamy sand 9 inches thick. The subsurface layer is light yellowish brown loamy sand 5 inches thick. The subsoil is more than 56 inches thick. The upper 12 inches is yellowish brown sandy clay loam. The next 32 inches is yellowish brown sandy clay loam that has yellowish red and red mottles. The lower 12 inches is mottled yellowish red and yellowish brown sandy clay loam.

Permeability and available water capacity are moderate in the Norfolk soil. The seasonal high water table is at a depth of 4 to 6 feet. Surface runoff is slow.

Urban land consists of areas where the soil has been covered with shopping centers, factories, houses, municipal buildings, parking lots, roads, or other impervious surfaces. The extent of site modification varies greatly. Some areas have had little disturbance. Other areas have been extensively reshaped by cutting, filling, and grading.

Included in mapping are areas of Goldsboro, Lynchburg, Wagram, Cecil, Wedowee, Marlboro, and Bonneau soils. The included areas of Goldsboro, Lynchburg, and Wagram soils are mainly in Smithfield. The included areas of Cecil, Wedowee, Marlboro, and Bonneau soils are mainly in Clayton. Goldsboro soils are moderately well drained. Lynchburg soils are somewhat poorly drained. Bonneau and Wagram soils have a thick, sandy surface layer and subsurface layer. Cecil, Wedowee, and Marlboro soils have more clay in the subsoil than the Norfolk soil. Also included are small areas that have a slope of more than 3 percent. Included soils make up about 20 percent of the map unit.

The Norfolk soil is well suited to parks, open spaces, building sites, lawns, and gardens. Surface runoff is considerable because the building sites and paved areas are impermeable. It is particularly heavy during intense rainstorms. Erosion is a moderate hazard if the soil is not protected. Erosion control practices are needed on construction sites to prevent sedimentation. Wetness in the lower part of the subsoil and the moderate permeability are the main limitations affecting urban uses.

This map unit was not assigned a capability subclass or a woodland ordination symbol.

PaD—Pacolet loam, 10 to 15 percent slopes. This well drained soil is on hillslopes in dissected areas in the uplands on the Piedmont. Mapped areas are long, narrow, and irregular in shape. They range from about 20 to 100 acres in size.

Typically, the surface layer is dark reddish brown loam 5 inches thick. The upper 20 inches of the subsoil is red clay. The lower 10 inches is mottled reddish brown, reddish yellow, and weak red clay loam. The underlying material to a depth of 60 inches is mottled weak red, reddish yellow, and reddish brown loam.

Permeability is moderate, and available water capacity is low or moderate. Surface runoff is very rapid.

Included with this soil in mapping are small areas of soils that have an eroded surface layer of clay loam and other areas of soils that have a gravelly surface layer. Also included are small areas of Cecil soils, soils that have a loamy subsoil, and soils that have bedrock within a depth of 40 inches. Cecil soils have a thicker subsoil than that of the Pacolet soil. All of these included soils are intermingled in landscape positions similar to those of the Pacolet soil. Included soils make up about 20 percent of the map unit.

Nearly all areas of the Pacolet soil are used as woodland. A few areas are used as pasture.

This soil is poorly suited to cropland. The slope and the very rapid surface runoff are the main limitations. The hazard of erosion is severe. Intensive conservation measures are needed if the soil is used as cropland. The soil is suited to pasture. Proper stocking rates, pasture rotation, and restricted use during wet periods help to maintain the condition of the pasture and prevent excessive erosion.

This soil is well suited to woodland. The common canopy species are loblolly pine, shortleaf pine, white oak, red oak, sweetgum, hickory, and yellow-poplar. The main understory species are dogwood, sourwood, red maple, and wild grape. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. The slope and the permeability are the main limitations.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

PaE—Pacolet loam, 15 to 25 percent slopes. This well drained soil is on hillslopes in dissected areas in the uplands on the Piedmont. Mapped areas are long, narrow, and irregular in shape. They range from about 5 acres to 40 acres in size.

Typically, the surface layer is dark reddish brown loam about 5 inches thick. The upper 20 inches of the subsoil is red clay. The lower 10 inches is reddish yellow clay loam that has brown and red mottles. The underlying material to a depth of 60 inches is mottled weak red, reddish yellow, and reddish brown loam.

Permeability is moderate, and available water

capacity is low or moderate. Surface runoff is very rapid.

Included with this soil in mapping are small areas of soils that have an eroded surface layer of clay loam or clay. Also included are small areas of Cecil soils, soils that have a loamy subsoil, and soils that have bedrock within a depth of 40 inches. Cecil soils have a thicker subsoil than that of the Pacolet soils. All of these included soils are intermingled in landscape positions similar to those of the Pacolet soil. Also included are small areas of gullies. Included soils make up about 25 percent of the map unit.

Nearly all areas of the Pacolet soil are used as woodland. A few areas are used as pasture.

This soil is poorly suited to cropland and pasture. The slope and the very rapid surface runoff are the major limitations. The hazard of erosion is very severe.

This soil is suited to woodland. The common canopy species are loblolly pine, shortleaf pine, white oak, red oak, sweetgum, hickory, and yellow-poplar. The main understory species are dogwood, sourwood, red maple, and wild grape. The slope is the main limitation.

This soil is poorly suited to urban and recreational uses. The slope is the major limitation.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

Pn—Pantego loam, occasionally flooded. This very poorly drained soil is on broad stream terraces on the Coastal Plain. Slopes are 0 to 2 percent. Mapped areas are broad and irregular in shape or long and narrow. They range from about 5 to 600 acres in size.

Typically, the surface layer is black loam about 26 inches thick. The upper 12 inches of the subsoil is dark gray sandy clay loam. The next 26 inches is dark gray sandy clay loam that has brown mottles. The lower 8 inches is dark grayish brown sandy loam that has brown mottles.

Permeability is moderate, and available water capacity is moderate or high. The seasonal high water table is within 1 foot of the surface in winter and spring. The soil is occasionally flooded for long or very long periods. Surface runoff is slow.

Included with this soil in mapping are small areas of soils that have a clayey subsoil, soils that have a sandy subsoil, and soils that have a dark surface layer that is less than 10 inches thick. These soils are intermingled with areas of the Pantego soil. Also included are small areas of Augusta and Bibb soils. Augusta soils are somewhat poorly drained and are in the slightly higher areas. Bibb soils have less clay throughout than the Pantego soil and are along small streams or at the edge of the larger flood plains. Included soils make up about 20 percent of the map unit.

Most areas of the Pantego soil are used as woodland. About a third of the areas are used as cropland.

Where drained, this soil is well suited to cropland. The main crops are corn, soybeans, and small grain. The wetness and the flooding are the main limitations. The soil is poorly suited to pasture because of the wetness.

This soil is well suited to woodland. The common canopy species are loblolly pine, willow oak, water oak, sweetgum, blackgum, and red maple. The main understory species are switchcane, hornbeam, greenbrier, and maple. The wetness and the flooding are the main limitations. Equipment should be operated only during dry seasons. The seedling mortality rate may be high because of the wetness and the flooding.

This soil is poorly suited to most urban and recreational uses because of the wetness and the flooding.

The capability subclass is VIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

Ra—Rains sandy loam. This poorly drained soil is in broad interstream areas, in shallow depressions, and at the head of drainageways in the uplands on the Coastal Plain. Slopes are 0 to 2 percent. Mapped areas vary in shape and range from about 10 to 300 acres in size.

Typically, the surface layer is gray sandy loam 5 inches thick. The upper 5 inches of the subsoil is brownish gray sandy clay loam that has brown mottles. The next 34 inches is gray sandy clay loam that has brown and red mottles. The next 18 inches is dark gray sandy clay that has brown and red mottles. The lower 16 inches is dark gray sandy clay loam that has yellow, red, and gray mottles. The underlying material to a depth of 88 inches is light gray sandy clay loam that has brown mottles.

Permeability and available water capacity are moderate. The seasonal high water table is at the surface or within a depth of 1.0 foot in winter and early spring. Surface runoff is slow.

Included with this soil in mapping are small areas of Toisnot and Grantham soils and soils that have a clayey subsoil. Toisnot soils have a dense, brittle layer in the subsoil. Grantham soils have more silt in the subsoil than the Rains soil. All of these included soils are in landscape positions similar to those of the Rains soil. Also included are the somewhat poorly drained Lynchburg soils in the higher areas and the very poorly drained Pantego soils in depressions. Included soils make up about 15 percent of the map unit.

Most areas of the Rains soil are used as woodland. A few areas have been cleared of trees and are used as cropland.

Where adequately drained, this soil is suited to cropland. The main crops are corn and soybeans. The wetness is the main limitation. The soil is suited to pasture. Grazing when the soil is wet causes compaction and damages plants.

This soil is well suited to woodland. The main canopy species are loblolly pine, sweetgum, willow oak, and water oak. The main understory species are red maple, sweetbay, greenbrier, and summersweet clethra. The wetness restricts the use of equipment. The seeding mortality rate may be high because of the high water table.

This soil is poorly suited to most urban and recreational uses. The wetness is the main limitation.

The capability subclass is IIIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 10W.

RbA—Rains-Urban land complex, 0 to 2 percent slopes. This map unit consists of poorly drained Rains soils and Urban land in broad upland areas on the Coastal Plain. The Rains soil and Urban land occur as areas so intricately mixed that mapping them separately was not feasible at the scale selected. The areas mainly are in the town of Selma. This unit is about 55 percent Rains soil and 25 percent Urban land. Most mapped areas are irregular in shape and range from about 20 to 300 acres in size.

Typically, the surface layer of the Rains soil is gray sandy loam 5 inches thick. The upper 5 inches of the subsoil is brownish gray sandy clay loam that has brown and red mottles. The next 34 inches is gray sandy clay loam that has brown and red mottles. The next 18 inches is dark gray sandy clay loam that has brown and red mottles. The lower 16 inches is dark gray sandy clay loam that has yellow, red, and gray mottles. The underlying material to a depth of 88 inches is gray sandy clay loam that has brown mottles.

Permeability and available water capacity are moderate in the Rains soil. The seasonal high water table is at the surface or within a depth of 1 foot during winter and late spring. Surface runoff is slow.

Urban land consists of areas where the soil has been covered with shopping centers, houses, municipal buildings, parking lots, roads, or other impervious surfaces. The extent of site modification varies. Some areas have had little disturbance. Other areas have been extensively reshaped by cutting, filling, and grading.

Included with this soil in mapping are small areas of the somewhat poorly drained Lynchburg soils and the moderately well drained Goldsboro soils. These soils are in the slightly higher areas. Also included are Toisnot and Grantham soils in the lower areas. Toisnot soils have a firm, dense, brittle layer in the subsoil. Included soils make up about 20 percent of the map unit.

Where drained, the Rains soil is well suited to grasses, vegetables, flowers, trees, and shrubs. Most areas are drained by sewer systems, drainage tile, or surface ditches.

Runoff is considerable because the urban areas are covered by buildings, streets, and parking lots. The wetness is the main limitation affecting urban and recreational uses. It can be overcome by drainage measures.

This map unit was not assigned a capability subclass or a woodland ordination symbol.

RnF—Rion sandy loam, 15 to 40 percent slopes. This well drained soil is on strongly dissected hillslopes on the Piedmont. Slopes range from 15 to 40 percent but commonly are 20 to 35 percent. Mapped areas generally are long and narrow. They range from about 10 to 75 acres in size.

Typically, the surface layer is dark grayish brown sandy loam 8 inches thick. The upper 18 inches of the subsoil is strong brown sandy clay loam that has yellow mottles. The lower 6 inches is strong brown sandy loam that has brown mottles. The underlying material to a depth of 60 inches is mottled brown and yellow saprolite that has a texture of sandy loam.

Permeability is moderate, and available water capacity is low or moderate. Surface runoff is very rapid.

Included with this soil in mapping are small areas of soils having a subsoil that contains either more clay or more sand than is typical for the Rion soil. Also included are soils that have bedrock within a depth of 60 inches and some areas that have a few shallow gullies. Included soils are in scattered areas throughout the map unit in landscape positions similar to those of the Rion soil. They make up about 20 percent of the map unit.

Most areas of the Rion soil are used as woodland. A few areas are used as pasture.

This soil is poorly suited to crops and pasture. The slope and the very rapid surface runoff are the major limitations. The hazard of erosion is very severe.

This soil is suited to woodland. The major canopy species are loblolly pine, shortleaf pine, yellow-poplar, hickory, sweetgum, beech, and white oak. The understory species are dogwood, American holly, sourwood, sassafras, and red maple. The slope is the main limitation.

This soil is poorly suited to urban and recreational uses. The slope is the main limitation.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8R.

Ro—Roanoke loam, occasionally flooded. This poorly drained soil is on stream terraces. Slopes are 0 to 2 percent. Typically, mapped areas are long and narrow. Some areas, however, are oblong or rounded. Mapped areas range from about 8 to 100 acres in size.

Typically, the surface layer is very dark gray loam 8 inches thick. The upper 5 inches of the subsoil is gray clay loam that has yellowish brown mottles. The next 27 inches is dark gray clay that has brown and gray mottles. The lower 15 inches is light gray clay loam that has brown mottles. The underlying material to a depth of 60 inches is light gray sandy loam that has yellow mottles.

Permeability is slow, and available water capacity is moderate or high. The seasonal high water table is at the surface or within a depth of 1 foot during winter and spring. This soil is occasionally flooded for brief periods. The shrink-swell potential is moderate. Surface runoff is slow.

Included with this soil in mapping are small areas of Wahee and Tomotley soils in the slightly higher areas. Wahee soils are somewhat poorly drained. Tomotley soils have less clay in the subsoil than the Roanoke soil. Also included are areas of Wehadkee soils. They also are less clayey than the Roanoke soils and are near the deeper sloughs or small intermittent stream channels. Included soils make up less than 10 percent of the map unit.

Most areas of the Roanoke soil are used as woodland. A few areas are used as cropland or pasture.

This soil is poorly suited to cropland and pasture. The wetness, the flooding, and the high content of clay in the subsoil are the main limitations.

This soil is well suited to the production of hardwoods. The common native canopy species are sweetgum, willow oak, water oak, red maple, blackgum, and ash. The main understory species are hornbeam, switchcane, and greenbrier. The wetness and the flooding are the main limitations. The wetness and the flooding can result in a high seedling mortality rate for loblolly pine.

This soil is poorly suited to urban and recreational uses because of the flooding, the wetness, the moderate shrink-swell potential, and the slow permeability.

The capability subclass is IVw. Based on sweetgum as the indicator species, the woodland ordination symbol is 7W.

StA—State sandy loam, 0 to 3 percent slopes, occasionally flooded. This well drained soil is on stream terraces. Mapped areas are on elongated ridges or are irregular in shaped. They range from about 5 to 50 acres.

Typically, the surface layer is dark yellowish brown sandy loam 9 inches thick. The upper 13 inches of the subsoil is strong brown sandy clay loam. The next 10 inches is yellowish brown sandy clay loam. The lower 8 inches is mottled brownish yellow and strong brown sandy loam. The upper 12 inches of the underlying material is mottled yellowish brown and brownish yellow loamy sand. The lower 8 inches is yellowish brown gravelly sand.

Permeability and available water capacity are moderate. The seasonal high water table is at a depth of 4 to 6 feet. This soil is occasionally flooded for brief periods. Surface runoff is slow.

Included with this soil in mapping are small areas of the moderately well drained Altavista soils in slight depression or the lower areas and the sandier Tarboro soils on ridges and knolls. Also included are soils that have a redder subsoil than is typical for the State soil. Included soils make up less than 10 percent of the map unit.

Most areas of the State soil are used as pasture or cropland. Some areas are used as woodland.

This soil is well suited to cropland and pasture. Corn, soybeans, tobacco, and small grain are the main crops. The flooding may damage crops.

This soil is well suited to woodland. The common canopy species are loblolly pine, white oak, northern red oak, southern red oak, beech, elm, American sycamore, and loblolly pine. The main understory species are dogwood, holly, cedar, black cherry, and sassafras. No major limitations affect woodland use and management.

In most areas this soil is poorly suited to most urban uses because of the wetness and the flooding. In some higher areas where it is not subject to flooding, it is suited to most urban uses. It is suited to most recreational uses.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

Ta—Tarboro loamy sand, rarely flooded. This nearly level, somewhat excessively drained soil is on stream terraces. Slopes are 0 to 2 percent. The largest areas are on the south side of the Neuse River, north of Mill Creek. Mapped areas generally are rounded and 5 to 15 acres in size. A few irregularly shaped areas are about 30 acres in size.

Typically, the surface layer is dark brown loamy sand

10 inches thick. The underlying material extends to a depth of more than 80 inches. The upper 19 inches is dark brown or brown loamy sand. The lower 51 inches is brownish yellow and yellowish brown loamy sand.

Permeability is rapid, and available water capacity is very low or low. This soil is subject to rare flooding. Surface runoff is slow.

Included with this soil in mapping are small areas of the moderately well drained Altavista soils and the well drained State soils. These soils are in the slightly lower areas. Also included are a few small areas that are not subject to flooding. Included soils make up less than 10 percent of the map unit.

Most areas of the Tarboro soil are used as cropland or woodland. A few areas are used as pasture.

This soil is suited to some of the crops that are commonly grown in the county. The main crops are tobacco, small grain, and soybeans. The major limitation is the low or very low available water capacity. Plant nutrients are readily leached from the soil. Large fields are subject to wind erosion. Winter cover crops, conservation tillage, crop residue management, and windbreaks help to control erosion and conserve soil moisture. Split applications of fertilizer can help to maintain nutrient levels and minimize losses caused by leaching. The soil is suited to pasture. Special care should be taken to avoid overgrazing during dry periods.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, white oak, black oak, red oak, beech, elm, and American sycamore. The main understory species are holly and hornbeam. The deep sand restricts the use of equipment. The low available water capacity results in a high seedling mortality rate.

In most areas this soil is poorly suited to most urban uses because of the flooding. In some higher areas where it is not subject to flooding, it is suited to most urban uses. Ground water can be contaminated by effluent from septic tank absorption fields. The soil is suited to some recreational uses.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7S.

Tn—Toisnot loam. This poorly drained soil is in broad upland areas on the Coastal Plain and around the head of drainageways. Slopes are 0 to 2 percent. Mapped areas are broad and irregular in shape. They range from about 10 to 200 acres in size.

Typically, the surface layer is very dark gray loam 4 inches thick. The upper 4 inches of the subsoil is grayish brown loam. The next 22 inches is light brownish gray loam that has brown mottles. The lower 28 inches is dominantly hard and brittle, light gray fine sandy loam that has gray and brown mottles. The underlying material to a depth of 65 inches is light gray sandy loam that has yellow mottles.

Permeability is moderately slow in the upper and middle parts of the subsoil and slow in the lower part. Available water capacity is low or moderate. The dense brittle layer limits rooting depth. The seasonal high water table is at the surface or within a depth of 1 foot in winter and spring. Surface runoff is slow.

Included with this soil in mapping are small areas of soils that have a clayey subsoil and sandy soils that do not have a dense layer in the subsoil. Areas near Cecil and Appling soils have gravelly subsoil layers overlying silty clay loam. Also included are small areas of Rains, Grantham, Lynchburg, and Bibb soils. Rains and Grantham soils are intermingled with areas of the Toisnot soil. They do not have a dense layer in the subsoil. Lynchburg soils are somewhat poorly drained and are near the edge of the adjoining well drained and moderately well drained soils. Included soils make up about 25 percent of the map unit.

Most areas of the Toisnot soil are used as woodland. A few areas that have been cleared and drained are used as cropland.

Unless drained, this soil is poorly suited to cropland. The wetness and the hardpan are the main limitations. Where drained, this soil is suited to some crops. It is suited to fescue and white clover. Grazing when the soil is wet causes compaction and damages plants.

This soil is suited to woodland. The main canopy species are loblolly pine, sweetgum, willow oak, water oak, maple, and blackgum. The main understory species are blueberry, switchcane, greenbrier, and sweetbay. The main limitations are the wetness and the hardpan, which limits root penetration. Heavy equipment should be operated only during dry periods. The wetness can result in a high seedling mortality rate for pine and high competition from hardwoods.

This soil is poorly suited to most urban and recreational uses because of the wetness and the slow permeability.

The capability subclass is Vw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7W.

To—Tomotley sandy loam, rarely flooded. This poorly drained soil is on stream terraces on the Coastal Plain. Slopes are 0 to 2 percent. Mapped areas are long and irregular in width. They range from 20 to 200 acres in size.

Typically, the surface layer is grayish brown sandy loam 8 inches thick. The subsoil is 32 inches of gray sandy clay loam that has yellow mottles. The underlying

material to a depth of 60 inches is gray sand.

Permeability and available water capacity are moderate. The seasonal high water table is at the surface or within a depth of 1 foot in winter and spring. This soil is subject to rare flooding. Surface runoff is slow.

Included with this soil in mapping are small areas of Augusta, Roanoke, Wehadkee, and Pantego soils. Augusta soils are in the slightly higher areas and are somewhat poorly drained. Roanoke soils are in landscape positions similar to those of the Tomotley soil. They have a surface layer of loam and more clay in the subsoil than the Tomotley soil. Wehadkee soils are on flood plains and are frequently flooded. Pantego soils are very poorly drained and have a thick surface layer of black loam. Included soils make up about 15 percent of the map unit.

Nearly all areas of the Tomotley soil are used as woodland. Some areas are used as pasture.

Because of the wetness, this soil is poorly suited to pasture and to most of the crops that are commonly grown in the county. Where drained, it is suited to corn, soybeans, small grain, hay, and pasture.

This soil is suited to woodland. The common native canopy species are loblolly pine, sweetgum, yellow-poplar, water oak, and pond pine. The common understory species are ironwood, switchcane, holly, myrtle, blueberry, and bay. The wetness is the main limitation.

This soil is poorly suited to most urban and recreational uses. The wetness and the flooding are the main limitations.

The capability subclass is IVw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 10W.

UcB—Uchee loamy coarse sand, 2 to 6 percent slopes. This well drained soil is on ridges and side slopes in the uplands on the Coastal Plain. Mapped areas are long and narrow, irregularly shaped, oblong, or oval. They range from about 10 to 100 acres in size.

Typically, the surface layer is grayish brown loamy coarse sand 10 inches thick. The subsurface layer is light yellowish brown loamy coarse sand 20 inches thick. The upper 11 inches of the subsoil is yellowish brown sandy clay loam that has red and yellow mottles. The lower 12 inches is mottled yellowish brown, pale yellow, and red sandy clay loam. The underlying material to a depth of 60 inches is mottled red, light gray, and brownish yellow sandy clay loam.

Permeability is moderately slow, and available water capacity is low or moderate. A perched seasonal high water table is at a depth of 3.5 to 5.0 feet. Surface runoff is medium.

Included with this soil in mapping are a few small areas of Nankin, Gilead, Cowarts, Wagram, and Blanton soils. Nankin, Gilead, and Cowarts soils are intermingled with areas of the Uchee soil. They have a thinner surface layer than that of the Uchee soil and are browner. Wagram and Blanton soils are in nearly level, smooth areas. Wagram soils have a thicker subsoil than that of the Uchee soil. Blanton soils have a sandy surface layer and subsurface layer that have a combined thickness of more than 40 inches. Included soils make up about 20 percent of the map unit.

Most areas of the Uchee soil are used as cropland, pasture, or hayland. A few areas are used as woodland.

This soil is suited to most of the crops commonly grown in the county. Droughtiness, leaching of plant nutrients, and the slope are the main limitations. The hazard of erosion is moderate. The soil is better suited to the more drought-tolerant crops, such as tobacco, sweet potatoes, and asparagus, than to other crops. Crop residue management, conservation tillage, stripcropping, grassed waterways, field borders, and cover crops minimize erosion and conserve soil moisture. The soil is well suited to hybrid bermudagrass. Special care should be taken to avoid overgrazing during dry periods.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, hickory, red oak, and black oak. The main understory species are dogwood, sourwood, blueberry, and holly. The sandy surface layer is the main limitation.

This soil is suited to most urban uses. The perched water table in the lower part of the subsoil is a limitation on sites for dwellings with basements and on sites for septic tank absorption fields. The soil is suited to recreational uses.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

UcC—Uchee loamy coarse sand, 6 to 12 percent slopes. This well drained soil is on hillslopes in the uplands on the Coastal Plain. Mapped areas are long and narrow and range from about 10 to 50 acres in size.

Typically, the surface layer is dark grayish brown loamy coarse sand 10 inches thick. The subsurface layer is 20 inches of light yellowish brown loamy coarse sand. The upper 11 inches of the subsoil is yellowish brown sandy clay loam that has red and yellow mottles. The lower 12 inches is mottled yellowish brown, pale yellow, and red sandy clay loam. The underlying material to a depth of 60 inches is mottled red, light gray, and brownish yellow sandy clay loam.

Permeability is moderately slow, and available water

capacity is low or moderate. A perched seasonal high water table is at a depth of about 3.5 to 5.0 feet. Surface runoff is rapid.

Included with this soil in mapping are small areas of soils that have a subsoil that is either sandy or has more clay than is typical for the Uchee soil. Also included are small areas of soils that have a sandy surface layer that is less than 20 inches thick and soils that have a slope of slightly more than 12 percent. Included soils make up about 15 percent of the map unit.

Most areas of the Uchee soil are used as woodland. A few areas are used as pasture or hayland.

This soil is suited to cropland. The slope, the rapid surface runoff, droughtiness, and leaching of plant nutrients are the main limitations. The hazard of erosion is severe. Conservation tillage, diversions, grassed waterways, and field borders help to control erosion and sedimentation. The soil is suited to bermudagrass. Special care should be taken to avoid overgrazing during dry periods.

This soil is suited to woodland. The main canopy species are loblolly pine, longleaf pine, red oak, white oak, hickory, blackjack oak, and black oak. The main understory species are lowbush blueberry, sassafras, holly, dogwood, and persimmon. The sandy surface layer is the main limitation. Because of the low available water capacity, the seedling mortality rate is high during hot, dry weather.

This soil is suited to urban and recreational uses. The slope and the perched seasonal high water table in the lower part of the subsoil are limitations on sites for dwellings with basements and on sites for septic tank absorption fields. Droughtiness is a limitation affecting the establishment and maintenance of lawns and golf fairways.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

Ud—Udorthents, loamy. This map unit consists of borrow pits, cut and fill areas, quarries, and landfills. In these areas all or nearly all of the natural soil has been altered by digging, grading, or filling.

Borrow Pits are excavated areas from which sand, gravel, or clay has been removed for use as construction material. Cuts are 3 feet to more than 10 feet deep. The base slope in these cuts is predominantly level. Most cuts have two or more vertical or nearly vertical side slopes. The exposed surface layer consists mainly of dense, loamy, Coastal Plain deposits. The borrow pits range from 3 to more than 30 acres in size. Borrow pits less than 3 acres in size are shown on the detailed soil maps by a special symbol.

Included in mapping with the borrow pits are small areas where water stands intermittently, areas of fill material that have been pushed aside during excavation, and areas of undisturbed soils. Also included are areas where the exposed surface layer is predominantly clayey and areas that have been reclaimed by the addition of topsoil.

Most borrow pits have naturally reseeded to pines and native grasses. Generally, this vegetation is stunted because of low fertility and low available water capacity. Erosion is a severe hazard in areas that do not have a plant cover.

Cut and fill areas are areas that have been extensively altered by cutting and filling. They consist of embankments, roadbeds, and berms that have been constructed with material cut from the higher areas within the unit. The cut slopes and fill areas have been graded and shaped to maintain slope stability. The interchanges along the interstate highways, the county airport and other airstrips, and areas around the oil terminals south of the town of Selma are cut and fill areas.

Included in mapping with the cut and fill areas are areas of paved roadways, runways, trainways, and parking areas. Also included are small areas of undisturbed soils.

The cut and fill areas have been seeded to perennial grasses or have naturally established stands of pines and hardwoods. Erosion is a severe hazard in areas that do not have a plant cover.

Quarries are areas from which the entire soil has been removed and part of the underlying bedrock has been used as a source for crushed stone. They are in two areas north of the town of Princeton along the Little River. Generally, they are irregular in shape and range from 60 to 80 acres in size. The quarry pits have vertical walls and are more than 50 feet deep. The base slope in the pits is level to undulating. Piles of stones are in scattered areas in the quarries. Some abandoned quarries are partially filled with water.

Included in mapping with quarries are the areas that contain mounds of spoil material surrounding the pits and some areas used as roadways or equipment parking areas.

The areas where mining is still in progress are generally unvegetated. A few pines and weeds are in scattered areas. Erosion is a severe hazard, especially from the larger piles of spoil material.

The spoil material commonly has poor physical properties for establishing and supporting plant growth. The rooting depth is usually shallow, and available

water capacity, fertility, and content of organic matter are low or very low.

Landfill areas are excavated areas where the natural soil has been altered by landfill activities. They consist of graded trenches that are backfilled with alternate layers of solid refuse and soil material. A final cover of about 2 feet of soil is on the surface. After the final cover is added, the surface is nearly level or gently sloping.

Included in mapping with landfill areas are areas of undisturbed soil, commonly near the edge of mapped areas. The soil between the trenches is relatively undisturbed, except for the final cover used to smooth the entire area.

Landfill areas are suited to plant growth. Available water capacity is generally low. A permanent plant cover is essential to protect these areas from erosion.

The characteristics of the soil material in this unit vary to such a degree that interpretive statements cannot be made without onsite examination.

This map unit has not been assigned a capability subclass or a woodland ordination symbol.

VaB—Vance coarse sandy loam, 2 to 8 percent slopes. This well drained soil is in broad upland areas on the Piedmont. Mapped areas mostly are irregular in shape and commonly range from 90 to 275 acres in size. Smaller areas, usually less than 75 acres, are common on the narrower ridges.

Typically, the surface layer is yellowish brown coarse sandy loam 8 inches thick. The subsoil is 24 inches of yellowish brown clay that has red mottles. The underlying material to a depth of 60 inches is multicolored yellowish brown, very pale brown, and yellow saprolite that has a texture of clay loam.

Permeability is slow in the subsoil, and available water capacity is moderate. The shrink-swell potential also is moderate. Surface runoff is medium.

Included with this soil in mapping are small areas of soils that have a gravelly surface layer, soils that have a surface layer that is more than 20 inches thick, and a few eroded areas. The eroded areas have a surface texture of sandy clay loam. Also included are small areas of Wedowee soils intermingled with areas of the Vance soil. Included soils make up about 15 percent of the map unit.

About half of the areas of the Vance soil are used as woodland. The rest are used as pasture or cropland.

This soil is suited to most of the crops that are commonly grown in the county. This soil is commonly used for soybeans, small grain, hay, or pasture. The slope and the surface runoff are the main limitations. The hazard of erosion is moderate. Conservation tillage, crop rotations, crop residue management, grassed waterways, and grassed field borders help to control runoff, erosion, and sedimentation. The soil is well suited to pasture.

This soil is well suited to woodland. The major canopy species are loblolly pine, shortleaf pine, red oak, white oak, yellow-poplar, sweetgum, and hickory. Understory species include dogwood, sourwood, American holly, sassafras, and maple. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. The slow permeability in the subsoil is the main limitation on sites for septic tank absorption fields. The moderate shrink-swell potential is a limitation on sites for buildings and local roads and streets.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

VrA—Varina loamy sand, 0 to 2 percent slopes. This well drained soil is in broad upland areas on the Coastal Plain. Mapped areas are broad and irregular in shape and range from about 50 to more than 500 acres in size.

Typically, the surface layer is grayish brown loamy sand 7 inches thick. It has pale yellow mottles. The subsurface layer is pale yellow loamy sand 7 inches thick. The upper 4 inches of the subsoil is light yellowish brown sandy clay loam. The next 20 inches is yellowish brown and brownish yellow sandy clay. The next 43 inches is mottled yellowish brown, brownish red, yellow, and white sandy clay. The red material is very firm and brittle. The lower 19 inches is mottled red, yellow, and white sandy clay loam. The underlying material to a depth of 118 inches is mottled yellow and white sandy clay loam.

Permeability is moderate in the upper part of the subsoil and slow in the lower part. Available water capacity is moderate. A perched water table is at a depth of 4 to 5 feet during late winter and spring. Surface runoff is slow.

Included with this soil in mapping are small areas of soils that have a surface layer that is slightly more than 20 inches thick and areas of soils that have a thinner, less clayey subsoil than is typical for the Varina soil. These included soils are intermingled with areas of the Varina soil. Included soils make up about 15 percent of the map unit.

Nearly all areas of the Varina soil are used as cropland. A few areas are used as pasture or woodland.

This soil is suited to cropland. The main crops are sweet potatoes, tobacco, corn, and soybeans. Droughtiness in the surface layer and subsurface layer is the main limitation. The soil is well suited to pasture and hayland.

This soil is well suited to woodland. The main canopy species are loblolly pine, white oak, red oak, hickory, and sweetgum. The main understory species are dogwood, sourwood, sassafras, greenbrier, and holly. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. The slow permeability and the perched water table are limitations on sites for dwellings with basements and on sites for septic tank absorption fields.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

VrB—Varina loamy sand, 2 to 6 percent slopes. This well drained soil is on gently sloping side slopes in the uplands on the Coastal Plain. Mapped areas are narrow and irregular in shape and range from about 20 to 100 acres in size.

Typically, the surface layer is brown loamy sand 8 inches thick. The subsurface layer is light yellowish brown loamy sand 5 inches thick. The subsoil is 52 inches of sandy clay. The upper part is yellowish brown and has red mottles. The next part is mottled yellowish brown, strong brown, yellowish red, and red. The red material is very firm and brittle. The lower part is red, has strong brown and light gray mottles, and contains 5 to 15 percent plinthite.

Permeability is moderate in the upper part of the subsoil and slow in the lower part. Available water capacity is moderate. A perched water table is at a depth of 4 to 5 feet during late winter and spring. Surface runoff is medium.

Included with this soil in mapping are small areas of Uchee and Gilead soils along the lower edge of mapped areas. Uchee soils have less clay in the subsoil than the Varina soil. Gilead soils are moderately well drained. Included soils make up about 25 percent of the map unit.

Most areas of the Varina soil are used as cropland. A few areas are used as pasture, and a few are used as woodland.

This soil is well suited to tobacco, sweet potatoes, corn, soybeans, and small grain. The slope and the surface runoff are the main limitations. The hazard of erosion is moderate. Contour farming, terraces, diversions, crop residue management, and minimum tillage help to control erosion and reduce sedimentation. The soil is well suited to pasture.

This soil is well suited to woodland. The dominant canopy species are loblolly pine, white oak, red oak, hickory, and sweetgum. The main understory species are dogwood, sourwood, sassafras, greenbrier, and holly. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. The slow permeability and the perched water table are limitations on sites for dwellings with basements and on sites for septic tank absorption fields.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

WaB—Wagram loamy sand, 0 to 6 percent slopes. This well drained soil is on slightly convex uplands on the Coastal Plain. Most mapped areas are irregular in shape and range from about 20 to 150 acres in size.

Typically, the surface layer is dark grayish brown loamy sand 10 inches thick. The subsurface layer is light yellowish brown loamy sand 18 inches thick. The subsoil is more than 52 inches thick. The upper 7 inches is strong brown sandy clay loam. The next 29 inches is yellowish brown sandy clay loam that has brown mottles. The lower 16 inches is strong brown sandy clay loam that has red and brown mottles.

Permeability is moderate, and available water capacity is low. Surface runoff is slow.

Included with this soil in mapping are small areas of Norfolk and Blanton soils. The combined thickness of the sandy surface layer and subsurface layer is less than 20 inches in Norfolk soils and more than 40 inches in Blanton soils. Also included are small areas of moderately well drained soils and soils that have a clayey subsoil. The included soils have no distinguishable pattern of occurrence. They make up about 10 percent of the map unit.

Most areas of the Wagram soil are used as cropland. Some areas are used as pasture. A few are used as woodland.

This soil is suited to most of the crops that are commonly grown in the county. The main crops are tobacco and sweet potatoes. Corn and soybeans are grown as rotation crops. The soil does not produce the highest yields of sweet potatoes but does produce a good mix of yield and quality. Leaching of plant nutrients, droughtiness, and the hazard of wind erosion are the main management concerns. Windbreaks, cover crops, crop residue management, and conservation tillage help to control wind erosion. Losses caused by leaching can be reduced by cover crops during winter months and by split applications of fertilizer during the growing season. The soil is suited to hybrid bermudagrass. Special care should be taken to avoid overgrazing during dry periods.

This soil is suited to woodland. The common canopy species are loblolly pine, longleaf pine, red oak,

blackjack oak, hickory, and black oak. The common understory species are dogwood, sourwood, lowbush blueberry, and sassafras. The thick, sandy surface layer is the main limitation.

This soil is well suited to urban uses. The sandy surface layer is a limitation on sites for lawns and golf fairways. Irrigation and proper selection of species are necessary for the establishment of good stands of grass.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

Wh—Wahee loam, occasionally flooded. This somewhat poorly drained soil is on broad flats and in slight depressions on stream terraces. Slopes are 0 to 2 percent. Mapped areas are irregular in shape and range from about 20 to 100 acres in size.

Typically, the surface layer is brown loam 5 inches thick. The upper 4 inches of the subsoil is pale yellow loam that has yellow mottles. The next 17 inches is light brownish gray clay that has brown mottles. The lower 16 inches is gray clay loam that has brown and gray mottles. The underlying material to a depth of 60 inches is light olive gray loam that has brown mottles.

Permeability is slow, and available water capacity is moderate or high. The seasonal high water table is 0.5 foot to 1.5 feet below the surface in winter and spring. The shrink-swell potential is moderate. This soil is occasionally flooded for very brief or brief periods. Surface runoff is slow.

Included with this soil in mapping are small areas of poorly drained Roanoke soils in shallow depressions. Also included are small areas of Augusta and Altavista soils. Augusta and Altavista soils have less clay in the subsoil than the Wahee soil. Altavista soils are moderately well drained and generally are in the higher areas. Also included are some areas that have a surface layer of fine sandy loam or silt loam. Included soils make up about 15 percent of the map unit.

Most areas of the Wahee soil are used as woodland. A few areas are used as cropland.

This soil is suited to some crops commonly grown in the county. The main crops are corn, soybeans, and small grain. The wetness, the flooding, and the clayey subsoil are the main limitations. The soil is suited to pasture. Grazing when the soil is wet causes compaction and damages the plants.

This soil is suited to woodland. The common canopy species are loblolly pine, willow oak, white oak, water oak, chestnut oak, and sweetgum. The main understory species are red maple, hornbeam, holly, switchcane, and greenbrier. The wetness is the main limitation. Equipment should be operated only during dry seasons.

This soil is poorly suited to urban and recreational uses because of the flooding, the wetness, and the slow permeability.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

WoB—Wedowee sandy loam, 2 to 8 percent slopes. This well drained soil is on ridges and side slopes in the uplands on the Piedmont. Mapped areas generally are irregular in shape and range from about 10 to 225 acres in size. The smaller areas, which generally are less than 30 acres, are common on the narrower ridges.

Typically, the surface layer is grayish brown sandy loam 9 inches thick. The upper 6 inches of the subsoil is strong brown sandy clay loam. The next 13 inches is strong brown clay that has red mottles. The lower 4 inches is strong brown clay that has red mottles. The underlying material to a depth of 60 inches is mottled yellowish red, brownish yellow, and white clay loam.

Permeability and available water capacity are moderate. The shrink-swell potential also is moderate. Surface runoff is medium.

Included with this soil in mapping are small areas of a Wedowee soil that has a gravelly surface layer or that is eroded and has a surface layer of sandy clay loam. Also included are soils that have bedrock within a depth of 60 inches, small areas of the moderately well drained Gilead soils in areas adjacent to the Coastal Plain, and Cecil soils, which have a subsoil that is thicker and redder than that of the Wedowee soil and are on the smoothest parts of the landscape. Included soils make up about 15 percent of the map unit.

About half of the areas of this Wedowee soil are used as woodland. The rest are used as pasture or cropland.

This soil is well suited to most of the crops commonly grown in the county. It is commonly used for soybeans, small grain, tobacco, hay, or pasture. The slope and the surface runoff are the main limitations affecting row crops. The hazard of erosion is moderate. Conservation tillage, crop rotations, contour farming, and crop residue management control erosion and minimize sedimentation. The soil is well suited to pasture (fig. 6).

This soil is well suited to woodland. The common canopy species are loblolly pine, shortleaf pine, red oak, white oak, yellow-poplar, sweetgum, and hickory. Understory species include dogwood, sourwood, American holly, sassafras, and maple. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. The moderate permeability is a limitation on sites

Figure 6.—A pasture of fescue in an area of Wedowee sandy loam, 2 to 8 percent slopes. Wedowee soils are well suited to fescue.

for septic tank absorption fields. The moderate shrink-swell potential is a limitation affecting some urban uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

WoD—Wedowee sandy loam, 8 to 15 percent slopes. This well drained soil is on side slopes in the uplands on the Piedmont. It is in areas that are dissected by numerous drainageways. Some of the larger areas are north of Archer Lodge and northwest of the town of Clayton. Mapped areas are long, narrow, and irregular in shape and range from about 10 to 70 acres in size.

Typically, the surface layer is grayish brown sandy loam 9 inches thick. The upper 6 inches of the subsoil is strong brown sandy clay loam. The next 13 inches is strong brown clay that has red mottles. The lower 4 inches is strong brown clay loam that has red mottles. The underlying material to a depth of 60 inches is mottled yellowish red, brownish yellow, and white clay loam.

Permeability and available water capacity are moderate. The shrink-swell potential also is moderate. Surface runoff is rapid.

Included with this soil in mapping are small areas of eroded Wedowee soils that have a surface layer of sandy clay loam and other soils, commonly on the lower slopes where soil material has accumulated as thick surface layers. Some areas have few or common shallow gullies. Also included are areas of soils that have bedrock within a depth of 60 inches and some small areas of Pacolet soils. The Pacolet soils have a subsoil that is redder than that of the Wedowee soil. Included soils make up about 20 percent of the map unit.

Most areas of this Wedowee soil are used as woodland. A few small areas are used as pasture.

This soil is poorly suited to cropland. The slope and the rapid surface runoff are the main limitations. The hazard of erosion is severe. Contour farming, conservation tillage, and crop residue management help to control runoff and erosion. The soil is suited to pasture. Proper stocking rates, pasture rotation, and restricted use during wet periods help to maintain the condition of the pasture and prevent excessive erosion.

This soil is well suited to woodland. The common canopy species are loblolly pine, shortleaf pine, yellow-poplar, hickory, sweetgum, red oak, white oak, and black oak. The understory species are dogwood, sourwood, cherry, American holly, maple, and sassafras. Few limitations affect woodland use and management.

This soil is suited to most urban and recreational uses. The slope and the moderate permeability are limitations on sites for buildings and septic tank absorption fields. The slope is the main limitation affecting recreational uses.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

Wt—Wehadkee loam, frequently flooded. This nearly level, poorly drained soil is on flood plains, generally along streams. A few small areas are along tributaries. Slopes are 0 to 2 percent. Most mapped areas are long and narrow and are as much as several hundred acres in size.

Typically, the surface layer is dark brown loam 7 inches thick. The upper 11 inches of the subsoil is light brownish gray loam that has brown mottles. The lower 31 inches is gray clay loam that has brown mottles. The underlying material to a depth of 63 inches is mottled gray and strong brown clay loam.

Permeability is moderate, and available water capacity is high. The seasonal high water table is at the surface or within a depth of 1 foot. This soil is frequently flooded for brief periods. Surface runoff is slow.

Included with this soil in mapping are small areas of the somewhat poorly drained Chewacla soils, commonly adjacent to small stream channels. Also included are small areas of very poorly drained soils that have a thick, black surface layer. These soils are in small depressions that remained ponded after flooding. Included soils make up about 20 percent of the map unit.

Most areas of the Wehadkee soil are used as woodland. A few isolated areas are used as cropland or pasture.

This soil is poorly suited to cropland and pasture. The flooding and the wetness are the main limitations. Where drained and protected from flooding, this soil is suited to corn, soybeans, small grain, and pasture.

This soil is well suited to the production of hardwoods. The common canopy species are sweetgum, loblolly pine, yellow-poplar, water oak, ash, and American sycamore. The flooding and the wetness are the main limitations. The use of equipment should be limited to dry periods. The flooding can result in a high seedling mortality rate for pine.

This soil is poorly suited to urban and recreational uses because of the flooding and the wetness.

The capability subclass is VIw. Based on sweetgum as the indicator species, the woodland ordination symbol is 8W.

Ww—Wehadkee-Chastain association, frequently flooded. This map unit consists of areas of nearly level, poorly drained Wehadkee and Chastain soils on broad flood plains. Slopes are 0 to 2 percent. These soils were not separated in mapping because they have similar use and management. This unit is about 45 percent Wehadkee soil and 35 percent Chastain soil. The Wehadkee soil is commonly near stream channels. The Chastain soil is at the base of uplands, in slack-water areas, and in sloughs. Mapped areas are long and vary in width. They are as large as several hundred acres in size.

Typically, the surface layer of the Wehadkee soil is dark brown loam 7 inches thick. The upper 11 inches of the subsoil is light brownish gray loam that has brown mottles. The lower 31 inches is gray clay loam that has brown mottles. The underlying material to a depth of 63 inches is mottled gray and strong brown clay loam.

Typically, the surface layer of the Chastain soil is grayish brown silty clay 4 inches thick. The subsoil to a depth of 60 inches is dark gray and gray clay that has red and brown mottles.

Permeability is moderate in the Wehadkee soil and

slow in the Chastain soil. Available water capacity is high in the Wehadkee soil and moderate in the Chastain soil. The seasonal high water table is at or near the surface during late winter and spring in both soils. In some areas water stands on the surface for significant periods. These soils are frequently flooded for brief to very long periods. Surface runoff is slow.

Included with these soils in mapping are the somewhat poorly drained Chewacla and Wahee soils and the moderately well drained Altavista soils. Generally, Chewacla soils are adjacent to stream channels and Wahee and Altavista soils are on low ridges or in the slightly higher areas. Included soils make up about 20 percent of the map unit.

Nearly all areas of this unit are used as woodland. A few areas are used as cropland or pasture.

The Wehadkee and Chastain soils are poorly suited to cropland and pasture because of the wetness and the flooding. Where drained and protected from flooding, they are suited to corn, soybeans, small grain, and pasture.

These soils are suited to the production of hardwoods. The main limitations are the flooding and the wetness. The degree of wetness determines the type of hardwood community. In the flat, poorly drained areas where water does not stand on the surface, the canopy species are sweetgum, willow oak, water oak, chestnut oak, white oak, and blackgum. The main understory species in these areas are hornbeam, switchcane, greenbrier, and grape. In the poorly drained sloughs and slack-water areas where water stands for significant periods, the canopy species are baldcypress, green ash, cottonwood, and blackgum. Understory plants are sparse in these areas.

These soils are poorly suited to nearly all urban and recreational uses. The wetness, the flooding, and a high content of clay in the Chastain soil are the main limitations.

The capability subclass is VIw for both soils. Based on sweetgum as the indicator species, the woodland ordination symbol is 8W for both soils.

Prime Farmland

In this section, prime farmland is defined and the soils in Johnston County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent.

The following map units are considered prime farmland in Johnston County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. If applicable, the need for these measures is indicated in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine whether or not limitations have been overcome by corrective measures.

The soils identified as prime farmland in Johnston County are:

AaA	Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded
AmB	Appling-Marlboro complex, 1 to 6 percent slopes
AsA	Augusta sandy loam, 0 to 2 percent slopes, occasionally flooded (where drained)
CeB	Cecil loam, 2 to 6 percent slopes
Ch	Chewacla loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
DoA	Dogue fine sandy loam, 0 to 2 percent slopes
FaA	Faceville sandy loam, 0 to 2 percent slopes
FaB	Faceville sandy loam, 2 to 6 percent slopes
GoA	Goldsboro sandy loam, 0 to 2 percent slopes
Gr	Grantham silt loam (where drained)
Ly	Lynchburg sandy loam (where drained)
MaA	Marlboro sandy loam, 0 to 2 percent slopes
MaB	Marlboro sandy loam, 2 to 8 percent slopes

McB	Marlboro-Cecil complex, 2 to 8 percent slopes
Na	Nahunta silt loam (where drained)
NkB	Nankin fine sandy loam, 2 to 6 percent slopes
NnB	Nason silt loam, 2 to 8 percent slopes
NoA	Norfolk loamy sand, 0 to 2 percent slopes
NoB	Norfolk loamy sand, 2 to 6 percent slopes
Pn	Pantego loam, occasionally flooded (where drained)
Ra	Rains sandy loam (where drained)
StA	State sandy loam, 0 to 3 percent slopes, occasionally flooded
To	Tomotley sandy loam, rarely flooded (where drained)
VaB	Vance coarse sandy loam, 2 to 8 percent slopes
VrA	Varina loamy sand, 0 to 2 percent slopes
VrB	Varina loamy sand, 2 to 6 percent slopes
WoB	Wedowee sandy loam, 2 to 8 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help to prevent construction failures caused by unfavorable soil properties.

Generally, the soils in Johnston County that are well suited to crops also are well suited to urban uses. The data concerning specific soils in the county can be used in planning future land use patterns. The potential for farming should be considered relative to any soil limitations and the potential for nonfarm development.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

William J. Harrell, district conservationist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the North Carolina Agricultural Extension Service.

In 1987, about 153,885 acres in Johnston County was used for crops and pasture *(22)*. Of this total, 32,737 acres was used for permanent pasture or hayland; 86,621 acres for row crops, mainly corn, soybeans, tobacco, and sweet potatoes; and 13,589 acres for close growing crops, such as wheat, oats, sorghum, barley, and cereal rye, much of which was double cropped with soybeans.

The county has been following a nationwide trend toward larger farms and farming operations and fewer farms and farmers. Despite this trend, the county has 1,713 farms, which is the largest number of individual farms of any county in the state. The average farm size is about 137 acres *(22)*. Most farmers are increasing their acreage by renting or share-cropping.

The total acreage used for crops and pasture in the county has gradually decreased as more land has been used for urban development. Such development is converting several hundred acres per year to urban land.

Cropland

In Johnston County, agriculture has always been the mainstay of the economy because of the large acreage

of well suited soils and the favorable climate. The county is a leading producer of tobacco and sweet potatoes, both statewide and nationwide. It has a variety of soils that are suited to a number of different crops in addition to traditional staple crops.

Tobacco and sweet potatoes are the most important cash crops, even though they are planted on an acreage several times smaller than that used for corn and soybeans. The well drained and moderately well drained Norfolk, Marlboro, Faceville, Varina, State, and Goldsboro soils are well suited to all of these crops. These soils are nearly level or gently sloping. Because the available water capacity is adequate in the surface layer of sandy loam or loamy sand and in the loamy subsoil, these soils produce good yields in most years. They are well suited to small grain, which is grown as a cash crop and a rotation crop.

Sandy soils, such as Blanton, Bonneau, Tarboro, Uchee, and Wagram soils, are mainly used for tobacco or sweet potatoes. These soils have thick sandy layers and generally do not have an adequate available water capacity for good yields of moisture-sensitive crops in most years. They are fairly well suited to tobacco and sweet potatoes, which are somewhat drought tolerant. Irrigation is necessary, however, to sustain high yields year after year. Corn, soybeans, and small grain are grown mainly as rotation crops on these soils. Where irrigated, these soils have a high potential for vegetables. They warm up early in the spring and thus early planting and harvesting are possible. Hybrid bermudagrass commonly is grown for hay on these soils.

Soils that have a friable or firm, predominantly clayey subsoil, such as Appling, Cecil, Faceville, Gilead, Nankin, Nason, and Wedowee soils, are used for soybeans, sorghum, and small grain. These soils have a thin surface layer of sandy loam, loamy sand, gravelly sandy loam, or loam. Because of the thin surface layer and the high content of clay in the subsoil, they do not have adequate available water capacity for good yields in most years.

Pastureland

Johnston County has about 24,000 acres of improved pasture and hayland. It has about 16,800 acres of mixed fescue, native grass, and clover used for pasture and about 7,200 acres of hybrid bermudagrass used for pasture or hay. Most of the bermudagrass is used for hay. The pastures of fescue, native grass, and fescue-clover are mainly in areas of the poorly drained and somewhat poorly drained soils on the Coastal Plain and the well drained, sloping soils on the Piedmont. The native grasses in these pastures consist of broomsedge bluestem, crabgrass, common bermudagrass, and switch cane. The hayfields and pastures of hybrid bermudagrass are mainly in areas of the well drained to excessively drained, sandy soils on the Coastal Plain. The acreage of bermudagrass is increasing because the grass is well suited to the sandy soils that are extensive throughout the county (fig. 7).

Good management is important for the maintenance of pastures and hayfields. Generally, high-value forage grasses require high levels of soil fertility for optimum quality, yield, and stand maintenance. Soil fertility can be maintained by regular soil testing and applications of recommended amounts of lime and fertilizer.

The seasonal application of nitrogen fertilizer is important in order to obtain maximum yields and maintain full stands of cool-season grasses, such as fescue. Controlled or split applications of nitrogen fertilizer are desirable to minimize losses caused by leaching of nutrients in deep sandy soils that support hybrid bermudagrass. Grazing management and appropriate clipping practices help to maintain full stands and assure good-quality forage during the growing season.

Overseeding pastures of fescue with clover provides a balanced diet of forage for livestock. Overseeding pastures of bermudagrass with rye can provide year-round grazing. Burning hayfields of hybrid bermudagrass in the early spring removes dead grass and facilitates regrowth in the spring.

Erosion

About 20 percent of the cropland in the county has no significant conservation problems. These soils have a high potential for the continued production of crops. Most of the soils, however, have management concerns, such as droughtiness, inadequate drainage, and the hazard of erosion.

Erosion is a major concern on about 44 percent of the cropland and pastureland in the county. In areas where the slope is more than 2 percent, erosion is a hazard on Norfolk, Marlboro, Faceville, Cowarts, Gilead, Uchee, Nankin, Appling, Wedowee, and Cecil soils.

Loss of the surface layer is damaging for several reasons. Valuable organic matter, which is important in maintaining inherent fertility, is lost. As the thickness of the surface layer is reduced, plowing mixes clay from the subsoil with the surface layer and thus reduces the suitability of the topsoil as a seedbed, makes tillage more difficult, and reduces the available water capacity of the soil. Erosion results in sedimentation of streams. Control of erosion minimizes pollution caused by sediments and improves the quality of water for municipal uses, for recreation, and for fish and wildlife.

Figure 7.—Hybrid bermudagrass used for hay in an area of Bonneau sand, 0 to 3 percent slopes. These sandy soils are well suited to bermudagrass.

Erosion-control systems provide a protective surface cover, help to control runoff, and increase the rate of water infiltration. Maintaining a plant cover limits the losses caused by erosion to amounts that do not reduce the productive capacity of the soils. Including legumes and grasses in the cropping sequence helps to control erosion on the gently sloping and strongly sloping soils, provides nitrogen, increases the content of organic matter, and improves tilth.

Many areas of the Cecil, Wedowee, Gilead, Cowarts, Nankin, and Uchee soils are small, irregular in shape, and have short and irregular slopes. In these areas a minimum tillage system is desirable. Commonly, small grain is double cropped with soybeans or sorghum planted in the grain stubble or no-till planting is used in undisturbed crop residue.

Terraces and diversions shorten the length of slopes and thus minimize erosion caused by runoff. They are practical on the well drained soils that have smooth, regular slopes. Norfolk, Marlboro, Faceville, Varina, Uchee, Wedowee, and some areas of Cecil soils are suitable for terraces. Many areas of the Cowarts and Gilead soils are less suitable for terraces and diversions because they are small and have irregular slopes. Grassed field borders help to control erosion around the edges of fields in these areas and prevent pollution of streams.

Contour tillage has potential for use in the county on large fields that have smooth, uniform slopes. These fields are mainly in areas of the gently sloping Norfolk, Marlboro, Faceville, Cecil, and Uchee soils.

Wind erosion is a hazard on the sandy Wagram, Bonneau, Blanton, Autryville, Tarboro, and Uchee soils. These soils make up about 11 percent of the county. Wind erosion removes the very fine sand, silts, and organic matter from the soil. The silt and organic matter are very important factors affecting the ability of the soils to hold nutrients and water. If the soils are dry and

unprotected, wind erosion can damage young plants. The hazard of wind erosion can be reduced by a windbreak consisting of trees and shrubs, a plant cover, surface mulch, or a combination of a rough surface made by proper tillage and windbreak strips of rye or oats.

Information concerning the design of erosion-control systems for each kind of soil is available at the local office of the Soil Conservation Service.

Chemical Weed Control

The use of herbicides for weed control is a common practice on cropland in Johnston County. It decreases the need for tillage and is an integral part of modern farming. Selected soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. Estimates of both of these properties were determined for the soils in the county. Table 15 shows a general range of organic matter content in the surface layer of the soils. The texture of the surface layer is shown in the USDA texture column in table 14.

In some areas the organic matter content projected for the different soils is outside the range shown in the table. The content can be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently been brought into cultivation may have a higher content of organic matter in the surface layer than similar soils that have been cultivated for a long time. Conservation tillage can increase the content of organic matter in the surface layer. A lower content of organic matter is common where the surface layer has been partly or completely removed by erosion or land smoothing. Current soil tests should be used for specific organic matter content determinations.

Soil Fertility

The soils in Johnston County generally are low in natural fertility. They are naturally acid. Additions of lime and fertilizer are needed for the production of most kinds of crops.

Liming requirements are a major concern on cropland. The acidity level in the soil affects the availability of many nutrients to plants and the activity of beneficial bacteria. Lime also neutralizes exchangeable aluminum in the soil and thus counteracts the adverse effects of high levels of aluminum on many crops. Liming adds calcium (from calcitic lime) or calcium and magnesium (from dolomitic lime) to the soil.

A soil test is a guide to what amount and kind of lime should be used. The desired pH levels may differ, depending on the soil properties and the crop to be grown.

Nitrogen fertilizer is required for most crops. It is generally not required, however, for peanuts and clover, in some rotations of soybeans, or for alfalfa that is established. A reliable soil test is not available for predicting nitrogen requirements. Appropriate rates of nitrogen application are described in the section "Yields per Acre."

Soil tests can indicate the need for phosphorus and potassium fertilizer. They are needed because phosphorus and potassium tend to build up in the soil.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. The application rate of nitrogen for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds per acre. If the yield potential for corn is 100 bushels per acre or less, a rate of 100 to 120 pounds of nitrogen per acre should be used. The application of nitrogen in excess of that required for potential yields generally is not recommended. The excess nitrogen fertilizer that is not utilized by a crop is an unnecessary expense and causes a hazard of water pollution. If corn or cotton is grown after the harvest of soybeans or peanuts, nitrogen rates can be reduced by about 20 to 30 pounds per acre. Because nitrogen can be readily leached from sandy soils, applications may be needed on these soils more than once during the growing season.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the North Carolina Agricultural Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland *(18)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

The acreage of soils in each capability class and subclass is shown in table 6. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 5.

Woodland Management and Productivity

Albert B. Coffey, forester, Soil Conservation Service, helped prepare this section.

Forest managers in Johnston County are faced with the challenge of producing greater yields from smaller areas. Meeting this challenge requires intensive management and silvicultural practices. Many modern silvicultural techniques resemble those long practiced in agriculture. They include establishing, weeding, and thinning a desirable young stand; propagating the more productive species and genetic varieties; providing short rotations and complete fiber utilization; controlling insects, diseases, and weeds; and improving tree growth by applications of fertilizer and the installation of a drainage system. Even though timber crops require decades to grow, the goal of intensive management is similar to the goal of intensive agriculture. This goal is to produce the greatest yield of the most valuable crop as quickly as possible.

Commercial forests cover 253,935 acres, or about 50 percent of the land area of Johnston County. Commercial forest is land that is producing or is capable of producing crops of industrial wood and that has not been withdrawn from timber production. Loblolly pine is the most important timber species in the county

Figure 8.—A young stand of loblolly pine in an area of Rains sandy loam.

because it grows fast, is adapted to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage (fig. 8).

For purposes of forest inventory, six forest types are identified in Johnston County *(17)*. They are described in the following paragraphs.

Loblolly-shortleaf. This forest type covers 70,946 acres. It is more than 50 percent loblolly pine and shortleaf pine. Common included trees are pond pine, red oak, white oak, gum, hickory, and yellow-poplar.

Longleaf-slash. This forest type covers 7,319 acres. It is more than 50 percent longleaf pine or slash pine, or both. Common included trees are oak, hickory, and gum.

Oak-pine. This forest type covers 62,214 acres. It is more than 50 percent hardwoods and more than 25 percent pines. Common included trees are upland oaks, gum, hickory, and yellow-poplar. If left undisturbed, this forest type develops into a forest of predominantly oak and other upland hardwoods. The understory usually consists of hardwood seedlings and saplings, which are more tolerant of shade than pine seedlings and saplings. In shaded understory, hardwoods compete for light and moisture so strongly that few pine seedlings

are able to survive. If mature stands of pine are cut, the dense understory of young hardwoods becomes dominant.

Oak-hickory. This forest type covers 40,257 acres. It is more than 50 percent oaks and hickory. Common included trees are elm, maple, and yellow-poplar.

Oak-gum-cypress. This forest type covers 47,579 acres. It is bottom-land forest, consisting predominantly of tupelo, blackgum, sweetgum, oaks, southern cypress, or a combination of these species. Common included trees are cottonwood, willow, ash, elm, hackberry, and maple.

Elm-ash-cottonwood. This forest type covers 25,620 acres. It is more than 50 percent elm, ash, or cottonwood. Common included trees are willow, sycamore, beech, and maple.

One of the first steps in planning intensive woodland management is to determine the potential productivity of the soil for several alternative tree species. The most productive and valued trees are then selected for each soil type. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of realistic decisions concerning expenses and profits associated with intensive woodland management, land acquisition, or industrial investments.

The potential productivity of woodland depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to the water table, affect forest productivity primarily by influencing available water capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine the potential site productivity.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 7 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of the slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, the use of wheeled equipment becomes more difficult. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness

restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of the naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees are listed in the order of their observed general occurrence. The table generally lists four to six trees for each applicable map unit. Additional species that commonly occur on the soils may be listed in the detailed soil map unit descriptions. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

For soils that are commonly used for timber production, the yield is predicted in cubic feet per acre per year. It is predicted at the point where mean annual increment culminates. The productivity of the soils in this survey is mainly based on loblolly pine and shortleaf pine *(6)*, sweetgum *(4)*, and yellow-poplar *(3)*.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years (50 years in this survey). This index applies to fully stocked, even-aged, unmanaged stands *(16)*. Productivity of a site can be improved through management practices, such as bedding, ditching, managing water, applying fertilizer, and planting genetically improved species.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

In table 8, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table

11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John P. Edwards, biologist, Soil Conservation Service, helped prepare this section.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

Johnston County is characterized by two general areas of wildlife habitat. The uplands have mixed openland and woodland wildlife habitats, and the major stream valleys dominantly have woodland wildlife habitat interspersed with small areas of wetland wildlife habitat.

The habitats in the uplands support a variety of small animals, such as squirrel, rabbit, quail, mourning dove, fox, opossum, and a variety of songbirds. A few deer are in the larger wooded areas. The uplands have an abundance of "edge type" habitat, which is a good source of cover and food. Cropland also is an excellent source of food. Seeding a mixture of annual and perennial seeds and installing conservation practices, such as windbreaks and field borders, provide a good source of cover and food. Norfolk, Goldsboro, Rains, Grantham, Gilead, Bonneau, Wagram, and Blanton soils are the dominant soils in the uplands.

The habitats in the stream valleys are dominated by hardwood forest. Squirrels and raccoons are plentiful. The deer population is increasing. A few isolated wetland habitats are in the stream valleys. Some of these habitats are maintained by beavers, which have been introduced to the area in recent years. Wetland habitat supports wood ducks and other migratory waterfowl. The dominant soils in the stream valleys are Wehadkee, Chastain, Chewacla, Wahee, Altavista, State, and Tarboro soils.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat. The ratings in the table are intended to be used as a guide and are not site specific. Onsite investigation is needed for individual management plans.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult

and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, lovegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, and beggarweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwoods and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, white-tailed deer, and black bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, the shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. The depth to a high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. The depth to bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), the shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, and the available water capacity in

the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established. Soil tests are essential to determine liming and fertilizer needs. Help in making soil tests or in deciding what soil additive, if any, should be used can be obtained from the office of the Johnston County Soil and Water Conservation District or the local office of the North Carolina Agricultural Extension Service.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. The animal waste lagoons commonly used in farming operations are not considered in the ratings. They are generally deeper than the lagoons referred to in the table and rely on anaerobic bacteria to decompose waste materials.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope or bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction,

and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained off-site, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and the shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* have more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. These soils have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale, siltstone, and weathered granite saprolite, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading

is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability in the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area. Ponds that are less than about 2 acres in size are not shown on the soil maps because of the scale of mapping.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table and permeability in the aquifer. The depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, susceptibility to flooding, subsidence of organic layers, and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the availability of suitable irrigation water, the depth of the root zone, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to help to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. Maintenance of terraces and diversions is adversely affected by a restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 17.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 17.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-

weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated content of clay in each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time. It is the difference between the amount of soil water at field moisture capacity and the amount at wilting point.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

The shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low,* a change of less than 3 percent; *moderate,* 3 to 6 percent; and *high,* more than 6 percent. *Very high,* more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE)

to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil listed in table 16 is assigned to two hydrologic groups, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary covering of the surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less

than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high.* It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 17 shows laboratory test data for two pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the North Carolina Department of Transportation and Highway Safety, Materials and Test Unit, Raleigh, North Carolina.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(19)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Kandiudults (*Kandi*, meaning more than normal development with low activity clay, plus *udults*, the suborder of the Ultisols that is moist but not wet.

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Kandiudults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, thermic Typic Kandiudults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The location of the typical pedon is described, and coordinates are identified by the State plane grid system. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(20)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(19)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Altavista Series

The Altavista series consists of very deep, moderately well drained soils that formed in fluvial

sediments on stream terraces. Slopes range from 0 to 2 percent.

Typical pedon of Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded; about 5.5 miles northeast of Bentonville; about 3,450 feet southwest of the Neuse River bridge on Secondary Road 1201 and 200 feet east of a field fence (State plane coordinates 2,238,200 feet E., 580,800 feet N.):

Ap—0 to 7 inches; brown (10YR 4/3) fine sandy loam; weak very fine granular structure; very friable, nonsticky and nonplastic; moderately acid; abrupt smooth boundary.

E—7 to 11 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak very fine granular structure; very friable, nonsticky and nonplastic; strongly acid; abrupt smooth boundary.

Bt1—11 to 18 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—18 to 24 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct strong brown (7.5YR 5/8) and common medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—24 to 34 inches; strong brown (7.5YR 5/8) sandy clay loam; many medium distinct light yellowish brown (10YR 6/4) and many medium prominent light gray (10YR 7/1) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg—34 to 47 inches; light gray (10YR 7/2) sandy loam; many medium distinct brownish yellow (10YR 6/6) and many medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and nonplastic; few faint clay films on faces of peds; common flakes of mica; strongly acid; clear wavy boundary.

Cg—47 to 57 inches; mottled light gray (10YR 7/2) and light yellowish brown (10YR 6/4) sandy loam and loamy sand with lenses of sandy clay loam; massive; friable, nonsticky and nonplastic; common flakes of mica; strongly acid; gradual smooth boundary.

C—57 to 60 inches; very pale brown (10YR 7/4) loamy sand; single grained; loose, nonsticky and nonplastic; common flakes of mica; strongly acid.

The thickness of the solum ranges from 30 to more than 60 inches. Reaction ranges from extremely acid to moderately acid throughout the profile, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is fine sandy loam, loam, or sandy loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 3 to 8. In the lower part, it is mottled in shades of red, gray, or brown. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2 or is mottled in shades of gray, brown, and red. The Bt and Btg horizons are sandy clay loam, clay loam, or sandy loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8. It is mottled in shades of gray or brown. It is sandy loam, loamy sand, sand, or sandy clay loam. In some pedons it is stratified.

Appling Series

The Appling series consists of very deep, well drained soils on uplands near the contact between areas of Coastal Plain sediments and residuum weathered from bedrock. These soils formed in thin gravelly sediments overlying material weathered from bedrock. Slopes range from 1 to 6 percent.

Typical pedon of Appling gravelly fine sandy loam in an area of Appling-Marlboro complex, 1 to 6 percent slopes; about 8 miles west of Smithfield; 700 feet southeast from Bethesda Church on U.S. Highway 70 to the junction with a farm road, about 2,000 feet northeast of the junction, and 50 feet north of the farm road, in a small wooded area (State plane coordinates 2,180,200 feet E., 666,600 feet N.):

Ap—0 to 5 inches; brown (10YR 5/3) gravelly fine sandy loam; weak fine granular and subangular blocky structure; very friable; common fine and medium roots; about 30 percent gravel; strongly acid; clear smooth boundary.

E—5 to 10 inches; light yellowish brown (10YR 6/4) gravelly sandy loam; weak coarse granular structure; friable; few fine and medium roots; about 30 percent gravel; strongly acid; clear wavy boundary.

Bt1—10 to 18 inches; yellowish brown (10YR 5/8) clay; weak fine and medium subangular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; about 10 percent gravel; few distinct strong brown (7.5YR 5/6) clay films on faces of peds and on gravel; strongly acid; gradual wavy boundary.

Bt2—18 to 26 inches; strong brown (7.5YR 5/6) clay; common medium distinct yellowish red (5YR 5/6) mottles; weak fine subangular blocky structure;

friable, sticky and slightly plastic; few fine and medium roots; about 5 percent gravel; few faint clay films on faces of peds and on gravel; strongly acid; gradual smooth boundary.

Bt3—26 to 46 inches; mottled yellowish red (5YR 4/6), yellowish brown (10YR 5/8), and strong brown (7.5YR 5/6) clay; moderate fine and medium subangular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; few distinct clay films on faces of peds and in root channels; few fine flakes of mica; strongly acid; gradual smooth boundary.

Bt4—46 to 61 inches; mottled yellowish red (5YR 4/6), yellowish brown (10YR 5/8), and strong brown (7.5YR 5/8) clay; yellowish brown mottles oriented in horizontal bands; moderate medium and fine angular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; few distinct clay films on faces of peds and in old root channels; few fine flakes of mica; strongly acid; clear wavy boundary.

BC1—61 to 74 inches; yellowish red (5YR 4/6) clay loam; common medium prominent yellow (10YR 7/6) diagonally oriented mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; strongly acid; few distinct clay films on faces of peds and around yellow mottles; common fine flakes of mica; strongly acid; gradual smooth boundary.

BC2—74 to 86 inches; yellowish red (5YR 5/8) clay loam; many medium prominent yellow (10YR 7/8) and common fine and medium prominent very pale brown (10YR 8/3) diagonally oriented mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; common distinct yellowish red (5YR 4/6) clay films on faces of peds and in root channels; common fine flakes of mica; strongly acid; gradual smooth boundary.

C—86 to 104 inches; yellowish red (5YR 5/8) clay loam; many medium distinct yellow (10YR 7/8) diagonally oriented mottles; massive; friable, sticky and nonplastic; few fine roots; few clay films along vertical planes of weakness; common fine flakes of mica; strongly acid.

The thickness of the solum ranges from 50 to more than 80 inches. Reaction is very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, chroma of 2 to 6. The E horizon, if it occurs, has hue of 10YR or 2.5Y and value and chroma of 4 to 6. It is sandy loam, fine sandy loam, or the gravelly analogs of those textures.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. In the lower part, it has mottles in shades of red, yellow, and brown. It is clay, clay loam, or sandy clay. In some pedons, it has thin layers of sandy clay loam.

The BC horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is clay loam, sandy clay loam, or sandy clay.

The C horizon is multicolored, soft, weathered saprolite. It is mottled in shades of red, brown, gray, or white. It is loam or clay loam.

The Appling soils in Johnston County are taxadjuncts to the series because they typically have a solum that is thicker than that defined for the series.

Augusta Series

The Augusta series consists of very deep, somewhat poorly drained soils on low stream terraces. These soils formed in loamy alluvial deposits that contain a significant amount of weatherable minerals. Slopes range from 0 to 2 percent.

Typical pedon of Augusta sandy loam, 0 to 2 percent slopes, occasionally flooded; about 14 miles southeast of Smithfield; about 1,340 feet east-northeast of Riverside Church, along Secondary Road 1201 (State plane coordinates 2,237,200 feet E., 585,500 feet N.):

Ap—0 to 7 inches; grayish brown (10YR 5/2) sandy loam; weak fine granular structure; very friable; slightly acid; clear wavy boundary.

BE—7 to 11 inches; pale brown (10YR 6/3) sandy loam; common medium distinct yellowish brown (10YR 5/6) and light gray (10YR 7/2) mottles; weak medium subangular blocky structure; very friable; moderately acid; clear smooth boundary.

Bt—11 to 25 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; common fine distinct light gray (10YR 7/2) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg—25 to 32 inches; light gray (10YR 7/2) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

BCg—32 to 43 inches; light gray (10YR 7/2) sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Cg—43 to 60 inches; white (10YR 8/1) coarse sand; few coarse distinct yellowish brown (10YR 6/6) mottles; single grained; loose; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction is very strongly acid to moderately acid throughout the profile, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 to 6. Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is sandy loam or loam.

The BE horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. It has mottles in shades of brown or gray.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. It has mottles in shades of brown, yellow, red, or gray. It is loam, sandy clay loam, or clay loam.

The Btg and BCg horizons have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2, or they are neutral in hue and have value of 5 to 7. They have mottles in shades of brown or gray. The Btg horizon is clay loam, sandy clay loam, or loam. The BCg horizon is clay, clay loam, sandy clay loam, loam, or sandy loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It is coarse sand, loamy coarse sand, loamy sand, sandy loam, loam, or the gravelly analogs of those textures.

Autryville Series

The Autryville series consists of very deep, well drained soils in the uplands on the Coastal Plain. These soils formed in sandy and loamy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Autryville sand, 0 to 2 percent slopes; about 3.3 miles west-southwest of Harper; about 2,550 feet north-northwest of the junction of Secondary Road 1008 and Secondary Road 1131, in a field (State plane coordinates 2,182,600 feet E., 556,500 feet N.):

Ap—0 to 8 inches; brown (10YR 4/3) sand; single grained; loose; common fine roots; moderately acid; abrupt smooth boundary.

E—8 to 22 inches; light yellowish brown (2.5Y 6/4) loamy sand; single grained; loose; few fine roots; strongly acid; clear wavy boundary.

Bt—22 to 31 inches; yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay bridges between sand grains; very strongly acid; gradual smooth boundary.

E'1—31 to 48 inches; light yellowish brown (10YR 6/4) loamy sand; single grained; loose, nonsticky and nonplastic; very strongly acid; diffuse smooth boundary.

E'2—48 to 58 inches; light yellowish brown (10YR 6/4) loamy sand; single grained; loose, nonsticky and nonplastic; strongly acid; clear smooth boundary.

B't—58 to 70 inches; yellowish brown (10YR 5/6) sandy loam; common fine distinct strong brown (7.5YR 5/6) and light gray (10YR 7/2) mottles; weak fine subangular blocky structure; friable, slightly sticky and nonplastic; few faint clay films on faces of peds; strongly acid.

The thickness of the solum is more than 60 inches. Reaction is very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8. It is sand, loamy sand, or loamy fine sand.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or sandy clay loam.

The E' horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 8. It is loamy sand, loamy fine sand, fine sand, or sand.

The B't horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 to 8. It has mottles in shades of yellow, brown, red, or gray. It is sandy loam, fine sandy loam, or sandy clay loam.

Bibb Series

The Bibb series consists of very deep, poorly drained soils on flood plains along streams on the Coastal Plain. These soils formed in loamy and sandy sediments that have a low content of weatherable minerals. Slopes are less than 2 percent.

Typical pedon of Bibb sandy loam, frequently flooded; about 15 miles west of Smithfield; about 0.3 mile north of North Carolina Highway 210 on Secondary Road 1532, about 0.5 mile northwest on Secondary Road 1538, and 75 feet north of the road, in a wooded area (State plane coordinates 2,107,400 feet E., 648,200 feet N.):

A—0 to 5 inches; very dark grayish brown (10YR 3/2) sandy loam; moderate medium granular structure; very friable; many fine tree and shrub roots; moderately acid; abrupt smooth boundary.

Cg1—5 to 10 inches; light gray (10YR 7/2) sand; single

grained; loose; few fine tree and shrub roots; moderately acid; abrupt smooth boundary.
Cg2—10 to 20 inches; grayish brown (2.5Y 5/2) sandy loam; common medium distinct dark brown (10YR 4/3) mottles; massive; very friable, slightly sticky and slightly plastic; few fine tree and shrub roots; strongly acid; abrupt smooth boundary.
Cg3—20 to 23 inches; light gray (10YR 7/2) loamy sand; single grained; loose; few fine tree and shrub roots; strongly acid; abrupt smooth boundary.
Cg4—23 to 36 inches; grayish brown (10YR 5/2) sandy loam; massive; very friable, slightly sticky and slightly plastic; strongly acid; abrupt smooth boundary.
Cg5—36 to 60 inches; light gray (10YR 7/2) sand; single grained; loose; very strongly acid.

The loamy and sandy layers are more than 60 inches thick. Reaction is very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 5, and chroma of 1 to 3.

The Cg horizon has hue of 10YR to 5Y, value of 3 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 3 to 7. It has mottles in shades of red, yellow, or brown. It is sandy loam, fine sandy loam, loam, loamy fine sand, loamy sand, or sand. In some pedons it is stratified with those textures.

Blanton Series

The Blanton series consists of very deep, moderately well drained soils on the middle and upper parts of the Coastal Plain. These soils formed in sandy and loamy marine sediments. Slopes range from 0 to 3 percent.

Typical pedon of Blanton sand, 0 to 3 percent slopes; about 8.8 miles south-southeast of Four Oaks; about 1,075 feet northwest from the intersection of U.S. Highway 701 and Secondary Road 1137 (State plane coordinates 2,189,000 feet E., 574,300 feet N.):

Ap—0 to 10 inches; brown (10YR 5/3) sand; single grained; loose; few fine roots; very strongly acid; abrupt wavy boundary.
E1—10 to 36 inches; light yellowish brown (10YR 6/4) sand; single grained; very friable; few fine roots; very strongly acid; gradual smooth boundary.
E2—36 to 52 inches; very pale brown (10YR 7/4) sand; single grained; loose; very strongly acid; clear smooth boundary.
Bt1—52 to 61 inches; mottled yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.
Bt2—61 to 74 inches; reticulately mottled light brownish gray (10YR 6/2), strong brown (7.5YR 5/6), and yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; few nodules of plinthite; very strongly acid; gradual irregular boundary.
BC—74 to 81 inches; mottled brownish yellow (10YR 6/6) and yellowish red (5YR 4/6) sandy loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual smooth boundary.
C—81 to 97 inches; yellowish brown (10YR 5/8) sandy loam; common coarse distinct light yellowish brown (10YR 6/4) and dark reddish brown (2.5YR 3/6) mottles; massive; very friable; about 5 percent fine and medium pebbles; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. Reaction is very strongly acid to moderately acid throughout the profile, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 to 4. The E horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 to 8. It is loamy sand or sand.

The Bt and BC horizons have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. They are mottled in shades of brown, yellow, red, or gray. They are sandy clay loam or sandy loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It has mottles in shades of red, brown, or gray. It is sandy loam or loamy sand.

Bonneau Series

The Bonneau series consists of very deep, well drained soils in the uplands on the Coastal Plain. These soils formed in sandy and loamy marine sediments. Slopes range from 0 to 3 percent.

Typical pedon of Bonneau sand, 0 to 3 percent slopes; about 3 miles southeast of Meadow; about 500 feet north of the junction of Secondary Roads 1132 and 1133 and 100 feet east of Secondary Road 1133 (State plane coordinates 2,177,800 feet E., 567,100 feet N.):

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; few fine and very fine roots; few fine and very fine pores; very strongly acid; clear wavy boundary.
E—10 to 28 inches; light yellowish brown (2.5Y 6/4) loamy sand; weak fine granular structure; very friable; few fine and very fine roots; few fine and

very fine pores; strongly acid; clear wavy boundary.
Bt1—28 to 41 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine roots; many very fine and common fine pores; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.
Bt2—41 to 53 inches; mottled light yellowish brown (2.5Y 6/4), strong brown (7.5YR 5/6), and red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few very fine roots; few fine and medium pores; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.
Bt3—53 to 71 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/8), and red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few very fine roots; few very fine pores; few faint clay films on faces of peds; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction is strongly acid or moderately acid in the A and E horizons, except where the surface layer has been limed. It is very strongly acid or strongly acid the B horizon.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 2 to 6. It is loamy sand or fine sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of brown in the upper part and in shades of brown, red, and gray in the lower part. It is sandy clay loam in the upper part and sandy clay loam or sandy clay in the lower part.

Cecil Series

The Cecil series consists of very deep, well drained soils on broad uplands and hillslopes on the Piedmont. These soils formed in material weathered from felsic rocks, mostly gneiss and schist. Slopes range from 2 to 10 percent.

Typical pedon of Cecil loam, 2 to 6 percent slopes; about 9 miles north of Smithfield; about 6,200 feet south-southwest of Flowers Crossroads and 600 feet north of the end of a farm road (State plane coordinates 2,192,600 feet E., 687,300 feet N.):

A—0 to 5 inches; dark brown (10YR 3/3) loam; weak fine granular structure; friable, slightly sticky and slightly plastic; many fine and medium roots; about 8 percent gravel; moderately acid; clear smooth boundary.
E—5 to 9 inches; dark yellowish brown (10YR 4/4) loam; weak fine granular structure; friable, slightly sticky and slightly plastic; about 8 percent gravel; few fine and medium roots; strongly acid; clear smooth boundary.
Bt1—9 to 21 inches; red (2.5YR 5/8) clay; few fine distinct strong brown (7.5YR 5/6) mottles; weak fine and medium subangular blocky structure; friable, sticky and plastic; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt2—21 to 40 inches; red (10R 4/8) clay; moderate medium and fine subangular blocky structure; friable and firm, sticky and plastic; few distinct clay films on faces of peds; strongly acid; diffuse smooth boundary.
Bt3—40 to 52 inches; red (10R 4/8) clay; common medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky and plastic; common very fine flakes of mica in the yellowish red material; common distinct clay films on faces of peds; strongly acid; diffuse smooth boundary.
BC—52 to 72 inches; red (10R 4/8) clay loam; common medium distinct yellowish red (5YR 5/8) mottles; weak medium and coarse subangular blocky structure; friable, sticky and slightly plastic; many very fine flakes of mica; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction is very strongly acid to moderately acid in the A and E horizons, except where the surface layer has been limed. It is very strongly acid or strongly acid in the B horizon and in the C horizon, if it occurs.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6. It is loam or sandy loam.

The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is loam or sandy loam.

The Bt horizon generally has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. In some pedons, it has thin layers with hue of 5YR in the upper part. It is clay or clay loam.

The BC horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8. It is clay loam, sandy clay loam, or clay.

The C horizon, if it occurs, is soft, multicolored saprolite that has a texture of loam or sandy loam.

Chastain Series

The Chastain series consists of very deep, poorly drained soils formed in fine textured or moderately fine textured alluvial sediments. These soils are in ponded

slack water areas and on broad flats, mainly along on the Neuse River. Slopes are less than 2 percent.

Typical pedon of Chastain silty clay, in an area of Wehadkee-Chastain association, frequently flooded; about 5 miles north-northeast of Bentonville; about 4,600 feet south of the Neuse River; about 2.1 miles northeast of the junction of Secondary Road 1009 and Secondary Road 1185, in a wooded area (State plane coordinates 2,204,400 feet E., 606,700 feet N.):

A—0 to 4 inches; grayish brown (10YR 5/2) silty clay; many fine distinct dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; friable, sticky and slightly plastic; many fine and few coarse roots; strongly acid; clear smooth boundary.

Bg1—4 to 11 inches; dark gray (10YR 4/1) clay; many fine distinct yellowish red (5YR 4/6) mottles in ped interiors and many fine distinct dark grayish brown (10YR 4/2) mottles on faces of peds; weak very coarse angular blocky structure; friable, slightly sticky and slightly plastic; common medium and fine roots; very strongly acid; clear smooth boundary.

Bg2—11 to 24 inches; gray (10YR 6/1) clay; many medium distinct strong brown (7.5YR 5/6) mottles in ped interiors; weak coarse prismatic structure parting to weak very coarse angular blocky; firm, sticky and plastic; few medium and fine roots; strongly acid; gradual smooth boundary.

Bg3—24 to 42 inches; gray (10YR 6/1) clay; common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse angular blocky structure; firm, sticky and plastic; few fine and medium roots; very strongly acid; gradual smooth boundary.

Bg4—42 to 60 inches; gray (10YR 6/1) clay; many medium distinct strong brown (7.5YR 5/6) mottles; weak coarse angular blocky structure; firm, sticky and plastic; thin discontinuous clay films on surfaces of peds; few fine roots; very strongly acid.

The thickness of the solum ranges from 40 to more than 72 inches. Reaction is very strongly acid to moderately acid throughout the profile, except where the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is loam, silt loam, clay loam, silty clay, or silty clay loam.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of red or brown. It is clay, silty clay loam, clay loam, or silty clay.

The C horizon, if it occurs, has colors similar to those of the Bg horizon. It is clay, silty clay, silty clay loam, clay loam, or sandy clay loam.

Chewacla Series

The Chewacla series consists of very deep, somewhat poorly drained soils on level flood plains. These soils formed in loamy alluvium that has significant amounts of weatherable minerals. Slopes are less than 2 percent.

Typical pedon of Chewacla loam, frequently flooded; about 4 miles south of Smithfield; about 2 miles south-southwest of the junction of Polecat Creek and Brogden Road (Secondary Road 1007), 40 feet northeast of Woodland Road, and 800 feet east of the Neuse River, in a large wooded area (State plane coordinates 2,195,600 feet E., 617,200 feet N.):

A—0 to 6 inches; dark brown (10YR 4/3) loam; weak fine and medium granular structure; friable, sticky and slightly plastic; common flakes of mica; many fine and few medium roots; moderately acid; clear smooth boundary.

Bw1—6 to 11 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable, sticky and slightly plastic; common fine and medium roots; moderately acid; clear smooth boundary.

Bw2—11 to 18 inches; dark yellowish brown (10YR 4/4) loam; many medium faint yellowish brown (10YR 5/4) mottles; weak fine and medium subangular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; moderately acid; clear smooth boundary.

Bw3—18 to 32 inches; dark yellowish brown (10YR 4/4) loam; common fine distinct light brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; strongly acid; gradual smooth boundary.

Bg—32 to 44 inches; light brownish gray (2.5Y 6/2) clay loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; many fine distinct black (10YR 2/1) soft concretions; strongly acid; gradual smooth boundary.

Cg—44 to 60 inches; mottled light gray (10YR 6/1) and strong brown (7.5YR 5/6) clay loam; massive; friable, sticky and slightly plastic; strongly acid.

The thickness of the solum ranges from 40 to more than 70 inches. To a depth of 40 inches, reaction is very strongly acid to slightly acid, except where the surface layer has been limed. Below a depth of 40 inches, it is very strongly acid to mildly alkaline.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 4.

The Bw horizon has hue of 7.5YR or 10YR, value of

4 to 7, and chroma of 3 to 8. It is loam, clay loam, sandy clay loam, or sandy loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of brown. It is loam, clay loam, sandy clay loam, or sandy loam.

The Cg horizon has colors similar to those of the Bg horizon. It is clay loam, sandy loam, or sand.

Cowarts Series

The Cowarts series consists of very deep, well drained soils in the uplands on the Coastal Plain. These soils formed in loamy marine sediments. Slopes range from 2 to 10 percent.

Typical pedon of Cowarts loamy sand, 2 to 6 percent slopes; south of Archers Lodge; about 1,570 feet west of the intersection of Secondary Road 1700 and Secondary Road 1706 and about 325 feet south-southwest of Secondary Road 1700 (State plane coordinates 2,179,900 feet E., 705,400 feet N.):

Ap—0 to 6 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable, nonsticky and nonplastic; many very fine and fine roots; few very fine and fine pores; slightly acid; abrupt smooth boundary.

Bt1—6 to 16 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few very fine and fine roots; common very fine and fine pores; few faint clay films on faces of peds; moderately acid; clear wavy boundary.

Bt2—16 to 28 inches; yellowish brown (10YR 5/6) sandy clay loam; many medium prominent strong brown (7.5YR 5/8) and red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few very fine roots in pores and along faces of peds; few fine and medium pores; few faint yellowish brown (10YR 5/4) clay films in pores and along some faces of peds; strongly acid; gradual smooth boundary.

BC—28 to 34 inches; strong brown (7.5YR 5/8) sandy clay loam; common medium prominent red (10R 4/8), light yellowish brown (2.5Y 6/4), and light gray (10YR 7/1) mottles; weak thick platy structure parting to weak fine subangular blocky; friable, sticky and slightly plastic; few very fine and fine roots in pores; few very fine, fine, and medium pores; few distinct clay films on faces of peds and in pores; strongly acid; clear wavy boundary.

C—34 to 69 inches; mottled red (10R 5/6), yellowish brown (10YR 5/8), and light gray (10YR 7/1) sandy clay loam; massive; friable, sticky and slightly plastic; few very fine roots in gray zones; few very fine and fine pores in gray zones; about 8 percent gravel; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches. Reaction is very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is loamy sand or sandy loam.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of brown, yellow, or red. It is sandy clay loam, clay loam, or sandy clay.

The BC horizon has hue of 10R to 10YR, value of 4 to 8, and chroma of 1 to 8. It has mottles in shades of red, brown, yellow, or gray. It is sandy clay loam, sandy loam, or sandy clay.

The C horizon has hue of 10R to 10YR, value of 4 to 8, and chroma of 1 to 8. It is mottled in shades of these colors. It is sandy clay loam, sandy loam, or sandy clay.

Dogue Series

The Dogue series consists of very deep, moderately well drained soils on stream terraces. These soils formed in loamy and clayey sediments. Slopes range from 0 to 2 percent.

Typical pedon of Dogue fine sandy loam, 0 to 2 percent slopes; about 3.5 miles east of Four Oaks; about 1.5 miles north of the junction of Secondary Road 1009 and Secondary Road 1184, about 80 feet north of a farm path, and 945 feet west of the junction of the farm path with Secondary Road 1009 (State plane coordinates 2,187,500 feet E., 613,800 feet N.):

Ap—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; very friable; common fine roots; strongly acid; abrupt wavy boundary.

E—8 to 10 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak medium granular structure; friable; few fine roots; common fine pores; very strongly acid; clear smooth boundary.

Bt1—10 to 17 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; common fine and medium pores; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—17 to 27 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; common very fine roots; common fine and medium pores;

few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—27 to 55 inches; mottled strong brown (7.5YR 5/6), light gray (10YR 6/1), and red (2.5YR 4/8) clay; weak medium prismatic structure parting to weak medium angular blocky; firm, sticky and plastic; few fine, medium, and large pores; many distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Cg—55 to 75 inches; light gray (10YR 6/1) sandy clay loam; common medium and coarse prominent brownish yellow (10YR 6/8) and yellowish red (5YR 5/8) mottles; massive; friable, sticky and plastic; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction is extremely acid to strongly acid throughout, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is fine sandy loam or sandy loam.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The lower part has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8; is neutral in hue and has value of 4 to 7; or is mottled in shades of these colors. It is clay loam, sandy clay loam, sandy clay, or clay.

The Cg horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. Some pedons have a C horizon, which has value of 4 to 7 and chroma of 3 to 8. The Cg or C horizon has mottles in shades of yellow, brown, red, or gray. Texture ranges from sand to sandy clay loam.

Faceville Series

The Faceville series consists of very deep, well drained soils in deeply dissected upland areas on the Coastal Plain. These soils formed in clayey and loamy marine sediments. Slopes range from 0 to 6 percent.

Typical pedon of Faceville sandy loam, 0 to 2 percent slopes; about 2 miles southeast of Ogburn; about 0.3 mile southeast on a farm road from the intersection of Secondary Roads 1541 and 1531 and 15 feet west of the farm road, in a field (State plane coordinates 2,101,800 feet E., 647,700 feet N.):

Ap—0 to 8 inches; brown (10YR 5/3) sandy loam; weak coarse granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary.

E—8 to 13 inches; very pale brown (10YR 7/4) sandy loam; weak coarse granular structure; very friable; many fine roots; moderately acid; abrupt wavy boundary.

Bt1—13 to 22 inches; yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; firm, sticky and plastic; common fine roots; common fine pores; few faint clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—22 to 45 inches; red (2.5YR 5/8) clay loam; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; few fine pores; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt3—45 to 53 inches; red (2.5YR 5/8) clay loam; common medium prominent brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine pores; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt4—53 to 65 inches; red (2.5YR 5/6) clay loam; common medium prominent yellow (10YR 7/6) and many medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky and plastic; few fine and medium pores; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

C—65 to 70 inches; mottled red (2.5YR 5/6), yellow (10YR 7/6), and strong brown (7.5YR 5/8) sandy loam with lenses of sand and pockets of clay; massive; friable, slightly sticky and slightly plastic; very strongly acid.

The thickness of the solum is 65 inches or more. Reaction is very strongly acid or strongly acid throughout, except where the surface layer has been limed.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. The E horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 or 4. It is loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It has mottles in shades of yellow and brown in the middle and lower parts. It is sandy clay loam or clay loam in the upper part and clay loam, sandy clay, or clay in the middle and lower parts.

The C horizon is mottled in shades of red, yellow, and brown. It is sandy loam with lenses of sand and pockets of clay.

Fuquay Series

The Fuquay series consists of very deep, well drained soils on broad ridges in the uplands on the Coastal Plain. These soils formed in loamy and sandy marine sediments. Slopes range from 0 to 3 percent.

Typical pedon of Fuquay sand, 0 to 3 percent slopes; about 15 miles west of Smithfield; about 0.3 mile south of the junction of North Carolina Highways 50 and 210 at McGee's Crossroads, 250 feet west of the intersection of North Carolina Highway 50 and Secondary Road 1320, and 125 feet north, in a field (State plane coordinates 2,124,900 feet E., 641,600 feet N.):

Ap—0 to 8 inches; grayish brown (2.5Y 5/2) sand; single grained; loose; common fine roots; few medium nodules of ironstone; strongly acid; abrupt smooth boundary.

E—8 to 34 inches; light yellowish brown (2.5Y 6/4) sand; many coarse light gray (2.5Y 7/2) bodies of clean sand grains in the lower part; single grained; loose; few fine roots; few medium nodules of ironstone; strongly acid; diffuse wavy boundary.

Bt—34 to 45 inches; brownish yellow (10YR 6/6) sandy loam; common medium faint strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; few small nodules of ironstone; strongly acid; clear wavy boundary.

Btc—45 to 50 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; weak medium angular blocky structure; friable; few fine roots and pores; few faint clay films on faces of peds; common hard strong brown (7.5YR 5/8) nodules of ironstone about 0.5 inch in diameter; strongly acid; abrupt wavy boundary.

Btv1—50 to 54 inches; mottled strong brown (7.5YR 5/8) and brownish yellow (10YR 6/6) sandy clay loam; few coatings and streaks of light gray (10YR 7/2) sandy clay; few linear streaks of yellowish red (5YR 4/6) sandy loam; weak medium angular blocky structure; friable; common fine pores; common nodules of plinthite, very firm and brittle where red and brown; few faint clay films on faces of peds; strongly acid; abrupt smooth boundary.

Btv2—54 to 70 inches; reticulately mottled brownish yellow (10YR 6/6) and yellowish red (5YR 4/8) sandy clay loam and light gray (10YR 7/1) sandy clay (gray parts surrounded by brownish yellow colors that grade to yellowish red); weak medium angular blocky structure; firm; few fine pores; common nodules of plinthite; few fine faint brownish yellow clay films on faces of peds; strongly acid; gradual smooth boundary.

Btv3—70 to 96 inches; brownish yellow (10YR 6/8) sandy clay loam; brownish yellow (10YR 6/8) sandy loam in the lower part; common coarse prominent reticulate mottles of red (2.5YR 4/8), yellowish red (5YR 5/8), and light gray (10YR 7/2); weak coarse subangular blocky structure; firm; common nodules of plinthite; few fine pores; common distinct clay films on faces of peds in the light gray material; strongly acid; gradual wavy boundary.

C—96 to 108 inches; yellowish red (5YR 5/8) loamy sand; common fine and coarse distinct red (2.5YR 5/8) and few fine prominent brownish yellow (10YR 6/6) mottles; massive; friable; strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid to moderately acid throughout the profile, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3, or it is neutral in hue and has value of 4 or 5.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is sand or loamy sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 4 to 8. It has a few mottles of redder hue in the upper part. In the lower part, it is reticulately mottled in shades of red, brown, and gray. It has layers containing more than 5 percent, by volume, plinthite at depths of 40 to 60 inches. It is sandy loam or sandy clay loam.

The C horizon has hue of 2.5YR to 2.5Y, value of 4 to 8, and chroma of 1 to 8. It is mottled in shades of these colors. It is sandy loam or loamy sand.

Gilead Series

The Gilead series consists of very deep, moderately well drained soils in the uplands on the Coastal Plain. These soils formed in loamy and clayey marine sediments. Slopes range from 2 to 15 percent.

Typical pedon of Gilead sandy loam, 2 to 8 percent slopes; about 2 miles northeast of Hardee Crossroads; about 0.3 mile east of Hardee Crossroads on Secondary Road 1322, about 0.1 mile north on Secondary Road 1319, and 200 feet west of the road, in a cultivated field (State plane coordinates 2,122,500 feet E., 633,500 feet N.):

Ap—0 to 5 inches; pale brown (10YR 6/3) sandy loam; weak medium granular structure; very friable; moderately acid; abrupt smooth boundary.

Bt1—5 to 9 inches; strong brown (7.5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; strongly acid; abrupt smooth boundary.

Bt2—9 to 15 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; firm, sticky and plastic; few faint clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—15 to 20 inches; yellowish brown (10YR 5/8) clay

loam; common fine distinct light gray (10YR 7/2) and common fine prominent red (2.5YR 5/8) mottles; weak medium subangular blocky structure; firm, very sticky and plastic; few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt4—20 to 29 inches; reddish yellow (7.5YR 6/8) clay; common medium distinct red (2.5YR 5/8) and common medium prominent light gray (10YR 7/2) mottles; weak fine angular blocky structure; firm, sticky and plastic; very few faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg—29 to 38 inches; light gray (10YR 7/2) clay loam; common medium prominent red (2.5YR 5/8) and strong brown (7.5YR 5/8) mottles; weak fine angular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

Cg—38 to 75 inches; light gray (10YR 7/2) sandy clay loam; common coarse prominent red (2.5YR 5/8) and reddish yellow (7.5YR 6/8) mottles; massive; firm, sticky and plastic; few pressure faces on peds; very strongly acid.

The thickness of the solum ranges from 24 to 60 inches. Reaction is strongly acid or very strongly acid throughout the profile, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is loamy sand or sandy loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. In the lower part, it has mottles in shades of red, yellow, brown, or gray. It is sandy clay, clay, or clay loam. In some pedons, it has thin transitional layers of sandy clay loam.

The Btg horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is sandy loam, sandy clay loam, clay loam, or clay.

The Cg horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 1 or 2; is neutral in hue and has value of 4 to 8; or is mottled in shades of these colors. Some pedons have a C horizon, which has value of 4 to 8 and chroma of 3 to 8. It has mottles in shades of yellow, brown, red, or gray. Texture of the Cg or C horizon is sandy clay loam, clay loam, clay, sandy clay, or silty clay loam.

Goldsboro Series

The Goldsboro series consists of very deep, moderately well drained soils in the uplands on the Coastal Plain. These soils formed in loamy and clayey marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Goldsboro sandy loam, 0 to 2 percent slopes; about 4 miles southeast of Smithfield; about 1,345 feet east from the intersection of Secondary Road 2510 and Secondary Road 2509, in a field (State plane coordinates 2,212,000 feet E., 633,000 feet N.):

Ap—0 to 8 inches; brown (10YR 4/3) sandy loam; weak fine granular structure; very friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine and fine pores; strongly acid; abrupt smooth boundary.

Bt1—8 to 16 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine and medium pores; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—16 to 26 inches; yellowish brown (10YR 5/6) sandy clay loam; many medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; common very fine and fine roots; few large pores; very strongly acid; gradual wavy boundary.

Bt3—26 to 42 inches; yellowish brown (10YR 5/6) clay loam; common fine prominent light brownish gray (2.5Y 6/2) and red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable, sticky and plastic; few very fine roots; few large pores; few faint clay films on faces of peds; very strongly acid; gradual irregular boundary.

Btg—42 to 65 inches; light gray (10YR 6/1) sandy clay; common medium prominent strong brown (7.5YR 5/6) and red (2.5YR 4/6) mottles; moderate medium and coarse angular blocky structure; firm, slightly brittle, sticky and plastic; few very fine and fine roots; few fine, medium, and large pores; few faint clay films on faces of peds; very strongly acid; gradual irregular boundary.

Cg—65 to 70 inches; light gray (10YR 7/1) sandy clay loam; common medium prominent strong brown (7.5YR 5/8) and red (2.5YR 4/6) mottles; massive; firm, sticky and plastic; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction is extremely acid to strongly acid throughout, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 4 to 6. It is sandy loam, fine sandy loam, or loamy sand.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 to 8. It has low-chroma mottles

within a depth of 18 to 30 inches. It is sandy clay, sandy clay loam, sandy loam, loam, or clay loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2, or it is mottled in shades of these colors. It is sandy clay loam, sandy loam, loam, or clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2, or it is mottled in shades of these colors. It is dominantly sandy clay loam, loam, clay loam, or sandy loam but can include stratified loamy, sandy, or clayey Coastal Plain sediments.

Grantham Series

The Grantham series consists of very deep, poorly drained soils in the uplands on the Coastal Plain. These soils formed in loamy marine sediments having a high content of silt. Slopes range from 0 to 2 percent.

Typical pedon of Grantham silt loam; about 2 miles south-southeast of Selma; about 5,600 feet northeast of the junction of U.S. Highway 70 and Secondary Road 2305 and about 2,300 feet southeast from the fire tower along Secondary Road 2305, in a forested area (State plane coordinates 2,216,600 feet E., 639,200 feet N.):

O—2 inches to 0; undecomposed or partially decomposed leaves, twigs, and roots; abrupt smooth boundary.

A—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable, slightly sticky and nonplastic; few fine, medium, and coarse roots; very strongly acid; clear smooth boundary.

BEg—4 to 11 inches; light brownish gray (2.5Y 6/2) silt loam; common fine distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and nonplastic; few fine and medium roots; very strongly acid; gradual smooth boundary.

Btg1—11 to 24 inches; light brownish gray (2.5Y 6/2) loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to weak fine subangular blocky; friable, slightly sticky and slightly plastic; few fine and medium roots; few faint clay films on faces of peds; dense, red (2.5YR 4/8) vertical accumulations of iron 0.5 inch to 2.0 inches wide and 10 to 20 inches apart; very strongly acid; gradual smooth boundary.

Btg2—24 to 61 inches; gray (2.5Y 6/1) loam; many medium prominent strong brown (7.5YR 5/6) and common medium distinct gray (10YR 5/1) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; dense, red (2.5YR 4/8) vertical accumulations of iron 1 to 4 inches wide and 10 to 20 inches apart extending from the Btg1 horizon; few fine and medium roots; very strongly acid; gradual smooth boundary.

Btg3—61 to 85 inches; gray (10YR 5/1) clay loam; common coarse prominent brownish yellow (10YR 6/8) and strong brown (7.5YR 5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable, sticky and plastic; common distinct clay films on faces of peds; few fine roots; very strongly acid; gradual smooth boundary.

Cg—85 to 94 inches; light brownish gray (2.5Y 6/2) clay; many coarse distinct brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) mottles; massive; very firm, sticky and plastic; few fine roots; few vertical cracks filled with gray (10YR 5/1) clay and silty clay; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction is extremely acid to strongly acid throughout the profile, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2.

The BEg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It has mottles in shades of brown or yellow. It is loam or silt loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It has mottles in shades of red, gray, brown, or yellow. It is silt loam, loam, silty clay loam, or clay loam. In the upper 20 inches, it contains more than 30 percent silt and the texture of the sand fraction is dominantly very fine.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It has mottles in shades of brown, yellow, red, or gray. It is clay loam, coarse sandy loam, gravelly coarse sandy loam, gravelly loamy coarse sand, or clay.

Lakeland Series

The Lakeland series consists of very deep, excessively drained soils on uplands and stream terraces. These soils formed in eolian sands derived from sandy alluvium. Slopes range from 0 to 6 percent.

Typical pedon of Lakeland sand, 0 to 6 percent slopes; about 1.6 miles northwest of the junction of Secondary Roads 1143 and 1009 and about 100 feet northwest of a farm path, in a wooded area (State plane coordinates 2,201,800 feet E., 595,800 feet N.):

Ap—0 to 6 inches; dark brown (10YR 4/3) sand; weak fine granular structure; very friable; many fine and medium tree and shrub roots; moderately acid; clear smooth boundary.
C1—6 to 13 inches; yellowish brown (10YR 5/8) sand; single grained; loose; few fine and medium tree and shrub roots; moderately acid; gradual smooth boundary.
C2—13 to 48 inches; strong brown (7.5YR 5/6) sand; single grained; loose; few fine and medium tree and shrub roots; moderately acid; gradual smooth boundary.
C3—48 to 73 inches; pale yellow (2.5Y 7/4) sand; single grained; loose; moderately acid.

The deep sandy layers are more than 80 inches thick. Reaction is very strongly acid to moderately acid throughout the profile, except where the surface layer has been limed. Most of the sand grains between a depth of 10 and 40 inches are coated.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3.

The C horizon has hue of 7.5YR, value of 5 or 6, and chroma of 6 to 8; hue of 10YR, value of 4 to 7, and chroma of 3 to 8; or hue of 2.5Y, value of 7 or 8, and chroma of 4 to 8.

Leaf Series

The Leaf series consists of very deep, poorly drained soils on old stream terraces. These soils formed in clayey and loamy alluvial sediments. Slopes range from 0 to 2 percent.

Typical pedon of Leaf silt loam; about 1.8 miles southwest of the junction of Secondary Road 1007 and Secondary Road 2543 and about 600 feet northwest of a slough in a bottom along the Neuse River (State plane coordinates 2,222,000 feet E., 600,500 feet N.):

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable, slightly sticky and slightly plastic; many fine and medium roots; very strongly acid; clear smooth boundary.
BEg—4 to 7 inches; light gray (10YR 7/2) silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak coarse granular structure; friable, slightly sticky and slightly plastic; few medium and fine roots; very strongly acid; clear wavy boundary.
Btg1—7 to 17 inches; grayish brown (10YR 5/2) clay; many medium distinct yellowish brown (10YR 5/8) mottles in ped interiors; weak medium prismatic structure parting to moderate medium and coarse angular blocky; firm, sticky and plastic; common distinct continuous clay films on faces of peds; few medium and fine roots; very strongly acid; gradual smooth boundary.
Btg2—17 to 39 inches; light brownish gray (2.5Y 6/2) clay; many medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium angular blocky structure; firm, sticky and plastic; many distinct clay films on faces of peds; few medium and fine roots; very strongly acid; gradual smooth boundary.
Btg3—39 to 54 inches; mottled light brownish gray (2.5Y 6/2) and strong brown (7.5YR 5/8) clay; weak medium subangular blocky structure; firm, sticky and plastic; many distinct clay films on faces of peds; few fine roots; extremely acid; clear smooth boundary.
Btg4—54 to 67 inches; light gray (2.5Y 7/2) clay; common fine distinct brownish yellow (10YR 6/8) mottles; weak medium and coarse angular blocky structure; firm, sticky and slightly plastic; common distinct clay films on faces of peds; few fine roots; extremely acid; gradual smooth boundary.
Cg—67 to 75 inches; light gray (5Y 7/2) clay loam; common medium distinct light olive brown (2.5Y 5/6) mottles; massive; firm, sticky and slightly plastic; few faint clay films along root channels; few fine roots; extremely acid.

The thickness of the solum is 60 inches or more. Reaction is extremely acid or very strongly acid throughout the profile, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The BEg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of red, yellow, or brown. It is clay, silty clay, or silty clay loam with thin layers or lenses of clay loam.

The Cg horizon has hue of 2.5Y or 5Y, value of 4 to 7, and chroma of 1 or 2. It is mottled in shades of these colors. It is clay loam, loam, silty clay loam, or fine sandy loam.

Lynchburg Series

The Lynchburg series consists of very deep, somewhat poorly drained soils in the uplands on the Coastal Plain. These soils formed in loamy marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Lynchburg sandy loam; about 4.3 miles southeast of Smithfield; about 1,450 feet southeast of the junction of Secondary Roads 1007 and 2508, about 200 feet northeast of Secondary Road 1007, and 20 feet east of a field ditch (State plane coordinates 2,208,900 feet E., 624,500 feet N.):

Ap—0 to 7 inches; very dark gray (10YR 3/1) sandy loam; weak medium granular structure; very friable; common fine roots; common fine and very fine pores; strongly acid; abrupt smooth boundary.
Bt—7 to 16 inches; light yellowish brown (2.5Y 6/4) sandy loam; many medium faint light brownish gray (2.5Y 6/2) and common medium distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine and very fine pores; very strongly acid; gradual irregular boundary.
Btg1—16 to 54 inches; light gray (10YR 6/1) sandy loam; many coarse prominent yellowish brown (10YR 5/8) and common fine prominent red (2.5YR 4/6) vertically oriented mottles; few fine distinct very dark gray (10YR 3/1) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable, slightly sticky and slightly plastic; few very fine, fine, and medium pores; more clayey and slightly denser in brown vertical zones than in gray zones; very strongly acid; gradual irregular boundary.
Btg2—54 to 71 inches; light brownish gray (10YR 6/2) sandy clay loam; many coarse prominent brownish yellow (10YR 6/8) and yellowish brown (10YR 5/8) vertically oriented mottles and common fine distinct very dark gray (10YR 3/1) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable, sticky and plastic; more clayey and denser in brown vertical zones than in gray zones; very strongly acid; gradual irregular boundary.
Cg—71 to 82 inches; light gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; friable and firm, slightly sticky and slightly plastic; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction is extremely acid to strongly acid throughout the profile, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It has mottles in shades of red, brown, yellow, or gray. It is sandy loam, sandy clay loam, loam, fine sandy loam, or clay loam.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of red, yellow, brown, or gray. It is dominantly sandy loam, sandy clay loam, loam, fine sandy loam, or clay loam. In some pedons it is sandy clay or clay below a depth of 40 inches.

The C horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It has mottles in shades of red, brown, yellow, or gray. It commonly is stratified sandy clay loam, sandy clay, sandy loam, or sand. In some pedons it is clay loam or clay.

Marlboro Series

The Marlboro series consists of very deep, well drained soils on broad interstream divides in the uplands on the Coastal Plain. These soils formed in loamy and clayey marine sediments. Slopes range from 0 to 8 percent.

Typical pedon of Marlboro sandy loam, 0 to 2 percent slopes; about 3 miles northeast of Selma; about 1,520 feet south-southwest of the junction of Secondary Roads 2331 and 2330 and 260 feet west of Secondary Road 2331 (State plane coordinates 2,225,800 feet E., 656,400 feet N.):

Ap—0 to 5 inches; dark brown (10YR 4/3) sandy loam; weak fine subangular blocky structure; very friable, slightly sticky and nonplastic; few very fine, fine, medium, and coarse roots; many fine pores; very strongly acid; abrupt wavy boundary.
Bt1—5 to 13 inches; strong brown (7.5YR 5/6) sandy clay; weak medium subangular blocky structure; friable, sticky and slightly plastic; common very fine and fine roots; common medium and few coarse tubular pores; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.
Bt2—13 to 28 inches; yellowish brown (10YR 5/8) sandy clay; weak medium subangular blocky structure; friable, sticky and slightly plastic; common very fine and fine roots; common medium and few coarse tubular pores; few faint clay films on faces of peds; very strongly acid; diffuse smooth boundary.
Bt3—28 to 39 inches; yellowish brown (10YR 5/6) sandy clay; common medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; common medium and few coarse tubular pores; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.
Bt4—39 to 50 inches; mottled yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) sandy clay; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; common very fine and fine tubular pores; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.
Bt5—50 to 62 inches; mottled strong brown (7.5YR 5/8), red (2.5YR 4/6), and light gray (10YR 7/1) sandy

clay; weak medium angular blocky structure; friable in brown and gray material and firm in red material, sticky and slightly plastic; few very fine tubular pores; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

C—62 to 73 inches; mottled red (10YR 4/6), strong brown (7.5YR 5/8), and light gray (10YR 7/1) sandy clay loam; massive; firm in brown and gray material and brittle in red material, sticky and plastic; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction is very strongly acid to slightly acid in the A horizon, except where the surface layer has been limed, and very strongly acid to moderately acid in the B and C horizons.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 5. It is sandy loam or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of brown or red. In some pedons it is mottled in shades of red, yellow, brown, or gray below a depth of about 50 inches. It is sandy clay, clay loam, or clay.

The BC horizon, if it occurs, has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. It is mottled in shades of red, brown, or gray. In some pedons it contains plinthite.

The C horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 8, or it is reticulately mottled in shades of red, brown, or gray. It is sandy clay loam, sandy clay, or clay.

Nahunta Series

The Nahunta series consists of very deep, somewhat poorly drained soils in the uplands on the Coastal Plain. These soils formed in loamy and silty marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Nahunta silt loam; about 5 miles southeast of Smithfield; about 1,300 feet west of the junction of Secondary Road 2514 and Secondary Road 2515 and about 50 feet northwest of Secondary Road 2514, in a field (State plane coordinates 2,215,800 feet E., 622,000 feet N.):

Ap—0 to 6 inches; dark gray (10YR 4/1) silt loam; common medium pockets of light yellowish brown (2.5Y 6/4) material; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; common fine and very fine pores; strongly acid; abrupt wavy boundary.

Bt1—6 to 12 inches; light yellowish brown (2.5Y 6/4) loam; common fine and medium distinct yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; common fine roots; few root channels filled with material from the Ap horizon; common fine and medium pores; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—12 to 24 inches; yellowish brown (10YR 5/6) clay loam; many medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; few fine and medium pores; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg1—24 to 52 inches; gray (10YR 6/1) clay loam; common medium distinct light brownish yellow (10YR 6/4), common medium prominent red (2.5YR 4/8), and few medium distinct strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable, sticky and plastic; few fine roots in gray zones; few fine and medium pores; few faint clay films on faces of peds; denser and firmer in brown and red vertical zones than in gray zones; very strongly acid; gradual smooth boundary.

Btg2—52 to 75 inches; light brownish gray (10YR 6/2) silty clay loam; common coarse distinct brownish yellow (10YR 6/6) and common medium distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, sticky and plastic; few faint clay films on faces of peds; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. Reaction is extremely acid to strongly acid throughout, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It has mottles in shades of gray or brown. It is loam, clay loam, or silty clay loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 8. It has mottles in shades of brown, yellow, or red. It is clay loam or silty clay loam.

Nankin Series

The Nankin series consists of very deep, well drained soils in the uplands on the Coastal Plain. These soils formed in loamy and clayey marine sediments. Slopes range from 2 to 6 percent.

Typical pedon of Nankin fine sandy loam, 2 to 6 percent slopes; about 9 miles north of Benson; about 1,600 feet east of the junction of North Carolina Highway 50 and Secondary Road 1322 and about 100 feet south of Secondary Road 1322, in a field (State plane coordinates 2,129,300 feet E., 633,400 feet N.):

Ap—0 to 6 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; very friable; few fine roots; neutral; abrupt smooth boundary.

E—6 to 9 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; very friable; few fine roots; neutral; clear smooth boundary.

Bt1—9 to 24 inches; yellowish red (5YR 5/8) sandy clay; few medium prominent brownish yellow (10YR 6/6) mottles; weak fine and medium subangular blocky structure; friable, sticky and slightly plastic; few fine flakes of mica; few distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—24 to 36 inches; strong brown (7.5YR 5/8) sandy clay; common medium distinct brownish yellow (10YR 6/8) mottles; firm, sticky and plastic; few fine flakes of mica; few distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—36 to 50 inches; strong brown (7.5YR 5/8) sandy clay loam; many medium and coarse distinct brownish yellow (10YR 6/6) and common fine prominent light gray (10YR 7/1) mottles; weak coarse subangular blocky structure; friable, sticky and slightly plastic; few fine flakes of mica; common distinct clay films on faces of peds; very strongly acid; diffuse smooth boundary.

C—50 to 63 inches; mottled brownish yellow (10YR 6/6), strong brown (7.5YR 5/8), and light gray (10YR 7/1) sandy clay loam; massive; friable, sticky and slightly plastic; few fine flakes of mica; very strongly acid.

The thickness of the solum is 40 inches or more. Reaction is strongly acid or very strongly acid throughout the profile, except where the surface layer has been limed.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 1 to 4. The E horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8 and has mottles in shades of yellow, brown, or red. In the lower part, it also has gray mottles. It is sandy clay or sandy clay loam.

The BC horizon, if it occurs, has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8, or it is mottled in shades these colors. It is sandy clay loam or sandy loam.

The C horizon has hue of 2.5YR, value of 4 to 7, and chroma of 1 to 8, or it is mottled in shades of these colors. It is sandy clay loam or sandy loam.

Nason Series

The Nason series consists of deep, well drained soils on south-facing side slopes of stream valleys in the uplands on the Piedmont. These soils formed in loamy and clayey material weathered from slate and phyllite. Slopes range from 2 to 25 percent.

Typical pedon of Nason silt loam, 2 to 8 percent slopes; about 8 miles north of Kenly near Crockers Nub Crossroads; about 3,200 feet northeast of the intersection of Secondary Roads 2110 and 2111 and down a farm path, in a wooded area (State plane coordinates 2,244,200 feet E., 713,600 feet N.):

A—0 to 4 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable, slightly sticky and nonplastic; few pebbles; strongly acid; abrupt wavy boundary.

Bt1—4 to 16 inches; strong brown (7.5YR 5/6) silty clay; weak medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; few pebbles; strongly acid; gradual wavy boundary.

Bt2—16 to 35 inches; yellowish red (5YR 5/8) silty clay; weak medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—35 to 45 inches; yellowish red (5YR 5/8) silty clay loam having variegated streaks of loamy saprolite material; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; strongly acid; clear wavy boundary.

C—45 to 56 inches; multicolored pink, purple, brown, and white saprolite that has a texture of silt loam; massive; friable, slightly sticky and slightly plastic; very strongly acid; clear wavy boundary.

Cr—56 to 60 inches; soft, weathered, multicolored phyllite that has a texture of silt loam; very strongly acid.

The thickness of the solum ranges from 25 to 50 inches. Depth to the Cr horizon is 40 to 60 inches. Reaction is strongly acid or very strongly acid throughout, except where the surface layer has been limed.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. The E horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 2 to 5. It is silt loam or loam.

The Bt horizon has hue of 5YR to 10YR, value of 4

to 6, and chroma of 4 to 8. It is silty clay loam, silty clay, or clay loam.

The BC horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is silt loam or silty clay loam.

The C horizon is soft, multicolored saprolite in shades of red, yellow, brown, pink, purple, and white. It is silt loam, loam, silty clay loam, or the channery analogs of those textures.

The Cr horizon is a multicolored mixture of hard, platy rock fragments and crushable fragments. The crushable material has a texture of silt loam or silty clay loam.

Norfolk Series

The Norfolk series consists of very deep, well drained soils on broad interstream divides in the uplands on the Coastal Plain. These soils formed in loamy marine sediments. Slopes range from 0 to 6 percent.

Typical pedon of Norfolk loamy sand, 0 to 2 percent slopes; about 6 miles southeast of Benson; about 1,400 feet northwest of the junction of Secondary Roads 1112 and 1105, in a cultivated field (State plane coordinates 2,150,800 feet E., 571,000 feet N.):

Ap—0 to 9 inches; brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; common fine roots; moderately acid; abrupt wavy boundary.

E—9 to 14 inches; light yellowish brown (2.5Y 6/4) loamy sand; weak fine granular structure; very friable; few very fine roots; moderately acid; clear smooth boundary.

Bt1—14 to 26 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; common fine and very fine pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—26 to 41 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few very fine roots; common fine and very fine pores; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—41 to 58 inches; yellowish brown (10YR 5/6) sandy clay loam; many medium distinct yellowish red (5YR 5/6) and red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few very fine and medium pores; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC—58 to 70 inches; mottled yellowish red (5YR 5/6) and yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few very fine pores; few nodules of plinthite; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction is extremely acid to strongly acid throughout, except where the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 6. It is loamy sand, sandy loam, or fine sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 3 to 8. It is dominantly sandy clay loam. In some pedons it is clay loam below a depth of 40 inches. In the lower part, it has mottles in shades of red, brown, yellow, or gray. In some pedons it has as much as 5 percent firm, brittle nodules of plinthite.

The BC horizon has hue of 5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8, or it is mottled in shades of these colors. It is sandy clay loam, clay loam, sandy clay, or clay.

The C horizon has hue of 2.5YR to 5Y, value of 4 to 8, and chroma of 1 to 8, or it is mottled in shades of these colors. Texture ranges from sand to clay.

Pacolet Series

The Pacolet series consists of very deep, well drained soils on hillslopes on the Piedmont. These soils formed in loamy and clayey material weathered from schist and gneiss. Slopes range from 10 to 25 percent.

Typical pedon of Pacolet loam, 10 to 15 percent slopes; about 2 miles north of Wilsons Mill; about 2,450 feet east of the junction of Secondary Roads 1904 and 1903 and 600 feet north of Secondary Road 1904, in a cutover wooded area (State plane coordinates 2,192,600 feet E., 676,700 feet N.):

A—0 to 5 inches; dark reddish brown (5YR 3/3) loam; weak medium granular structure; friable, slightly sticky and slightly plastic; about 12 percent quartz pebbles; many fine and medium roots; moderately acid; clear smooth boundary.

Bt1—5 to 13 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; friable, sticky and plastic; common distinct clay films on faces of peds; few fine and medium roots; about 10 percent quartz pebbles; moderately acid; clear smooth boundary.

Bt2—13 to 25 inches; red (2.5YR 4/6) clay; weak medium subangular blocky structure; friable, sticky and plastic; common distinct clay films on faces of

peds; few fine and medium roots; strongly acid; gradual smooth boundary.

BC—25 to 35 inches; mottled reddish brown (5YR 4/4), reddish yellow (7.5YR 6/8), and weak red (10R 4/4) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; strongly acid; gradual smooth boundary.

C—35 to 60 inches; mottled weak red (10YR 4/4), reddish yellow (7.5YR 6/8), and reddish brown (5YR 4/4) loam; massive; friable, slightly sticky and slightly plastic; strongly acid.

The thickness of the solum ranges from 20 to 40 inches. Reaction is very strongly acid to moderately acid throughout, except where the surface layer has been limed.

The A horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 to 4.

The Bt horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It has mottles in shades of yellow or brown. It is clay loam or clay. In the upper 20 inches, it has more than 35 percent clay.

The BC horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8. It has mottles in shades of red, brown, or yellow. It is clay loam, sandy clay loam, or loam.

The C horizon has colors similar to those of the BC horizon, or it is multicolored saprolite. Texture is loam or clay loam.

Pantego Series

The Pantego series consists of very deep, very poorly drained soils on stream terraces. These soils formed in loamy alluvial sediments. Slopes are less than 2 percent.

Typical pedon of Pantego loam, occasionally flooded; about 1.5 miles north of the Bentonville Community Building; from the intersection of Secondary Roads 1198 and 1199, about 3,340 feet north on Secondary Road 1198 and about 2,800 feet east of the intersection of a farm road and Secondary Road 1198 (State plane coordinates 2,214,600 feet E., 586,100 feet N.):

A1—0 to 14 inches; black (10YR 2/1) loam; weak very fine granular structure; friable, slightly sticky and slightly plastic; moderately acid; gradual smooth boundary.

A2—14 to 26 inches; black (10YR 2/1) loam; weak very fine granular structure; friable, slightly sticky and slightly plastic; strongly acid; gradual smooth boundary.

Btg1—26 to 38 inches; dark gray (10YR 4/1) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg2—38 to 64 inches; dark gray (10YR 4/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and slightly plastic; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

BCg—64 to 72 inches; dark grayish brown (10YR 4/2) sandy loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. Reaction is extremely acid to strongly acid throughout the profile, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It has mottles in shades of brown or yellow. It is sandy clay loam, clay loam, or sandy loam.

The BCg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is sandy loam or sandy clay loam.

The Cg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of brown, yellow, or gray. It is sandy clay loam, clay loam, sandy loam, or loamy sand.

Rains Series

The Rains series consists of very deep, poorly drained soils in broad interstream areas on the Coastal Plain. These soils formed in loamy marine sediments. Slopes are less than 2 percent.

Typical pedon of Rains sandy loam; about 3.4 miles north of Selma; about 1,100 feet northwest of the intersection of North Carolina Highway 39 and Secondary Road 1935, in a wooded area (State plane coordinates 2,217,300 feet E., 670,400 feet N.):

Ap—0 to 5 inches; gray (10YR 5/1) sandy loam; weak medium granular structure; friable, slightly sticky and slightly plastic; many fine and medium roots; slightly acid; clear smooth boundary.

Btg1—5 to 10 inches; brownish gray (10YR 6/2) sandy clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine and medium roots; common fine and medium and few coarse pores; few faint clay films

on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—10 to 44 inches; gray (10YR 5/1) sandy clay loam; many medium and coarse distinct yellowish brown (10YR 5/6) and common medium prominent yellowish red (5YR 5/6) vertically aggregated mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable, slightly sticky and slightly plastic; few fine and medium roots in gray zones; common fine and medium pores and few coarse pores in gray zones; few faint clay films on faces of peds; few vertical crawfish holes filled with gray (10YR 5/1) sandy loam; very strongly acid; gradual wavy boundary.

Btg3—44 to 62 inches; dark gray (10YR 4/1) sandy clay; common medium and coarse distinct yellowish brown (10YR 5/6) and common fine prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few vertical crawfish holes filled with dark gray (10YR 4/1) and grayish brown (10YR 5/2) sandy loam; few fine and medium roots; few faint clay films on faces of peds; very strongly acid; diffuse smooth boundary.

BCg—62 to 78 inches; dark gray (10YR 4/1) sandy clay loam; many medium distinct yellow (10YR 7/8) and gray (10YR 6/1) and many medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm, sticky and plastic; very strongly acid; gradual wavy boundary.

Cg—78 to 88 inches; light gray (10YR 7/1) sandy clay loam with few pockets of clay; few medium distinct yellowish brown (10YR 5/6) mottles; massive; friable and firm, sticky and plastic; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction is extremely acid to slightly acid in the A and E horizons, except where the surface layer has been limed, and extremely acid to strongly acid in the B and C horizons.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2, or it is neutral in hue and has value of 2 to 5.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It has mottles in shades of red, brown, yellow, or gray. It is sandy clay loam, clay loam, or sandy loam in the upper part and sandy clay or sandy clay loam in the lower part.

The BCg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 5 to 7. It has mottles in shades of red, brown, yellow, or gray. It is sandy clay loam, sandy clay, or sandy loam.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1, or it is neutral in hue and has value of 5 to 7. Texture ranges from sand to sandy clay.

Rion Series

The Rion series consists of very deep, well drained soils on steep, highly dissected uplands on the Piedmont. These soils formed in material weathered from felsic rock. Slopes range from 15 to 40 percent.

Typical pedon of Rion sandy loam, 15 to 40 percent slopes; about 3.5 miles west of Archer Lodge; about 0.7 mile on Secondary Road 1714 from the intersection of Secondary Roads 1700 and 1714 and about 700 feet northeast of the road, in a forested area on a tributary of Mark's Arm's Creek (State plane coordinates 2,170,800 feet E., 710,400 feet N.):

A—0 to 8 inches; dark grayish brown (10YR 4/2) sandy loam; weak medium granular structure; very friable; strongly acid; clear smooth boundary.

Bt—8 to 26 inches; strong brown (7.5YR 5/6) sandy clay loam; common distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

BC—26 to 32 inches; strong brown (7.5YR 5/6) sandy loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; common flakes of mica; very strongly acid; gradual smooth boundary.

C—32 to 60 inches; mottled yellowish brown (10YR 5/4) and yellow (10YR 7/6) sandy loam; massive; very friable; many flakes of mica; few angular quartz pebbles; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches. Reaction is very strongly acid to slightly acid throughout the profile, except where the surface layer has been limed.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6. The E horizon, if it occurs, has hue of 10YR, value of 4 to 6, and chroma of 3 to 8. It is sandy loam, loam, or loamy sand.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of brown, red, or gray. It is dominantly sandy clay loam, sandy loam, or clay loam. In some pedons it has thin layers of sandy clay.

The BC horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It has mottles in shades of red, brown, or gray. It is sandy clay loam, clay loam, or sandy loam.

The C horizon has colors similar to those of the BC

horizon, or it is mottled in shades of brown, red, yellow, or white. It is loamy sand, loam, or sandy loam.

Roanoke Series

The Roanoke series consists of very deep, poorly drained soils on stream terraces that are subject to flooding. These soils formed in clayey marine sediments. Slopes are less than 2 percent.

Typical pedon of Roanoke loam, occasionally flooded; about 13 miles southeast of Smithfield; about 500 feet north-northwest from Riverside Church on Secondary Road 1201 and about 100 feet west of Secondary Road 1201, in a wooded area (State plane coordinates 2,236,000 feet E., 585,600 feet N.):

A—0 to 8 inches; very dark gray (10YR 3/1) loam; weak fine and medium granular structure; friable, sticky and slightly plastic; moderately acid; clear smooth boundary.

Btg1—8 to 13 inches; gray (10YR 5/1) clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Btg2—13 to 28 inches; dark gray (10YR 4/1) clay; common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, sticky and plastic; few fine and medium roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—28 to 40 inches; dark gray (10YR 4/1) clay; many coarse distinct light gray (10YR 7/1) and common medium distinct yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, sticky and plastic; few fine and medium roots; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—40 to 55 inches; light gray (10YR 6/1) clay loam; common fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine and medium roots; very strongly acid; gradual smooth boundary.

Cg—55 to 60 inches; light gray (10YR 6/1) sandy loam; few fine distinct brownish yellow (10YR 6/4) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction is extremely acid to strongly acid in the A and B horizons, except where the surface layer has been limed, and extremely acid to slightly acid in the C horizon.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It has mottles in shades of brown, yellow, and red. It is clay loam or clay.

The BCg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It has mottles in shades of brown, yellow, or red. It is clay loam, sandy clay loam, or clay.

The Cg horizon is variable in color and texture. In most pedons it has hue of 10YR, value of 5 or 6, and chroma of 1 or 2 and is mottled in shades of brown or yellow. It is domiantly sandy loam or loam, but in some pedons it is stratified with material ranging in texture from sand to clay.

State Series

The State series consists of very deep, well drained soils on stream terraces. These soils formed in loamy alluvial sediments. Slopes range from 0 to 3 percent.

Typical pedon of State sandy loam, 0 to 3 percent slopes, occasionally flooded; about 12 miles southeast of Smithfield; about 4,340 feet west-northwest from Riverside Church and 575 feet northeast of a farm road, in a field (State plane coordinates 2,235,800 feet E., 583,600 feet N.):

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine granular structure; very friable, slightly sticky and slightly plastic; slightly acid; clear smooth boundary.

Bt1—9 to 22 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—22 to 32 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; gradual smooth boundary.

BC—32 to 40 inches; mottled brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual smooth boundary.

C1—40 to 52 inches; mottled yellowish brown (10YR 5/8) and brownish yellow (10YR 6/6) loamy sand; massive; very friable; very strongly acid; gradual smooth boundary.

C2—52 to 60 inches; yellowish brown (10YR 5/8)

gravelly sand; single grained; loose; very strongly acid.

The thickness of the solum ranges from 30 to 60 inches. Reaction is extremely acid to strongly acid in the A horizon and the upper part of the B horizon, except where the surface layer has been limed, and extremely acid to slightly acid in the lower part of the B horizon and in the C horizon.

The Ap or A horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 2 to 6. The E horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is fine sandy loam or sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, clay loam, or sandy loam.

The BC horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8, or it is mottled in shades of these colors. It is sandy loam or sandy clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 2 to 8, or it is mottled in shades of these colors. It is stratified with loamy sand, sand, sandy loam, or the gravelly analogs of those textures.

Tarboro Series

The Tarboro series consists of very deep, somewhat excessively drained soils on stream terraces. These soils formed in sandy fluvial sediments that contain a significant amount of weatherable minerals. Slopes range from 0 to 2 percent.

Typical pedon of Tarboro loamy sand, rarely flooded; about 10 miles south of Smithfield; about 1.8 miles northeast of the intersection of Secondary Roads 1185 and 1009, in a field (State plane coordinates 2,206,800 feet E., 601,900 feet N.):

Ap—0 to 10 inches; dark brown (10YR 3/3) loamy sand; weak fine granular structure; very friable; common fine roots; moderately acid; abrupt smooth boundary.

C1—10 to 20 inches; dark brown (7.5YR 4/4) loamy sand; single grained; loose; common fine roots; very strongly acid; gradual smooth boundary.

C2—20 to 29 inches; brown (7.5YR 5/4) loamy sand; single grained; friable; few fine roots; very strongly acid; gradual smooth boundary.

C3—29 to 54 inches; brownish yellow (10YR 6/6) loamy sand; single grained; loose; strongly acid; diffuse smooth boundary.

C4—54 to 80 inches; yellowish brown (10YR 5/6) loamy sand; single grained; loose; strongly acid.

The sandy horizons are more than 80 inches thick. Reaction is very strongly acid to slightly acid throughout the profile, except where the surface layer has been limed.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 6.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 3 to 8. It is loamy sand or sand. In many pedons it has coarse sand and gravelly layers below a depth of 40 inches.

Toisnot Series

The Toisnot series consists of poorly drained soils that are moderately deep to a fragipan and very deep over bedrock. These soils are in the uplands on the Coastal Plain. They formed in loamy marine or fluvial sediments. Slopes range from 0 to 2 percent.

Typical pedon of Toisnot loam; about 1 mile northeast of Selma; about 1,200 feet north of the intersection of the Seaboard Coastline Railroad and Secondary Road 2326 and 100 feet south of a farm path (State plane coordinates 2,219,600 feet E., 653,500 feet N.):

A—0 to 4 inches; very dark gray (10YR 3/1) loam; weak coarse granular structure; friable, slightly sticky and slightly plastic; common medium and fine roots; very strongly acid; clear smooth boundary.

Eg/A—4 to 8 inches; grayish brown (10YR 5/2) loam; many medium distinct very dark gray (10YR 3/1) pockets of material from the A horizon; weak medium granular structure; friable, slightly sticky and slightly plastic; few fine and medium roots; very strongly acid; clear smooth boundary.

Btg1—8 to 18 inches; light brownish gray (10YR 6/2) loam; many coarse faint grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/8) mottles; weak fine and medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; very strongly acid; clear irregular boundary.

Btg2—18 to 30 inches; light brownish gray (10YR 6/2) loam; many coarse distinct yellowish brown (10YR 5/8) and common fine distinct dark brown (7.5YR 4/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; very strongly acid; clear wavy boundary.

Exg1—30 to 40 inches; light gray (10YR 7/2) fine sandy loam; many medium distinct light brownish gray (10YR 6/2) mottles; weak medium and coarse subangular blocky structure; hard and brittle, very firm; strongly acid; gradual smooth boundary.

Exg2—40 to 58 inches; about 65 percent light gray (10YR 7/1) fine sandy loam; common fine distinct yellowish brown (10YR 5/8) mottles; weak very

coarse prismatic structure parting to weak coarse subangular blocky; hard and brittle, very firm; about 35 percent light gray (10YR 7/2) loam; common fine distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; strongly acid; gradual smooth boundary.

Cg—58 to 65 inches; light gray (10YR 7/1) sandy loam; common medium distinct brownish yellow (10YR 6/6) mottles; massive; friable; strongly acid.

The thickness of the solum is more than 40 inches. Depth to the fragipan ranges from 20 to 40 inches. Reaction is extremely acid to strongly acid throughout the profile, except where the surface layer has been limed.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The Eg part of the Eg/A horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is loam, silt loam, sandy loam, or loamy sand. The A part has colors and texture similar to those of the A horizon.

The Btg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It has mottles in shades of gray, yellow, or brown. It is loam, sandy loam, or sandy clay loam.

The Exg horizon has hue of 10YR, value of 7, and chroma of 1 or 2. It is sandy loam, fine sandy loam, loam, or loamy sand. It is hard and brittle in 60 percent or more of the volume.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is sandy loam, sandy clay loam, or clay loam.

Tomotley Series

The Tomotley series consists of very deep, poorly drained soils on stream terraces on the Coastal Plain. These soils formed in loamy fluvial sediments. Slopes range from 0 to 2 percent.

Typical pedon of Tomotley sandy loam, rarely flooded; about 6 miles southwest of Willow Springs; about 1,600 feet northwest of the intersection of Secondary Roads 1309 and 1313, in a wooded area (State plane coordinates 2,115,400 feet E., 632,300 feet N.):

A—0 to 8 inches; grayish brown (10YR 5/2) sandy loam; weak fine granular structure; very friable, nonsticky and nonplastic; very strongly acid; abrupt smooth boundary.

Btg1—8 to 20 inches; gray (10YR 6/1) sandy clay loam; common fine distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—20 to 40 inches; gray (10YR 6/1) sandy clay loam; many medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; clear smooth boundary.

Cg—40 to 60 inches; gray (N 6/0) sand; single grained; loose, nonsticky and nonplastic; very strongly acid.

The thickness of the solum ranges from 30 to more than 60 inches. Reaction ranges from extremely acid to strongly acid in the A and B horizons, except where the surface layer has been limed, and from extremely acid to moderately acid in the C horizon.

The Ap or A horizon has hue of 10YR, value of 2 to 4, chroma of 1 or 2.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It has mottles in shades of gray, yellow, brown, or red. It is sandy clay loam, clay loam, loam, or sandy loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 6 or 7. In some pedons it has mottles in shades of yellow, olive, and gray. It is sand or loamy sand. In some pedons it is stratified with loamy material.

Uchee Series

The Uchee series consists of very deep, well drained soils on side slopes and in upland areas on the Coastal Plain. These soils formed in unconsolidated marine and fluvial sediments. Slopes range from 2 to 12 percent.

Typical pedon of Uchee loamy coarse sand, 2 to 6 percent slopes; about 4 miles north of Benson; about 3,000 feet southwest from the intersection of North Carolina Highway 50 and Secondary Road 1168, in a field (State plane coordinates 2,127,200 feet E., 610,800 feet N.):

Ap—0 to 10 inches; grayish brown (10YR 5/2) loamy coarse sand; weak fine granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.

E1—10 to 17 inches; light yellowish brown (10YR 6/4) loamy coarse sand; weak fine granular structure; very friable; about 10 percent fine gravel; strongly acid; clear smooth boundary.

E2—17 to 30 inches; light yellowish brown (10YR 6/4) loamy coarse sand; weak fine granular structure; very friable; about 10 percent fine gravel; very strongly acid; clear wavy boundary.

Bt—30 to 41 inches; yellowish brown (10YR 5/6) sandy

clay loam; common medium prominent red (10R 4/8) and common medium distinct pale yellow (2.5Y 7/4) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; common faint clay films on faces of peds; about 10 percent fine gravel; very strongly acid; clear smooth boundary.

BC—41 to 53 inches; mottled yellowish brown (10YR 5/8), red (10R 4/6), and pale yellow (2.5Y 7/4) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; about 5 percent fine gravel; very strongly acid; gradual wavy boundary.

C—53 to 60 inches; mottled red (2.5YR 5/6), light gray (10YR 7/2), and brownish yellow (10YR 6/6) sandy clay loam; massive; friable, slightly sticky and slightly plastic; very strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction is strongly acid or very strongly acid throughout the profile, except where the surface layer has been limed. The content of rock fragments ranges from 0 to 15 percent.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The E horizon has hue of 10YR and value and chroma of 4 to 6. It is loamy coarse sand, sand, or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. It has mottles in shades of brown, yellow, or red. It is sandy clay loam, sandy clay, clay loam, or clay.

The BC horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 4 to 8. It is mottled in shades of brown, yellow, red, and gray. It is sandy clay loam. In some pedons it has thin layers of sandy loam, sandy clay, clay loam, or clay.

The C horizon is mottled in shades of yellow, brown, red, and gray. It is sandy clay loam or sandy loam. In some pedons it is stratified with loamy and clayey material.

Udorthents

Udorthents consist of areas where the natural soil has been altered by excavation or covered by earthy fill material. These areas are well drained or moderately well drained. The excavated areas mainly are borrow pits from which the soil has been removed and used as foundation material for roads or buildings. In excavated areas, the exposed substratum ranges in texture from sand to clay. The fill areas are sites where at least 20 inches of sandy, loamy, or clayey, earthy fill material covers borrow pits, landfills, natural drainageways, or low areas. Slopes range from nearly level to steep, and some areas are undulating.

A typical pedon is not given for these soils because of their variability. Most areas are deep or very deep over bedrock, but some areas, particularly borrow areas, are moderately deep or shallow over bedrock. The fill areas are more than 20 inches deep and as thick as 30 feet in places. Landfills have layers of material other than soil covered by loamy soil material.

Udorthents have colors in shades of red, brown, yellow, and gray. Texture is variable but typically is loamy. Reaction ranges from extremely acid to slightly acid.

Vance Series

The Vance series consists of very deep, well drained soils on ridges and side slopes on the Piedmont. These soils formed in material weathered from felsic rocks, mostly granite. Slopes range from 2 to 8 percent.

Typical pedon of Vance coarse sandy loam, 2 to 8 percent slopes; near Clyde's Chapel Church about 3 miles north of Archer Lodge near the Wake County line; about 2,350 feet north-northeast of the junction of Secondary Roads 1718 and 1717 (State plane coordinates 2,185,300 feet E., 728,300 feet N.):

Ap—0 to 8 inches; yellowish brown (10YR 5/4) coarse sandy loam; weak medium granular structure; very friable; moderately acid; abrupt smooth boundary.

Bt1—8 to 24 inches; yellowish brown (10YR 5/8) clay; common medium distinct red (2.5YR 5/6) mottles; weak coarse prismatic structure parting to moderate coarse angular blocky; firm, sticky and plastic; common distinct clay films on faces of peds; common fine flakes of mica; very strongly acid; gradual smooth boundary.

Bt2—24 to 32 inches; yellowish brown (10YR 5/8) clay; common medium distinct red (2.5YR 5/6) mottles; moderate medium angular blocky structure; firm, sticky and plastic; many distinct clay films on faces of peds; many fine and very fine flakes of mica; very strongly acid; clear wavy boundary.

C—32 to 60 inches; multicolored yellowish brown (10YR 5/8), very pale brown (10YR 7/3), and yellow (10YR 7/8) clay loam; massive; friable; many very fine to coarse flakes of mica; very strongly acid.

The thickness of the solum ranges from 24 to 40 inches. Reaction is very strongly acid to moderately acid in the A horizon, except where the surface layer has been limed, and very strongly acid or strongly acid in the B and C horizons.

The Ap horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 6.

The Bt horizon has hue of 5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It has mottles in shades of red,

brown, and yellow. It is clay loam, sandy clay, or clay.

The C horizon is multicolored saprolite that has a texture of clay loam, sandy clay loam, loam, or sandy loam.

Varina Series

The Varina series consists of very deep, well drained soils in broad upland areas on the Coastal Plain. These soils formed in loamy and clayey marine sediments. Slopes range from 0 to 6 percent.

Typical pedon of Varina loamy sand, 0 to 2 percent slopes; about 3 miles north of Benson; about 0.7 mile south of the junction of North Carolina Highway 50 and Secondary Road 1308, about 0.3 mile north of North Carolina Highway 50, along a farm lane, and 78 feet west of the farm lane (State plane coordinates 2,129,500 feet E., 616,200 feet N.):

Ap—0 to 7 inches; grayish brown (2.5Y 5/2) loamy sand; common coarse distinct pale yellow (2.5Y 7/4) mottles; weak fine granular structure; very friable; few or common fine very hard sesquioxide nodules that have dark red (10R 3/6) interiors; moderately acid; abrupt wavy boundary.

E—7 to 14 inches; pale yellow (2.5Y 7/4) loamy sand; single grained; loose; few fine very hard sesquioxide nodules that have dark red (10R 3/6) interiors; strongly acid; abrupt wavy boundary.

Bt1—14 to 18 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium pores; few fine very hard sesquioxide nodules; few fine quartz pebbles; strongly acid; clear smooth boundary.

Bt2—18 to 26 inches; yellowish brown (10YR 5/6) sandy clay; weak medium subangular blocky structure; friable, sticky; common fine and medium pores; few fine extremely hard sesquioxide nodules; few fine quartz pebbles; very strongly acid; clear smooth boundary.

Bt3—26 to 32 inches; brownish yellow (10YR 6/6) sandy clay; weak medium subangular blocky structure; friable, sticky; few faint clay films on faces of peds; few fine soft red nodules; few fine hard sesquioxide nodules; few fine quartz pebbles; very strongly acid; clear smooth boundary.

Bt4—32 to 38 inches; brownish yellow (10YR 6/6) sandy clay; weak medium subangular blocky structure; friable, sticky; few faint clay films on faces of peds; few fine soft red nodules; few fine hard sesquioxide nodules; few fine quartz pebbles; very strongly acid; clear smooth boundary.

Bt5—38 to 57 inches; mottled yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) sandy clay; weak coarse subangular blocky structure; friable; common medium and coarse soft red (2.5YR 4/8) nodules; few or common tongues of white (10YR 8/2) to light gray (10YR 7/1) material 0.5 inch in diameter; few faint clay films on red nodules; few hard sesquioxide nodules; few fine quartz pebbles; very strongly acid; gradual smooth boundary.

Btv1—57 to 67 inches; mottled red (2.5YR 4/8), yellow (10YR 7/8), and white (2.5Y 8/2) sandy clay; weak thick platy structure; firm; about 30 percent red plinthite that is hard and brittle; common distinct clay films in yellow and white parts; few hard sesquioxide nodules in red material; few quartz pebbles; very strongly acid; gradual smooth boundary.

Btv2—67 to 81 inches; reticulately mottled white (2.5Y 8/2), red (2.5YR 4/8), and yellow (10YR 7/8) sandy clay; weak thick platy structure; friable, slightly brittle in white part; few distinct clay films in white and yellow parts; about 10 percent plinthite; few fine and medium quartz pebbles; very strongly acid; gradual wavy boundary.

BC—81 to 100 inches; reticulately mottled red (2.5YR 4/8), yellow (10YR 7/8), and white (2.5Y 8/2) sandy clay loam; sandy loam in red parts, sandy clay in white parts; weak thick platy structure; friable; few distinct clay films along borders of white parts; few fine to medium quartz pebbles; very strongly acid; gradual wavy boundary.

C—100 to 118 inches; mottled yellow (10YR 7/8) and white (10YR 8/2) sandy clay loam; few lenses of sandy loam and sandy clay; massive; friable; common fine and medium soft red (2.5YR 4/8) nodules; common fine and medium quartz pebbles; very strongly acid.

The thickness of the solum ranges from 60 to more than 100 inches. Reaction is strongly acid or very strongly acid throughout, except where the surface layer has been limed. The depth to horizons that contain more than 5 percent plinthite ranges from 40 to 60 inches.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3. The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 to 8. It is loamy sand or sandy loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is sandy clay, clay loam, or clay with thin layers of sandy clay loam.

The Btv horizon has colors and texture similar to those of the Bt horizon, but is mottled in shades of red, brown, yellow, gray, and white in a mixed or reticulate pattern. The red mottles are firm or very firm.

The BC horizon has colors similar to those of the Bt

horizon, but is mottled in shades of red, brown, yellow, gray, and white in a mixed or reticulate pattern. It is sandy clay or sandy clay loam.

The C horizon is mottled red, yellow, or gray sandy clay loam with lenses of sandy loam and sandy clay.

Wagram Series

The Wagram series consists of very deep, well drained soils in the uplands on the Coastal Plain. These soils formed in sandy and loamy marine sediments. Slopes range from 0 to 6 percent.

Typical pedon of Wagram loamy sand, 0 to 6 percent slopes; near the Bentonville Community Building; about 670 feet north-northeast of the intersection of Secondary Roads 1009 and 1197 (State plane coordinates 2,210,000 feet E., 582,600 feet N.):

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; many fine and very fine roots; strongly acid; abrupt smooth boundary.

E—10 to 28 inches; light yellowish brown (2.5Y 6/4) loamy sand; single grained; loose; few fine and very fine roots; strongly acid; abrupt smooth boundary.

Bt1—28 to 35 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine and few medium pores; strongly acid; gradual wavy boundary.

Bt2—35 to 64 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct reddish brown (5YR 5/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common very fine and fine and few medium pores; very strongly acid; gradual irregular boundary.

Bt3—64 to 80 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) and few medium prominent red (2.5YR 4/6) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction is very strongly acid to moderately acid throughout the profile, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is loamy sand or loamy fine sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of red and brown in the middle or lower part. It is sandy clay loam or sandy loam.

Wahee Series

The Wahee series consists of very deep, somewhat poorly drained soils on stream terraces. These soils formed in loamy and clayey alluvial deposits. Slopes are less than 2 percent.

Typical pedon of Wahee loam, occasionally flooded; about 6,930 feet east of Hannah's Creek bridge on Secondary Road 1009 and 300 feet west of a woodland road, in a forested area (State plane coordinates 2,213,400 feet E., 589,000 feet N.):

A—0 to 5 inches; brown (10YR 5/3) loam; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; very strongly acid; clear smooth boundary.

BE—5 to 9 inches; pale yellow (2.5Y 7/4) loam; common fine distinct brownish yellow (10YR 6/6) mottles; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; very strongly acid; clear wavy boundary.

Btg1—9 to 26 inches; light brownish gray (2.5Y 6/2) clay; many coarse prominent yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate coarse angular blocky; very firm, sticky and plastic; many distinct clay films on faces of peds; few fine roots; very strongly acid; diffuse smooth boundary.

Btg2—26 to 42 inches; gray (5Y 5/1) clay loam; many medium prominent yellowish brown (10YR 5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak very coarse prismatic structure; very firm, sticky and plastic; common faint light brownish gray (2.5Y 6/2) clay films on faces of peds; few fine roots; extremely acid; gradual smooth boundary.

Cg—42 to 60 inches; light olive gray (5Y 6/2) loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm, slightly sticky and slightly plastic; few fine roots; extremely acid.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction is very strongly acid to moderately acid in the A horizon, except where the surface layer has been limed, and extremely acid to strongly acid in the B and C horizons.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3.

The BE horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. It has mottles in shades of

gray, yellow, brown, or red. It is loam or fine sandy loam.

The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It has mottles in shades of brown, red, or gray. It is clay or clay loam.

The BCg horizon, if it occurs, has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2; is neutral in hue and has value of 5 to 7; or is mottled in shades of these colors. It is clay loam, sandy clay loam, or fine sandy loam. The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is loam, clay loam, sandy loam, or loamy sand.

Wedowee Series

The Wedowee series consists of very deep, well drained soils in upland areas on the Piedmont. These soils formed in material weathered from coarse and medium grained granitic rocks. Slopes range from 2 to 15 percent.

Typical pedon of Wedowee sandy loam, 2 to 8 percent slopes; about 2 miles west of Clayton; about 3,750 feet west of the junction of Secondary Roads 1004 and 1553 and 650 feet south of the Southern Railway tracks, in a field (State plane coordinates 2,151,600 feet E., 698,700 feet N.):

Ap—0 to 9 inches; grayish brown (10YR 5/2) sandy loam; weak fine granular structure; very friable; many fine roots; about 10 percent fine and medium pebbles; moderately acid; abrupt smooth boundary.

BE—9 to 15 inches; strong brown (7.5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; many fine roots; few faint clay films on faces of peds; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bt1—15 to 28 inches; strong brown (7.5YR 5/8) clay; few fine distinct yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—28 to 32 inches; strong brown (7.5YR 5/8) clay loam; many medium distinct yellowish red (5YR 5/8) and common coarse distinct yellowish red (5YR 4/8) mottles; weak fine and medium subangular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C—32 to 60 inches; yellowish red (5YR 4/8) clay; common medium and coarse distinct brownish yellow (10YR 6/8) mottles; massive; friable, slightly sticky and slightly plastic; about 20 percent white (N 8/0) loamy saprolite; common fine flakes of mica; very strongly acid.

The thickness of the solum ranges from 20 to 40 inches. Reaction is very strongly acid or strongly acid throughout the profile, except where the surface layer has been limed.

The Ap horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 4. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 6. It is sandy loam, coarse sandy loam, or the gravelly analogs of those textures.

The BE horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 3 to 6. It is loam or sandy clay loam.

The Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. In the lower part, it has mottles in shades of red and brown. It is sandy clay, clay loam, or clay.

The BC horizon, if it occurs, has colors similar to those of the Bt horizon. It is sandy clay loam, clay loam, or loam.

The C horizon is multicolored, highly weathered saprolite that has a texture of clay loam, sandy clay loam, sandy loam, or sandy clay.

Wehadkee Series

The Wehadkee series consists of very deep, poorly drained soils on flood plains. These soils formed in recent alluvial sediments. Slopes are less than 2 percent.

Typical pedon of Wehadkee loam, frequently flooded; about 2,900 feet south of the Neuse River; about 2.5 miles north of the junction of Secondary Roads 1009 and 1185, in a wooded area (State plane coordinates 2,204,400 feet E., 609,000 feet N.):

A—0 to 7 inches; dark brown (10YR 4/3) loam; weak fine and medium granular structure; friable, sticky and slightly plastic; many fine, medium, and coarse roots; very strongly acid; gradual smooth boundary.

Bg1—7 to 18 inches; light brownish gray (2.5Y 6/2) loam; many fine and medium distinct yellowish brown (10YR 5/4) mottles; weak medium and coarse subangular blocky structure; friable, sticky and slightly plastic; common continuous silt coatings on peds; few fine and medium roots; very strongly acid; gradual smooth boundary.

Bg2—18 to 32 inches; gray (10YR 6/1) clay loam; many fine and medium distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable, sticky and slightly plastic; common continuous silt coatings on vertical faces of peds;

few fine and medium roots; few black concretions; strongly acid; gradual smooth boundary.

Bg3—32 to 49 inches; gray (10YR 6/1) clay loam; many medium and coarse brown (7.5YR 4/4) mottles; weak coarse prismatic structure; friable, sticky and slightly plastic; few discontinuous silt coatings on vertical faces of peds; few fine and medium roots; common vertically oriented pockets of concretions; strongly acid; diffuse smooth boundary.

Cg—49 to 63 inches; mottled gray (10YR 6/1) and strong brown (7.5YR 5/6) clay loam; massive; friable and firm, sticky and plastic; few fine roots; moderately acid.

The thickness of the solum ranges from 20 to more than 60 inches. Reaction ranges from very strongly acid to neutral.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 6. It has mottles in shades of yellow or brown. It is clay loam, loam, or sandy clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2, or it is neutral in hue and has value of 4 to 7. It has mottles in shades of brown, yellow, or red. It is loam, sandy clay loam, or clay loam.

Formation of the Soils

Soil is the product of the interaction of parent material, climate, organisms, relief, and time. Precisely determining the magnitude of the effect of any one of these factors is difficult. The effects are commonly observed by comparing one soil to another on a different landscape *(5)*. In most areas one or two of these factors dominate soil formation. In Johnston County parent material is probably the dominant soil-forming factor.

Parent Material

Parent material is the mass in which a soil forms. The parent materials in Johnston County are dominantly mineral materials that weathered from the various rocks that underlie the land surfaces. These rocks differ widely in age. The weathered material differs considerably in chemical, mineral, and physical composition. Parent material directly influences the amount of sand, silt, and clay in a soil; strongly influences the mineralogy of the soil; and indirectly influences such soil properties as permeability, available water capacity, shrink-swell potential, and thickness of the profile. The variability in composition of parent materials influences the complexity of the soils within a mapped area.

Two general types of parent materials are in the county *(23)*. One type is material weathered from crystalline bedrock in the Piedmont region. The other is material derived from the various unconsolidated sediments in the Coastal Plain region, along river terraces, and on flood plains. The sediments on the flood plains are recent alluvial deposits.

Climate

Climate affects the physical, chemical, and biological relationships in the soil, primarily through the influence of rainfall and temperature.

Johnston County has a warm and humid climate. Summers are long and hot, and winters are relatively short and mild. Rainfall exceeds potential evapotranspiration and is essentially distributed evenly throughout the year. These conditions are conducive to relatively rapid weathering of soil minerals and to decomposition of organic matter. Decomposing organic matter produces organic acids in the soil, and the high amount of rainfall leaches bases. As a result, the soils in the county are naturally acid, low in fertility, and dominated by stable clay minerals that have low activity.

Even though the rainfall is well distributed, a pronounced drying period occurs during most summers because of evapotranspiration. This drying and the subsequent rewetting during the winter influences the downward movement of clay in the soil profile. It causes the formation of a clay-enriched subsoil (an argillic horizon), which is present in most of the soils in the county.

The internal soil climate has influenced some of the soils in the county. During winter and early spring, poorly drained soils are saturated for significant periods and a chemically reducing environment exists for awhile. In summer, the water table is lowered by stream outflow and evapotranspiration and an oxidizing environment exists for awhile. This cycle of oxidation and reduction in poorly drained soils is believed to be important to the destruction and removal of clay minerals and the mobilization and resegregation of iron minerals *(11)*. As a result, the texture of the subsoil in these soils varies, and the soils have distinctive patterns of mottling.

The climate in the past differed from that of the present. During the late Pleistocene epoch, climatic conditions were probably cooler and wetter. These conditions and strong directional winds are thought to be influential in the formation of the Lakeland soils, which are believed to be relic eolian sands, and in the formation of the oval Carolina bays, which are near Wilson's Mills and in the southern parts of the county *(9, 14)*.

Organisms

The plant and animal life in and on a soil influence soil formation to varying degrees and are determined to a large extent by the climate and to some extent by parent material, relief, and the age of the soil. Bacteria,

fungi, and other microscopic organisms increase the rate of weathering of rocks and of decomposing of organic matter.

The warm, humid climate of the county favors the development of mixed deciduous and coniferous forests, which once dominated the county. Most of the feeder roots of the trees in this type of forest are located in the upper few inches of the soil. Annually, leaves fall on the surface. They are decomposed and mixed into the upper part of the soil by insects, fungi, and bacteria. The feeder roots take up the nutrients that were released by decomposition and recycle them into new growth. The organic, enriched surface layer of the soils in these areas is characteristically thin because the organic matter only accumulates near the surface. The layer immediately below the surface is light colored and has a low content of organic matter and clay because of the intense weathering brought about by leaching of organic acids from the overlying surface layer. This layer is characteristic of soils formed under forest vegetation.

Trees actively mix soil material throughout the soil profile. When strong winds uproot trees, the roots pull up subsoil material and mix it with topsoil. When deep tree roots decay, they form channels. Soil moves down through these channels, and material is mixed to a considerable depth. Longleaf pine has a distinct tap root, which has probably been significant in this kind of mixing. Soils in the nearly level areas at an elevation of more than 120 feet have been in place for a long time and are characteristically thick, which may be an indication of prolonged deep mixing by trees and other organisms *(10)*.

The organisms that affect soil formation include small rodents, reptiles, insects, earthworms, crayfish, fungi, and bacteria. Most of these are active in the decomposition and mixing of plant material in the upper part of the soil. Some bacteria produce nitrogen that can be used by the higher plants either directly or through symbiotic relationships. Some fungi aid in the acquisition and uptake of soil nutrients by certain species of trees. Crayfish are active in poorly drained soils. They bring subsoil material from deep in the soil to the surface. Subsequent filling of their burrows with material from the surface causes mixing deep in the soil.

Relief

Relief is the amount of change in elevation from one place to another. It influences soil formation by affecting moisture regimes, erosion, soil temperature, soil thickness, and plant cover.

The county has a wide range in relief. The flood plains and broad interstream areas on the Coastal Plain are nearly level and have little relief. Relief in the stream valleys on the Coastal Plain and the Piedmont ranges from about 25 feet to more than 150 feet. The steepest slopes and maximum relief are along the edges of the stream valleys in the northern and western parts of the county. Slopes range as much as 40 percent.

Relief largely determines the natural drainage of a soil. In the nearly level areas on the Coastal Plain and on flood plains, the water table is near the surface and the soils are poorly drained. In these areas, a few feet of relief can result in significant differences in drainage, such as occur in the Goldsboro soils. Along the edges of interstream divides, the water table is deep and the soils have been well drained for a long time. As a result, these soils have brighter colors and a thicker sandy surface layer than the soils nearer the center of the divide. This difference has been described as the "edge effect" *(8)*. Soils on hillslopes generally are well drained because the water table is deep and the rate of runoff is greater than on the flat surfaces. On some hillslopes a water table is seasonally perched where impervious layers are near the surface. Soils on steep slopes have less available moisture for plants because the rate of runoff is greater and they receive less rainfall per unit area.

Soils are thinner on hillslopes where there is significant relief than on many level ridgetops and interstream divides because the soils on hillslopes are younger and thus soil formation has occurred for a shorter time. On hillslopes, geologic erosion occurs at a faster rate than in level areas. As a result, soils on young hillslopes tend to more closely resemble their parent materials than soils on old surfaces *(7)*.

Steep slopes that have a northerly aspect are shaded from the sunlight for longer periods and are cooler than slopes that have a southerly aspect. In several areas in the county, north-facing slopes support mountain laurel, which is not common to the rest of the county.

Time

Time is a significant factor affecting the formation of the soils in Johnston County. The age of a soil is measured beginning from the completion of the formation of the land surface on which the soil formed. The age of the land surfaces in the county ranges from less than 10,000 years to more than 5 million years *(10)*. The older land surfaces are some of the oldest in the world.

Time influences soil characteristics, such as the mineralogy of the soil, the thickness of the profile, and the formation of clay-enriched subsoil layers

(argillic horizons). Certain minerals, such as feldspars and micas, weather more readily than quartz. The absence of feldspars and micas can be an indication that a soil is old. Soils on the very old landscapes generally have thick profiles, supporting the idea that profiles tend to thicken over time. An argillic horizon is believed to require a considerable amount of time to form even under favorable conditions. It is not present in soils on recent landscapes.

The youngest landscapes in the county are the recent flood plains. Most of these surfaces are probably less than 10,000 years old. Soil profiles are not well developed on these surfaces. The river terraces are slightly higher than the flood plains and are apparently older. The soils on the river terraces are well developed and typically have argillic subsoil horizons.

The land surfaces on the lower, middle, and upper Coastal Plain range in age from about 200,000 years old to more than 5 million years old *(10)*. Most of the soils on the Coastal Plain have a thick profile. They are highly weathered, as evidenced by the absence of weatherable minerals in the sand fractions and the presence of stable clay minerals that have low chemical activity. On the older land surfaces, the lower part of the subsoil contains plinthite nodules, which are thought to have formed over a very long time because of fluctuating water tables.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Aquifer. A water-bearing bed or stratum of permeable rock, sand, or gravel capable of fielding considerable quantities of water to wells or springs.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Atterberg limits. Atterberg limits are measured for soil materials passing the No. 40 sieve. They include the liquid limit (LL), which is the moisture content at which the soil passes from a plastic to a liquid state, and the plastic limit (PL), which is the water content corresponding to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Basic rock. An igneous rock composed dominantly of dark minerals. The minerals of this rock are comparatively low in silica and rich in bases, such as the amphiboles, the pyroxenes, biotite, and olivine.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Benchmark soil. A soil of large extent that holds a key position in the soil classification system or is of special significance to farming, engineering, forestry, or other uses.

Bottom land. The normal flood plain of a stream, subject to flooding.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey. A general textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

CMAI (cumulative mean annual increment). The age or rotation at which growing stock of a forest produces the greatest annual growth (for that time period). It is the age at which periodic annual growth and mean annual growth are equal.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Coastal Plain. The physiographic region of eastern North Carolina that consists of ocean-deposited sediments of sand, silt, and clay. These areas of sediments are level to rolling and vary in thickness.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Use of that portion of the plant or crop left in the field after harvest for protection or improvement of the soil.

Dbh (diameter at breast height). The diameter of a tree at 4 feet above the ground level on the uphill side.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delineation. The process of drawing or plotting features on a map with lines and symbols.

Depth class. Refers to the depth to a root-restricting layer. Unless otherwise stated, this layer is understood to be consolidated bedrock. The depth classes in this survey are:

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Depth to bedrock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for

significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Engineering test data. Laboratory test and mechanical analysis of selected soils in the county.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Erosion classes. Classes based on estimates of past erosion. The classes are as follows:

Class 1.—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most of the area, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit or in the map symbol.

Class 2.—Soils that have lost an average of 25 to 75 percent of the original A horizon or the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

Class 3.—Soils that have lost an average of 75 percent or more of the original A horizon or the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most cultivated areas of class 3 erosion, material that was below the original A horizon is exposed. The plow layer consists entirely or largely of this material.

Class 4.—Soils that have lost all of the A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but most have an intricate pattern of gullies.

Erosion hazard. Terms describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in tons per acre (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per acre	None
Less than 1 ton per acre	Slight
1 to 5 tons per acre	Moderate
5 to 10 tons per acre	Severe
More than 10 tons per acre	Very Severe

Felsic. A general term for light colored igneous rock and some metamorphic crystalline rock.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flooding. The temporary covering of the surface by flowing water from any source, such as overflowing streams, runoff from adjacent or surrounding slopes, and inflow from high tides. The frequency of flooding generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The duration of flooding is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month).

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forest type. A classification of forest land based on the species forming the majority of live-tree stocking.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Geomorphic surface. A part of the surface of the land that has definite geographic boundaries and is formed by one or more agencies during a given time span.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gneiss. A coarse grained metamorphic rock in which bands rich in granular minerals alternate with bands in which schistose minerals predominate. It is commonly formed by the metamorphism of granite.

Granite. A coarse grained igneous rock dominated by light colored minerals, consisting of about 50 percent orthoclase and 25 percent quartz with the balance being plagioclase feldspars and ferromagnesian silicates. Granites and granodiorites comprise 95 percent of all intrusive rocks.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the

subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:
O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.
A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.
E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.
B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.
C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.
Cr horizon.—Soft, consolidated bedrock beneath the soil.
R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification of molten rock, generally crystalline in nature.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Interstream area. The nearly level land between drainageways in relatively undissected parts of the Coastal Plain. It is in areas on uplands, low marine terraces, and stream terraces. Soils in these areas are generally poorly drained or very poorly drained.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35 percent clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Low strength. The soil is not strong enough to support loads.

Mafic. A dark rock composed predominantly of

magnesium silicates. It contains little quartz, feldspar, or muscovite mica.

Mean annual increment. The average yearly volume of a stand of trees from the year of origin to the age under consideration.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mica. Any of various colored or transparent mineral silicates crystallizing in monoclinic forms that readily separate into very thin sheets.

Micas. A group of silicate minerals characterized by sheet or scale cleavage. Biotite is the ferromagnesian black mica. Muscovite is the potassic white mica.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Overstory. The portion of the trees in a forest stand forming the upper crown cover.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piedmont. The physiographic region of central North Carolina characterized by rolling landscapes formed from the weathering of residual rock material.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range in moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone

hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	below 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Runoff class (surface). Refers to the rate at which water flows away from the soil over the surface without infiltrating. Six classes of rate of runoff are recognized:

Ponded.—Little of the precipitation and water that runs onto the soil escapes as runoff, and free water stands on the surface for significant periods. The amount of water that is removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level and nearly level soils in depressions. The water depth may fluctuate greatly.

Very slow.—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils are commonly level or nearly level or are very open and porous.

Slow.—Surface water flows away so slowly that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium.—Surface water flows away so fast that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid.—Surface water flows away so rapidly that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils generally are moderately steep or steep and have moderate or slow rates of absorption.

Very rapid.—Surface water flows away so rapidly that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandy. A general textural term that includes coarse sand, sand, fine sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand. According to family level

criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of sand or loamy sand that contains less than 50 percent very fine sand, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Seasonal high water table. The highest level of a saturated zone (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Strongly sloping	6 to 10 percent
Moderately steep	10 to 15 percent
Steep	15 to 40 percent

Classes for complex slopes are as follows:

Nearly level	0 to 2 percent
Undulating	2 to 6 percent
Strongly sloping	6 to 10 percent
Moderately steep	10 to 15 percent
Steep	15 to 40 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil map unit. A kind of soil or miscellaneous area or a combination of two or more soils or one or more soils and one or more miscellaneous areas that can be shown at the scale of mapping for the defined purposes and objectives of the soil survey. They are generally designed to reflect significant differences in use and management.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil

particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Suitability ratings. Ratings for the degree of suitability of soils for pasture, crops, woodland, and engineering uses. The ratings and the general criteria used for their selection are as follows:
Well suited.—The intended use may be initiated and maintained by using only the standard materials and methods typically required for that use. Good results can be expected.
Suited.—The intended use has limitations that make special planning, design, or maintenance necessary.
Poorly suited.—The intended use is difficult or costly to initiate and maintain because of certain soil properties, such as steep slopes, a high hazard of erosion, a high water table, low fertility, or a hazard of flooding. Major soil reclamation, special design, or intensive management practices are needed.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topography. The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Understory. The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portions of adjacent trees and other woody growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1962-78 at Smithfield, North Carolina)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	53.6	30.9	42.3	77	8	54	3.79	2.39	5.04	8	0.8
February	56.9	32.7	44.8	79	13	51	4.14	2.35	5.59	7	.7
March	64.6	39.4	52.0	86	21	161	4.11	2.80	5.30	8	.1
April	75.4	47.7	61.5	92	30	345	3.38	1.65	4.79	6	.0
May	82.2	56.0	69.1	97	37	592	3.79	2.26	5.15	7	.0
June	88.2	63.3	75.7	101	48	771	3.74	2.06	5.11	6	.0
July	90.9	67.5	79.2	100	53	905	5.94	2.75	8.53	8	.0
August	89.6	66.7	78.2	99	53	874	4.84	2.20	6.98	7	.0
September	84.5	60.1	72.4	96	42	672	4.55	2.22	6.50	6	.0
October	74.5	48.4	61.5	90	26	365	3.27	.98	5.11	5	.0
November	65.0	38.0	51.5	83	18	99	2.84	1.42	4.00	5	.0
December	55.7	32.1	43.9	76	11	54	3.42	1.83	4.71	6	.0
Yearly:											
Average	73.4	48.6	61.0	---	---	---	---	---	---	---	---
Extreme	---	---	---	102	8	---	---	---	---	---	---
Total	---	---	---	---	---	4,943	47.81	40.82	54.52	79	1.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1962-78 at Smithfield, North Carolina)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 31	Apr. 6	Apr. 25
2 years in 10 later than--	Mar. 20	Apr. 1	Apr. 19
5 years in 10 later than--	Feb. 28	Mar. 21	Apr. 6
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 3	Oct. 21	Oct. 13
2 years in 10 earlier than--	Nov. 8	Oct. 26	Oct. 18
5 years in 10 earlier than--	Nov. 18	Nov. 4	Oct. 26

TABLE 3.--GROWING SEASON

(Recorded in the period 1962-78 at Smithfield, North Carolina)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	228	203	177
8 years in 10	239	211	185
5 years in 10	262	227	202
2 years in 10	287	243	219
1 year in 10	301	253	230

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AaA	Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded	8,593	1.7
AmB	Appling-Marlboro complex, 1 to 6 percent slopes	2,632	0.5
AsA	Augusta sandy loam, 0 to 2 percent slopes, occasionally flooded	2,784	0.5
AuA	Autryville sand, 0 to 2 percent slopes	1,672	0.3
Bb	Bibb sandy loam, frequently flooded	25,426	5.0
BnA	Blanton sand, 0 to 3 percent slopes	8,970	1.8
BoA	Bonneau sand, 0 to 3 percent slopes	8,409	1.6
CeB	Cecil loam, 2 to 6 percent slopes	12,786	2.5
CeC	Cecil loam, 6 to 10 percent slopes	6,265	1.2
Ch	Chewacla loam, frequently flooded	6,634	1.3
CoB	Cowarts loamy sand, 2 to 6 percent slopes	7,358	1.4
CoC	Cowarts loamy sand, 6 to 10 percent slopes	1,646	0.3
DoA	Dogue fine sandy loam, 0 to 2 percent slopes	2,052	0.4
FaA	Faceville sandy loam, 0 to 2 percent slopes	2,719	0.5
FaB	Faceville sandy loam, 2 to 6 percent slopes	4,617	0.9
FuA	Fuquay sand, 0 to 3 percent slopes	1,699	0.3
GeB	Gilead sandy loam, 2 to 8 percent slopes	32,001	6.3
GeD	Gilead sandy loam, 8 to 15 percent slopes	18,227	3.6
GoA	Goldsboro sandy loam, 0 to 2 percent slopes	31,444	6.2
Gr	Grantham silt loam	6,806	1.3
LaB	Lakeland sand, 0 to 6 percent slopes	1,552	0.3
Le	Leaf silt loam	8,387	1.6
Ly	Lynchburg sandy loam	16,782	3.3
MaA	Marlboro sandy loam, 0 to 2 percent slopes	5,740	1.1
MaB	Marlboro sandy loam, 2 to 8 percent slopes	7,700	1.5
McB	Marlboro-Cecil complex, 2 to 8 percent slopes	11,322	2.2
Na	Nahunta silt loam	1,612	0.3
NkB	Nankin fine sandy loam, 2 to 6 percent slopes	2,981	0.6
NnB	Nason silt loam, 2 to 8 percent slopes	5,388	1.1
NnD	Nason silt loam, 8 to 15 percent slopes	6,334	1.2
NnE	Nason silt loam, 15 to 25 percent slopes	2,930	0.6
NoA	Norfolk loamy sand, 0 to 2 percent slopes	34,008	6.8
NoB	Norfolk loamy sand, 2 to 6 percent slopes	28,020	5.5
NuA	Norfork-Urban land complex, 0 to 3 percent slopes	3,363	0.7
PaD	Pacolet loam, 10 to 15 percent slopes	9,062	1.8
PaE	Pacolet loam, 15 to 25 percent slopes	5,809	1.1
Pn	Pantego loam, occasionally flooded	2,956	0.6
Ra	Rains sandy loam	36,661	7.3
RbA	Rains-Urban land complex, 0 to 2 percent slopes	920	0.2
RnF	Rion sandy loam, 15 to 40 percent slopes	3,188	0.6
Ro	Roanoke loam, occasionally flooded	2,327	0.5
StA	State sandy loam, 0 to 3 percent slopes, occasionally flooded	4,329	0.8
Ta	Tarboro loamy sand, rarely flooded	1,106	0.2
Tn	Toisnot loam	4,830	0.9
To	Tomotley sandy loam, rarely flooded	3,118	0.6
UcB	Uchee loamy coarse sand, 2 to 6 percent slopes	13,286	2.6
UcC	Uchee loamy coarse sand, 6 to 12 percent slopes	7,018	1.4
Ud	Udorthents, loamy	2,539	0.5
VaB	Vance coarse sandy loam, 2 to 8 percent slopes	2,098	0.4
VrA	Varina loamy sand, 0 to 2 percent slopes	4,867	1.0
VrB	Varina loamy sand, 2 to 6 percent slopes	2,253	0.4
WaB	Wagram loamy sand, 0 to 6 percent slopes	16,585	3.3
Wh	Wahee loam, occasionally flooded	1,204	0.2
WoB	Wedowee sandy loam, 2 to 8 percent slopes	13,076	2.6
WoD	Wedowee sandy loam, 8 to 15 percent slopes	10,188	2.0
Wt	Wehadkee loam, frequently flooded	18,852	3.7
Ww	Wehadkee-Chastain association, frequently flooded	13,932	2.7
	Water	1,075	0.2
	Total	510,138	100.0

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Sweet potatoes	Wheat	Improved bermudagrass	Grass clover
		Bu	Bu	Lbs	Bu	Bu	AUM*	AUM*
AaA--Altavista	IIw	120	42	2,600	---	55	10.0	9.0
AmB:								
Appling	IIs	80	27	2,400	---	45	10.0	8.0
Marlboro	IIe	90	30	2,400	---	---	10.0	10.5
AsA--Augusta	IIIw	100	35	2,200	---	---	---	10.0
AuA--Autryville	IIs	70	25	2,200	260	---	9.0	---
Bb--Bibb	Vw	---	---	---	---	---	---	---
BnA--Blanton	IIIs	55	20	2,000	210	---	8.0	---
BoA--Bonneau	IIs	75	25	2,400	375	---	8.5	8.0
CeB--Cecil	IIe	85	28	2,100	---	---	8.0	8.5
CeC--Cecil	IIIe	80	26	1,800	---	---	---	7.5
Ch--Chewacla	IVw	80	26	---	---	30	---	9.0
CoB--Cowarts	IIe	80	26	---	---	---	8.0	8.5
CoC--Cowarts	IIIe	70	23	---	---	---	7.0	---
DoA--Dogue	IIw	110	37	---	---	60	---	9.5
FaA--Faceville	I	105	35	---	330	---	10.0	10.0
FaB--Faceville	IIe	95	32	---	330	---	9.0	9.0
FuA--Fuquay	IIs	70	24	2,400	340	---	9.0	8.5
GeB--Gilead	IIIe	70	23	2,000	220	---	7.0	7.0
GeD--Gilead	VIe	---	---	---	---	---	5.5	5.5

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Sweet potatoes	Wheat	Improved bermudagrass	Grass clover
		Bu	Bu	Lbs	Bu	Bu	AUM*	AUM*
GoA---- Goldsboro	IIw	125	42	3,000	---	60	10.0	11.5
Gr---- Grantham	VIw	---	---	---	---	---	---	---
LaB---- Lakeland	IVs	50	17	1,500	---	---	7.0	---
Le---- Leaf	IVw	80	27	---	---	---	---	8.0
Ly---- Lynchburg	IIw	115	38	---	---	---	---	10.0
MaA---- Marlboro	I	110	37	2,750	340	---	10.0	10.5
MaB---- Marlboro	IIe	100	35	2,400	340	---	10.0	10.0
McB:								
Marlboro-------	IIe	100	37	2,400	---	---	10.0	10.0
Cecil----------	IIe	95	30	2,100	---	---	10.0	10.0
Na---- Nahunta	IIw	120	45	---	---	---	---	10.5
NkB---- Nankin	IIe	75	25	2,200	---	---	9.0	9.0
NnB---- Nason	IIe	80	27	---	---	45	---	8.0
NnD---- Nason	IIIe	75	25	---	---	42	---	7.5
NnE---- Nason	VIe	65	---	---	---	35	---	7.0
NoA---- Norfolk	I	110	37	2,750	400	54	10.0	10.5
NoB---- Norfolk	IIe	100	35	2,700	400	55	10.0	10.0
PaD---- Pacolet	IVe	65	22	---	---	---	---	6.0
PaE---- Pacolet	VIe	---	---	---	---	---	---	5.5
Pn---- Pantego	VIw	---	---	---	---	---	---	---
Ra---- Rains	IIIw	110	40	---	---	---	---	9.0

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Sweet potatoes	Wheat	Improved bermudagrass	Grass clover
		Bu	Bu	Lbs	Bu	Bu	AUM*	AUM*
RnF---------- Rion	VIIe	---	---	---	---	---	---	4.5
Ro---------- Roanoke	IVw	---	---	---	---	---	---	---
StA---------- State	IIw	110	35	2,700	---	---	---	8.5
Ta---------- Tarboro	IIIs	50	20	---	---	---	8.0	6.0
Tn---------- Toisnot	Vw	---	---	---	---	---	---	---
To---------- Tomotley	IVw	---	---	---	---	---	---	---
UcB---------- Uchee	IIs	70	25	---	325	---	8.5	---
UcC---------- Uchee	IIIs	65	22	---	---	---	8.0	---
VaB---------- Vance	IIIe	70	24	2,000	---	55	---	---
VrA---------- Varina	IIs	100	40	2,400	410	60	---	10.5
VrB---------- Varina	IIe	100	40	2,400	410	60	---	10.5
WaB---------- Wagram	IIs	70	23	2,400	350	36	8.5	---
Wh---------- Wahee	IIw	110	37	---	---	---	---	10.0
WoB---------- Wedowee	IIe	70	24	---	---	40	---	7.5
WoD---------- Wedowee	IVe	55	18	---	---	30	---	7.0
Wt---------- Wehadkee	VIw	---	---	---	---	---	---	---
Ww**:								
Wehadkee-------	VIw	---	---	---	---	---	---	---
Chastain-------	VIw	---	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	42,467	---	---	---	---
II	210,667	96,554	66,016	48,097	---
III	103,237	46,698	39,445	17,094	---
IV	45,844	23,826	20,466	1,552	---
V	30,256	---	30,256	---	---
VI	63,626	24,036	39,590	---	---
VII	6,144	3,188	2,956	---	---
VIII	---	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
AaA---------- Altavista	9A	Slight	Moderate	Slight	Loblolly pine--------	91	133	Loblolly pine, yellow-poplar, black walnut, sweetgum, American sycamore, cherrybark oak.
					Longleaf pine--------	87	117	
					White oak----------	---	---	
					Sweetgum----------	---	---	
					Red maple----------	---	---	
					Yellow-poplar--------	---	---	
AmB**:								
Appling----------	8A	Slight	Slight	Slight	Loblolly pine--------	84	118	Loblolly pine, yellow-poplar.
					Shortleaf pine-------	65	99	
					White oak----------	64	47	
					Yellow-poplar--------	---	---	
					Sweetgum----------	---	---	
					Southern red oak-----	---	---	
					Hickory----------	---	---	
Marlboro----------	8A	Slight	Slight	Slight	Loblolly pine--------	82	114	Loblolly pine.
					Longleaf pine--------	62	60	
AsA---------- Augusta	9W	Slight	Moderate	Slight	Loblolly pine--------	90	131	Loblolly pine, sweetgum, American sycamore, yellow-poplar, cherrybark oak.
					Sweetgum----------	90	106	
					American sycamore----	90	98	
					White oak----------	80	82	
					Water oak----------	---	---	
					Red maple----------	---	---	
					Yellow-poplar--------	---	---	
					American beech-------	---	---	
AuA---------- Autryville	7S	Slight	Moderate	Moderate	Loblolly pine--------	77	105	Loblolly pine, longleaf pine.
					Longleaf pine--------	60	56	
					Southern red oak-----	---	---	
					Hickory----------	---	---	
					Red maple----------	---	---	
					Northern red oak-----	---	---	
					Post oak----------	---	---	
					Blackjack oak--------	---	---	
Bb---------- Bibb	9W	Slight	Severe	Severe	Loblolly pine--------	90	131	Eastern cottonwood, loblolly pine, sweetgum, yellow-poplar.
					Sweetgum----------	90	106	
					Water oak----------	90	86	
					Blackgum----------	---	---	
					Yellow-poplar--------	---	---	
					Willow oak----------	---	---	
BnA---------- Blanton	11S	Slight	Moderate	Moderate	Loblolly pine--------	80	110	Longleaf pine.
					Longleaf pine--------	70	74	
					Blackjack oak--------	---	---	
					Post oak----------	---	---	
					Southern red oak-----	---	---	
					Black oak----------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
BoA Bonneau	9S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine White oak Southern red oak	86 75 --- ---	123 90 --- ---	Loblolly pine, longleaf pine.
CeB, CeC Cecil	8A	Slight	Slight	Slight	Loblolly pine Shortleaf pine Black oak Northern red oak Post oak	83 69 --- 81 72	116 108 --- --- ---	Loblolly pine, yellow-poplar.
Ch Chewacla	7W	Slight	Moderate	Slight	Yellow-poplar Loblolly pine Sweetgum Water oak Eastern cottonwood	95 95 97 80 ---	98 142 128 74 ---	Loblolly pine, yellow-poplar, sweetgum, American sycamore.
CoB, CoC Cowarts	9A	Slight	Slight	Slight	Loblolly pine Longleaf pine White oak Norhtern red oak Sweetgum	86 62 --- --- ---	123 72 --- --- ---	Loblolly pine, longleaf pine.
DoA Dogue	9W	Slight	Moderate	Slight	Loblolly pine Southern red oak Sweetgum Yellow-poplar White oak	90 80 90 93 80	131 62 106 95 62	Loblolly pine.
FaA, FaB Faceville	8A	Slight	Slight	Slight	Loblolly pine Longleaf pine White oak Northern red oak Hickory	82 65 --- --- ---	114 67 --- --- ---	Loblolly pine.
FuA Fuquay	8S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine Hickory Black oak	85 77 --- ---	120 94 --- ---	Loblolly pine.
GeB, GeD Gilead	8A	Slight	Slight	Slight	Loblolly pine Longleaf pine Sweetgum Blackgum White oak Hickory	84 70 --- --- --- ---	118 79 --- --- --- ---	Loblolly pine.
GoA Goldsboro	9A	Slight	Moderate	Slight	Loblolly pine Longleaf pine Sweetgum Southern red oak White oak	90 66 90 --- ---	131 70 106 --- ---	Loblolly pine, yellow-poplar, American sycamore, sweetgum.
Gr Grantham	9W	Slight	Severe	Severe	Loblolly pine Sweetgum Water oak Red maple Willow oak	86 --- --- --- ---	123 --- --- --- ---	Loblolly pine, sweetgum, yellow- poplar, American sycamore.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Volume*	
LaB---------- Lakeland	7S	Slight	Moderate	Moderate	Loblolly pine--------	75	101	Longleaf pine.
					Longleaf pine--------	60	56	
					Turkey oak----------	---	---	
					Blackjack oak--------	---	---	
					Post oak------------	---	---	
Le---------- Leaf	9W	Slight	Moderate	Moderate	Loblolly pine--------	90	131	Loblolly pine, Shumard oak, sweetgum.
					Sweetgum------------	90	106	
					White oak----------	---	---	
					Willow oak----------	---	---	
					Red maple----------	---	---	
Ly---------- Lynchburg	9W	Slight	Moderate	Slight	Loblolly pine--------	86	123	Loblolly pine, American sycamore, sweetgum.
					Longleaf pine--------	74	88	
					Yellow-poplar--------	92	93	
					Sweetgum------------	90	106	
					Southern red oak-----	---	---	
					White oak----------	---	---	
					Blackgum------------	---	---	
MaA, MaB---------- Marlboro	8A	Slight	Slight	Slight	Loblolly pine--------	82	114	Loblolly pine.
					Longleaf pine--------	62	60	
McB**:								
Marlboro----------	8A	Slight	Slight	Slight	Loblolly pine--------	82	114	Loblolly pine.
					Longleaf pine--------	62	60	
Cecil----------	8A	Slight	Slight	Slight	Loblolly pine--------	83	110	Loblolly pine, shortleaf pine.
					Shortleaf pine-------	69	108	
					Northern red oak-----	81	84	
					Post oak------------	65	48	
					Scarlet oak----------	65	48	
					Yellow-poplar--------	92	93	
Na---------- Nahunta	9W	Slight	Moderate	Slight	Loblolly pine--------	87	125	Loblolly pine, yellow-poplar, American sycamore, cherrybark oak.
					Sweetgum------------	---	---	
					Yellow-poplar--------	---	---	
					White oak----------	---	---	
NkB---------- Nankin	8A	Slight	Slight	Slight	Loblolly pine--------	80	110	Loblolly pine, slash pine.
					Longleaf pine--------	70	79	
					Southern red oak-----	---	---	
					White oak----------	---	---	
					Hickory-------------	---	---	
					Red maple----------	---	---	
NnB, NnD---------- Nason	8A	Slight	Slight	Slight	Loblolly pine--------	80	110	Loblolly pine, eastern white pine.
					Northern red oak-----	66	48	
					Shortleaf pine-------	66	101	
					White oak----------	---	---	
					Sweetgum------------	---	---	
					Hickory-------------	---	---	
NnE---------- Nason	8R	Moderate	Moderate	Slight	Loblolly pine--------	80	110	Loblolly pine, eastern white pine.
					Northern red oak-----	66	48	
					Shortleaf pine-------	66	101	
					White oak----------	---	---	
					Sweetgum------------	---	---	
					Hickory-------------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
NoA, NoB---------- Norfolk	8A	Slight	Slight	Slight	Loblolly pine--------	84	118	Loblolly pine.
					Longleaf pine--------	77	94	
					Southern red oak-----	---	---	
					White oak----------	---	---	
					Blackjack oak--------	---	---	
					Hickory----------	---	---	
PaD---------- Pacolet	8A	Slight	Slight	Slight	Loblolly pine--------	78	107	Loblolly pine,
					Shortleaf pine-------	70	110	shortleaf pine,
					Yellow-poplar--------	90	90	yellow-poplar,
					Northern red oak-----	---	---	eastern white pine.
					Hickory----------	---	---	
					White oak----------	---	---	
PaE---------- Pacolet	8R	Moderate	Moderate	Slight	Loblolly pine--------	78	107	Loblolly pine,
					Shortleaf pine-------	70	110	shortleaf pine,
					Yellow-poplar--------	90	90	yellow-poplar,
					Northern red oak-----	---	---	eastern white pine.
					Hickory----------	---	---	
					White oak----------	---	---	
Pn---------- Pantego	9W	Slight	Severe	Severe	Loblolly pine--------	91	133	Loblolly pine,
					Sweetgum----------	91	109	sweetgum.
					Baldcypress----------	---	---	
					Blackgum----------	---	---	
					Water oak----------	---	---	
Ra---------- Rains	10W	Slight	Moderate	Moderate	Loblolly pine--------	94	140	Loblolly pine,
					Sweetgum----------	90	108	sweetgum, American
					Willow oak----------	---	---	sycamore.
					Water oak----------	---	---	
RnF---------- Rion	8R	Moderate	Moderate	Slight	Loblolly pine--------	80	110	Loblolly pine,
					Shortleaf pine-------	70	110	shortleaf pine,
					Sweetgum----------	80	79	yellow-poplar.
					White oak----------	70	52	
					Yellow-poplar--------	90	90	
					Hickory----------	---	---	
					Northern red oak-----	---	---	
Ro---------- Roanoke	7W	Slight	Severe	Severe	Sweetgum----------	90	106	Sweetgum.
					Willow oak----------	76	68	
					Water oak----------	---	---	
					Red maple----------	---	---	
StA---------- State	9A	Slight	Slight	Slight	Loblolly pine--------	86	123	Loblolly pine, black
					Southern red oak-----	85	67	walnut, yellow-
					Yellow-poplar--------	100	107	poplar.
					White oak----------	---	---	
Ta---------- Tarboro	7S	Slight	Moderate	Moderate	Loblolly pine--------	72	96	Loblolly pine.
					Longleaf pine--------	---	---	
					Blackjack oak--------	---	---	
					White oak----------	---	---	
Tn---------- Toisnot	7W	Slight	Severe	Severe	Loblolly pine--------	76	103	Loblolly pine,
					Sweetgum----------	80	79	sweetgum.
					Willow oak----------	---	---	
					Blackgum----------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
To---------- Tomotley	10W	Slight	Moderate	Moderate	Loblolly pine--------	97	147	Loblolly pine.
					Willow oak----------	86	---	
					Sweetgum----------	90	106	
UcB, UcC---------- Uchee	8S	Slight	Moderate	Moderate	Loblolly pine--------	82	114	Loblolly pine,
					Longleaf pine--------	67	72	longleaf pine.
					Hickory----------	---	---	
					Black oak----------	---	---	
VaB---------- Vance	7A	Slight	Slight	Slight	Loblolly pine--------	73	98	Loblolly pine.
					Shortleaf pine-------	68	106	
					White oak----------	76	58	
					Northern red oak-----	72	82	
					Hickory----------	---	---	
					Yellow-poplar--------	---	---	
					Southern red oak-----	---	---	
VrA, VrB---------- Varina	8A	Slight	Slight	Slight	Loblolly pine--------	85	120	Loblolly pine.
					Longleaf pine--------	70	79	
					White oak----------	---	---	
					Hickory----------	---	---	
					Sweetgum----------	---	---	
WaB---------- Wagram	8S	Slight	Moderate	Moderate	Loblolly pine--------	82	114	Loblolly pine,
					Longleaf pine--------	67	72	longleaf pine.
					Black oak----------	---	---	
					Hickory----------	---	---	
Wh---------- Wahee	9W	Slight	Moderate	Moderate	Loblolly pine--------	86	123	Loblolly pine,
					Sweetgum----------	90	106	sweetgum, American
					Water oak----------	---	---	sycamore, water oak.
					Swamp chestnut oak---	---	---	
					Willow oak----------	---	---	
WoB, WoD---------- Wedowee	8A	Slight	Slight	Slight	Loblolly pine--------	80	110	Loblolly pine,
					Shortleaf pine-------	69	108	Virginia pine,
					Southern red oak-----	70	52	shortleaf pine,
					Northern red oak-----	70	50	yellow-poplar.
					White oak----------	65	48	
Wt---------- Wehadkee	8W	Slight	Severe	Moderate	Sweetgum----------	94	119	Yellow-poplar,
					Yellow-poplar--------	100	107	loblolly pine,
					Loblolly pine--------	93	138	sweetgum, American
					Water oak----------	91	87	sycamore.
					White ash----------	---	---	
					American sycamore----	---	---	
Ww**:								
Wehadkee----------	8W	Slight	Severe	Moderate	Sweetgum----------	94	119	Yellow-poplar,
					Yellow-poplar--------	100	107	loblolly pine,
					Loblolly pine--------	93	138	sweetgum, American
					Water oak----------	91	87	sycamore.
					White ash----------	---	---	
					American sycamore----	---	---	
Chastain----------	8W	Slight	Severe	Severe	Sweetgum----------	95	122	Sweetgum.
					Water oak----------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaA Altavista	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
AmB*: Appling	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
Marlboro	Slight	Slight	Moderate: slope.	Slight	Slight.
AsA Augusta	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
AuA Autryville	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
Bb Bibb	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding, too sandy.	Severe: wetness.	Severe: wetness, flooding.
BnA Blanton	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
BoA Bonneau	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
CeB Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
CeC Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Ch Chewacla	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
CoB Cowarts	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
CoC Cowarts	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
DoA Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
FaA Faceville	Slight	Slight	Slight	Slight	Slight.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FaB---- Faceville	Slight	Slight	Moderate: slope.	Slight	Slight.
FuA---- Fuquay	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
GeB---- Gilead	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
GeD---- Gilead	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
GoA---- Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
Gr---- Grantham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
LaB---- Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
Le---- Leaf	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Ly---- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MaA---- Marlboro	Slight	Slight	Slight	Slight	Slight.
MaB---- Marlboro	Slight	Slight	Moderate: slope.	Slight	Slight.
McB*:					
Marlboro----	Slight	Slight	Moderate: slope.	Slight	Slight.
Cecil----	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
Na---- Nahunta	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
NkB---- Nankin	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
NnB---- Nason	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
NnD---- Nason	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
NnE Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
NoA Norfolk	Slight	Slight	Slight	Slight	Moderate: droughty.
NoB Norfolk	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
NuA*: Norfork	Slight	Slight	Slight	Slight	Moderate: droughty.
Urban land.					
PaD Pacolet	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
PaE Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Pn Pantego	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Ra Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RbA*: Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.					
RnF Rion	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ro Roanoke	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
StA State	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Ta Tarboro	Severe: flooding.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
Tn Toisnot	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
To Tomotley	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
UcB, UcC Uchee	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones, too sandy.	Moderate: too sandy.	Moderate: droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ud. Udorthents					
VaB Vance	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight	Slight.
VrA Varina	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Moderate: droughty.
VrB Varina	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Moderate: droughty.
WaB Wagram	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Wh Wahee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WoB Wedowee	Slight	Slight	Moderate: slope.	Slight	Slight.
WoD Wedowee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Wt Wehadkee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ww*: Wehadkee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Chastain	Severe: flooding, wetness, too clayey.	Severe: wetness, too clayey.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaA---------- Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
AmB*:										
Appling----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Marlboro----------	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AsA---------- Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
AuA---------- Autryville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Bb---------- Bibb	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
BnA---------- Blanton	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BoA---------- Bonneau	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CeB---------- Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeC---------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ch---------- Chewacla	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
CoB, CoC---------- Cowarts	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
DoA---------- Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
FaA---------- Faceville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FaB---------- Faceville	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FuA---------- Fuquay	Fair	Fair	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
GeB---------- Gilead	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GeD---------- Gilead	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GoA---- Goldsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Gr---- Grantham	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
LaB---- Lakeland	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Le---- Leaf	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Ly---- Lynchburg	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
MaA, MaB---- Marlboro	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
McB*:										
Marlboro----	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Cecil----	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Na---- Nahunta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
NkB---- Nankin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NnB---- Nason	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NnD---- Nason	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NnE---- Nason	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
NoA, NoB---- Norfolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NuA*:										
Norfork.										
Urban land.										
PaD---- Pacolet	Poor	Fair	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PaE---- Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Pn---- Pantego	Very poor.	Very poor.	Very poor.	Fair	Fair	Good	Good	Very poor.	Fair	Good.
Ra---- Rains	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
RbA*:										
Rains.										
Urban land.										
RnF---------- Rion	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Ro---------- Roanoke	Poor	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
StA---------- State	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ta---------- Tarboro	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Tn---------- Toisnot	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
To---------- Tomotley	Very poor.	Very poor.	Poor	Fair	Fair	Good	Good	Very poor.	Poor	Good.
UcB, UcC---------- Uchee	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Ud. Udorthents										
VaB---------- Vance	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
VrA, VrB---------- Varina	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WaB---------- Wagram	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Wh---------- Wahee	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
WoB, WoD---------- Wedowee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Wt---------- Wehadkee	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
Ww*:										
Wehadkee----------	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
Chastain----------	Very poor.	Poor	Poor	Fair	Poor	Good	Good	Poor	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaA Altavista	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
AmB*: Appling	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Moderate: small stones.
Marlboro	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
AsA Augusta	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
AuA Autryville	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty, too sandy.
Bb Bibb	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
BnA Blanton	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
BoA Bonneau	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty, too sandy.
CeB Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
CeC Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Ch Chewacla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
CoB Cowarts	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
CoC Cowarts	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
DoA Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
FaA Faceville	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
FaB---- Faceville	Moderate: too clayey.	Slight----	Slight----	Moderate: slope.	Moderate: low strength.	Slight.
FuA---- Fuquay	Slight----	Slight----	Moderate: wetness.	Slight----	Slight----	Severe: droughty.
GeB---- Gilead	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Moderate: wetness.
GeD---- Gilead	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, wetness, slope.	Moderate: wetness, slope.
GoA---- Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
Gr---- Grantham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
LaB---- Lakeland	Severe: cutbanks cave.	Slight----	Slight----	Slight----	Slight----	Moderate: droughty, too sandy.
Le---- Leaf	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
Ly---- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MaA---- Marlboro	Moderate: too clayey, wetness.	Slight----	Moderate: wetness.	Slight----	Slight----	Slight.
MaB---- Marlboro	Moderate: too clayey, wetness.	Slight----	Moderate: wetness.	Moderate: slope.	Slight----	Slight.
McB*:						
Marlboro----	Moderate: too clayey.	Slight----	Slight----	Moderate: slope.	Moderate: low strength.	Slight.
Cecil----	Moderate: too clayey.	Slight----	Slight----	Moderate: slope.	Moderate: low strength.	Moderate: small stones.
Na---- Nahunta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
NkB---- Nankin	Moderate: too clayey.	Slight----	Slight----	Moderate: slope.	Slight----	Slight.
NnB---- Nason	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NnD---------- Nason	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
NnE---------- Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
NoA---------- Norfolk	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
NoB---------- Norfolk	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Moderate: droughty.
NuA*: Norfork----------	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
Urban land.						
PaD---------- Pacolet	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
PaE---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pn---------- Pantego	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding.
Ra---------- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
RbA*: Rains----------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
RnF---------- Rion	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ro---------- Roanoke	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
StA---------- State	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Ta---------- Tarboro	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
Tn---------- Toisnot	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
To---------- Tomotley	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
UcB, UcC---------- Uchee	Severe: cutbanks cave.	Slight---------	Moderate: wetness, shrink-swell.	Moderate: slope.	Slight---------	Moderate: droughty.
Ud. Udorthents						
VaB---------- Vance	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
VrA---------- Varina	Moderate: too clayey, wetness.	Slight---------	Moderate: wetness.	Slight---------	Moderate: low strength.	Moderate: droughty.
VrB---------- Varina	Moderate: too clayey, wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Moderate: low strength.	Moderate: droughty.
WaB---------- Wagram	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Wh---------- Wahee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
WoB---------- Wedowee	Moderate: too clayey.	Slight---------	Slight---------	Moderate: shrink-swell, slope.	Moderate: low strength.	Slight.
WoD---------- Wedowee	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Wt---------- Wehadkee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
Ww*: Wehadkee---------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
Chastain---------	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaA Altavista	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness, too clayey.
AmB*: Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
Marlboro	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
AsA Augusta	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
AuA Autryville	Moderate: wetness.	Severe: seepage.	Severe: wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Bb Bibb	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
BnA Blanton	Moderate: wetness.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy.
BoA Bonneau	Severe: wetness.	Severe: seepage.	Severe: wetness.	Severe: seepage.	Good.
CeB Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
CeC Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
Ch Chewacla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
CoB Cowarts	Severe: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
CoC Cowarts	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
DoA---------- Dogue	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
FaA---------- Faceville	Slight----------	Moderate: seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey.
FaB---------- Faceville	Slight----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
FuA---------- Fuquay	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
GeB---------- Gilead	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, hard to pack.
GeD---------- Gilead	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, hard to pack, slope.
GoA---------- Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Gr---------- Grantham	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
LaB---------- Lakeland	Slight----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Le---------- Leaf	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ly---------- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
MaA---------- Marlboro	Moderate: percs slowly, wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
MaB---------- Marlboro	Moderate: percs slowly, wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
McB*: Marlboro----------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
Cecil----------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Na Nahunta	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
NkB Nankin	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
NnB Nason	Moderate: depth to rock, percs slowly.	Moderate: slope, seepage, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
NnD Nason	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
NnE Nason	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
NoA, NoB Norfolk	Moderate: wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
NuA*: Norfork	Moderate: wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
Urban land.					
PaD Pacolet	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: too clayey, slope.
PaE Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Pn Pantego	Severe: flooding, ponding.	Severe: seepage, flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding.
Ra Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RbA*: Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Urban land.					
RnF Rion	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ro Roanoke	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
StA State	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding.	Fair: too clayey, thin layer.
Ta Tarboro	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
Tn Toisnot	Severe: cemented pan, ponding, percs slowly.	Severe: seepage, cemented pan, ponding.	Severe: ponding.	Severe: ponding, cemented pan.	Poor: cemented pan, ponding.
To Tomotley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
UcB, UcC Uchee	Severe: wetness, percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Ud. Udorthents					
VaB Vance	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
VrA Varina	Severe: percs slowly.	Slight	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
VrB Varina	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
WaB Wagram	Moderate: percs slowly.	Severe: seepage.	Slight	Severe: seepage.	Good.
Wh Wahee	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
WoB Wedowee	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
WoD Wedowee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Wt Wehadkee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness, thin layer.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ww*:					
Wehadkee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness, thin layer.
Chastain	Severe: flooding, wetness, percs slowly.	Severe: flooding, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: wetness, too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AaA Altavista	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
AmB*: Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
Marlboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
AsA Augusta	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
AuA Autryville	Good	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
Bb Bibb	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones.
BnA Blanton	Good	Probable	Improbable: too sandy.	Poor: too sandy.
BoA Bonneau	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
CeB, CeC Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ch Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CoB Cowarts	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
CoC Cowarts	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey, thin layer.
DoA Dogue	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too clayey.
FaA, FaB Faceville	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
FuA Fuquay	Good	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GeB, GeD---------- Gilead	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GoA---------- Goldsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Gr---------- Grantham	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
LaB---------- Lakeland	Good----------	Probable----------	Improbable: too sandy.	Poor: too sandy.
Le---------- Leaf	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
Ly---------- Lynchburg	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MaA, MaB---------- Marlboro	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
McB*: Marlboro----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Cecil----------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Na---------- Nahunta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
NkB---------- Nankin	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
NnB, NnD---------- Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, area reclaim.
NnE---------- Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope, area reclaim.
NoA, NoB---------- Norfolk	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
NuA*: Norfork----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Urban land.				
PaD---------- Pacolet	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PaE---- Pacolet	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Pn---- Pantego	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ra---- Rains	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RbA*: Rains----	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Urban land.				
RnF---- Rion	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Ro---- Roanoke	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
StA---- State	Good----	Probable----	Improbable: too sandy.	Fair: too clayey.
Ta---- Tarboro	Good----	Probable----	Improbable: too sandy.	Fair: too sandy.
Tn---- Toisnot	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
To---- Tomotley	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
UcB, UcC---- Uchee	Good----	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
Ud. Udorthents				
VaB---- Vance	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
VrA, VrB---- Varina	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
WaB---- Wagram	Good----	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Wh---- Wahee	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
WoB, WoD---- Wedowee	Good----	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Wt---- Wehadkee	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ww*:				
Wehadkee	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Chastain	Poor: wetness.	Probable	Improbable: excess fines.	Poor: too clayey, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AaA Altavista	Moderate: seepage.	Moderate: deep to water, slow refill.	Flooding	Wetness	Wetness, soil blowing.	Favorable.
AmB*: Appling	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope	Soil blowing	Favorable.
Marlboro	Moderate: seepage, slope.	Severe: no water.	Deep to water	Soil blowing, slope.	Favorable	Favorable.
AsA Augusta	Moderate: seepage.	Moderate: slow refill.	Flooding	Wetness, flooding.	Wetness, soil blowing.	Wetness.
AuA Autryville	Severe: seepage.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
Bb Bibb	Moderate: seepage.	Moderate: slow refill.	Flooding	Wetness, flooding.	Erodes easily, wetness.	Erodes easily, wetness.
BnA Blanton	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
BoA Bonneau	Severe: seepage.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Soil blowing	Droughty.
CeB Cecil	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope	Favorable	Soil blowing.
CeC Cecil	Severe: slope.	Severe: no water.	Deep to water	Slope	Slope	Slope, soil blowing.
Ch Chewacla	Moderate: seepage.	Moderate: slow refill.	Flooding	Wetness, flooding.	Wetness	Wetness.
CoB Cowarts	Moderate: slope, seepage.	Severe: no water.	Deep to water	Fast intake, percs slowly, slope.	Percs slowly	Slope, percs slowly, rooting depth.
CoC Cowarts	Severe: slope.	Severe: no water.	Deep to water	Fast intake, percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly, rooting depth.
DoA Dogue	Moderate: seepage.	Severe: slow refill, cutbanks cave.	Favorable	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
FaA Faceville	Moderate: seepage.	Severe: no water.	Deep to water	Favorable	Favorable	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
FaB---------- Faceville	Moderate: seepage.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
FuA---------- Fuquay	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
GeB---------- Gilead	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Slope, wetness, soil blowing.	Wetness, soil blowing.	Percs slowly.
GeD---------- Gilead	Severe: slope.	Severe: no water.	Percs slowly, slope.	Slope, wetness, soil blowing.	Slope, wetness, soil blowing.	Slope, percs slowly.
GoA---------- Goldsboro	Moderate: seepage.	Moderate: deep to water, slow refill.	Favorable------	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
Gr---------- Grantham	Slight---------	Severe: slow refill.	Favorable------	Wetness, soil blowing, erodes easily.	Erodes easily, wetness, soil blowing.	Wetness, erodes easily.
LaB---------- Lakeland	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
Le---------- Leaf	Slight---------	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ly---------- Lynchburg	Moderate: seepage.	Moderate: slow refill.	Favorable------	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
MaA---------- Marlboro	Moderate: seepage.	Moderate: deep to water.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
MaB---------- Marlboro	Moderate: seepage, slope.	Moderate: deep to water.	Deep to water	Soil blowing, slope.	Soil blowing---	Favorable.
McB*:						
Marlboro---------	Moderate: seepage, slope.	Severe: no water.	Deep to water	Soil blowing, slope.	Favorable------	Favorable.
Cecil----------	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope----------	Favorable------	Soil blowing.
Na---------- Nahunta	Slight---------	Severe: slow refill.	Favorable------	Wetness, erodes easily, soil blowing.	Erodes easily, wetness, soil blowing.	Wetness, erodes easily.
NkB---------- Nankin	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
NnB---------- Nason	Moderate: seepage, depth to rock, slope.	Severe: no water.	Deep to water	Erodes easily, slope.	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
NnD, NnE---------- Nason	Severe: slope.	Severe: no water.	Deep to water	Erodes easily, slope.	Slope, erodes easily.	Slope, erodes easily.
NoA---------- Norfolk	Moderate: seepage.	Moderate: deep to water, slow refill.	Deep to water	Fast intake, soil blowing.	Soil blowing---	Favorable.
NoB---------- Norfolk	Moderate: seepage, slope.	Moderate: deep to water, slow refill.	Deep to water	Slope, fast intake.	Soil blowing---	Favorable.
NuA*: Norfork----------	Moderate: seepage.	Moderate: deep to water, slow refill.	Deep to water	Fast intake, soil blowing.	Soil blowing---	Favorable.
Urban land.						
PaD, PaE---------- Pacolet	Severe: slope.	Severe: no water.	Deep to water	Slope----------	Soil blowing, slope.	Slope.
Pn---------- Pantego	Moderate: seepage.	Moderate: slow refill.	Ponding, flooding.	Ponding--------	Ponding, soil blowing.	Wetness.
Ra---------- Rains	Moderate: seepage.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness, soil blowing.	Wetness.
RbA*: Rains----------	Moderate: seepage.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness, soil blowing.	Wetness.
Urban land.						
RnF---------- Rion	Severe: seepage, slope.	Severe: no water.	Deep to water	Droughty, slope.	Soil blowing, slope.	Slope, droughty.
Ro---------- Roanoke	Severe: seepage.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
StA---------- State	Severe: seepage.	Severe: cutbanks cave.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
Ta---------- Tarboro	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty, rooting depth.
Tn---------- Toisnot	Moderate: cemented pan.	Severe: slow refill, cutbanks cave.	Cemented pan, percs slowly, ponding.	Ponding, droughty.	Cemented pan, erodes easily, ponding.	Wetness, erodes easily, droughty.
To---------- Tomotley	Moderate: seepage.	Severe: slow refill.	Favorable------	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
UcB, UcC---------- Uchee	Moderate: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Too sandy------	Droughty.
Ud. Udorthents						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
VaB---------- Vance	Moderate: slope.	Severe: no water.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
VrA---------- Varina	Slight---------	Severe: no water.	Deep to water	Droughty-------	Favorable------	Droughty.
VrB---------- Varina	Slight---------	Severe: no water.	Deep to water	Slope, droughty.	Favorable------	Droughty.
WaB---------- Wagram	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Soil blowing---	Droughty, rooting depth.
Wh---------- Wahee	Slight---------	Severe: slow refill.	Percs slowly, flooding.	Wetness--------	Wetness, percs slowly.	Wetness, percs slowly.
WoB---------- Wedowee	Moderate: slope, seepage.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
WoD---------- Wedowee	Severe: slope.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
Wt---------- Wehadkee	Moderate: seepage.	Moderate: slow refill.	Flooding-------	Wetness, soil blowing, flooding.	Wetness, soil blowing.	Wetness.
Ww*:						
Wehadkee---------	Moderate: seepage.	Moderate: slow refill.	Flooding-------	Wetness, soil blowing, flooding.	Wetness, soil blowing.	Wetness.
Chastain---------	Severe: seepage.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
AaA	0-11	Fine sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	95-100	90-100	65-99	35-60	<23	NP-7
Altavista	11-47	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	47-60	Variable	---	---	---	---	---	---	---	---	---
AmB*:											
Appling	0-10	Gravelly sandy loam.	SM, SC-SM, SC	A-2, A-1-b, A-4	5-15	70-95	55-85	40-75	15-40	<40	NP-10
	10-61	Sandy clay, clay loam, clay.	MH, ML, CL	A-7	0-5	95-100	90-100	70-95	51-80	41-74	15-30
	61-86	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6, A-7	0-5	95-100	85-100	70-90	40-75	25-45	8-22
	86-99	Variable	---	---	---	---	---	---	---	---	---
Marlboro	0-8	Sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0	98-100	95-100	75-100	30-60	<35	NP-7
	8-48	Sandy clay, clay loam, clay.	CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	78-100	51-70	25-48	6-20
	48-70	Sandy clay loam, sandy clay, clay.	CL, ML, SM, SC	A-4, A-6, A-7	0	98-100	95-100	74-100	45-70	24-48	6-20
AsA	0-11	Sandy loam	SM, SC-SM, ML	A-2, A-4	0	90-100	75-100	50-98	30-60	<25	NP-7
Augusta	11-43	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-100	51-80	20-45	5-25
	43-60	Variable	---	---	---	---	---	---	---	---	---
AuA	0-22	Sand	SP-SM, SM	A-2, A-3	0	100	100	50-100	5-20	---	NP
Autryville	22-31	Sandy loam, sandy clay loam, fine sandy loam.	SM	A-2	0	100	100	50-100	15-30	<25	NP-3
	31-58	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	100	50-100	5-20	---	NP
	58-70	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SC-SM	A-2, A-4	0	100	100	60-100	20-49	<30	NP-10
Bb	0-23	Sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0-5	95-100	90-100	60-90	30-60	<25	NP-7
Bibb	23-60	Sandy loam, loam, silt loam.	SM, SC-SM, ML, CL-ML	A-2, A-4	0-10	60-100	50-100	40-100	30-90	<30	NP-7
BnA	0-52	Sand	SP-SM, SM	A-3, A-2-4	0	100	90-100	65-100	5-20	---	NP
Blanton	52-97	Sandy clay loam, sandy loam, sandy clay.	SC, SC-SM, SM	A-4, A-2-4, A-2-6, A-6	0	100	95-100	69-100	25-50	12-45	3-22

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
BoA---------- Bonneau	0-28	Sand----------	SM, SP-SM	A-2, A-3	0	100	100	60-95	8-20	---	NP
	28-53	Sandy loam, sandy clay loam, fine sandy loam.	SC, SC-SM	A-2, A-6, A-4	0	100	100	60-100	30-50	21-40	4-21
	53-71	Sandy loam, sandy clay loam, sandy clay.	CL, SC, SC-SM, CL-ML	A-4, A-6, A-2	0	100	100	60-95	25-60	20-40	4-18
CeB---------- Cecil	0-9	Loam----------	SM, SC-SM	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-7
	9-72	Clay, clay loam	MH, ML	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
CeC---------- Cecil	0-15	Loam----------	SM, SC-SM	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-7
	15-52	Clay, clay loam	MH, ML	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	52-60	Variable---------	---	---	---	---	---	---	---	---	---
Ch---------- Chewacla	0-6	Loam----------	ML, CL, CL-ML	A-4, A-6, A-7	0	98-100	95-100	70-100	55-90	25-49	4-20
	6-32	Sandy clay loam, loam, sandy loam.	SM, SC-SM, ML, CL	A-4, A-7-6, A-6	0	96-100	95-100	60-100	36-70	20-45	2-15
	32-44	Silt loam, clay loam, silty clay loam.	ML, MH, CL, CH	A-4, A-6, A-7	0	75-100	65-100	60-100	51-98	22-61	4-28
	44-60	Variable---------	---	---	---	---	---	---	---	---	---
CoB, CoC--------- Cowarts	0-6	Loamy sand-------	SM	A-2	0	90-100	85-100	50-80	13-30	---	NP
	6-34	Sandy clay loam, sandy clay, clay loam.	SM, SC	A-6, A-7, A-2-6, A-2-7	0	95-100	90-100	60-95	25-50	30-54	11-25
	34-69	Sandy loam, sandy clay loam, clay loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6, A-7	0	85-100	80-100	60-95	25-58	25-53	5-20
DoA---------- Dogue	0-10	Fine sandy loam	SM, SC, SC-SM	A-2, A-4	0	95-100	75-100	50-100	20-50	<25	NP-10
	10-55	Clay loam, clay, sandy clay.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
	55-75	Stratified sand to sandy clay loam.	SM, SC, SP-SM, SC-SM	A-2, A-4, A-1	0	80-100	60-100	35-100	10-40	<30	NP-10
FaA---------- Faceville	0-13	Sandy loam-------	SM, SC-SM	A-2, A-4	0	90-100	85-100	72-97	17-38	<25	NP-7
	13-65	Sandy clay, clay, clay loam.	CL, SC, CH, ML	A-6, A-7	0	98-100	95-100	75-99	45-72	25-52	11-25
FaB---------- Faceville	0-7	Sandy loam-------	SM, SC-SM	A-2, A-4	0	90-100	85-100	72-97	17-38	<25	NP-7
	7-60	Sandy clay, clay, clay loam.	CL, SC, CH, ML	A-6, A-7	0	98-100	95-100	75-99	45-72	25-52	11-25
FuA---------- Fuquay	0-34	Sand----------	SP-SM, SM	A-1, A-2, A-3	0	95-100	90-100	45-80	5-20	---	NP
	34-45	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SC-SM	A-2, A-4, A-6	0	85-100	85-100	70-90	23-45	<45	NP-13
	45-96	Sandy clay loam	SC, SC-SM, SM	A-2, A-4, A-6, A-7-6	0	95-100	90-100	58-90	28-49	25-45	4-13
	96-99	Variable---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
GeB, GeD--------- Gilead	0-5	Sandy loam--------	SM	A-2	0-5	90-100	70-100	60-90	20-35	<30	NP-4
	5-9	Sandy loam, sandy clay loam.	SC-SM, SC	A-2, A-4, A-6	0-5	95-100	70-100	65-95	30-49	<30	4-16
	9-29	Sandy clay, clay loam, clay.	SC, CL, CH, ML	A-6, A-7, A-5, A-4	0-5	95-100	85-100	75-98	45-80	35-70	9-37
	29-38	Sandy loam, sandy clay loam.	SC, CL, CL-ML, SC-SM	A-2, A-6, A-4	0-5	95-100	85-100	70-98	30-60	<32	4-16
	38-75	Variable---------	---	---	---	---	---	---	---	---	---
GoA--------- Goldsboro	0-8	Sandy loam--------	SM, SC-SM, SC	A-2, A-4, A-6	0	95-100	95-100	50-100	15-45	<25	NP-14
	8-26	Sandy clay loam, sandy loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	60-100	25-55	16-37	4-18
	26-65	Sandy clay loam, clay loam, sandy clay.	SC, CL, CL-ML, CH	A-4, A-6, A-7-6	0	95-100	90-100	65-95	36-70	25-55	6-32
	65-70	Variable---------	---	---	---	---	---	---	---	---	---
Gr--------- Grantham	0-11	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	55-85	<30	NP-7
	11-94	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	90-100	60-95	22-49	8-30
LaB--------- Lakeland	0-48	Sand----------	SP-SM	A-3, A-2-4	0	90-100	90-100	60-100	5-12	---	NP
	48-73	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	90-100	90-100	50-100	1-12	---	NP
Le--------- Leaf	0-7	Silt loam--------	ML, CL	A-4, A-6	0	100	95-100	85-100	50-90	30-40	5-15
	7-75	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	95-100	90-100	75-95	42-65	20-38
Ly--------- Lynchburg	0-7	Sandy loam-------	SM, ML, SC-SM, CL-ML	A-2, A-4	0	92-100	90-100	75-100	25-55	<30	NP-7
	7-82	Sandy clay loam, sandy loam, clay loam.	SC-SM, SC, CL, CL-ML	A-2, A-4, A-6	0	92-100	90-100	70-100	25-67	15-40	4-18
MaA--------- Marlboro	0-5	Sandy loam-------	SM, ML	A-2, A-4	0	98-100	95-100	75-100	30-60	<35	NP-7
	5-62	Sandy clay, clay loam, clay.	CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	78-100	51-70	25-48	6-20
	62-73	Sandy clay loam, sandy clay, clay.	CL, ML, SM, SC	A-4, A-6, A-7	0	98-100	95-100	74-100	45-70	24-48	6-20
MaB--------- Marlboro	0-7	Sandy loam-------	SM, ML	A-2, A-4	0	98-100	95-100	75-100	30-60	<35	NP-7
	7-48	Sandy clay, clay loam, clay.	CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	78-100	51-70	25-48	6-20
	48-71	Sandy clay loam, sandy clay, clay.	CL, ML, SM, SC	A-4, A-6, A-7	0	98-100	95-100	74-100	45-70	24-48	6-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
McB*:											
Marlboro	0-13	Sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0	98-100	95-100	75-100	30-60	<35	NP-7
	13-45	Sandy clay, clay loam, clay.	CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	78-100	51-70	25-48	6-20
	45-88	Sandy clay loam, sandy clay, clay.	CL, ML, SM, SC	A-4, A-6, A-7	0	98-100	95-100	74-100	45-70	24-48	6-20
Cecil	0-8	Gravelly loam	SM, GM	A-2, A-1-b	5-15	60-95	55-85	40-75	13-30	<22	NP-4
	8-50	Clay, clay loam	MH, ML	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	50-72	Variable	---	---	---	---	---	---	---	---	---
Na	0-16	Silt loam	ML, CL-ML, CL	A-4	0	100	95-100	80-100	51-85	<25	NP-10
Nahunta	16-75	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	95-100	90-100	60-95	22-49	8-30
NkB	0-9	Fine sandy loam	SM, SC-SM	A-2, A-4	0	85-100	85-100	70-90	25-45	<25	NP-4
Nankin	9-50	Sandy clay, clay, sandy clay loam.	SC, CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	75-95	40-70	25-45	7-20
	50-63	Sandy clay loam, sandy loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	98-100	95-100	70-85	25-55	20-40	4-16
NnB	0-4	Silt loam	ML, CL-ML, CL	A-4, A-6	0-5	80-100	75-100	55-95	50-85	15-35	NP-15
Nason	4-45	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	45-56	Channery silt loam, silt loam, loam.	CL-ML, SC, GM-GC, CL	A-2, A-4, A-6	0-5	50-80	45-75	40-75	30-70	20-35	4-12
	56	Weathered bedrock	---	---	---	---	---	---	---	---	---
NnD	0-7	Silt loam	ML, CL-ML, CL	A-4, A-6	0-5	80-100	75-100	55-95	50-85	15-35	NP-15
Nason	7-24	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	24-45	Channery silt loam, silt loam, loam.	CL-ML, SC, GM-GC, CL	A-2, A-4, A-6	0-5	50-80	45-75	40-75	30-70	20-35	4-12
	45	Weathered bedrock	---	---	---	---	---	---	---	---	---
NnE	0-6	Silt loam	ML, CL-ML, CL	A-4, A-6	0-5	80-100	75-100	55-95	50-85	15-35	NP-15
Nason	6-36	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	36-42	Channery silt loam, silt loam, loam.	CL-ML, SC, GM-GC, CL	A-2, A-4, A-6	0-5	50-80	45-75	40-75	30-70	20-35	4-12
	42	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
NoA	0-14	Loamy sand	SM	A-2	0	95-100	92-100	50-95	13-30	<20	NP
Norfolk	14-58	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	95-100	91-100	70-96	30-63	20-38	4-15
	58-70	Sandy clay loam, clay loam, sandy clay.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7-6	0	100	98-100	65-98	36-72	20-52	4-23
NoB	0-14	Loamy sand	SM	A-2	0	95-100	92-100	50-95	13-30	<20	NP
Norfolk	14-38	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	95-100	91-100	70-96	30-63	20-38	4-15
	38-70	Sandy clay loam, clay loam, sandy clay.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7-6	0	100	98-100	65-98	36-72	20-52	4-23
	70-99	Variable	---	---	---	---	---	---	---	---	---
NuA*:											
Norfork	0-14	Loamy sand	SM	A-2	0	95-100	92-100	50-95	13-30	<20	NP
	14-58	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	95-100	91-100	70-96	30-63	20-38	4-15
	58-70	Sandy clay loam, clay loam, sandy clay.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7-6	0	100	98-100	65-98	36-72	20-52	4-23
Urban land.											
PaD	0-5	Loam	SM, SC-SM	A-2, A-1-b, A-4	0-2	85-100	80-100	42-90	16-42	<28	NP-7
Pacolet	5-25	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	25-35	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	35-60	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-2	80-100	70-100	60-90	25-50	<28	NP-6
PaE	0-8	Loam	SM, SC-SM	A-2, A-1-b, A-4	0-2	85-100	80-100	42-90	16-42	<28	NP-7
Pacolet	8-28	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	28-35	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SC-SM, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
	35-60	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-2	80-100	70-100	60-90	25-50	<28	NP-6
Pn	0-26	Loam	SM, ML	A-2, A-4	0	100	100	70-95	30-65	<35	NP-7
Pantego	26-72	Sandy clay loam, clay loam, fine sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6, A-7	0	100	100	75-98	36-70	18-45	NP-22

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Ra	0-5	Sandy loam	SM, ML, SC-SM	A-2, A-4	0	100	95-100	50-85	25-56	<35	NP-10
Rains	5-44	Sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	55-98	30-70	18-40	4-20
	44-62	Sandy clay loam, clay loam, sandy clay.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7	0	100	98-100	60-98	36-72	18-45	4-28
	62-88	Sandy loam, sandy clay loam, sandy clay.	SM, SC, ML, CL	A-2, A-4, A-6	0	100	95-100	60-95	30-60	15-40	3-18
RbA*:											
Rains	0-5	Sandy loam	SM, ML	A-2, A-4	0	100	95-100	50-85	25-56	<35	NP-10
	5-44	Sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	55-98	30-70	18-40	4-20
	44-62	Sandy clay loam, clay loam, sandy clay.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7	0	100	98-100	60-98	36-72	18-45	4-28
	62-88	Sandy loam, sandy clay loam, sandy clay.	SM, SC, ML, CL	A-2, A-4, A-6	0	100	95-100	60-95	30-60	15-40	3-18
Urban land.											
RnF	0-8	Sandy loam	SM	A-2, A-4	0-2	90-100	85-100	60-80	20-45	<35	NP-7
Rion	8-32	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL-ML, CL	A-2, A-4, A-6	0-2	90-100	85-100	60-85	30-60	20-35	5-15
	32-60	Sandy loam, sandy clay loam, loamy sand.	SC, SM, SC-SM	A-2, A-4, A-6	0-2	90-100	80-100	60-85	15-50	<36	NP-12
Ro	0-8	Loam	SC-SM, CL-ML, CL, SC	A-4, A-6	0	95-100	85-100	60-100	35-90	20-35	5-16
Roanoke	8-13	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	85-100	80-100	80-95	35-45	14-20
	13-55	Clay, silty clay, clay loam.	CH, CL	A-7	0	90-100	85-100	85-100	65-95	45-70	22-40
	55-60	Stratified sand to clay.	CL-ML, GM-GC, CH, SM	A-1, A-2, A-4	0-5	40-100	35-100	25-95	15-90	10-60	NP-40
StA	0-9	Sandy loam	SM, ML, CL-ML, SC-SM	A-2, A-4	0	95-100	95-100	45-85	25-55	<28	NP-7
State	9-32	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	95-100	95-100	75-100	35-80	24-40	8-22
	32-60	Stratified sand to fine sandy loam.	SM, SC-SM, SP-SM	A-1, A-2, A-3, A-4	0	85-100	60-100	40-90	5-50	<25	NP-7
Ta	0-10	Loamy sand	SM, SP-SM, SW-SM	A-2, A-3, A-1	0	95-100	95-100	40-99	8-35	---	NP
Tarboro	10-72	Sand, coarse sand, loamy sand.	SP, SP-SM, SW-SM, SM	A-2, A-3, A-1	0	95-100	90-100	45-100	3-15	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Tn Toisnot	0-4	Loam	CL-ML, CL	A-4, A-6	0	100	100	85-95	60-75	20-30	5-15
	4-30	Sandy loam, fine sandy loam.	SM, SC-SM, SC	A-2, A-4	0	100	100	60-85	30-49	<25	NP-10
	30-58	Loamy sand, sandy loam.	SM, SC-SM	A-2, A-4	0	100	100	50-75	20-49	<25	NP-7
	58-65	Stratified sand to loam.	CL, SC	A-4, A-6	0	100	100	60-95	36-60	25-40	7-20
To Tomotley	0-8	Sandy loam	SM, SC-SM	A-2, A-4	0	98-100	95-100	75-99	25-50	<30	NP-7
	8-40	Fine sandy loam, sandy clay loam, clay loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	75-100	30-70	20-40	6-23
	40-60	Variable	---	---	---	---	---	---	---	---	---
UcB Uchee	0-30	Loamy coarse sand	SM	A-2, A-1-b	0	90-100	80-100	40-70	15-30	---	NP
	30-41	Sandy clay loam, sandy clay, clay.	MH, CH, CL, SC	A-7	0	90-100	80-100	65-90	40-70	41-70	18-38
	41-60	Sandy loam, sandy clay loam, sandy clay.	MH, CH, CL, SC	A-6, A-7, A-2-6, A-2-7	0	85-100	80-100	50-80	30-65	35-65	15-35
UcC Uchee	0-30	Loamy coarse sand	SM	A-2, A-1-b	0	90-100	80-100	40-70	15-30	---	NP
	30-53	Sandy clay loam, sandy clay, clay.	MH, CH, CL, SC	A-7	0	90-100	80-100	65-90	40-70	41-70	18-38
	53-60	Sandy loam, sandy clay loam, sandy clay.	MH, CH, CL, SC	A-6, A-7, A-2-6, A-2-7	0	85-100	80-100	50-80	30-65	35-65	15-35
Ud. Udorthents											
VaB Vance	0-8	Coarse sandy loam	SM, SC-SM	A-2, A-4	0-5	90-100	80-100	55-80	15-40	<27	NP-7
	8-32	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	32-60	Variable	---	---	---	---	---	---	---	---	---
VrA Varina	0-14	Loamy sand	SM, SP-SM	A-2	0-5	95-100	92-100	70-90	10-35	<20	NP-3
	14-38	Sandy clay, clay loam, clay.	SC, MH, ML, SM	A-6, A-7	0	95-100	92-100	80-95	36-65	36-60	11-25
	38-99	Sandy clay, clay loam, clay.	SC, CL, CH	A-4, A-6, A-7	0	95-100	92-100	75-95	36-68	28-53	8-26
VrB Varina	0-13	Loamy sand	SM, SP-SM	A-2	0-5	95-100	92-100	70-90	10-35	<20	NP-3
	13-41	Sandy clay, clay loam, clay.	SC, MH, ML, SM	A-6, A-7	0	95-100	92-100	80-95	36-65	36-60	11-25
	41-65	Sandy clay, clay loam, clay.	SC, CL, CH	A-4, A-6, A-7	0	95-100	92-100	75-95	36-68	28-53	8-26
WaB Wagram	0-28	Loamy sand	SM, SP-SM	A-2, A-3	0	100	98-100	50-85	8-35	---	NP
	28-80	Sandy clay loam, sandy loam.	SC	A-2, A-4, A-6, A-7	0	100	98-100	60-95	31-49	21-41	8-25
Wh Wahee	0-9	Loam	ML, CL-ML, CL	A-4	0	100	100	90-98	51-75	20-35	2-10
	9-42	Clay, clay loam, silty clay.	CL, CH	A-6, A-7	0	100	100	85-100	51-92	38-81	16-54
	42-60	Variable	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Wt	0-7	Loam	SM, SC, SC-SM	A-2, A-4	0	100	95-100	60-90	30-50	<30	NP-10
Wehadkee	7-63	Variable	---	---	---	---	---	---	---	---	---
WoB, WoD	0-9	Sandy loam	SM, SC-SM	A-4, A-2-4	0	95-100	90-100	50-99	23-50	<30	NP-6
Wedowee	9-15	Loam, sandy clay loam.	SM, SC, CL, ML	A-4, A-6	0	90-100	90-100	80-97	40-75	<32	NP-15
	15-32	Sandy clay, clay loam, clay.	SC, ML, CL, MH	A-6, A-7	0	95-100	95-100	65-97	45-75	30-58	10-30
	32-60	Sandy clay loam, clay loam, sandy loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	80-100	70-100	60-80	30-60	20-35	5-15
Ww*:											
Wehadkee	0-7	Loam	SM, SC, SC-SM	A-2, A-4	0	100	95-100	60-90	30-50	<30	NP-10
	7-63	Variable	---	---	---	---	---	---	---	---	---
Chastain	0-4	Silty clay	ML, CL, MH, CH	A-6, A-7	0	100	100	90-100	75-98	35-75	12-40
	4-60	Silty clay loam, clay loam, silty clay.	CL, CH, ML, MH	A-6, A-7	0	100	100	95-100	85-98	35-75	12-40

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AaA	0-11	10-20	1.30-1.50	2.0-6.0	0.12-0.20	3.6-6.5	Low	0.24	5	.5-3
Altavista	11-47	18-35	1.30-1.50	0.6-2.0	0.12-0.20	3.6-6.0	Low	0.24		
	47-60	---	---	---	---	---				
AmB*:										
Appling	0-10	5-30	1.45-1.65	2.0-6.0	0.08-0.13	4.5-6.5	Low	0.15	4	.5-2
	10-61	35-60	1.25-1.45	0.6-2.0	0.15-0.17	4.5-5.5	Low	0.28		
	61-86	20-50	1.25-1.45	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28		
	86-99	---	---	---	---	---				
Marlboro	0-8	5-20	1.30-1.60	2.0-6.0	0.09-0.14	4.5-6.5	Low	0.20	5	.5-2
	8-48	35-65	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low	0.20		
	48-70	30-60	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.20		
AsA	0-11	5-20	1.40-1.70	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.20	4	.5-2
Augusta	11-43	20-35	1.35-1.60	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.24		
	43-60	---	---	0.6-20.0	---	---				
AuA	0-22	2-10	1.60-1.70	>6.0	0.04-0.09	4.5-6.5	Low	0.10	5	.5-1
Autryville	22-31	10-25	1.40-1.60	2.0-6.0	0.08-0.13	4.5-5.5	Low	0.10		
	31-58	2-8	1.60-1.70	>6.0	0.03-0.08	4.5-5.5	Low	0.10		
	58-70	10-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.17		
Bb	0-23	2-18	1.25-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.20	5	.5-2
Bibb	23-60	2-18	1.30-1.60	0.6-2.0	0.12-0.20	4.5-5.5	Low	0.37		
BnA	0-52	1-7	1.30-1.60	6.0-20	0.03-0.07	4.5-6.0	Low	0.10	5	.5-1
Blanton	52-97	12-40	1.60-1.70	0.2-2.0	0.10-0.15	4.5-5.5	Low	0.20		
BoA	0-28	2-8	1.30-1.70	6.0-20	0.04-0.08	4.5-6.0	Low	0.10	5	.5-2
Bonneau	28-53	13-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.20		
	53-71	15-40	1.40-1.60	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.20		
CeB	0-9	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-6.5	Low	0.28	4	.5-2
Cecil	9-72	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28		
CeC	0-15	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-6.5	Low	0.28	4	.5-2
Cecil	15-52	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28		
	52-60	---	---	---	---	---				
Ch	0-6	10-35	1.30-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low	0.28	5	1-4
Chewacla	6-32	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.5	Low	0.28		
	32-44	18-35	1.30-1.50	0.6-2.0	0.15-0.24	4.5-7.8	Low	0.32		
	44-60	---	---	---	---	---				
CoB, CoC	0-6	3-10	1.30-1.70	2.0-6.0	0.06-0.10	4.5-5.5	Low	0.15	4	<1
Cowarts	6-34	25-40	1.30-1.50	0.2-2.0	0.10-0.16	4.5-5.5	Low	0.28		
	34-69	18-35	1.45-1.75	0.06-0.6	0.10-0.14	4.5-5.5	Low	0.24		
DoA	0-10	5-10	1.35-1.50	2.0-6.0	0.08-0.15	3.6-5.5	Low	0.28	5	.5-1
Dogue	10-55	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-5.5	Moderate	0.28		
	55-75	5-30	1.30-1.50	0.6-6.0	0.05-0.14	3.6-5.5	Low	0.17		
FaA	0-13	5-20	1.40-1.65	6.0-20	0.06-0.09	4.5-5.5	Low	0.28	5	.5-2
Faceville	13-65	35-55	1.25-1.60	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.37		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
FaB	0-7	5-20	1.40-1.65	6.0-20	0.06-0.09	4.5-5.5	Low	0.28	5	.5-2
Faceville	7-60	35-55	1.25-1.60	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.37		
FuA	0-34	1-7	1.60-1.70	>6.0	0.03-0.07	4.5-6.0	Low	0.10	5	.5-2
Fuquay	34-45	10-35	1.40-1.60	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.20		
	45-96	20-35	1.40-1.60	0.06-0.2	0.10-0.13	4.5-6.0	Low	0.20		
	96-99	---	---	---	---	---	---	----		
GeB, GeD	0-5	6-18	1.50-1.60	2.0-6.0	0.08-0.12	4.5-5.5	Low	0.20	3	.5-2
Gilead	5-9	10-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	9-29	35-60	1.40-1.60	0.06-0.6	0.12-0.16	4.5-5.5	Low	0.28		
	29-38	10-35	1.50-1.70	0.2-0.6	0.10-0.15	4.5-5.5	Low	0.24		
	38-75	---	---	---	---	4.5-5.5	---	----		
GoA	0-8	5-15	1.40-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.20	5	.5-2
Goldsboro	8-26	18-30	1.30-1.50	0.6-2.0	0.11-0.17	3.6-5.5	Low	0.24		
	26-65	20-34	1.30-1.40	0.6-2.0	0.11-0.20	3.6-5.5	Low	0.24		
	65-70	---	---	---	---	---	---	----		
Gr	0-11	6-18	1.30-1.50	2.0-6.0	0.13-0.20	3.6-5.5	Low	0.37	5	2-4
Grantham	11-94	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.43		
LaB	0-48	2-8	1.35-1.65	6.0-20	0.05-0.09	4.5-6.0	Low	0.10	5	.5-1
Lakeland	48-73	1-6	1.50-1.60	6.0-20	0.02-0.08	4.5-6.0	Low	0.10		
Le	0-7	12-25	1.30-1.50	0.06-0.2	0.20-0.22	3.6-5.5	Low	0.32	4	1-3
Leaf	7-75	35-60	1.50-1.60	<0.06	0.18-0.21	3.6-5.5	High	0.32		
Ly	0-7	5-20	1.30-1.60	2.0-6.0	0.09-0.13	3.6-5.5	Low	0.20	5	.5-5
Lynchburg	7-82	18-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.20		
MaA	0-5	5-20	1.30-1.60	2.0-6.0	0.09-0.14	5.1-6.5	Low	0.20	5	.5-2
Marlboro	5-62	35-65	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low	0.20		
	62-73	30-60	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.20		
MaB	0-7	5-20	1.30-1.60	2.0-6.0	0.09-0.14	5.1-6.5	Low	0.20	5	.5-2
Marlboro	7-48	35-65	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low	0.20		
	48-71	30-60	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.20		
McB*:										
Marlboro	0-13	5-20	1.30-1.60	2.0-6.0	0.09-0.14	5.1-6.5	Low	0.20	5	.5-2
	13-45	35-65	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low	0.20		
	45-88	30-60	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.20		
Cecil	0-8	5-20	1.40-1.60	2.0-6.0	0.07-0.09	4.5-6.5	Low	0.15	4	.5-2
	8-50	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28		
	50-72	---	---	---	---	---	---	----		
Na	0-16	6-18	1.30-1.50	2.0-6.0	0.15-0.20	3.6-5.5	Low	0.43	5	2-4
Nahunta	16-75	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.43		
NkB	0-9	7-20	1.45-1.55	2.0-6.0	0.08-0.12	4.5-5.5	Low	0.28	3	.5-1
Nankin	9-50	35-50	1.30-1.70	0.2-0.6	0.11-0.16	4.5-5.5	Low	0.24		
	50-63	15-35	1.60-1.70	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
NnB	0-4	10-27	1.25-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.43	4	1-3
Nason	4-45	35-50	1.30-1.60	0.6-2.0	0.12-0.19	4.5-5.5	Moderate	0.28		
	45-56	10-25	1.25-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28		
	56	---	---	0.0-0.06	---	---	---	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
NnD	0-7	10-27	1.25-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.43	4	1-3
Nason	7-24	35-50	1.30-1.60	0.6-2.0	0.12-0.19	4.5-5.5	Moderate	0.28		
	24-45	10-25	1.25-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28		
	45	---	---	0.0-0.06	---	---				
NnE	0-6	10-27	1.25-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.43	4	1-3
Nason	6-36	35-50	1.30-1.60	0.6-2.0	0.12-0.19	4.5-5.5	Moderate	0.28		
	36-42	10-25	1.25-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28		
	42	---	---	0.0-0.06	---	---				
NoA	0-14	2-8	1.55-1.70	6.0-20	0.06-0.11	3.6-5.5	Low	0.17	5	.5-2
Norfolk	14-58	18-35	1.30-1.65	0.6-2.0	0.10-0.18	3.6-5.5	Low	0.24		
	58-70	20-43	1.20-1.65	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.24		
NoB	0-14	2-8	1.55-1.70	6.0-20	0.06-0.11	3.6-5.5	Low	0.17	5	.5-2
Norfolk	14-38	18-35	1.30-1.65	0.6-2.0	0.10-0.18	3.6-5.5	Low	0.24		
	38-70	20-43	1.20-1.65	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.24		
	70-99	---	---	---	---	---				
NuA*:										
Norfork	0-14	2-8	1.55-1.70	6.0-20	0.06-0.11	3.6-5.5	Low	0.17	5	.5-2
	14-58	18-35	1.30-1.65	0.6-2.0	0.10-0.18	3.6-5.5	Low	0.24		
	58-70	20-43	1.20-1.65	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.24		
Urban land.										
PaD	0-5	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	3	.5-2
Pacolet	5-25	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.28		
	25-35	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low	0.28		
	35-60	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low	0.28		
PaE	0-8	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	3	.5-2
Pacolet	8-28	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.28		
	28-35	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low	0.28		
	35-60	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low	0.28		
Pn	0-26	5-20	1.20-1.50	2.0-6.0	0.10-0.16	4.5-6.5	Low	0.17	5	2-9
Pantego	26-72	18-35	1.30-1.60	0.6-2.0	0.12-0.18	4.5-6.5	Low	0.24		
Ra	0-5	5-20	1.30-1.60	2.0-6.0	0.10-0.14	3.6-6.5	Low	0.20	5	1-6
Rains	5-44	18-35	1.30-1.60	0.6-2.0	0.11-0.15	3.6-5.5	Low	0.24		
	44-62	18-40	1.30-1.50	0.6-2.0	0.10-0.15	3.6-5.5	Low	0.28		
	62-88	15-45	1.30-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low	0.28		
RbA*:										
Rains	0-5	5-20	1.30-1.60	2.0-6.0	0.10-0.14	3.6-6.5	Low	0.20	5	1-6
	5-44	18-35	1.30-1.60	0.6-2.0	0.11-0.15	3.6-5.5	Low	0.24		
	44-62	18-40	1.30-1.50	0.6-2.0	0.10-0.15	3.6-5.5	Low	0.28		
	62-88	15-45	1.30-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low	0.28		
Urban land.										
RnF	0-8	5-20	1.30-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low	0.24	3	.5-2
Rion	8-32	18-35	1.40-1.50	0.6-2.0	0.08-0.15	4.5-6.5	Low	0.20		
	32-60	2-20	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.5	Low	0.20		
Ro	0-8	10-27	1.20-1.50	0.6-2.0	0.14-0.20	3.6-5.5	Low	0.37	4	.5-2
Roanoke	8-13	20-35	1.20-1.50	<20	0.16-0.19	3.6-5.5	Moderate	0.24		
	13-55	35-60	1.35-1.65	<0.2	0.10-0.19	3.6-5.5	Moderate	0.24		
	55-60	5-50	1.20-1.50	0.06-20	0.04-0.14	3.6-6.5	Moderate	0.24		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
StA	0-9	5-15	1.25-1.40	0.6-6.0	0.08-0.15	3.6-5.5	Low	0.28	5	<2
State	9-32	18-34	1.35-1.50	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.28		
	32-60	2-15	1.35-1.50	>2.0	0.02-0.10	3.6-6.0	Low	0.17		
Ta	0-10	3-12	1.60-1.75	6.0-20	0.05-0.09	4.5-6.5	Low	0.10	5	.5-1
Tarboro	10-72	2-7	1.60-1.75	>20	0.02-0.06	4.5-6.5	Low	0.10		
Tn	0-4	7-17	1.30-1.50	2.0-6.0	0.15-0.20	4.5-5.5	Low	0.15	3	.5-2
Toisnot	4-30	5-15	1.45-1.65	0.2-0.6	0.10-0.15	4.5-5.5	Low	0.32		
	30-58	7-17	1.45-1.65	0.06-0.2	<0.06	4.5-5.5	Low	0.43		
	58-65	15-30	1.25-1.35	0.06-0.2	0.10-0.18	4.5-5.5	Low	0.37		
To	0-8	5-20	1.30-1.60	2.0-6.0	0.10-0.15	3.6-5.5	Low	0.20	5	1-6
Tomotley	8-40	18-35	1.30-1.50	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.20		
	40-60	---	---	---	---	---	---	---		
UcB	0-30	3-10	1.30-1.70	6.0-20	0.05-0.10	4.5-5.5	Low	0.10	5	<1
Uchee	30-41	25-50	1.40-1.60	0.2-0.6	0.10-0.16	4.5-5.5	Moderate	0.28		
	41-60	15-40	1.40-1.60	0.2-2.0	0.10-0.16	4.5-5.5	Moderate	0.28		
UcC	0-30	3-10	1.30-1.70	6.0-20	0.05-0.10	4.5-5.5	Low	0.10	5	<1
Uchee	30-53	25-50	1.40-1.60	0.2-0.6	0.10-0.16	4.5-5.5	Moderate	0.28		
	53-60	15-40	1.40-1.60	0.2-2.0	0.10-0.16	4.5-5.5	Moderate	0.28		
Ud.										
Udorthents										
VaB	0-8	8-20	1.45-1.70	2.0-6.0	0.10-0.14	4.5-6.0	Low	0.24	3	.5-2
Vance	8-32	35-60	1.25-1.40	0.06-0.2	0.12-0.15	4.5-5.5	Moderate	0.28		
	32-60	---	---	---	---	---	---	---		
VrA	0-14	3-10	1.50-1.70	6.0-20	0.05-0.09	4.5-6.5	Low	0.15	4	.5-2
Varina	14-38	35-60	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
	38-99	30-55	1.30-1.50	0.06-0.2	0.06-0.09	4.5-5.5	Low	0.28		
VrB	0-13	3-10	1.50-1.70	6.0-20	0.05-0.09	4.5-6.5	Low	0.15	4	.5-2
Varina	13-41	35-60	1.30-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
	41-65	30-55	1.30-1.50	0.06-0.2	0.06-0.09	4.5-5.5	Low	0.28		
WaB	0-28	2-10	1.60-1.75	6.0-20	0.05-0.08	4.5-6.0	Low	0.15	5	.5-2
Wagram	28-80	10-35	1.35-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low	0.20		
Wh	0-9	10-27	1.20-1.50	0.2-2.0	0.15-0.20	4.5-6.0	Low	0.28	5	.5-5
Wahee	9-42	35-60	1.40-1.60	0.06-0.2	0.12-0.20	3.6-5.5	Moderate	0.28		
	42-60	---	---	---	---	---	---	---		
WoB, WoD	0-9	5-20	1.25-1.60	2.0-6.0	0.10-0.18	4.0-5.5	Low	0.24	3	<1
Wedowee	9-15	14-30	1.30-1.55	0.6-2.0	0.12-0.18	4.0-5.5	Low	0.28		
	15-32	35-45	1.30-1.50	0.6-2.0	0.12-0.18	4.0-5.5	Low	0.28		
	32-60	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.0-5.5	Low	0.28		
Wt	0-7	5-20	1.35-1.60	2.0-6.0	0.10-0.15	4.5-6.5	Low	0.24	5	2-5
Wehadkee	7-63	---	---	---	---	---	---	---		
Ww*:										
Wehadkee	0-7	5-20	1.35-1.60	2.0-6.0	0.10-0.15	4.5-6.5	Low	0.24	5	2-5
	7-63	---	---	---	---	---	---	---		
Chastain	0-4	27-50	1.20-1.40	0.06-0.2	0.12-0.16	4.5-6.0	Moderate	0.28	5	1-6
	4-60	35-60	1.30-1.50	0.06-0.2	0.12-0.16	4.5-6.0	Moderate	0.37		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AaA---------- Altavista	C	Occasional	Very brief	Mar-Jul	1.5-2.5	Apparent	Dec-Apr	>60	---	Moderate	Moderate.
AmB*:											
Appling----------	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Marlboro----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
AsA---------- Augusta	C	Occasional	Brief-----	Jan-May	1.0-2.0	Apparent	Dec-May	>60	---	High-----	Moderate.
AuA---------- Autryville	A	None--------	---	---	4.0-6.0	Apparent	Jan-Apr	>60	---	Low------	High.
Bb---------- Bibb	D	Frequent----	Brief to long.	Dec-May	0.5-1.5	Apparent	Dec-Apr	>60	---	High-----	Moderate.
BnA---------- Blanton	A	None--------	---	---	4.0-6.0	Perched	Mar-Aug	>60	---	High-----	High.
BoA---------- Bonneau	A	None--------	---	---	3.5-5.0	Apparent	Dec-Mar	>60	---	Low------	High.
CeB, CeC---------- Cecil	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Ch---------- Chewacla	C	Frequent----	Brief to long.	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	Moderate.
CoB, CoC---------- Cowarts	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
DoA---------- Dogue	C	None--------	---	---	1.5-3.0	Apparent	Jan-Mar	>60	---	High-----	High.
FaA, FaB---------- Faceville	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
FuA---------- Fuquay	B	None--------	---	---	4.0-6.0	Perched	Jan-Mar	>60	---	Low------	High.
GeB, GeD---------- Gilead	C	None--------	---	---	1.5-2.5	Perched	Jan-Mar	>60	---	Moderate	High.
GoA---------- Goldsboro	B	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	>60	---	Moderate	High.
Gr---------- Grantham	D	None--------	---	---	0-1.0	Apparent	Dec-May	>60	---	High-----	High.
LaB---------- Lakeland	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Le---------- Leaf	D	None--------	---	---	0.5-1.5	Apparent	Jan-Apr	>60	---	High-----	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
Ly Lynchburg	C	None	---	---	0.5-1.5	Apparent	Nov-Apr	>60	---	High	High.
MaA, MaB Marlboro	B	None	---	---	4.0-6.0	Apparent	Dec-Mar	>60	---	High	High.
McB*:											
Marlboro	B	None	---	---	4.0-6.0	Apparent	Dec-Mar	>60	---	High	High.
Cecil	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Na Nahunta	C	None	---	---	1.0-2.5	Apparent	Dec-May	>60	---	High	High.
NkB Nankin	C	None	---	---	>6.0	---	---	>60	---	High	High.
NnB, NnD, NnE Nason	C	None	---	---	>6.0	---	---	40-60	Soft	Moderate	High.
NoA, NoB Norfolk	B	None	---	---	4.0-6.0	Apparent	Jan-Mar	>60	---	Moderate	High.
NuA*:											
Norfork	B	None	---	---	4.0-6.0	Apparent	Jan-Mar	>60	---	Moderate	High.
Urban land.											
PaD, PaE Pacolet	B	None	---	---	>6.0	---	---	>60	---	High	High.
Pn Pantego	D	Occasional	Long	Dec-Apr	+1-1.0	Apparent	Nov-Apr	>60	---	High	High.
Ra Rains	B/D	None	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High	High.
RbA*:											
Rains	B/D	None	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High	High.
Urban land.											
RnF Rion	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Ro Roanoke	D	Occasional	Brief	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High	High.
StA State	B	Occasional	Brief	Dec-Jun	4.0-6.0	Apparent	Dec-Jun	>60	---	Moderate	High.
Ta Tarboro	A	Rare	---	---	>6.0	---	---	>60	---	Low	Moderate.
Tn Toisnot	D	None	---	---	+.5-1.0	Apparent	Dec-Apr	>60	---	High	High.
To Tomotley	B/D	Rare	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
UcB, UcC---------- Uchee	A	None---------	---	---	3.5-5.0	Perched	Jan-Apr	>60	---	Low-------	High.
Ud. Udorthents											
VaB---------- Vance	C	None---------	---	---	>6.0	---	---	>60	---	High------	High.
VrA, VrB---------- Varina	C	None---------	---	---	4.0-5.0	Perched	Dec-Apr	>60	---	Moderate	High.
WaB---------- Wagram	A	None---------	---	---	>6.0	---	---	>60	---	Low-------	High.
Wh---------- Wahee	D	Occasional	Very brief to brief.	Dec-Apr	0.5-1.5	Apparent	Dec-Mar	>60	---	High------	High.
WoB, WoD---------- Wedowee	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High.
Wt---------- Wehadkee	D	Frequent----	Brief to long.	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High------	Moderate.
Ww*: Wehadkee---------	D	Frequent----	Brief to long.	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High------	Moderate.
Chastain---------	D	Frequent----	Very long	Dec-Apr	0-1.0	Apparent	Nov-May	>60	---	High------	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. NP, means nonplastic; LL, liquid limit; PI, plasticity index; MD, maximum dry density; and OM, optimum moisture)

Soil name, report number, horizon, and depth in inches*	Classification		Grain-size distribution: Percentage passing sieve-- No. 4	No. 10	No. 40	No. 200	Percentage smaller than-- .02 mm	.005 mm	.002 mm	LL	PI	Moisture density: MD	OM
	AASHTO	Unified								Pct		Lb/ cu ft	Pct
Lynchburg sandy loam: (S82NC101-17)													
Ap-------- 0 to 7	A-4(0)	ML, SM	100	100	98	50	24	10	7	17	NP	119	11
Btg1------ 16 to 54	A-6(3)	CL	100	100	99	54	31	23	19	24	11	121	11
Btg2------ 54 to 71	A-6(5)	SC	100	100	99	48	35	29	26	35	18	111	17
Rains sandy loam: (S82NC101-13)													
Ap-------- 0 to 5	A-4(0)	SC-SM	100	96	77	45	29	18	10	24	6	110	14
Btg2------ 10 to 44	A-6(5)	CL	100	95	76	52	41	29	25	34	16	114	15
Btg3------ 44 to 62	A-7-6(9)	CL	100	95	73	50	35	30	28	42	26	112	15

* Location of pedon sampled is the same as that given for the typical pedon in "Soil Series and Their Morphology."

TABLE 18.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
*Appling	Clayey, kaolinitic, thermic Typic Kanhapludults
Augusta	Fine-loamy, mixed, thermic Aeric Endoaquults
Autryville	Loamy, siliceous, thermic Arenic Paleudults
Bibb	Coarse-loamy, siliceous, acid, thermic Typic Fluvaquents
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Bonneau	Loamy, siliceous, thermic Arenic Paleudults
Cecil	Clayey, kaolinitic, thermic Typic Kanhapludults
Chastain	Fine, mixed, acid, thermic Typic Fluvaquents
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Cowarts	Fine-loamy, siliceous, thermic Typic Kanhapludults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Faceville	Clayey, kaolinitic, thermic Typic Kandiudults
Fuquay	Loamy, siliceous, thermic Arenic Plinthic Kandiudults
Gilead	Clayey, kaolinitic, thermic Aquic Hapludults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Grantham	Fine-silty, siliceous, thermic Typic Paleaquults
Lakeland	Thermic, coated Typic Quartzipsamments
Leaf	Clayey, mixed, thermic Typic Albaquults
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Marlboro	Clayey, kaolinitic, thermic Typic Paleudults
Nahunta	Fine-silty, siliceous, thermic Aeric Paleaquults
Nankin	Clayey, kaolinitic, thermic Typic Kanhapludults
Nason	Clayey, mixed, thermic Typic Hapludults
Norfolk	Fine-loamy, siliceous, thermic Typic Kandiudults
Norfork	Fine-loamy, siliceous, thermic Typic Kandiudults
Pacolet	Clayey, kaolinitic, thermic Typic Kanhapludults
Pantego	Fine-loamy, siliceous, thermic Typic Umbraquults
Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
Rion	Fine-loamy, mixed, thermic Typic Hapludults
Roanoke	Clayey, mixed, thermic Typic Endoaquults
State	Fine-loamy, mixed, thermic Typic Hapludults
Tarboro	Mixed, thermic Typic Udipsamments
Toisnot	Coarse-loamy, siliceous, thermic Typic Fragiaquults
Tomotley	Fine-loamy, mixed, thermic Typic Endoaquults
Uchee	Loamy, siliceous, thermic Arenic Hapludults
Udorthents	Udorthents
Vance	Clayey, mixed, thermic Typic Hapludults
Varina	Clayey, kaolinitic, thermic Plinthic Paleudults
Wagram	Loamy, siliceous, thermic Arenic Kandiudults
Wahee	Clayey, mixed, thermic Aeric Endoaquults
Wedowee	Clayey, kaolinitic, thermic Typic Kanhapludults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents

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