United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
North Carolina Department of
Natural Resources and
Community Development,
North Carolina Agricultural
Research Service,
North Carolina Agricultural
Extension Service, and
Lee County
Board of Commissioners

Soil Survey of Lee County, North Carolina

How To Use This Soil Survey

General Soil Map

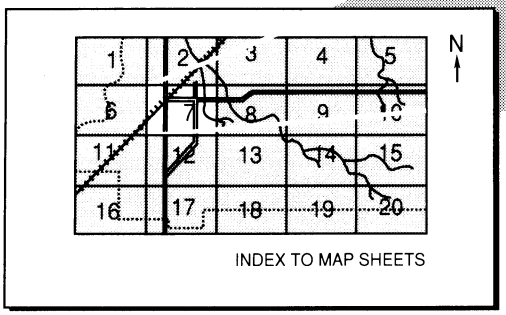
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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.

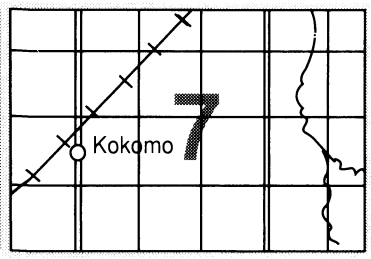
Detailed Soil Maps

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.

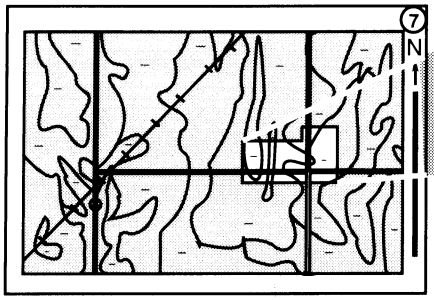


INDEX TO MAP SHEETS

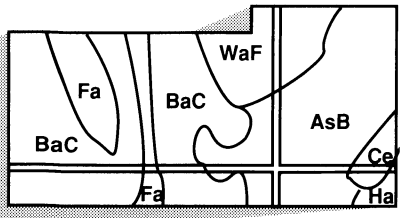


MAP SHEET

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 Agricultural Experiment Stations, 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 1981. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This soil survey was made cooperatively by the Soil Conservation Service and the North Carolina Department of Natural Resources and Community Development, North Carolina Agricultural Research Service, North Carolina Agricultural Extension Service, and Lee County Board of Commissioners. It is part of the technical assistance furnished to the Lee County Soil and Water Conservation District.

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.

This soil survey updates the first soil survey of Lee County, which was published in 1933, and provides additional information.

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.

Contents

Soil Series

Issued September 1989

Index to Map Units

Summary of Tables

Foreword

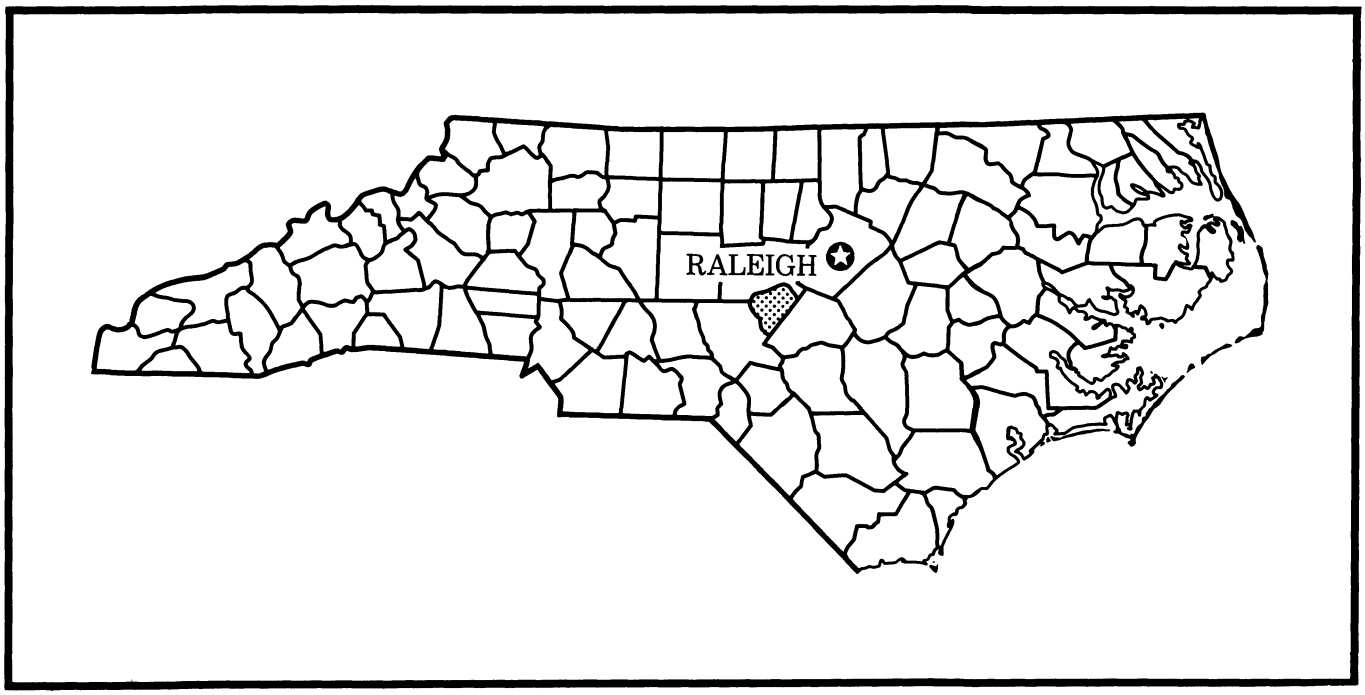
This soil survey contains information that can be used in land-planning programs in Lee County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of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

This soil survey is designed for many different users. Farmers, ranchers, 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 insure 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 use as 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 Cooperative Extension Service.

Bobbye Jack Jones
State Conservationist
Soil Conservation Service



Location of Lee County in North Carolina.

Soil Survey of
Lee County, North Carolina

By Jerry V. Stimpson, Soil Conservation Service

Soils surveyed by Jerry V. Stimpson and Johnson C. Jenkins,
Soil Conservation Service, and Perry W. Wyatt,
North Carolina Department of Natural Resources and Community Development

United States Department of Agriculture, Soil Conservation Service,
In cooperation with
North Carolina Department of Natural Resources and Community Development,
North Carolina Agricultural Research Service,
North Carolina Agricultural Extension Service, and
Lee County Board of Commissioners

General Nature of the Survey Area

LEE COUNTY is an agricultural, industrial, and urban county in the central part of North Carolina. The county, which was formed on February 16, 1907, from parts of Moore and Chatham Counties, is the 98th county in the state. It was named in honor of General Robert E. Lee *(15)*. Lee County is bounded on the north by Chatham County, on the east by Harnett County, and on the south and west by Moore County. According to the 1980 Census, the county's population was 36,718. The city of Sanford is the county seat.

The county has a land area of about 163,200 acres. It is in the Piedmont Plateau and the upper Coastal Plain physiographic provinces. The Piedmont Plateau consists of nearly level to steep upland areas in the Piedmont. The area has been dissected by numerous streams. The upper Coastal Plain is somewhat less rolling, but ground relief conforms more to that of the Piedmont Plateau than to the more level, lower Coastal Plain farther east in the state.

Lee County is primarily agricultural but is rapidly becoming an industrial and urban county. Tobacco makes up about 80 percent of the total value of crops marketed. Soybeans, corn, small grains, hay, and truck crops account for the rest. Livestock is also important to the economy. Well diversified industry, government at all levels, educational institutions, wholesale and retail outlets, and transportation also contribute substantially to the economy of the county *(10, 12)*.

Business, Industry, and Mining

Lee County has a growing and prosperous economic base representing a variety of manufacturing and industrial enterprises. Sanford is the retail trade center for Lee County and for parts of the surrounding counties. Retail and wholesale establishments bring in more than 300 million dollars annually.

The county has valuable shale deposits used in making brick and clay products and is one of the nation's largest brick-producing centers (fig. 1). One of the largest coal deposits in North Carolina is near Buckhorn Dam in Lee County. Iron ore is also in this area. Coal and iron were mined in the county from Civil War days to the 1930's *(10)*.

Transportation

U.S. Highway 1, which runs from Maine to Florida, passes through the county. Other highways include U.S. Highways 421 and 15-501 and North Carolina Highways 42, 78, and 87 *(13)*. The county is also served by Seaboard Coastline Railroad and Southern Railroad.

Figure 1.—Mayodan soils are removed to expose sediment used in brick production.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Lee county is hot and generally humid in summer because of the moist maritime air. Winter is moderately cold but short because the mountains to the west protect the area against many cold waves. Precipitation is quite evenly distributed throughout the year and is adequate for all crops. Every few years late in summer or in autumn, a tropical storm moves inland from the Atlantic Ocean and causes extremely heavy rain for 1 to 3 days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Moncure, North Carolina, in the period 1951 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 40 degrees F, and the average daily minimum temperature is 26 degrees. The lowest temperature on record, which occurred at Moncure, on January 31, 1966, is -4 degrees. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 88 degrees. The highest recorded temperature, which occurred on June 28, 1954, is 107 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 47 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 22 inches. The heaviest 1-day rainfall during the period of record was 5.14 inches at Moncure on August 11, 1967. Thunderstorms occur on about 45 days each year, and most occur in summer.

The average seasonal snowfall is 5 inches. The greatest snow depth at any one time during the period of record was 9 inches. On the average, only one day has at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

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.

Water Resources

Lee County has an abundant water supply with about 235 miles of streams and more than 2,000 acres of small water areas. Pollutants, such as sediment, animal waste, fertilizer, chemicals, and septic system overflow, are a problem. Of these pollutants, sediment is the most extensive and is the direct result of soil erosion. This problem can be solved only if good soil conservation practices are applied to the land *(10)*.

An abundance of surface water is available from the Deep, Cape fear, and Upper Little Rivers. Sanford has a modern water treatment plant that pumps water from the Deep River. Water line expansion from the city into the rural areas is needed, especially west of Sanford where the Triassic sediment has a very irregular water table. Other areas of the county appear to have good ground water supplies.

Water is becoming more important in farming each year. The majority of tobacco farmers are now equipped to irrigate their crop. Because of the dry growing season, many farmers have recognized the feasibility of irrigating corn, soybeans, small grains, and other crops. The nearly 750 farm ponds built in Lee County over the years can be used as water sources for irrigation.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. 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 dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile 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.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable 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, acidity, and other features that enable them to identify soils. After describing the soils in the survey area 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. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were 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 were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability 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 always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit.

Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

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 several 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 soils of minor extent.

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 mentioned 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, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units 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.

Each map unit is rated for *cultivated crops, specialty crops, woodland, urban uses,* and *recreation areas.* Cultivated crops are those grown extensively in the survey area. Specialty crops are the vegetables and fruits that generally require intensive management. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments. Intensive recreation areas are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic. Extensive recreation areas are those used for nature study and as wilderness.

1. Mayodan-Pinkston

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

These soils are in the western and northern parts of Lee County. The areas of this map unit are broad, oblong, and irregular in shape.

This map unit makes up 40 percent of the county. It is 56 percent Mayodan soils, 37 percent Pinkston soils, and 7 percent soils of minor extent.

The Mayodan soils are gently sloping to moderately steep. They are on broad ridges and side slopes. The surface layer is fine sandy loam, and the subsoil is clay loam, silty clay, and silty clay loam.

The Pinkston soils are gently sloping to steep. They are on narrow ridges and side slopes. The surface layer and the subsoil are silt loam.

Of minor extent in this map unit are the Creedmoor, White Store, Chewacla, Wehadkee, and Congaree soils. The Creedmoor soils are moderately well drained or somewhat poorly drained and are in depressional areas. The White Store soils are moderately well drained and are higher on the landscape between Creedmoor and Mayodan soils. The Chewacla, Wehadkee, and Congaree soils are on flood plains of drainageways.

The soils of this map unit are mainly used as woodland (fig. 2), but about 20 percent of the acreage has been cleared and is used for tobacco, soybeans, and corn. In other areas, the soils are used for pasture or urban development. The main limitations are steepness of slope and the hazard of erosion. Depth to bedrock is also a limitation of the Pinkston soils.

2. Fuquay-Dothan

Nearly level to sloping, well drained soils that have a sandy surface layer and a loamy subsoil; on uplands

These soils are in the eastern and southern parts of the county. The areas of this map unit typically are irregular in shape.

This map unit makes up 15 percent of the county. It is 49 percent Fuquay soils, 39 percent Dothan soils, and 12 percent soils of minor extent.

The Fuquay soils are nearly level to gently sloping and well drained. They are on broad ridges. The surface layer is loamy sand, and the subsoil is sandy loam and sandy clay loam.

The Dothan soils are nearly level to sloping and well drained. They are on broad ridges. The surface layer is loamy sand, and the subsoil is sandy clay loam.

Of minor extent in this map unit are the Candor, Gilead, Wehadkee, Blaney, and Vaucluse soils. The Candor soils are somewhat excessively drained and are on broad, flat to gently sloping ridges. The Gilead soils are moderately well drained and are in lower positions on ridges and side slopes than the Fuquay and Dothan soils. The Wehadkee soils are poorly drained and are along intermittent drainageways. The Blaney soils are well drained and are near the outer edges of delineations. The Vaucluse soils are well drained and are on ridges and side slopes, mainly around Broadway.

About 60 percent of the acreage in this map unit has been cleared and is used for tobacco, soybeans, corn, sweet potatoes, or hay. The other cleared acreage is in

Figure 2.—Some woodland sites on Mayodan and Pinkston soils are cleared for use as cropland.

urban development, or it is used as pasture. The rest is woodland. The main limitations for most uses are droughtiness and steepness of slope.

3. Blaney-Gilead-Candor

Nearly level to strongly sloping, well drained, moderately well drained, and somewhat excessively drained soils that have a sandy surface layer and a loamy, clayey, or sandy subsoil; on uplands

These soils are in the southern part of the county. The areas of this map unit typically are irregular in shape. The Gilead part of the map unit is narrow and irregular in shape.

This map unit makes up 13 percent of the county. It is 41 percent Blaney soils, 32 percent Gilead soils, 17 percent Candor soils, and 10 percent soils of minor extent.

The Blaney soils are gently sloping to strongly sloping and well drained. They are on broad ridges and side slopes. The surface layer is loamy sand, and the subsoil is sandy clay loam.

The Gilead soils are gently sloping to strongly sloping and moderately well drained. They are on the more dissected ridges and side slopes in lower positions on the landscape than the Blaney soils. The surface layer is loamy sand, and the subsoil is sandy clay loam and sandy clay.

The Candor soils are nearly level to sloping and somewhat excessively drained. They are on broad ridges. The surface is sand, and the subsoil is loamy sand, sandy loam, and sandy clay loam.

Of minor extent in this map unit are the Wehadkee, Dothan, Fuquay, Tetotum, and Cecil soils. The Wehadkee soils are along intermittent drainageways and are poorly drained. The Dothan and Fuquay soils are on the outer fringes of delineations and are well drained. The Tetotum and Cecil soils are next to drainageways.

The Tetotum soils are moderately well drained, and the Cecil soils are well drained.

About 30 percent of the acreage in this map unit has been cleared and is used for tobacco, soybeans, sweet potatoes, hay, or peach orchards. Some areas are used for pasture or urban development. The rest is woodland. Droughtiness, steepness of slope, and the hazard of erosion are limitations for most uses of these soils.

4. Cecil-Pacolet-Durham

Gently sloping to steep, well drained soils that have a loamy or sandy surface layer and a clayey and loamy subsoil; on uplands

These soils are in the central and eastern parts of the county. The areas of this map unit typically are oblong and irregular in shape.

This map unit makes up 9 percent of the county. It is 49 percent Cecil soils, 25 percent Pacolet soils, 13 percent Durham soils, and 13 percent soils of minor extent.

The Cecil soils are gently sloping to strongly sloping. They are on ridges and smooth side slopes. The surface layer is fine sandy loam, and the subsoil is clay and clay loam.

The Pacolet soils are moderately steep to steep. They are on side slopes. The surface layer is fine sandy loam, and the subsoil is clay loam and clay.

The Durham soils are gently sloping to sloping. They are on broad ridges in transitional areas and between the Cecil soils and adjacent Coastal Plain soils. The surface layer is loamy sand, and the subsoil is sandy clay loam and sandy clay.

Of minor extent in this map unit are the Dothan, Blaney, Wehadkee, and Chewacla soils. The Dothan and Blaney soils are on broad ridges where the Coastal Plain and acid crystalline areas join. The Wehadkee and Chewacla soils are on flood plains of intermittent drainageways.

Most of the acreage of this map unit is woodland. About 15 percent of the acreage has been cleared and is used for tobacco, corn, and soybeans. The rest is used for pasture or urban development. Steepness of slope, surface runoff, and the hazard of erosion are limitations for most uses of these soils.

5. Tatum-Nason

Gently sloping to steep, well drained soils that have a loamy surface layer and a loamy subsoil; on uplands

One part of this map unit is in the northern part of the county between U.S. Highway 1 and Deep River, and the other is in the southeastern part of the county between Lemon Springs and Broadway. The areas of this map unit are oblong, narrow, and irregular in shape.

This map unit makes up 7 percent of the county. It is 45 percent Tatum soils, 39 percent Nason soils, and 16 percent soils of minor extent.

The Tatum soils are gently sloping to steep. They are on broad ridges and steep side slopes. The surface layer is silt loam, and the subsoil is silty clay loam.

The Nason soils are gently sloping to strongly sloping. They are on ridges and side slopes. The surface layer is silt loam, and the subsoil is silty clay loam.

Of minor extent in this map unit are the Mayodan, Pinkston, Dothan, Fuquay, and Wehadkee soils. The Mayodan soils are on ridges, and the Pinkston soils are on side slopes in transitional areas where the two parts of the unit meet. The Dothan and Fuquay soils are also in transitional areas. The Wehadkee soils are on flood plains of drainageways.

Most areas of this map unit are woodland. About 15 percent of the acreage in this map unit has been cleared and is used for corn, soybeans, tobacco, and small grains. The rest is used for pasture or urban development. The hazard of erosion and steepness of slope are limitations for the use of these soils.

6. Creedmoor-White Store

Gently sloping to strongly sloping, moderately well drained and somewhat poorly drained soils that have a loamy surface layer and a clayey and loamy subsoil; on uplands

The largest areas of this map unit are in the northeastern part of the county. The areas of this map unit typically are irregular in shape.

This map unit makes up 7 percent of the county. It is 60 percent Creedmoor soils, 29 percent White Store soils, and 11 percent soils of minor extent.

The Creedmoor soils are gently sloping to strongly sloping, moderately well drained and somewhat poorly drained. They generally are in broad, flat areas. The surface layer is fine sandy loam, and the subsoil is silty clay loam and silty clay.

The White Store soils are gently sloping to strongly sloping and moderately well drained. They are on the higher parts of the landscape and on side slopes. The surface layer is silt loam, and the subsoil is clay and silty clay loam.

Of minor extent in this map unit are the Mayodan, Pinkston, Chewacla, Wehadkee, and Congaree soils. The Mayodan soils are near major slope break areas, and the Pinkston soils are on narrow ridgetops and steeper side slopes than the Creedmoor and White Store soils. The Chewacla, Wehadkee, and Congaree soils are on flood plains of drainageways.

Most areas of this map unit are in woodland. A small acreage has been cleared and is used for soybeans, tobacco, and small grains. The rest is used as pasture. The main limitations for most uses are the hazard of erosion, very slow permeability, and high shrink-swell potential. The major soils in this map unit generally are not used for urban development because of the very slow permeability and high shrink-swell potential.

7. Chewacla-Wehadkee-Congaree

Nearly level, well drained to poorly drained soils that have a loamy surface layer and a loamy subsoil or underlying material; on flood plains

The largest areas of this map unit are along Deep River, Big Buffalo Creek, Lick Creek, Wallace Branch Creek, and Hughes Creek. The areas of this map unit typically are elongated and narrow and run parallel to the river or along the major drainageways.

This map unit makes up 5 percent of the county. It is 37 percent Chewacla soils, 31 percent Wehadkee soils, 30 percent Congaree soils, and 2 percent soils of minor extent.

The Chewacla soils are somewhat poorly drained. They are between the Congaree soils and the toe slope of uplands. The surface layer is silt loam, and the subsoil is silty clay loam and loam.

The Wehadkee soils are poorly drained. They are between the Chewacla soils and the toe slope of uplands on flood plains and are parallel to intermittent streams. The surface layer is fine sandy loam, and the subsoil is sandy clay loam.

The Congaree soils are well drained to moderately well drained. They are adjacent to stream channels, generally in a higher position on the landscape than the Chewacla soils. The surface layer is silt loam, and the underlying material is loam, fine sandy loam, and sandy loam.

Of minor extent in this map unit are Tetotum, Wickham, State, and Roanoke soils. The Tetotum soils are moderately well drained and are on low stream terraces. The Wickham and State soils are well drained and are in higher positions on stream terraces than the Chewacla, Congaree, and Wehadkee soils. The Roanoke soils are poorly drained and are in depressions on stream terraces.

Most areas of this map unit are woodland. About 30 percent of the acreage has been cleared and is used for soybeans and corn. The rest is pasture. The main limitations for most uses are the hazard of flooding and a high water table.

8. Tetotum-Wickham-State

Nearly level to sloping, well drained to moderately well drained soils that have a loamy surface layer and a loamy subsoil; on stream terraces

The largest area of this map unit is above flood plains along the Deep River. The areas of this map unit typically are oblong and irregular in shape.

This unit makes up 4 percent of the county. It is 57 percent Tetotum soils, 25 percent Wickham soils, 16 percent State soils, and 2 percent soils of minor extent.

The Tetotum soils are nearly level to gently sloping and moderately well drained. They are in lower positions on the stream terraces than the Wickham and State soils. The surface layer is fine sandy loam, and the subsoil is silty clay loam and clay loam.

The Wickham soils are gently sloping to sloping and well drained. They are in higher positions on the stream terrace than the Tetotum and State soils. The surface layer is sandy loam, and the subsoil is sandy clay loam.

The State soils are nearly level and well drained. They generally are between the Tetotum and Wickham soils on stream terraces. The surface layer is fine sandy loam, and the subsoil is sandy clay loam.

Of minor extent in this map unit are the Chewacla, Congaree, Wehadkee, and Roanoke soils. The Chewacla soils are in lower positions on flood plains than the Tetotum soils and are somewhat poorly drained. The Congaree soils are adjacent to the stream channel on flood plains and are well drained to moderately well drained. The Wehadkee soils are adjacent to the terrace in the lowest position on the flood plains, and the Roanoke soils are in low, depressional areas on stream terraces. These soils are poorly drained.

Most areas of this map unit are woodland. About 35 percent of the acreage in this map unit has been cleared and is used for soybeans, corn, and small grains. The rest is pasture. The main limitation of the Tetotum soil is wetness. Erosion is a hazard on the Wickham and State soils.

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, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives 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, Mayodan fine sandy loam, 2 to 8 percent slopes, is one of several phases in the Mayodan series.

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

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. Mayodan-Urban land complex, 2 to 8 percent slopes, 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.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Udorthents, loamy, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown 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 potentials for many uses. The Glossary defines many of the terms used in describing the soils.

BaB—Blaney loamy sand, 2 to 8 percent slopes. This soil is well drained and is in interstream areas on the upper Coastal Plain in the Sandhill Region. The areas of this soil are elongated and irregular in shape and range from 5 to over 100 acres.

Typically, the surface layer is dark grayish brown loamy sand 3 inches thick. The subsurface layer to a depth of 28 inches is light yellowish brown loamy sand. The subsoil to a depth of 49 inches is yellowish brown sandy clay loam. The underlying material to a depth of 60 inches is mottled brownish yellow, strong brown, and light gray sandy loam that has pockets of sandy clay loam.

Permeability is rapid in the surface and subsurface layers and moderately slow in the subsoil. The available water capacity is low. This soil ranges from very strongly acid to medium acid in the surface and subsurface layers and is very strongly acid or strongly acid in the subsoil.

Included with this soil in mapping are small areas of Candor, Dothan, Fuquay, Gilead, Nason, Tatum, Cecil, and Vaucluse soils. Candor, Dothan, and Fuquay soils are slightly higher on the landscape than the Blaney soil. The Candor soils are mainly south of Lemon Springs. Gilead soils are around the head of drainageways. Nason and Tatum soils are on small knolls just before the slope breaks, mostly around the Upper Little River. Cecil soils are on small knolls just before the slope breaks, mostly north of Broadway and along Fall Creek. Vaucluse soils are in areas around Broadway. Also included are some areas of soils that have a moderately permeable subsoil.

This Blaney soil is mainly used as cropland. It is also used as woodland or pasture.

This soil is suited to row crops, particularly if it is irrigated. It is also suited to hay and pasture. Leaching of plant nutrients, low available water capacity, and runoff are the main limitations. Wind erosion is a hazard. Conservation tillage, cover crops, residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, hickory, white oak, and southern red oak. The understory includes flowering dogwood, sassafras, greenbrier, red maple, and sourwood. The main limitation for woodland use is droughtiness.

This soil is suited to most urban and recreational uses. Droughtiness and moderately slow permeability of the subsoil are the main limitations.

This Blaney soil is in capability subclass IIIs. The woodland ordination symbol is 3s.

BaD—Blaney loamy sand, 8 to 15 percent slopes. This soil is well drained and is in interstream areas and on toe slopes in the Sandhill Region. The areas of this soil are elongated and irregular in shape and range from 5 to over 100 acres.

Typically, the surface layer is dark grayish brown loamy sand 3 inches thick. The subsurface layer to a depth of 28 inches is light yellowish brown loamy sand. The subsoil to a depth of 49 inches is yellowish brown sandy clay loam. The underlying material to a depth of 60 inches is mottled brownish yellow, strong brown, light gray sandy loam that has pockets of sandy clay loam.

The permeability is rapid in the surface and subsurface layers and moderately slow in the subsoil. The available water capacity is low. This soil ranges from very strongly acid to medium acid in the surface and subsurface layers and is very strongly acid or strongly acid in the subsoil.

Included with this soil in mapping are small areas of Fuquay, Dothan, Gilead, and Vaucluse soils. Fuquay and Dothan soils are in areas that have slopes of about 8 percent. Gilead soils are in lower-lying parts of the area. Vaucluse soils are south of Broadway in landscape positions similar to those of the Blaney soil.

This Blaney soil is mainly used as woodland or pasture. In some areas, it is used as cropland.

This soil is poorly suited to row crops and small grains. It is suited to hay and pasture. Leaching of plant nutrients, steepness of slope, low available water capacity, and runoff are the main limitations. Erosion is a hazard if this soil is cultivated. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly and longleaf pines. The understory includes flowering dogwood, sassafras, greenbrier, red maple, and sourwood. Droughtiness and steepness of slope are the main limitations for woodland use.

This soil is suited to most urban and recreational uses. Droughtiness, steepness of slope, and moderately slow permeability of the subsoil are the main limitations. This soil is poorly suited to light industry because of the steepness of slope.

This Blaney soil is in capability subclass IVs. The woodland ordination symbol is 3s.

CaB—Candor sand, 0 to 8 percent slopes. This soil is somewhat excessively drained and is in broad interstream areas and on rounded side slopes in the Sandhill Region. The areas of this soil are large and irregular in shape and range from 5 to more than 100 acres.

Typically, the surface layer is brown sand 9 inches thick. The subsurface layer to a depth of 25 inches is light yellowish brown sand. The upper part of the subsoil to a depth of 35 inches is yellowish brown loamy sand. The next layer is very pale brown sand. The lower part of the subsoil to a depth of 94 inches is yellowish brown sandy loam, strong brown sandy clay loam, and red sandy loam. The underlying material to a depth of 99 inches is light red sandy loam.

Permeability is rapid or very rapid in the sandy surface layer and subsoil and moderate below that. The available water capacity is low. This soil is very strongly acid or strongly acid except where lime has been added.

Included with this soil in mapping are small areas of Blaney soils. These soils are slightly lower on the landscape than the Candor soil.

About half the acreage of the Candor soil is cropland. The rest is woodland, pasture, or in use for subdivisions and golf courses.

This soil is poorly suited to most crops; however, corn, tobacco, and soybeans are grown. Droughtiness and leaching of plant nutrients are the main limitations, and wind erosion is a hazard. Conservation tillage, cover crops, crop residue management, and windbreaks help control wind erosion and reduce leaching.

The dominant trees on this soil are loblolly pine, longleaf pine, hickory, southern red oak, post oak, blackjack oak, and turkey oak. The understory includes pineland threeawn, sweetgum, black oak, flowering dogwood, and sassafras. The sandy surface material is the main limitation for woodland use.

This soil is suited to most urban uses. Seepage and caving of trench banks are the main limitations. Because of droughtiness and the leaching of plant nutrients, lawns and shrubs are difficult to establish and maintain in some areas. Watering the plants and adding plant nutrients help overcome these limitations. This soil is poorly suited to recreational uses because of droughtiness.

This Candor soil is in capability subclass IVs. The woodland ordination symbol is 3s.

CfB—Cecil fine sandy loam, 2 to 8 percent slopes. This soil is well drained and is in narrow to broad, smooth interstream areas on Piedmont uplands. The areas of this soil are oblong and range from 5 to 200 acres.

Typically, the surface layer is yellowish red fine sandy loam 6 inches thick. The subsoil extends to a depth of 60 inches. The upper part is red clay, and the lower part is red clay loam. The underlying material to a depth of 70 inches is mottled red, strong brown, and pale brown saprolite that crushes to sandy loam.

Permeability is moderate, and available water capacity is moderate. Except where lime has been added, this soil ranges from very strongly acid to medium acid in the surface layer and is very strongly acid or strongly acid in the subsoil.

Included with this soil in mapping are small intermingled areas of Durham soils that have a loamy sand surface layer and a brown, less clayey subsoil than that of the Cecil soil.

This Cecil soil is mainly used as cropland. In some areas, it is used for hay, pasture, or as woodland.

This soil is suited to corn, soybeans, tobacco, small grains, and horticultural crops. Steepness of slope is the main limitation, and erosion is a hazard. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are hickory, white oak, black oak, northern red oak, southern red oak, sweetgum, loblolly pine, Virginia pine, and shortleaf pine. The understory includes flowering dogwood, red maple, sourwood, eastern redcedar, American holly, redbud, black cherry, pin oak, and sassafras.

This soil is well suited to most urban and recreational uses. Moderate permeability is a limitation for septic tank absorption fields.

This Cecil soil is in capability subclass IIe. The woodland ordination symbol is 3o.

CfD—Cecil fine sandy loam, 8 to 15 percent slopes. This soil is well drained and is on narrow side slopes on Piedmont uplands. The areas are oblong and range from 5 to 50 acres.

Typically, the surface layer is yellowish red fine sandy loam 6 inches thick. The subsoil extends to a depth of 60 inches. The upper part is red clay, and the lower part is red clay loam. The underlying material to a depth of 70 inches is mottled red, strong brown, and pale brown sandy loam.

Permeability is moderate, and the available water capacity is moderate. This soil ranges from very strongly acid to medium acid in the surface layer and is very strongly acid or strongly acid in the subsoil.

Included with this soil in mapping are small intermingled areas of Durham soils that have a loamy sand surface layer and brown, less clayey subsoil than that of the Cecil soil. Also included are small areas of Pacolet soils on steeper slopes.

This Cecil soil is mainly used as woodland. In some areas, it is used as cropland or pasture.

This soil is suited to corn, soybeans, tobacco, small grains, and horticultural crops. Steepness of slope is the main limitation, and erosion is a hazard. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are hickory, white oak, black oak, southern red oak, sweetgum, loblolly pine, Virginia pine, and shortleaf pine. The understory includes flowering dogwood, red maple, sourwood, eastern redcedar, American holly, redbud, black cherry, pin oak, and sassafras.

This soil is suited to most urban uses. Steepness of slope and moderate permeability are the main limitations. This soil is suited to recreational uses, but steepness of slope is a limitation.

This Cecil soil is in capability subclass IVe. The woodland ordination symbol is 3o.

Ch—Chewacla silt loam. This soil is nearly level and is somewhat poorly drained. It is on flood plains along major streams. The areas of this soil are long and narrow and range from 5 to 200 acres.

Typically, the surface layer is brown silt loam 6 inches thick. The subsoil extends to a depth of 46 inches. It is brown silty clay loam in the upper and middle parts and pinkish gray loam in the lower part. The underlying material to a depth of 60 inches is light brownish gray sandy loam.

Permeability is moderate, and the available water capacity is high. This soil ranges from strongly acid to slightly acid except where lime has been added. The seasonal high water table is 0.5 foot to 1.5 feet below the surface in winter and early in spring. This soil is frequently flooded for brief periods.

Included with this soil in mapping are small areas of Congaree and Wehadkee soils. Congaree soils are along stream channels and are well drained to moderately well drained. Wehadkee soils are along toe slopes next to the adjacent uplands and are poorly drained.

This Chewacla soil is mainly used as woodland. Only a small acreage has been cleared and is used for crops or pasture.

If this soil is protected from flooding, it is well suited to cultivated crops, such as corn and soybeans. Conservation tillage, cover crops, and crop residue management reduce runoff and help control erosion. This soil is well suited to pasture; however, flooding is a hazard.

The dominant trees on this soil are yellow poplar, sweetgum, willow oak, black oak, red maple, sycamore, white ash, hickory, water oak, white oak, southern red oak, American beech, and loblolly pine. The understory

includes flowering dogwood, sourwood, sassafras, and American holly.

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

This Chewacla soil is in capability subclass IVw. The woodland ordination symbol is 1w.

Cp—Congaree silt loam. This soil is nearly level and well drained to moderately well drained. It is adjacent to streams on flood plains. The areas of this soil are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is dark brown silt loam 9 inches thick. The underlying material to a depth of 80 inches is brown loam in the upper part, strong brown fine sandy loam and sandy loam in the middle part, and yellowish red sandy loam in the lower part.

Permeability is moderate, and the available water capacity is moderate. Surface runoff is slow. This soil ranges from very strongly acid to neutral except where lime has been added. The seasonal high water table is at a depth of 2.5 to 4 feet late in winter and early in spring. The soil is flooded frequently for brief periods.

Included with this soil in mapping are small areas of Chewacla and Wehadkee soils. Chewacla soils are on the flood plain between the Congaree soil and the Wehadkee soils, which are in lower positions on the flood plain than the Congaree soil.

This Congaree soil is mainly used as woodland. Small acreages are used as cropland or pasture.

This soil is well suited to most crops; however, flooding is a hazard. The main crops are corn, soybeans, and small grains. Conservation tillage, cover crops, and crop residue management reduce runoff and help control erosion. This soil is well suited to hay and pasture forage.

The dominant trees on this soil are yellow poplar, sweetgum, willow oak, black oak, red maple, sycamore, white ash, hickory, water oak, white oak, southern red oak, American beech, and loblolly pine. The understory includes flowering dogwood, sourwood, sassafras, and American holly.

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

This Congaree soil is in capability subclass IIIw. The woodland ordination symbol is 1o.

CrB—Creedmoor fine sandy loam, 2 to 8 percent slopes. This soil is moderately well drained and somewhat poorly drained. It is on ridges on Piedmont uplands. The areas of this soil are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is yellowish brown fine sandy loam 14 inches thick. The subsoil extends to a depth of 42 inches. The upper part is brownish yellow silty clay loam, the middle part is light gray silty clay, and the lower part is mottled brownish yellow, yellowish red, and strong brown silty clay. The next layer to a depth of 56 inches is red clay loam. The underlying material to a depth of 96 inches is dark red loam or silt loam.

Permeability is moderately rapid in the surface layer and very slow in the clayey subsoil. The available water capacity is moderate, and shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is 1.5 to 2 feet below the surface during wet seasons.

Included with this soil in mapping are Mayodan and White Store soils. The included soils are in higher positions on the landscape and in better drained areas than the Creedmoor soil.

This Creedmoor soil is mainly used as woodland. In some areas, it is used for cultivated crops or pasture.

This soil is well suited to most cultivated crops grown in the area. It is mainly used for corn, soybeans, small grains, and pasture plants. Runoff, erosion, and wetness are the main limitations. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, water oak, white oak, red oak, sweetgum, and red maple. The understory includes flowering dogwood, greenbrier, redbud, sourwood, and winged elm. Wetness is the main limitation for woodland use.

This soil is poorly suited to urban and recreational uses. Very slow permeability, wetness, and moderate shrink-swell potential are the main limitations.

This Creedmoor soil is in capability subclass IIe. The woodland ordination symbol is 3w.

CrD—Creedmoor fine sandy loam, 8 to 15 percent slopes. This soil is moderately well drained and somewhat poorly drained. It is along side slopes on Piedmont uplands. The areas of this soil are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is yellowish brown fine sandy loam 14 inches thick. The subsoil extends to a depth of 56 inches. The upper part is brownish yellow silty clay loam, the middle part is light gray silty clay, and the lower part is mottled brownish yellow, yellowish red, and strong brown silty clay. The underlying material to a depth of 96 inches is dark red loam or silt loam.

Permeability is moderately rapid in the surface layer and very slow in the subsoil. The available water capacity is moderate, and shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is 1.5 to 2 feet below the surface during wet periods.

Included with this soil in mapping are Mayodan, White Store, and Pinkston soils. These soils are intermingled throughout the map unit in higher positions on the landscape than the Creedmoor soil.

Nearly all of this Creedmoor soil is used as woodland. It is used as pasture in a few areas.

This soil is well suited to most cultivated crops grown in the area. Wetness and steepness of slope are the main limitations. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, water oak, white oak, red oak, sweetgum, and red maple. The understory includes flowering dogwood, greenbrier, redbud, sourwood, and winged elm. Wetness and steepness of slope are the main limitations for woodland use.

This soil is poorly suited to most urban and recreational uses. Very slow permeability, wetness, steepness of slope, and moderate shrink-swell potential are the main limitations.

This Creedmoor soil is in capability subclass IIIe. The woodland ordination symbol is 3w.

DoA—Dothan loamy sand, 0 to 2 percent slopes. This soil is well drained and is on broad, smooth interstream divides on Coastal Plain uplands. The areas of this soil are elongated or irregular in shape and range from 5 to 500 acres.

Typically, the surface layer is brown loamy sand 9 inches thick. The subsurface layer to a depth of 15 inches is very pale brown loamy sand. The subsoil to a depth of 65 inches is yellowish brown sandy clay loam. Plinthite nodules are below a depth of 30 inches.

Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. A perched seasonal high water table is above the plinthite during the wet season. The available water capacity is moderate. This soil ranges from very strongly acid to medium acid except where lime has been added.

Included with this soil in mapping are small areas of Fuquay, Gilead, and Blaney soils. The Fuquay soils are slightly lower on the landscape than the Dothan soil. Blaney soils are on outer edges of delineations near sandy, gently sloping ridges, and Gilead soils are around the head of drainageways.

This Dothan soil is mainly used as cropland. In some areas, it is used for hay and pasture. A very small acreage is woodland.

This soil is well suited to most crops grown in the area. The major crops are corn, soybeans, tobacco, and small grains. Conservation tillage, cover crops, and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, yellow poplar, water oak, and sweetgum. The understory includes flowering dogwood, sassafras, redbud, greenbrier, and red maple.

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

This Dothan soil is in capability class I. The woodland ordination symbol is 2o.

DoB—Dothan loamy sand, 2 to 8 percent slopes. This soil is well drained and is on broad, smooth interstream divides on the Coastal Plain uplands. The areas of this soil are oblong and range from 5 to 100 acres.

Typically, the surface layer is brown loamy sand about 9 inches thick. The subsurface layer to a depth of 15 inches is very pale brown loamy sand. The subsoil to a depth of 65 inches is yellowish brown sandy clay loam. Plinthite nodules are below a depth of 30 inches.

Permeability is moderate to moderately slow, and the available water capacity is moderate. This soil ranges from very strongly acid to medium acid except where lime has been added. A perched seasonal high water table is above the plinthite layer during wet seasons and after periods of high rainfall.

Included with this soil in mapping are small areas of Fuquay, Gilead, and Blaney soils. The Fuquay soils are slightly higher on the landscape than the Dothan soil. Gilead soils are on side slopes bordering drainageways and at the head of drainageways. Blaney soils are on outer edges of delineations near sandy, gently sloping ridges.

This Dothan soil is mainly used as cropland. In some areas, it is used for hay and pasture. A very small acreage is woodland.

This soil is well suited to most crops. The main crops are corn, soybeans, tobacco, and small grains. Conservation tillage, cover crops, and crop residue management reduce runoff and help control erosion.

The main trees on this soil are loblolly pine, longleaf pine, yellow poplar, and water oak. The understory includes flowering dogwood, sassafras, redbud, greenbrier, and red maple.

The soil is well suited to most urban and recreational uses. Wetness is a limitation for septic tank absorption fields.

This Dothan soil is in capability subclass IIIe. The woodland ordination symbol is 2o.

DuB—Durham loamy sand, 2 to 8 percent slopes. This soil is well drained and is on narrow to broad, smooth ridges on Piedmont uplands. The areas of this soil are oblong and range from 5 to 100 acres.

Typically, the surface layer is light yellowish brown loamy sand 10 inches thick. The subsurface layer to a depth of 15 inches is very pale brown loamy sand. The subsoil extends to a depth of 56 inches. The upper part is brownish yellow sandy clay loam, the middle part is strong brown sandy clay loam, and the lower part is yellowish red sandy clay and sandy clay loam. The underlying material to a depth of 70 inches is mottled yellowish brown, white, strong brown, and reddish yellow saprolite that crushes to sandy loam.

Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. The available water capacity is moderate, and the shrink-

swell potential is low. This soil is very strongly acid or strongly acid except where lime has been added.

Included with this soil in mapping are a few areas of Cecil soils intermingled throughout the map unit. The Cecil soils are red and clayey.

This Durham soil is mainly used as cropland. In some areas, it is used for hay and pasture, and other areas are woodland.

This soil is well suited to corn, soybeans, tobacco, small grains, and horticultural crops. The main limitation is steepness of slope, and erosion is a hazard. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are hickory, white oak, black oak, northern red oak, southern red oak, sweetgum, loblolly pine, Virginia pine, and shortleaf pine. The understory includes flowering dogwood, red maple, sourwood, eastern redcedar, American holly, redbud, black cherry, pin oak, and sassafras.

This soil is well suited to most urban and recreational uses. The moderate permeability is a limitation for septic tank absorption fields.

This Durham soil is in capability subclass IIe. The woodland ordination symbol is 3o.

FuB—Fuquay loamy sand, 0 to 6 percent slopes. This soil is well drained and is in broad interstream areas on Coastal Plain uplands. The areas of this soil are oblong and range from 5 to 150 acres.

Typically, the surface layer is dark grayish brown loamy sand 9 inches thick. The subsurface layer to a depth of 24 inches is light yellowish brown loamy sand. The subsoil to a depth of 83 inches is light olive brown sandy loam in the upper part; yellowish brown, brownish yellow, and yellowish red sandy clay loam in the middle part; and mottled yellowish red, brownish yellow, and gray sandy clay loam in the lower part.

Permeability is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is moderate. This soil is very strongly acid or strongly acid except where lime has been added. A perched seasonal high water table is 4 to 6 feet below the surface.

Included with this soil in mapping are a few small areas of Candor, Dothan, and Gilead soils. The Candor soils are intermingled on the landscape with the Fuquay soil. The Dothan soils are slightly higher on the landscape. The Gilead soils are on short, steep side slopes bordering drainageways and at the head of drainageways.

This Fuquay soil is mainly used as cropland. It is used for hay and pasture in some areas. A small acreage is woodland.

This soil is well suited to most crops grown in the area (fig. 3). The main crops are corn, soybeans, tobacco, and small grains. Conservation tillage, cover crops, and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, longleaf pine, and southern red oak. The understory includes flowering dogwood, sassafras, greenbrier, and persimmon.

The soil is well suited to most urban uses and suited to most recreational uses. Moderate permeability is a limitation for septic tank absorption fields.

This Fuquay soil in capability subclass IIs. The woodland ordination symbol is 3s.

GhB—Gilead loamy sand, 2 to 8 percent slopes. This soil is moderately well drained and is on broad, smooth ridges along drainageways of the Coastal Plain uplands. The areas of this soil are slightly narrow or irregular in shape and range from 5 to 40 acres.

Typically, the surface layer is brown loamy sand 7 inches thick. The subsoil extends to a depth of 52 inches. The upper part is brownish yellow and yellowish brown sandy clay loam, the middle part is brownish yellow sandy clay, and the lower part is light gray sandy clay loam. The underlying material to a depth of 75 inches is light gray clay.

Permeability is moderately slow or slow, and the available water capacity is moderate. This soil is very strongly acid or strongly acid except where lime has been added. A perched high water table is above the clayey horizons for short periods during wet seasons.

Included with this soil in mapping are small areas of Blaney soils in slightly higher positions on the landscape.

This Gilead soil is mainly used as woodland. In a few areas, it is used as cropland or pasture.

This soil is well suited to most crops in the area. The major crops are corn, soybeans, small grains, and tobacco. Wetness is the main limitation, and erosion is a hazard. Conservation tillage and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, longleaf pine, blackgum, and sweetgum. The understory includes post oak, blackjack oak, honeysuckle, flowering dogwood, bluestem, and panicum.

This soil is poorly suited to most urban and recreational uses because of wetness and moderately slow or slow permeability. Low strength is a limitation for local roads and streets.

This Gilead soil is in capability subclass IIIe. The woodland ordination symbol is 3o.

GhD—Gilead loamy sand, 8 to 15 percent slopes. This soil is moderately well drained and is on short side slopes along drainageways on Coastal Plain uplands. The areas of this soil are long and narrow and range from 5 to 25 acres.

Typically, the surface layer is brown loamy sand 7 inches thick. The subsoil extends to a depth of 52 inches. The upper part is brownish yellow and yellowish

Figure 3.—Irrigation improves tobacco crops on Fuquay loamy sand, 0 to 6 percent slopes.

brown sandy clay loam, the middle part is brownish yellow sandy clay, and the lower part is light gray sandy clay loam. The underlying material to a depth of 75 inches is light gray clay.

Permeability is moderately slow or slow, and the available water capacity is moderate. This soil is very strongly acid or strongly acid throughout. A perched high water table is above the clayey horizons for short periods during wet seasons.

Included with this soil in mapping are areas of similar soils that have a sandy loam surface layer and small areas of Blaney soils that are along the edge of delineations in slightly higher positions on the landscape.

This Gilead soil is mainly used as woodland. Small acreages are used for pasture or hay.

Only a small acreage of this soil is cultivated or in pasture. The main crops are corn, small grains, and soybeans. Steepness of slope is the main limitation, and erosion is a hazard. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, longleaf pine, blackgum, and sweetgum. The understory includes post oak, blackjack oak, honeysuckle, flowering dogwood, bluestem, and panicum.

The soil is poorly suited to most urban and recreational uses because of wetness, steepness of slope, and moderately slow or slow permeability. Low strength is a limitation for local roads and streets.

This Gilead soil is in capability subclass VIe. The woodland ordination symbol is 3o.

MfB—Mayodan fine sandy loam, 2 to 8 percent slopes. This soil is well drained and is in broad interstream areas on Piedmont uplands. The areas of this soil are broad and irregular in shape and range from 30 to about 200 acres.

Typically, the surface layer is yellowish brown fine sandy loam 7 inches thick. The subsoil extends to a depth of 51 inches. The upper part is reddish yellow clay loam, the middle part is red silty clay loam and silty clay, and the lower part is yellowish red silty clay and silty clay loam. The underlying material to a depth of 60 inches is red saprolite that crushes to loam.

Permeability is moderate, and the available water capacity is moderate. The shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added.

Included with this soil in mapping are small areas of Pinkston and Creedmoor soils. The Pinkston soils are on slightly steeper side slopes than the Mayodan soil. The Creedmoor soils are in slight depressions.

This Mayodan soil is mainly used as woodland. In some areas, it is used as pasture, cropland, or for urban development.

This Mayodan soil is well suited to most crops in the area; however, erosion is a hazard. The major crops are corn, tobacco, and soybeans. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, southern red oak, white oak, hickory, sweetgum, and yellow poplar. The understory includes flowering dogwood, sourwood, American holly, black cherry, and red maple.

This soil is suited to most urban uses and well suited to most recreational uses. Low strength as it affects roads and streets and moderate shrink-swell potential are the main limitations.

This Mayodan soil is in capability subclass IIe. The woodland ordination symbol is 3o.

MfD—Mayodan fine sandy loam, 8 to 15 percent slopes. This soil is well drained and is along drainageways on short side slopes on Piedmont uplands. The areas of this soil are irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is yellowish brown fine sandy loam 7 inches thick. The subsoil extends to a depth of 51 inches. The upper part is reddish yellow clay loam, the middle part is red silty clay loam and silty clay, and the lower part is yellowish red silty clay and silty clay loam. The underlying material to a depth of 60 inches is red saprolite that crushes to loam.

Permeability is moderate, and the available water capacity is moderate. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added.

Included with this soil in mapping are small areas of Pinkston and Creedmoor soils. The Pinkston soils are on the slightly steeper side slopes than the Mayodan soil. The Creedmoor soils are in depressions.

This Mayodan soil is mainly used as woodland. In some areas, it is used as cropland, pasture, or for urban development.

This soil is suited to most crops grown in the area. Steepness of slope is the main limitation, and erosion is a hazard. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, southern red oak, white oak, hickory, sweetgum, and yellow poplar. The understory includes flowering dogwood, sourwood, American holly, black cherry, and red maple.

This soil is suited to most urban and recreational uses. Steepness of slope and moderate shrink-swell potential are the main limitations. Low strength is a limitation for local roads and streets.

This Mayodan soil is in capability subclass IVe. The woodland ordination symbol is 3o.

MfE—Mayodan fine sandy loam, 15 to 25 percent slopes. This soil is well drained. It is along drainageways on short, steep side slopes on Coastal Plain uplands. The areas of this soil are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is yellowish brown fine sandy loam 7 inches thick. The subsoil extends to a depth of 51 inches. The upper part is reddish yellow clay loam. the middle part is red silty clay loam and silty clay, and the lower part is yellowish red silty clay and silty clay loam. The underlying material to a depth of 60 inches is red saprolite that crushes to loam.

Permeability is moderate, and the available water capacity is moderate. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added.

Included with this soil in mapping are small areas of Pinkston soils that are intermingled with Mayodan soil where the parent rock is close to the surface.

This Mayodan soil is mainly used as woodland. In some areas, it is used for urban development or as pasture.

This soil is poorly suited to use as cropland because of steepness of slope and the hazard of erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, red oak, white oak, hickory, yellow poplar, and sweetgum. The understory includes flowering dogwood, sourwood, American holly, black cherry, eastern redcedar, and red maple. Steepness of slope and the hazard of erosion are concerns in managing this soil for timber production.

This soil is poorly suited to urban and recreational development. Steepness of slope and moderate shrink-swell potential are the main limitations, and erosion is a hazard. Low strength is a limitation for local roads and streets.

This Mayodan soil is in capability subclass VIe. The woodland ordination symbol is 3r.

MrB—Mayodan-Urban land complex, 2 to 8 percent slopes. This map unit consists of areas of Mayodan soil that is well drained and areas of Urban land. It is the dominant map unit in the city of Sanford. This map unit is about 60 percent Mayodan soil, about 30 percent Urban land, and about 10 percent other soils including soil areas disturbed during urbanization.

The relatively undisturbed Mayodan soil has a yellowish brown fine sandy loam surface layer 7 inches thick. The subsoil extends to a depth of 51 inches. The upper part is reddish yellow clay loam, the middle part is red silty clay loam and silty clay, and the lower part is yellowish red silty clay and silty clay loam. The underlying material to a depth of 60 inches is red saprolite that crushes to loam.

Permeability is moderate, and the available water capacity is moderate. The shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added.

The Urban land part of this map unit consists of areas that are covered with impervious material, such as shopping centers, factories, houses, municipal buildings, parking lots, and roads. Slope is generally modified to fit the need. The extent of site modification varies greatly. Some areas have had little disturbance, while others have been extensively reshaped through cutting, filling, and grading.

Included with this complex in mapping are areas of Pinkston, Chewacla, and Dothan soils. The Pinkston soils are on side slopes near the main drainageways. The Chewacla soils are on narrow flood plains that dissect the city of Sanford. The Dothan soils are in the southern part of Sanford at the boundary between the Piedmont and Coastal Plain. Also included are areas of soils that have slopes of more than 8 percent.

Low strength and moderate shrink-swell potential of the Mayodan soil are the main limitations for most uses. Surface runoff is more severe on the Urban land part of this map unit than on the Mayodan soil. The clayey subsoil of the Mayodan soil is a limitation for landscaping. Onsite investigation is generally needed before planning the use and management of this soil.

This complex is not assigned to a capability subclass and does not have a woodland ordination symbol.

NaB—Nason silt loam, 2 to 8 percent slopes. This soil is well drained and is on smooth interstream divides on Piedmont uplands. The areas of this soil are narrow and irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is yellowish brown silt loam 6 inches thick. The subsoil extends to a depth of 46 inches. The upper part is yellowish brown silty clay loam, and the lower part is strong brown silty clay loam. The underlying material to a depth of 60 inches is mottled strong brown, brownish yellow, red, and light gray silt loam in the upper part. The lower part is mottled red, brownish yellow, strong brown, and light gray saprolite that crushes to silt loam.

Permeability is moderate, and the available water capacity is high. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added.

Included with this soil in mapping are small areas of Tatum soils. These soils generally are intermingled with the Nason soil throughout the map unit.

This Nason soil is mainly used as woodland. In some areas, it is used as cropland, pasture, or for urban development.

This soil is well suited to most crops grown in the area. The major crops are corn, soybeans, and tobacco. Surface runoff is the main limitation, and erosion is a hazard. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, white oak, southern red oak, hickory, yellow poplar, and red maple. The understory includes American holly, flowering dogwood, eastern redcedar, sourwood, redbud, sassafras, and greenbrier.

This soil is suited to most urban uses and well suited to recreational uses. Moderate shrink-swell potential and moderate permeability are the main limitations, and low strength is a limitation for local roads and streets.

This Nason soil is in capability subclass IIe. The woodland ordination symbol is 3o.

NaD—Nason silt loam, 8 to 15 percent slopes. This soil is well drained and is on short side slopes around intermittent drainageways on Piedmont uplands. The areas of this soil are oblong and narrow and range from 5 to 150 acres.

Typically, the surface layer is yellowish brown silt loam 6 inches thick. The subsoil extends to a depth of 46 inches. The upper part is yellowish brown silty clay loam, and the lower part is strong brown silty clay loam. The underlying material to a depth of 60 inches is mottled strong brown, brownish yellow, and red silt loam in the upper part and mottled red, brownish yellow, strong brown, and light gray silt loam in the lower part.

Permeability is moderate, and the available water capacity is high. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added.

Included with this soil in mapping are small areas of Tatum soils. These soils generally are intermingled with the Nason soil throughout the map unit.

This Nason soil is mainly used as woodland. In some areas, it is used for cultivated crops or urban development.

This soil is suited to most crops grown in the area. The major crops are corn, soybeans, tobacco, and pasture plants. Steepness of slope is the main limitation, and erosion is a hazard. Conservation tillage, cover crops, crop residue management, and contour tillage reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, white oak, southern red oak, hickory, yellow poplar, and red maple. The understory includes American holly, flowering dogwood, eastern redcedar, sourwood, redbud, sassafras, and greenbrier.

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

This Nason soil is in capability subclass IIIe. The woodland ordination symbol is 3o.

PaF—Pacolet fine sandy loam, 15 to 40 percent slopes. This soil is well drained and is on side slopes adjacent to major drainageways on Piedmont uplands. The areas of this soil are oblong and are irregular in width. They range from 5 to 80 acres.

Typically, the surface layer is reddish brown fine sandy loam 2 inches thick. The subsoil extends to a depth of 30 inches. The upper part is red clay loam, the middle part is red clay, and the lower part is red clay loam. The underlying material to a depth of 60 inches is mottled pinkish white, reddish yellow, yellowish red, and red saprolite that crushes to loam in the upper part and fine sandy loam in the lower part.

Permeability is moderate, and the available water capacity is moderate. This soil ranges from very strongly acid to medium acid except where lime has been added.

Included with this soil in mapping are areas of Cecil soils on narrow ridges and less sloping side slopes.

This Pacolet soil is mainly used as woodland. It is used as pasture in some areas.

This soil is poorly suited to use as cropland. Steepness of slope is the main limitation, and erosion is a hazard. This soil is poorly suited to hay and pasture forage. Proper pasture management reduces runoff and helps to control erosion.

The dominant trees on this soil are northern red oak, southern red oak, white oak, post oak, red maple, sweetgum, shortleaf pine, and Virginia pine. The understory includes flowering dogwood, eastern redcedar, American holly, sassafras, and black cherry. Steepness of slope is the main limitation for woodland use, and erosion is a hazard.

This soil is poorly suited to most urban and recreational uses because of steepness of slope.

This Pacolet soil is in capability subclass VIIe. The woodland ordination symbol is 3r.

PfB—Pinkston silt loam, 2 to 8 percent slopes. This soil is well drained and is on ridges and side slopes of Piedmont uplands. The areas of this soil are oblong and range from 5 to 200 acres.

Typically, the surface layer is brown silt loam 6 inches thick. The subsoil extends to a depth of 16 inches. The upper part is brown silt loam, and the lower part is light brown silt loam. The underlying material to a depth of 38 inches is reddish brown silt loam.

Permeability is moderately rapid, and the available water capacity is low to moderate. This soil is very strongly acid or strongly acid except where lime has been added. Depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Mayodan, Creedmoor, and White Store soils. Mayodan soils are near the outer edges of delineations and in slightly higher areas than the Pinkston soil. Creedmoor and White Store soils are in smooth, flat areas and in depressions. Also included are a few small areas of soils that have bedrock at a depth of less than 20 inches.

This Pinkston soil is mainly used as woodland. In some areas, it is used as pasture or cropland.

This soil is suited to some crops, such as corn, soybeans, and small grains. Depth to bedrock is the main limitation, and erosion is a hazard. Conservation tillage, cover crops, contour farming, and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are northern red oak, Virginia Pine, loblolly pine, yellow poplar, white oak, southern red oak, hickory, red maple, and American beech. The understory includes flowering dogwood, sourwood, redbud, American holly, black cherry, eastern redcedar, and sassafras. Depth to bedrock is the main limitation for woodland use.

This soil is poorly suited to most urban uses because of the depth to bedrock. It is suited to most recreational uses. Depth to bedrock is the main limitation, and stoniness is a limitation in some areas.

This Pinkston soil is in capability subclass IIIe. The woodland ordination symbol is 4d.

PfD—Pinkston silt loam, 8 to 15 percent slopes. This soil is well drained and is on short side slopes bordering major drainageways on Piedmont uplands. The areas of this soil are long and irregular in width. They range from 5 to 200 acres.

Typically, the surface layer is brown silt loam 6 inches thick. The subsoil extends to a depth of 16 inches. The upper part is brown silt loam, and the lower part is light brown silt loam. The underlying material to a depth of 38 inches is reddish brown silt loam.

Permeability is moderately rapid, and the available water capacity is low to moderate. This soil is very strongly acid or strongly acid except where lime has been added. Depth to bedrock ranges from 20 to 40 inches (fig. 4).

Figure 4.—Pinkston silt loam, 8 to 15 percent slopes, is underlain by bedrock at a depth of 20 to 40 inches. In a few places, bedrock is at a depth of less than 20 inches.

Included with this soil in mapping are small areas of Mayodan and Creedmoor soils. Mayodan soils generally are higher on the landscape than the Pinkston soil, and Creedmoor soils are on benches adjacent to steeper side slopes. Also included are a few small areas of soils that have bedrock at a depth of less than 20 inches.

This Pinkston soil is mainly used as woodland. It is used as pasture or cropland in some areas.

This soil is poorly suited to use as cropland. Steepness of slope and depth to bedrock are the main limitations, and erosion is a hazard. This soil is suited to hay and pasture forage. Proper pasture management reduces runoff and helps control erosion.

The dominant trees on this soil are northern red oak, Virginia pine, loblolly pine, yellow poplar, white oak, southern red oak, hickory, red maple, and American beech. The understory includes flowering dogwood, sourwood, redbud, black cherry, eastern redcedar, and sassafras. Steepness of slope and depth to bedrock are the main limitations for woodland use.

This soil is poorly suited to most urban and recreational uses because of steepness of slope and depth to bedrock.

This Pinkston soil is in capability subclass IVe. The woodland ordination symbol is 4d.

PfF—Pinkston silt loam, 15 to 40 percent slopes. This soil is well drained and is on side slopes adjacent to major drainageways on Piedmont uplands. The areas of this soil are long and narrow and range from 5 to 200 acres.

Typically, the surface layer is brown silt loam 6 inches thick. The subsoil extends to a depth of 16 inches. The upper part is brown silt loam, and the lower part is light brown silt loam. The underlying material to a depth of 38 inches is reddish brown silt loam.

Permeability is moderately rapid, and the available water capacity is low to moderate. This soil is very strongly acid or strongly acid except where lime has been added. Depth to bedrock ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Mayodan and Creedmoor soils. Mayodan soils generally are higher on the landscape than Pinkston soil, and Creedmoor soils typically are on benches. Also included are a few small areas of soils that have bedrock at a depth of less than 20 inches.

This Pinkston soil is mainly used as woodland. It is used as pasture in some areas.

This soil is poorly suited to use as cropland. Steepness of slope and depth to bedrock are the main limitations, and erosion is a hazard. This soil is poorly suited to hay and pasture forage.

The dominant trees on this soil are northern red oak, yellow poplar, white oak, southern red oak, hickory, maple, American beech, Virginia pine, shortleaf pine, and loblolly pine. The understory includes flowering dogwood, eastern redcedar, American holly, redbud, sassafras, and black cherry. Steepness of slope and depth to bedrock are the main limitations for woodland use.

This soil is poorly suited to urban and recreational uses because of steepness of slope and depth to bedrock.

This Pinkston soil is in capability subclass VIIe. The woodland ordination symbol is 4d.

Pt—Pits, quarry. Stone quarries are areas where the original soil material, gravel, or rock has been removed. This unit is composed of two stone quarries in Lee County. One is northeast of Lemon Springs (fig. 5), and the other is adjacent to the Deep River northwest of U.S. Highway 1, near the Chatham County line. Both quarries are open excavations up to 100 feet or more in depth. Plants do not grow in the excavations, but pine trees and native grasses have become established on the exposed soil around the top.

This map unit is not assigned to a capability subclass and does not have a woodland ordination symbol.

Ro—Roanoke silt loam. This soil is nearly level and poorly drained. It is along drainageways and in slight depressions on stream terraces. The areas of this soil are long and narrow and range from 5 to 80 acres.

Typically, the surface layer is dark gray silt loam 4 inches thick. The subsoil extends to a depth of 43 inches. It is light brownish gray silty clay loam in the upper part, light brownish gray silty clay in the middle part, and gray silty clay in the lower part. The underlying material to a depth of 65 inches is light gray silty clay loam.

Permeability is slow, and the shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is at or near the surface. This soil is frequently flooded for brief periods.

Included with this soil in mapping are a few areas of Tetotum soils that are moderately well drained. These soils are in slightly higher areas than the Roanoke soil.

This Roanoke soil is mainly used as woodland. In a few small areas, it is used as pasture.

If this soil is drained and protected from flooding, it is well suited to corn, soybeans, and small grains. Wetness is the main limitation for cropland use, and flooding is a hazard. Conservation tillage, cover crops, and crop residue management reduce runoff and help control erosion during flooding. This soil is well suited to pasture forage.

The dominant trees on this soil are southern red oak, hickory, sweetgum, loblolly pine, water oak, and yellow poplar. The understory includes American holly, sourwood, giant cane, and greenbrier.

This soil is poorly suited to most urban and recreational uses. Wetness and slow permeability are the main limitations, and flooding is a hazard. Low strength is a limitation for local roads and streets.

This Roanoke soil is in capability subclass Vw. The woodland ordination symbol is 2w.

StA—State fine sandy loam, 0 to 3 percent slopes. This soil is well drained and is on slightly convex ridges on stream terraces. The areas of this soil are oblong and range from 5 to 30 acres.

Typically, the surface layer is light yellowish brown fine sandy loam 5 inches thick. The subsurface layer to a depth of 8 inches is brownish yellow fine sandy loam. The subsoil to a depth of 49 inches is sandy clay loam. The upper part is strong brown; the middle part is mottled strong brown, brownish yellow, yellowish red, and red; and the lower part is brownish yellow. The underlying material to a depth of 72 inches is variegated light gray, yellowish red, brownish yellow, and red sandy loam and sand.

Permeability is moderate, and the available water capacity is high. This soil is very strongly acid or strongly acid except where lime has been added. The seasonal high water table is 4 to 6 feet below the surface.

Included with this soil in mapping are small areas of Wickham and Tetotum soils. Wickham soils are reddish and are in slightly higher areas than the State soil. Tetotum soils are in lower areas.

This soil is mainly used as cropland. In some areas, it is used for hay and pasture.

This soil is well suited to corn, tobacco, soybeans, and small grains. Conservation tillage, cover crops, and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, Virginia pine, Southern red oak, hickory, yellow poplar, and black walnut. The understory includes sourwood,

Figure 5.—The soil is being removed to expose bedrock in this stone quarry at Lemon Springs.

American holly, flowering dogwood, greenbrier, and blueberry.

This soil is suited or poorly suited to most urban uses because of wetness and low strength. It is well suited to recreational uses.

This State soil is in capability class I. The woodland ordination symbol is 1o.

TaB—Tatum silt loam, 2 to 8 percent slopes. This soil is well drained and is on Piedmont uplands on broad ridges that are dissected by intermittent drainageways. The areas of this soil are oblong and irregular in shape and range from 5 to 200 acres.

Typically, the surface layer is brown silt loam 8 inches thick. The subsoil extends to a depth of 50 inches. It is red silty clay loam. The underlying material to a depth of 60 inches is mottled red and brownish yellow saprolite that crushes to silt loam.

Permeability is moderate, and the available water capacity is moderate. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added. Soft bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of Nason soils. These soils are intermingled with the Tatum soil throughout the map unit.

This Tatum soil is mainly used as woodland. In some areas, it is used for hay, pasture, crops, or urban development.

This soil is well suited to corn, soybeans, pasture, hay, small grains, and horticultural crops. Surface runoff is the main limitation, and erosion is a hazard. Conservation

tillage, cover crops, contour tillage, and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, southern red oak, sweetgum, and post oak. The understory includes flowering dogwood, sourwood, American holly, eastern redcedar, black cherry, red maple, and sassafras.

This soil is suited to most urban uses. Moderate shrink-swell potential and depth to bedrock are limitations. This soil is well suited to recreational uses.

This Tatum soil is in capability subclass IIe. The woodland ordination symbol is 3o

TaD—Tatum silt loam, 8 to 15 percent slopes. This soil is well drained and is on side slopes on Piedmont uplands. The areas of this soil are oblong and range from 4 to more than 60 acres.

Typically, the surface layer is brown silt loam 8 inches thick. The subsoil extends to a depth of 50 inches. It is red silty clay loam. The underlying material to a depth of 60 inches is mottled red and brownish yellow saprolite that crushes to silt loam.

Permeability is moderate, and the available water capacity is moderate. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid except where lime has been added. Soft bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of Nason soils.

This Tatum soil is mainly used as woodland. In some areas, it is used for hay, pasture, crops, or urban development.

Tatum soil is well suited to corn, soybeans, pasture, hay, small grains, and horticultural crops. Steepness of slope and surface runoff are the main limitations, and erosion is a hazard. Conservation tillage, cover crops, contour tillage, and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, yellow poplar, hickory, white oak, southern red oak, sweetgum, and post oak. The understory includes flowering dogwood, sourwood, American holly, eastern redcedar, black cherry, red maple, and sassafras.

This soil is suited to most urban and recreational uses. Steepness of slope, moderate shrink-swell potential, and moderate permeability are the main limitations.

This Tatum soil is in capability subclass IIIe. The woodland ordination symbol is 3o.

TaE—Tatum silt loam, 15 to 30 percent slopes. This soil is well drained and is on side slopes on Piedmont uplands. The areas of this soil are oblong and range from 5 to more than 80 acres.

Typically, the surface layer is brown silt loam 8 inches thick. The subsoil extends to a depth of 50 inches. It is red silty clay loam. The underlying material to a depth of 60 inches is mottled red and brownish yellow saprolite that crushes to silt loam.

Permeability is moderate, and the available water capacity is moderate. Shrink-swell potential is moderate. This soil is very strongly acid or strongly acid. Soft bedrock is at a depth of 40 to 60 inches.

Included with this soil in mapping are small areas of a soil that has a channery silt loam surface layer. Also included are areas of Nason soils.

This Tatum soil is mainly used as woodland. In some areas, it is used as pasture.

This soil is poorly suited to use as cropland. Steepness of slope is the main limitation, and erosion is a hazard. This soil is suited to pasture and hay. Proper pasture management reduces runoff and helps to control erosion.

The dominant trees on this soil are loblolly pine, shortleaf pine, yellow poplar, hickory, white oak, southern red oak, and sweetgum. The understory includes flowering dogwood, sourwood, American holly, eastern redcedar, black cherry, red maple, and blackgum. Steepness of slope and the hazard of erosion are concerns in managing this soil for timber production.

This soil is poorly suited to most urban and recreational uses because of steepness of slope and moderate permeability.

This Tatum soil is in capability subclass IVe. The woodland ordination symbol is 3r.

ToB—Tetotum fine sandy loam, 1 to 4 percent slopes. This soil is moderately well drained and is on low ridges on stream terraces. The areas of this soil are irregular in shape and range from 4 to 100 acres.

Typically, the surface layer is brown fine sandy loam 7 inches thick. The subsoil extends to a depth of 55 inches. The upper part is light yellowish brown silty clay loam, the middle part is brownish yellow silty clay loam and clay loam, and the lower part is light yellowish brown clay loam and light gray sandy clay loam. The underlying material to a depth of 60 inches is light gray sandy loam.

Permeability is moderate, and the available water capacity is high. This soil ranges from extremely acid to strongly acid except where lime has been added. The high water table is 1.5 to 2.5 feet below the surface during winter.

Included with this soil in mapping are small areas of State and Wickham soils. These soils are well drained and are slightly higher on the landscape than the Tetotum soil.

About half the acreage of this Tetotum soil is in cultivated crops or pasture. The rest is mainly woodland.

This soil is well suited to corn, soybeans, and small grains. Wetness and susceptibility to erosion are the main limitations. Conservation tillage, cover crops, and crop residue management reduce runoff and help control erosion. Artificial drainage is needed for most crops.

The dominant trees on this soil are loblolly pine, shortleaf pine, sweetgum, southern red oak, and white oak. The understory includes flowering dogwood, red maple, winged elm, greenbrier, American holly, sourwood, and black cherry.

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

This Tetotum soil is in capability subclass IIe. The woodland ordination symbol is 2w.

Ud—Udorthents, loamy. This map unit consists of clay pits, sand pits, landfills, and borrow areas where most or all of the natural soil has been removed or altered by digging, grading, or filling. Most areas are identified on the soil maps by the symbol Ud and named. Areas of less than 2 acres are shown by a special symbol and are not named. Most of the small areas are borrow areas.

Clay pits. The clay pits are in the central part of the county on Piedmont uplands that are underlain with Triassic rocks. These rocks provide raw materials used in the manufacturing of bricks. The pits are excavated areas that have vertical side walls and a relatively smooth bottom. They range from 6 to more than 70 feet in depth. The areas are irregular in shape and range up to about 200 acres.

Where mining is still in progress, the clay pit areas generally are devoid of vegetation except for a few shortleaf and Virginia pines. Erosion is a hazard, and instability of the soil material results in gullying and siltation. A high percentage of sediment generally is trapped on site.

The exposed soil material commonly has poor physical properties for establishing and supporting plant growth. Rooting depth is shallow, and available water capacity, soil fertility, and organic matter content are low. Areas that are reseeded have a potential use as wildlife habitat.

Where the mining has stopped, the excavations have filled with water and are shown as bodies of water on the soil maps.

Sand pits. The sand pits are in the southern part of the county on Coastal Plain and Sandhill uplands. They include open excavations from which sand has been or is being removed for use in construction. Most excavations are in areas of Candor soils; a few are in areas of the Blaney soils.

These excavations have short, vertical side walls and a relatively smooth bottom. They range from 3 to about 7 feet in depth, depending on the thickness of the sand layer. Typically, the shape and size of the excavations vary. The largest area ranges up to about 175 acres.

The exposed loamy soil material supports plants; however, the rooting depth and low available water capacity are limiting features. Loblolly pine, turkey oak, and bluejack oak generally reseed the areas that are not reclaimed. Reclaimed areas support coastal bermudagrass and loblolly pine.

The sand pit areas have potential use for urban or recreational development and as habitat for wildlife.

Landfill areas. The Lee County landfill is in the southern part of the county on Coastal Plain and Sandhill uplands. It consists of graded trenches that are backfilled with alternate layers of solid refuse and soil material. After a final cover of about 2 feet of soil is added, the surface ranges from nearly level to gently sloping.

Areas of undisturbed soils are near the edge of the delineations. The soil between the trenches is relatively undisturbed except for the final cover used to smooth the entire area.

Landfill areas are suited to plants, and permanent plant cover is essential to protect these areas from erosion. The available water capacity is generally low.

The characteristics of the soil material within the delineations vary to such a degree that interpretive statements cannot be made. Onsite examinations of the individual areas are needed to determine the characteristics of the soil in that area.

Borrow areas. The borrow areas are scattered throughout the county and generally are adjacent to major roads. The soil material has been removed for use as fill material in the construction of highways. The excavations are 5 to more than 15 feet deep and have one or more short, nearly vertical side slopes. The base slope is level to gently sloping. The soil material presently exposed generally is similar to that in the subsoil and underlying material of closely adjacent soils. Loamy marine deposits are the most common material exposed in the excavations. The borrow areas range up to about 15 acres and include small areas of fill material that have been pushed aside during excavation. Areas that are less than 2 acres are shown by a special symbol on the map.

Some borrow areas have been reclaimed and seeded to grass, and a few areas are naturally reseeded to wild grasses, weeds, and loblolly pine. Borrow areas have poor physical properties for establishing and supporting plants because the rooting depth is shallow and the available water capacity, organic matter content, and soil fertility are low.

Borrow areas that are seeded have a potential use as habitat for wildlife.

Udorthents, loamy, is not assigned a capability subclass and does not have a woodland ordination symbol.

Ur—Urban land. This map unit consists of areas that are covered by streets, buildings, parking lots, railroad yards, airports, and other such urban uses. Because of the urbanization, the natural soils, dominantly Mayodan fine sandy loam, were greatly altered, and the original

landscape, topography, and drainage patterns have been changed. Slope generally is 2 to 8 percent.

Most of the Urban land is in the business district of Sanford and in industrial areas around Sanford.

Because nearly all of the precipitation that falls in urban areas runs off, the hazard of flooding is increased in low-lying areas. Waterway and reservoir siltation from areas that are graded but not stabilized is a hazard. Recommendations for use and management of the soil and water in urban areas require onsite investigation.

This map unit is not in a capability subclass and does not have a woodland ordination symbol.

VaB—Vaucluse gravelly sandy loam, 2 to 8 percent slopes. This soil is well drained and is on interstream divides on Coastal Plain uplands in and around Broadway and near the Harnett County line. The areas of this soil are elongated or irregular in shape and range from 5 to 150 acres.

Typically, the surface layer is brown gravelly sandy loam 9 inches thick. The subsurface layer to a depth of 14 inches is light yellowish brown gravelly sandy loam. The subsoil extends to a depth of 54 inches. The upper part is strong brown sandy loam, the middle part is red sandy clay loam, and the lower part is mottled red, yellowish red, brownish yellow, and very pale brown sandy loam. The underlying material to a depth of 80 inches is mottled red, yellowish red, brownish yellow, and light gray sandy loam.

Permeability is moderately rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low to moderate. This soil ranges from extremely acid to strongly acid except where lime has been added.

Included with this soil in mapping are small areas of soils that have a gravelly layer extending into the subsoil. Also included are small areas of Dothan and Blaney soils. Dothan and Blaney soils are in the same landscape position as Vaucluse soil but do not have a gravelly surface layer.

This Vaucluse soil is mainly used as cropland. In some areas, it is used as pasture or woodland.

This Vaucluse soil is suited to corn, tobacco, soybeans, and small grains. The gravelly surface layer hinders tillage. Conservation tillage, cover crops, contour tillage, and crop residue management reduce runoff and help control erosion. This soil is well suited to pasture and hay; however, the gravelly surface layer is a limitation.

The dominant trees on this soil are loblolly pine, longleaf pine, white oak, southern red oak, hickory, and sweetgum. The understory includes flowering dogwood, American holly, and sourwood.

This soil is poorly suited to most urban and recreational uses because of moderate permeability and stoniness.

This Vaucluse soil is in capability subclass IIIs. The woodland ordination symbol is 3o.

VaD—Vaucluse gravelly sandy loam, 8 to 15 percent slopes. This soil is well drained and is on side slopes on Coastal Plain uplands around Broadway and east to the Harnett County line. The areas of this soil are narrow and irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is brown gravelly sandy loam 9 inches thick. The subsurface layer to a depth of 14 inches is light yellowish brown gravelly sandy loam. The subsoil extends to a depth of 54 inches. The upper part is strong brown sandy loam, the middle part is red sandy clay loam, and the lower part is mottled red, yellowish red, brownish yellow, and very pale brown sandy loam. The underlying material to a depth of 80 inches is mottled red, yellowish red, brownish yellow, and light gray sandy loam.

Permeability is moderately rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low to moderate. This soil ranges from extremely acid to strongly acid except where lime has been added.

Included with this soil in mapping are small areas of Dothan and Blaney soils. These soils are slightly higher on the landscape than the Vaucluse soil and do not have gravel in the surface layer.

This Vaucluse soil is mainly used as woodland. In some areas, it is used for hay or pasture. A very small acreage is in cropland.

This soil is suited to corn, tobacco, soybeans, and small grains. The main limitations are the gravelly surface layer and steepness of slope. Erosion is a hazard. Conservation tillage, cover crops, contour tillage, and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, longleaf pine, white oak, southern red oak, and sweetgum. The understory includes flowering dogwood, American holly, and sourwood.

This soil is poorly suited to most urban and recreational uses because of moderate permeability, stoniness, and steepness of slope.

This Vaucluse soil is in capability subclass IVe. The woodland ordination symbol is 3o.

VaE—Vaucluse gravelly sandy loam, 15 to 25 percent slopes. This soil is well drained and is on side slopes bordering major drainageways on Coastal Plain uplands in and around Broadway. The areas of this soil are narrow and irregular in shape and range from 5 to 25 acres.

Typically, the surface layer is brown gravelly sandy loam 9 inches thick. The subsurface layer to a depth of 14 inches is light yellowish brown gravelly sandy loam. The subsoil extends to a depth of 54 inches. The upper

part is strong brown sandy loam, the middle part is red sandy clay loam, and the lower part is mottled red, yellowish red, brownish yellow, and very pale brown sandy loam. The underlying material to a depth of 80 inches is mottled red, yellowish red, brownish yellow, and light gray sandy loam.

Permeability is moderately rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is low to moderate. This soil ranges from extremely acid to strongly acid.

Included with this soil in mapping are small areas of Blaney soils.

This Vaucluse soil is mainly used as woodland. In a few small areas, it is used as pasture.

This soil is poorly suited to use as cropland. Steepness of slope and the gravelly surface layer are the main limitations, and erosion is a hazard. This soil is suited to pasture and hay. Proper pasture management reduces runoff and helps control erosion.

The dominant trees on this soil are loblolly pine, longleaf pine, white oak, southern red oak, hickory, and sweetgum. The understory includes flowering dogwood, American holly, and sourwood.

This soil is poorly suited to most urban and recreational uses because of steepness of slope and a gravelly surface layer.

This Vaucluse soil is in capability subclass VIe. The woodland ordination symbol is 3o.

Wn—Wehadkee fine sandy loam. This soil is nearly level and is poorly drained. It is on flood plains. The areas of this soil are long and narrow and range from 5 to 100 acres. Where the streams flow across the Coastal Plain, the areas are smooth and broad and range to about 300 acres.

Typically, the surface layer is gray fine sandy loam 6 inches thick. The subsoil extends to a depth of 46 inches. It is light brownish gray sandy clay loam in the upper and middle parts and gray sandy clay loam in the lower part. The underlying material to a depth of 60 inches is mottled gray, greenish gray, reddish yellow, and strong brown sandy loam.

Permeability is moderate, and the available water capacity is very high. This soil is medium acid or slightly acid except where lime has been added. The seasonal high water table is within 2.5 feet of the surface. This soil is frequently flooded for brief periods.

Included with this soil in mapping are a few small areas of Chewacla and Congaree soils. The Congaree soils are along stream channels, and the Chewacla soils are between the Congaree and the Wehadkee soils.

This Wehadkee soil is mainly used as woodland. A small acreage is pasture.

This soil is poorly suited to crop production because of flooding and wetness. It is well suited to pasture forage, such as fescue and ladino clover.

The dominant trees on this soil are baldcypress, red maple, sweetgum, hickory, yellow poplar, American beech, river birch, water oak, and willow oak. The understory includes American holly, sourwood, greenbrier, giant cane, and eastern redcedar.

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

This Wehadkee soil is in capability subclass VIw. The woodland ordination symbol is 1w.

WsB—White Store silt loam, 2 to 8 percent slopes. This soil is moderately well drained and is on broad, smooth ridges on Piedmont uplands. The areas of this soil are oblong and range from 10 to 1,000 acres.

Typically, the surface layer is brown silt loam 4 inches thick. The subsurface layer to a depth of 7 inches is light brown silt loam. The subsoil extends to a depth of 35 inches. The upper part is red clay, and the lower part is red silty clay loam. The underlying material to a depth of 96 inches is mottled red and dark reddish brown silt loam in the upper part, dark reddish brown silt loam in the middle part, and fine grained sandstone and mudstone in the lower part.

Permeability is slow to very slow, and the available water capacity is high. Shrink-swell potential is very high. This soil is very strongly acid or strongly acid except where lime has been added. Bedrock is at a depth of 48 to 72 inches. The seasonal high water table is 1 foot to 1.5 feet below the surface.

Included with this soil in mapping are small areas of Creedmoor and Pinkston soils. Creedmoor soils are in depressions, and Pinkston soils are along slope breaks.

This White Store soil is mainly used as woodland. In some areas, it is used for hay or pasture.

The dominant trees on this soil are loblolly pine, shortleaf pine, hickory, white oak, northern red oak, southern red oak, and sweetgum. The understory includes flowering dogwood, sourwood, greenbrier, eastern redcedar, blackgum, and blueberry. The clayey subsoil is the main limitation for woodland use and management.

Crops are not grown on White Store soil in this survey area, but this soil is suited to corn and small grains. It is well suited to use as pasture. Steepness of slope is a limitation to the use of this soil as cropland or pasture, and erosion is a hazard. If this soil is used as cropland, conservation tillage, cover crops, contour tillage, and crop residue management reduce runoff and help control erosion.

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

This White Store soil is in capability subclass IIe. The woodland ordination symbol is 4c.

WsD—White Store silt loam, 8 to 15 percent slopes. This soil is moderately well drained and is on

short side slopes on Piedmont uplands. The areas of this soil are irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is brown silt loam 4 inches thick. The subsurface layer to a depth of 7 inches is light brown silt loam. The subsoil extends to a depth of 35 inches. The upper part is red clay, and the lower part is red silty clay loam. The underlying material to a depth of 96 inches is mottled red and dark reddish brown silt loam in the upper part, dark reddish brown silt loam in the middle part, and fine grained sandstone and mudstone in the lower part.

Permeability is slow to very slow, and the available water capacity is high. Shrink-swell potential is very high. This soil is very strongly acid or strongly acid. Bedrock is at a depth of 48 to 72 inches. The seasonal high water table is 1 foot to 1.5 feet below the surface.

Included with this soil in mapping are small areas of Pinkston and Creedmoor soils. Pinkston soils are in areas where the slopes exceed 15 percent, and Creedmoor soils are around the head of drainageways.

All of the acreage of this White Store soil is woodland.

The dominant trees on this soil are loblolly pine, shortleaf pine, hickory, white oak, northern red oak, southern red oak, and sweetgum. The understory includes flowering dogwood, sourwood, greenbrier, eastern redcedar, blackgum, and blueberry. The clayey subsoil is the main limitation for woodland use and management.

Crops are not grown on the White Store soil in this survey area, but the soil is fairly well suited to corn and small grains. It is well suited to use as pasture. Steepness of slope is a limitation to the use of this soil as cropland or pasture, and erosion is a hazard. If this soil is used as cropland, conservation tillage, cover crops, contour tillage, and crop residue management reduce runoff and help control erosion.

This soil is poorly suited to most urban and recreational uses because of very high shrink-swell potential, steepness of slope, and slow or very slow permeability.

This White Store soil is in capability subclass IVe. The woodland ordination symbol is 4c.

WwB—Wickham sandy loam, 2 to 8 percent slopes. This soil is well drained and is on low ridges on stream terraces. The areas of this soil are oblong and range from 5 to 50 acres.

Typically, the surface layer is reddish brown sandy loam 5 inches thick. The subsoil to a depth of 52 inches is red sandy clay loam. The underlying material to a depth of 72 inches is red sandy loam.

Permeability is moderate, and the available water capacity is moderate. This soil ranges from very strongly acid to medium acid except where lime has been added.

Included with this soil in mapping are small areas of State and Tetotum soils. State soils are on the outer edges of delineations in slightly lower positions on the landscape. Tetotum soils are moderately well drained and are intermingled with the Wickham soil in long, narrow depressions and in nearly level areas.

This Wickham soil is mainly used as cropland. In some areas, it is used for hay or pasture. A very small acreage is woodland.

This soil is well suited to corn, soybeans, tobacco, and small grains. Erosion is a hazard in the more sloping areas that are cultivated. Conservation tillage, cover crops, contour tillage, and crop residue management reduce runoff and help control erosion.

The dominant trees on this soil are loblolly pine, yellow poplar, hickory, white oak, and southern red oak. The understory includes red maple, flowering dogwood, American elm, sassafras, redbud, and sourwood.

The soil is well suited to most urban and recreational uses.

This Wickham soil is in capability subclass IIe. The woodland ordination symbol is 2o.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Lee County 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 producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing 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 get 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 subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 6 percent.

About 52,228 acres, or 31 percent of Lee County, meets the requirement for prime farmland. The areas of prime farmland are scattered throughout the county but are mainly in map units 1, 2, 3, 5, and 8 on the general soil map. Some loss of prime farmlands to industrial and urban uses has occurred in recent years.

The following map units, or soils, make up prime farmland in Lee 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.

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. In the following list, the measures needed to overcome the limitations of a map unit, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to determine if the limitations have been overcome by the corrective measures.

CfB Cecil fine sandy loam, 2 to 8 percent slopes
CrB Creedmoor fine sandy loam, 2 to 8 percent slopes
DoA Dothan loamy sand, 0 to 2 percent slopes
DoB Dothan loamy sand, 2 to 8 percent slopes
DuB Durham loamy sand, 2 to 8 percent slopes
MfB Mayodan fine sandy loam, 2 to 8 percent slopes
NaB Nason silt loam, 2 to 8 percent slopes
StA State fine sandy loam, 0 to 3 percent slopes
TaB Tatum silt loam, 2 to 8 percent slopes
ToB Tetotum fine sandy loam, 1 to 4 percent slopes
WwB Wickham 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 avoid 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 behavior 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 rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation 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 prevent construction failures caused by unfavorable soil properties.

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

Fredrick Y. Alexander, district conservationist, and Foy D. Hendrix, conservation agronomist, 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 "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

The acreage available for crops and pasture has steadily decreased in Lee County. More than 7,000 acres of prime farmland has been converted to nonagricultural uses since 1967.

According to the 1978 Census of Agriculture, Lee County has about 17,000 acres in crops and over 6,600 acres in pasture and hayland. Of these, corn was grown on 3,500 acres; tobacco on 3,400 acres; soybeans on 7,000 acres; small grains, including wheat, oats, and barley on 1,500 acres; sweet potatoes on 100 acres; and all other crops on the remaining 1,500 acres. Pasture and hayland are almost equally planted in coastal bermudagrass (fig. 6) and tall fescue.

Soil erosion is a concern on about 60 percent of the cropland and pasture in the county *(11)*. This concern is more serious on cropland and pasture where the slope is more than 2 percent. Erosion is a hazard in some areas of the Dothan, Fuquay, Blaney, Gilead, Cecil, Durham, Mayodan, Nason, and Tatum soils.

Erosion is costly. Productivity and soil tilth decrease as the surface layer is washed away. Costly herbicides, fertilizers, and lime are carried out of the field along with valuable topsoil and organic matter if erosion is not controlled. In addition to being costly from an agricultural standpoint, social and environmental costs increase when the eroded soil is deposited into streams, lakes, and reservoirs. Effective agricultural control of erosion increases productivity and minimizes the public cost of maintaining water quality standards.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. Plant cover on the soil for extended periods of time, such as winter cover crops of small grains, can hold erosion losses to amounts that will not reduce the productive capacity of the soil.

Terraces and diversions reduce erosion by intercepting excess surface runoff and safely routing this water to suitable outlets. Grassed waterways, generally planted in

Figure 6.—Coastal bermudagrass hay is one of the major crops in Lee County. This hay crop is on Blaney loamy sand, 2 to 8 percent slopes.

tall fescue, provide safe disposal areas for surplus field water runoff. Field borders also help filter sediment-laden runoff. These conservation practices are practical and highly effective on uniform slope patterns of Dothan, Fuquay, Blaney, Mayodan, Tatum, and Nason soils.

Contour tillage and stripcropping are also effective conservation practices on many Lee County soils. Like terraces and diversions, these practices are most effective on soils that have more uniform slopes, but they can be adapted to a wide range of slope patterns. Conservation tillage, including minimum tillage, reduced tillage, and no-till, is also effective in controlling erosion on these soils.

In many areas of the Mayodan, Creedmoor, Vaucluse, Nason, and Cecil soils, slopes are so short and irregular that contour tillage and parallel terraces are not practical. On these soils, it is imperative to use effective conservation cropping systems that have substantial plant cover to control erosion.

Information for the design and applicability of erosion control practices for each kind of soil can be obtained from the local Soil Conservation Service offices.

Soil tilth is an important factor in crop production. Seed germination and water infiltration into the soil is highly influenced by soil tilth. Soils that have good tilth have a granular and porous surface layer.

Most of the soils in Lee County have a loamy sand, sandy loam, or fine sandy loam surface layer that is low in organic matter content. Tatum, Nason, Pinkston, and White Store soils, which have a finer textured surface layer of silt loam, are prone to "crusting" after intense rainfalls. Some other soils that have a very fine sandy loam surface layer or an eroded surface are also prone to crusting. Plant cover, crop residue, manure, and mulches that protect the surface from the direct impact of raindrops reduce crusting and improve soil structure and general soil tilth.

A compacted traffic pan can form between the topsoil and the subsoil in the Dothan, Blaney, Nason, State, Tetotum, and Wickham soils. Traffic pans reduce infiltration, root penetration, and permeability. The hazard of erosion is more severe on sloping soils that have a traffic pan. Conservation tillage systems that use rippers, subsoilers, and chisels can effectively reduce the

formation of a traffic pan. Occurrence and severity of the traffic pan increase with the number of trips per crop season.

Droughtiness is a problem on soils that have a sandy surface layer, such as Candor, Blaney, and Fuquay soils. In these soils, the organic matter content is very low, the available water capacity is low, and leaching of available nutrients is high. A large percentage of Lee County's tobacco, corn, soybeans, and small grains is grown on these soils. The droughty condition can be improved by using conservation cropping systems that include conservation tillage, crop residue management, and cover crops. Water infiltration is increased, and water retention in the soil is increased if organic matter is added. Conservation cropping systems and good irrigation management make this droughty condition less of a factor in crop production.

Wind erosion is often a problem on droughty soils that have a sandy surface layer. Many tons of topsoil are lost from these soils each year in Lee County. Conservation cropping systems that include conservation tillage, cover crops, crop residue management, and windbreaks of small grains in row crops can reduce wind damage to young crops.

Less than 1,000 acres of the soils used for crops and pastures in Lee County have drainage problems *(11)*. Tetotum, Gilead, Creedmoor, and Chewacla soils require some form of artificial drainage. A combination of surface drainage, tile drainage, and land smoothing is needed on these soils to obtain optimum crop production. A wide variety of crops, such as corn, soybeans, small grains, truck crops, and pasture, can be grown on these soils. Tobacco is often grown on Gilead soils where subsurface tile and surface drains are used and maintained. The Roanoke and Wehadkee soils are poorly drained, and they respond very slowly to artificial drainage. Drainage is hindered by the tight, clayey subsoil in the Roanoke soils and by frequent flooding on the Wehadkee soils. Crop production on these soils is generally not practical because of periodic flooding and the restricted use of equipment.

All soils in Lee County are low in natural fertility; however, high levels of fertilization on the better drained soils that are used for tobacco have resulted in high levels of phosphorus. Many farmers use fertilizers without phosphorus in an effort to utilize the phosphorus buildup in these soils. Ground limestone is needed on these soils to raise the pH level sufficiently for optimum crop production. Soil tests should be used to establish the amounts of lime and fertilizers needed for specific crops. The North Carolina Agricultural Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

Fall plowing is generally not a good practice on soils that have a very fine sandy loam or silt loam surface layer or that have an eroded surface. In the absence of protection from raindrop impact, the soil surface becomes almost impervious to water infiltration, and runoff and erosion increase during the winter months. Most of the soils in the county have this problem.

Pasture and hayland acreages in Lee County are almost equally planted in coastal bermudagrass and tall fescue. Most areas of coastal bermudagrass are used as hayland and are predominantly on soils that have a sandy surface layer, such as the Candor, Blaney, and Fuquay soils. Soil test recommendations are needed for initial establishment of coastal bermudagrass, and maintenance of nitrogen-phosphorus-potassium levels is essential to production. Split applications of nitrogen are generally recommended because nitrogen is readily leached from the soil. Each cutting of hay also removes significant amounts of nitrogen from the soil. Tall fescue is the predominant pasture grass in the county. It is grown on soils that have a clayey subsoil, such as the Mayodan, Creedmoor, Tatum, Nason, White Store, Cecil, Durham, and Roanoke soils, and also on soils on steeper side slopes, such as Pinkston and Pacolet soils. Soil test recommendations are needed for establishment of tall fescue or fescue-clover pastures. After a good stand is established, only I to 2 tons of lime is needed every 3 to 5 years. Since tall fescue makes most of its growth in the spring and fall, fertilizer recommendations usually call for split applications of nitrogen in February and again in September for best results. Tall fescue grows very little in hot, dry summer months; therefore, it should not be grazed shorter than 3 inches. Livestock rotation to other pastures is necessary.

Herbicides for weed control is a common practice in Lee County. Successful use results in less tillage and is an integral part of modern farming. Soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. The surface texture is shown in table 16 in the USDA texture column.

In some cases, the organic matter content projected for the different soils range outside that shown in the table. Higher ranges can occur in soil areas that have received high amounts of animal or manmade waste. Areas of soil currently being brought into cultivation may have higher levels of organic matter content in their surface layer than like soils that have been in cultivation for a long time. Conservation tillage may also increase organic matter content in the surface layer. Lower levels of organic matter are common in soils where the surface layer has been partly or completely removed by erosion or land smoothing. Other activities can also affect organic matter content for a given soil. Current soil tests should be used for specific organic matter determinations.

Rapid leaching of herbicides may damage young plants or prevent normal seed germination in sandy soils that have less than 2 percent organic matter. The effectiveness of herbicides commonly decreases as the organic matter level exceeds 6 to 10 percent. The label on the herbicide container will give specific herbicide

rates based on organic matter content and surface texture.

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 are also 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 insures the smallest possible loss.

For yields of irrigated crops, the assumption is that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

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 Cooperative 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. 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, landforming 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 rangeland, 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. These levels are defined in the following paragraphs.

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 limitation is 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, rangeland, 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."

Woodland Management and Productivity

Edwin J. Young, state staff forester, Soil Conservation Service, helped prepare this section.

Forest lands are of economic, social, recreational, and environmental importance to Lee County. Wooded areas have aesthetic value and provide habitat for wildlife. Commercial forests cover 111,292 acres, or 68 percent of the land area *(21)*. Urban encroachment and other forest withdrawals will continue to reduce the commercial forest acreage. Commercial forest land is defined as land capable of producing crops of industrial wood and not withdrawn from timber utilization.

Changes in forest type indicate hardwoods are replacing pines on a significant acreage *(3)*. The current rate of pine planting and regeneration is less than the acreage of mature pine stands now being harvested. When pine stands are cut, understory hardwoods become dominant and take over the site. Vigorous methods of hardwood control, such as prescribed burning or mechanical site preparation, are often used to reestablish pine at the time of harvest cutting. Loblolly pine is one of the most important timber species in the county. It is adapted to the soil and climate, brings the highest average sale value per acre, and is relatively easy to establish and manage. Unless the water table is within reach of tree roots, loblolly pine grows on a wide variety of soils including deep, excessively drained sands where site quality is low.

Lee County has four forest type groups *(20)*:

Loblolly-Shortleaf pine, 22,208 acres. This forest type is made up of more than 50 percent of these pine species along with red oak, white oak, sweetgum, hickory, and yellow poplar.

Oak-Pine, 22,066 acres. In this type, hardwoods make up more than 50 percent of the stand, but pines make up 25 to 50 percent in association with upland oaks, sweetgum, hickory, and yellow poplar. This type, if left undisturbed, develops into a forest of predominantly oak and other upland hardwoods.

The understory in the loblolly-shortleaf pine and oak-pine forest types generally consists of hardwood seedlings and saplings, which are more tolerant of shade than pine. In a shaded understory, hardwoods compete so strongly with pine reproduction for light and moisture that few pine seedlings are able to survive. When mature stands of pine are cut, the dense understory of young hardwoods becomes dominant.

Oak-Hickory, 56,804 acres. In this type, upland oaks and hickory make up more than 50 percent stocking, and common associates include winged elm, red maple, and yellow poplar.

Oak-Gum-Cypress, 9,620 acres. This forest type is divided into tupelo-cypress swamps and mixed bottom land hardwoods. Typically, these forests sites have an abundant supply of water and include both alluvial and residual soils. The species composition of mixed bottom land hardwoods that is prevalent on these sites is dependent upon the degree and duration of flooding and the soil-seasonal high water table relationship.

Site index is a measure of soil productivity and its capacity to produce tree growth. Loblolly pine is used as the key indicator species for determining site index for most soils in the county except on sites more suitable for hardwoods. Site index ranges for indicator forest species are shown in table 7 *(4, 5, 6, 7, 8, 14, 16)*. Yield tables for various tree species show the potential growth or yield by site index classes. For example, table 8 shows the potential loblolly pine yearly growth or yield per acre in Board Feet International 1/8-inch Rule by site index classes *(17, 19)*. It shows the range of timber growth or yield as it relates to soil productivity.

Table 9 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol (woodland suitability) for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w*, indicates excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w, d, c, s, and r.

In table 9, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in a well-managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings

apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

In table 10, 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 sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

Recreation is provided by the more than 750 farm ponds in the county and by some of the larger lakes. Fishing is good in many of these ponds as well as in the lakes. The large areas of forest provide some hunting as well as natural and scenic areas. Picnic areas and field sport areas are available. Golf is available to the public on a fee basis at Sanford Municipal Golf Course and at private clubs. San-Lee Recreational Park offers other outdoor activities *(9)*.

In table 10, 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 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

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 or a hardpan 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, and F.Y. Alexander, district conservationist, 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.

Wildlife habitat is the basic element for an abundance of wildlife, and most areas in rural Lee County have game and nongame wildlife. The climate is good, and the soils produce food and cover necessary for many wild game and nongame species. The increasing rate of rural housing, urban development, and free-roaming pets is, however, reducing the suitability in this county for wildlife.

A good supply of small game is in the county. Species include rabbit, squirrel, fox, dove, quail, turkey, raccoon, mink, beaver, muskrat, and duck. White-tail deer is the only established big game species of any consequence.

Land clearing has destroyed some of the good wildlife habitat in the county. Some streams have been damaged by sediment, animal waste, pesticides, and other pollutants. Wildlife habitat improvement is needed in open agricultural areas and in stands of pure pine. Over the last 10 years, massive timber harvesting operations and conversion to pine have also contributed to the degradation of wildlife habitat.

Fishing is good in larger streams, the Upper Little River, the Deep River, and the Cape Fear River, as well as in the many farm ponds and lakes scattered about the county. Major species are catfish, bass, and sunfish.

In table 11, 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 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 flood hazard. Soil temperature and soil moisture are also 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, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, 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 flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, partridge pea, panic grass, and paspalum grass.

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 hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, red maple, 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, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, spikerush, rushes, sedges, and giant cane.

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, meadows, 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. The wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, 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, deer, and red fox.

Habitat for wetland wildlife consists of open, marshy, or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

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. The ratings are given in the following tables: 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, and 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 must 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 to 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, 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 12 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, a cemented pan, 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 the 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, and shrink-swell potential can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 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. Depth to bedrock or to a cemented pan, 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), shrink-swell 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 or to a cemented pan, the available water capacity in the upper 40 inches, and the content of sodium 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.

Sanitary Facilities

Table 13 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 13 also shows the suitability of the soils for use as daily cover for landfills. 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 or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan 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.

Table 13 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 or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of 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, bedrock, and cemented pans can cause construction problems.

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 needs to be considered.

The ratings in table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, 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 sodium affect trench type 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 type sanitary landfill. The soil material is obtained offsite, 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, a cemented pan, 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 14 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 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, 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 shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, 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* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have 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 the depth to the water table is less than 1 foot. They may 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. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 14, 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 up to 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 and siltstone, 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, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, 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 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-available nutrients as it decomposes.

Water Management

Table 15 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; embankments, dikes, and levees; and aquifer-fed 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 of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

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, permeability of the aquifer, and quality of the water. 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, to a cemented pan, 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; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks

are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. 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 or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

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 or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, 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 19.

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 characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, 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 16 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 "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.

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 19.

Rock fragments larger than 3 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 17 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.

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, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

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.

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.

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 change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater 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.

Soil and Water Features

Table 18 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 intake 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.

Flooding, the temporary covering of the soil 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 18 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

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 (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). *Common* is used when classification as occasional or frequent does not affect interpretations. 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. November-May, for example, means that flooding can occur during the period November through May. 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 absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are 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 depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table, that is, *perched, artesian*, 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 18.

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. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. 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.

The two numbers in the "High water table-Depth" column 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 the water table exists 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 creates a severely corrosive environment. 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 is also 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 19 shows laboratory test data for several 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, Division of Highways, Materials and Tests Unit.

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 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); Moisture density, Method A—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 *(22)*. 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 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten 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 Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has an udic moisture regime).

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 Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly 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 clayey, mixed, thermic Typic Hapludults.

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. For example, the Mayodan series is a member of the clayey, mixed, thermic family of Typic Hapludults.

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. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (18)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (22)*. 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."

Blaney Series

The Blaney series consists of well drained soils on Coastal Plain uplands. These soils formed in moderately coarse textured sediment. Slopes range from 2 to 15 percent.

Typical pedon of Blaney loamy sand, 2 to 8 percent slopes; 0.7 mile north of the Moore County line on U.S. Highway 1 to State Road 1173, 0.6 mile southeast on State Road 1173 to State Road 1174, 0.4 mile northeast

on State Road 1174, 120 feet northwest of State Road 1174, in woods:

A—0 to 3 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common medium and many fine roots; strongly acid; abrupt smooth boundary.
E—3 to 28 inches; light yellowish brown (10YR 6/4) loamy sand; weak fine granular structure; very friable; few medium and fine roots; very strongly acid; gradual wavy boundary.
Bt—28 to 38 inches; brownish yellow (10YR 6/6) sandy clay loam; few fine distinct yellowish red (5YR 5/8) and yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and nonplastic; brittle in 30 percent of the mass; few fine roots; very strongly acid; gradual wavy boundary.
BC—38 to 49 inches; brownish yellow (10YR 6/8) sandy clay loam; many medium distinct yellowish red (5YR 5/8) and yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; firm; very strongly acid; gradual wavy boundary.
C—49 to 60 inches; mottled brownish yellow (10YR 6/8), strong brown (10YR 5/8), yellowish red (5YR 5/8), and light gray (10YR 7/2) sandy loam; 10 percent, by volume, pockets of sandy clay loam; massive; compact in place; very strongly acid.

The sandy and loamy horizons are more than 60 inches thick. The Blaney soils range from very strongly acid to medium acid in the A and E horizons and are very strongly acid or strongly acid in the Bt horizon. Immediately below the E horizon, the Bt horizon is dense and compact. Few fine plinthite nodules are in the lower part of the Bt horizon in some pedons.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. It is sand or loamy sand.

The Bt horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. Mottles in shades of yellow, brown, or red are common, and in some pedons, mottles in shades of gray are in the lower part of the horizon. The Bt horizon commonly is sandy clay loam but ranges to sandy loam.

The C horizon is mottled in shades of brown, red, white, and gray. The texture is variable, and in some pedons, it is stratified.

Candor Series

The Candor series consists of somewhat excessively drained soils on Coastal Plain uplands. These soils formed in sandy and loamy Coastal Plain sediment. Slopes range from 0 to 8 percent.

Typical pedon of Candor sand, 0 to 8 percent slopes; 0.3 mile west of the intersection of U.S. Highway I and State Road 1181, 0.1 mile east of the intersection of State Road 1181 and Quail Ridge Subdivision Road, 125 feet north of center line of State Road 1181:

A—0 to 9 inches; brown (10YR 5/3) sand; weak fine granular structure; very friable; few fine roots; strongly acid; abrupt smooth boundary.
E—9 to 25 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; few fine roots; strongly acid; clear smooth boundary.
Bt—25 to 35 inches; yellowish brown (10YR 5/8) loamy sand; weak fine subangular blocky structure; very friable; common faint clay bridging of sand grains; very strongly acid; clear wavy boundary.
E'—35 to 54 inches; very pale brown (10YR 7/4) sand; single grained; loose; very strongly acid; gradual wavy boundary.
B't1—54 to 63 inches; yellowish brown (10YR 5/6) sandy loam; few fine prominent yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.
B't2—63 to 76 inches; strong brown (7.5YR 5/8) sandy clay loam; many medium distinct light yellowish brown (10YR 6/4) mottles and common coarse prominent red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.
BC—76 to 94 inches; red (2.5YR 6/8) sandy loam; common medium distinct white (10YR 8/1) mottles and common fine distinct brownish yellow (10YR 6/8) mottles; massive; compact in place; firm; very strongly acid; gradual wavy boundary.
C—94 to 99 inches; light red (2.5YR 6/6) sandy loam; few fine distinct white (10YR 8/1) and brownish yellow (10YR 6/6) mottles; massive; very friable; very strongly acid.

The sandy and loamy horizons range from 60 to more than 80 inches in thickness. The Candor soils are very strongly acid or strongly acid except where lime has been added.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The E and E' horizons have hue of 10YR; value of 4 to 7 and chroma of 3 to 6. They are sand.

The Bt and B't horizons have hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. The Bt horizon is loamy sand, and the B't horizon is sandy loam or sandy clay loam. The BC and C horizons have hue of 2.5YR to 7.5YR, value of 6, and chroma of 6 or 8. They have few to common mottles in shades of brown, yellow, or red. In some pedons, few to common mottles that have chroma of 2 or less are in these horizons. These horizons range from sandy loam to sandy clay loam.

Cecil Series

The Cecil series consists of well drained soils on Piedmont uplands. These soils formed in fine textured residuum weathered from acid crystalline rock. Slopes range from 2 to 15 percent.

Typical pedon of Cecil fine sandy loam, 2 to 8 percent slopes; 8.6 miles east of Sanford, 1.6 miles northeast of the intersection of North Carolina Highway 42 and State Road 1538, 1 mile northeast of the intersection of State Road 1545 and State Road 1538, 10 feet south of State Road 1538, in a field:

Ap—0 to 6 inches; yellowish red (5YR 4/6) fine sandy loam; weak medium granular structure; very friable; few fine roots; common pebbles and few cobbles from 3 to 5 inches in diameter; strongly acid; abrupt smooth boundary.

Bt1—6 to 30 inches; red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few distinct clay films on faces of peds; few fine flakes of mica; few fine pebbles; very strongly acid; gradual wavy boundary.

Bt2—30 to 54 inches; red (2.5YR 4/8) clay; few fine distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt3—54 to 60 inches; red (2.5YR 4/8) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles and few fine distinct brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few flakes of mica; very strongly acid; gradual smooth boundary.

C—60 to 70 inches; mottled red (2.5YR 5/8), strong brown (7.5YR 5/8), and pale brown (10YR 6/3) saprolite that crushes to sandy loam; massive; friable; few flakes of mica; very strongly acid.

The clayey part of the Bt horizon ranges from 24 to 48 inches in thickness and extends to a depth of 30 to 60 inches. The Cecil soils range from very strongly acid to medium acid in the A horizon except where lime has been added and are very strongly acid or strongly acid in the Bt and C horizons. Most pedons have few to common flakes of mica in the A and Bt horizons and few to many flakes of mica in the Bt3 and C horizons.

The A or Ap horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 2 to 8.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is fine sandy loam or sandy loam.

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 or 8. It is clay or clay loam. In some pedons, mottles in shades of yellow or brown are few to common in the lower part of the Bt horizon or in the BC horizon.

The C horizon is mottled in shades of red, brown, gray, or white. It is saprolite that crushes to sandy loam.

Chewacla Series

The Chewacla series consists of somewhat poorly drained soils on flood Plains. These soils formed in recent alluvium. Slopes are less than 2 percent.

Typical pedon of Chewacla silt loam; 1.8 miles northwest of Sanford, 0.4 mile northwest of the intersection of U.S. Highway 15-501 and U.S. Highway 421, 0.4 mile southeast of the intersection of U.S. Highway 421 and State Road 1328, 200 feet south of U.S. Highway 421:

A—0 to 6 inches; brown (7.5YR 5/4) silt loam; few fine distinct strong brown (7.5YR 5/6) and light brown (7.5YR 6/4) mottles; weak medium granular structure; very friable; common fine roots; few fine flakes of mica; strongly acid; clear smooth boundary.

Bw1—6 to 17 inches; brown (7.5YR 5/4) silty clay loam; common fine distinct strong brown (7.5YR 5/8) mottles and few fine distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bw2—17 to 26 inches; brown (7.5YR 5/4) silty clay loam; few fine distinct yellowish red (5YR 5/8), strong brown (7.5YR 5/8), and pinkish gray (7.5YR 6/2) mottles; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bg—26 to 46 inches; pinkish gray (7.5YR 6/2) loam; common coarse distinct brown (7.5YR 5/4) mottles and few fine distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; very friable; few fine flakes of mica; strongly acid; gradual wavy boundary.

Cg—46 to 60 inches; light brownish gray (10YR 6/2) sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles and few fine distinct brown (7.5YR 5/4) mottles; massive; very friable; few fine flakes of mica; strongly acid.

The loamy horizons range from 36 to more than 72 inches in thickness. The Chewacla soils range from strongly acid to slightly acid except where lime has been added. Dark concretions are common in some pedons, and few to common flakes of mica are throughout some profiles.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4.

The upper part of the B horizon has hue of 5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. The lower part of the B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 8. Mottles in chroma of 2 or

less are within 24 inches of the surface. Mottles in shades of brown are common in the B horizon. The B horizon is sandy clay loam, sandy loam, loam, or clay loam. Layers of silt loam or silty clay loam are in some pedons.

The C horizon is sandy loam, silt loam, or sand. In some pedons, it is stratified with these textures.

Congaree Series

The Congaree series consists of well drained to moderately well drained soils on flood plains. These soils formed in recent alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Congaree silt loam; 3.2 miles northeast of the intersection of North Carolina Highway 42 and State Road 1007, 1 mile northeast of State Road 1007 and Bethlehem Church, 150 feet southeast of River Bridge, in a field:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; very friable; common fine roots; few fine flakes of mica; medium acid; clear smooth boundary.

C1—9 to 22 inches; brown (7.5YR 5/4) loam; common medium faint strong brown (7.5YR 5/6) mottles; massive; very friable; few fine roots; few fine flakes of mica; medium acid; gradual wavy boundary.

C2—22 to 42 inches; strong brown (7.5YR 5/6) fine sandy loam; few fine distinct reddish brown (5YR 4/4) and light yellowish brown (10YR 6/4) mottles; massive; very friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C3—42 to 60 inches; strong brown (7.5YR 5/6) sandy loam; few fine distinct light yellowish brown (10YR 6/4), yellowish red (5YR 5/8), and reddish brown (5YR 4/4) mottles; massive; very friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C4—60 to 80 inches; yellowish red (5YR 5/6) sandy loam, strata of loamy sand; common fine distinct strong brown (7.5YR 5/6) mottles and few fine distinct reddish brown (5YR 4/4) mottles; massive; very friable; few fine flakes of mica; very strongly acid.

The loamy horizons range from 40 to 60 inches or more in thickness. The Congaree soils range from very strongly acid to neutral except where lime has been added. Most pedons have few flakes of mica.

The A or Ap horizon has hue of 7.5YR to 10YR, value of 3 to 5, and chroma of 2 to 4.

The C horizon has hue of 5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 6. Mottles in shades of red, brown, or yellow are in some pedons. The C horizon has thin strata of contrasting textures. Below a depth of 40 inches, the texture is variable, ranging from loamy sand to silty clay.

Creedmoor Series

The Creedmoor series consists of moderately well drained and somewhat poorly drained soils on Piedmont uplands. These soils formed in fine textured residuum weathered from Triassic rocks. Slopes range from 2 to 15 percent.

Typical pedon of Creedmoor fine sandy loam, 2 to 8 percent slopes; 1.2 miles west of the intersection of North Carolina Highway 42 and State Road 1500, 0.3 mile southwest of the intersection of State Road 1500 and State Road 1505, 50 feet east of State Road 1505; in a field:

Ap—0 to 14 inches; yellowish brown (10YR 5/4) fine sandy loam; few fine distinct reddish yellow (7.5YR 6/8) mottles; weak medium granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.

Bt1—14 to 29 inches; brownish yellow (10YR 6/6) silty clay loam; common medium distinct light gray (10YR 7/2) mottles, few fine distinct reddish yellow (7.5YR 6/8) mottles, and common medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—29 to 38 inches; very pale brown (10YR 7/3) silty clay; few fine distinct brownish yellow (10YR 6/6) and reddish yellow (7.5YR 6/8) mottles and common medium prominent red (2.5YR 4/8) mottles; moderate coarse subangular blocky structure; very firm, sticky and plastic; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—38 to 46 inches; mottled strong brown (7.5YR 5/6), yellowish red (5YR 5/8), and brownish yellow (10YR 6/6) silty clay; moderate coarse angular blocky structure; very firm, sticky and plastic; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—46 to 56 inches; red (2.5YR 4/6) clay loam; few fine prominent brownish yellow (10YR 6/6) mottles and common medium prominent light gray (10YR 7/2) mottles; weak coarse angular blocky structure; firm, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.

C—56 to 72 inches; dark red (2.5YR 3/6) loam; mudstone saprolite with 0.25 to 0.50 inch vertical seams, about 3 to 4 inches apart, of light gray (10YR 7/2) silty clay loam; common oxidized zones of yellowish brown (10YR 5/6) mottles; massive; firm; very strongly acid; gradual wavy boundary.

Cr1—72 to 86 inches; dark red (2.5YR 3/6) mudstone saprolite that crushes to loam and silt loam; massive; firm; very strongly acid; gradual wavy boundary.

Cr2—86 to 96 inches; dark red (2.5YR 3/6) saprolite that crushes to loam and silt loam; massive; very firm; very strongly acid; gradual wavy boundary.
R—96 inches; dark red hard bedrock.

The clayey Bt horizon ranges from 15 to 50 inches in thickness. The Creedmoor soils are very strongly acid or strongly acid except where lime has been added.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

Some pedons have an E horizon that has hue of 10YR, value of 6, and chroma of 4. It is sandy loam, fine sandy loam, or silt loam.

The Bt horizon has hue of 7.5YR to 10YR, value of 4 to 7, and chroma of 2 to 8. It is clay, silty clay, silty clay loam, sandy clay loam, or clay loam.

The BC horizon has hue of 2.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8. The horizon contains gray streaks and mottles and is silty clay, silty clay loam, clay, or clay loam. The BC horizon generally contains a few fragments of saprolite and few to common flakes of mica.

The C horizon has hue of 10R to 2.5Y, value of 3 to 8, and chroma of 1 to 8; or it is variegated red, white, gray, or brown saprolite that crushes to silt loam, loam, clay loam, sandy loam, or silty clay loam.

The Creedmoor soils in Lee County are a taxadjunct to the Creedmoor series because the base saturation is slightly higher than 35 percent at the critical depth for classification as an Ultisol or an Alfisol. This difference does not affect the use, management, or behavior of the soil. The base saturation is less than 35 percent in the solum.

Dothan Series

The Dothan series consists of well drained soils on uplands. These soils formed in moderately fine textured sediment. Slopes range from 0 to 8 percent.

Typical pedon of Dothan loamy sand, 0 to 2 percent slopes; 0.3 mile north of the intersection of State Road 1538 and State Road 1579 in Broadway, 0.3 mile southwest of the intersection of State Road 1542 and State Road 1538, 20 feet west of farm path:

Ap—0 to 9 inches; brown (10YR 5/3) loamy sand; weak medium granular structure; very friable; common fine roots; medium acid; clear smooth boundary.
E—9 to 15 inches; very pale brown (10YR 7/4) loamy sand; weak medium granular structure; very friable; few fine roots; medium acid; clear wavy boundary.
Bt1—15 to 30 inches; yellowish brown (10YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; very strongly acid; gradual wavy boundary.
Bt2—30 to 45 inches; yellowish brown (10YR 5/8) sandy clay loam; few medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; 10 percent plinthite nodules; very strongly acid; gradual wavy boundary.
Bt3—45 to 65 inches; yellowish brown (10YR 5/8) sandy clay loam; few medium distinct strong brown mottles (7.5YR 5/6); about 20 percent, by volume, fine distinct red (2.5YR 4/8) plinthite nodules; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; compact in place; few distinct clay films on faces of peds; very strongly acid.

The loamy Bt horizon ranges from 60 to more than 80 inches in thickness. Depth to horizons that contain 5 percent or more plinthite ranges from 30 to 60 inches. The Dothan soils range from very strongly acid to medium acid except where lime has been added.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4.

The E horizon has the same range in color as the Ap horizon. It is loamy sand or gravelly loamy sand. Some pedons do not have an E horizon.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 4 to 8. Mottles in the upper part of the Bt horizon are in shades of brown and red, and in the lower part, they are in shades of red, white, brown, and gray. The Bt horizon is sandy loam, sandy clay loam, or clay loam. The lower part of the Bt horizon is 5 to 35 percent, by volume, nonindurated plinthite.

Durham Series

The Durham series consists of well drained soils on Piedmont uplands. These soils formed in loamy residuum weathered from acid crystalline rock. Slopes range from 2 to 8 percent.

Typical pedon of Durham loamy sand, 2 to 8 percent slopes; 0.8 mile south of the intersection of State Road 1146 and State Road 1133, 0.1 mile west of the intersection of State Road 1146 and a farm path, 200 feet west of farm path, in a cultivated field:

Ap—0 to 10 inches; light yellowish brown (10YR 6/4) loamy sand; weak medium granular structure; very friable; common fine roots; 5 percent, by volume, quartz fragments; slightly acid; abrupt smooth boundary.
E—10 to 15 inches; very pale brown (10YR 7/4) loamy sand; weak medium granular structure; very friable; few fine roots; 1 percent, by volume, quartz fragments; slightly acid; clear wavy boundary.
Bt1—15 to 20 inches; brownish yellow (10YR 6/6) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few fine

roots; few faint clay films on vertical faces of peds; medium acid; clear smooth boundary.

Bt2—20 to 26 inches; strong brown (7.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common faint clay films on faces of peds; strongly acid; clear wavy boundary.

Bt3—26 to 33 inches; strong brown (7.5YR 5/8) sandy clay loam; common medium prominent red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; strongly acid; clear wavy boundary.

Bt4—33 to 49 inches; yellowish red (5YR 5/8) sandy clay; common fine distinct red (2.5YR 5/8) mottles and few fine distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; many distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—49 to 56 inches; yellowish red (5YR 5/8) sandy clay loam; common medium prominent reddish yellow (7.5YR 6/8) mottles and common medium prominent brownish yellow (10YR 6/8) mottles; massive parting to weak coarse subangular blocky structure; firm, slightly sticky and plastic; very strongly acid; gradual wavy boundary.

C—56 to 70 inches; mottled yellowish brown (10YR 5/8), white (10YR 8/2), strong brown (7.5YR 5/8), and reddish yellow (5YR 6/8) saprolite that crushes to sandy loam; very strongly acid.

The loamy and clayey Bt horizon ranges from 35 to 50 inches in thickness. The Durham soils are very strongly acid or strongly acid except where lime has been added. Content of coarse fragments ranges from 0 to 10 percent in the A horizon and from 0 to 30 percent in the Bt horizon. Some pedons have few to common flakes of mica in the Bt and C horizons.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 6, and chroma of 2 to 6.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. It is sandy loam or loamy sand. Some pedons do not have an E horizon.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Pedons that are dominantly in 5YR hue have evident patterns of mottling below the upper 20 inches of the Bt horizon. The Bt horizon is sandy clay loam or clay loam and contains less than 30 percent silt. The BC horizon is similar in color to the Bt horizon. It is sandy clay loam or clay loam.

The C horizon is mottled in shades of red, brown, yellow, gray, or white soft saprolite of acid crystalline rock that crushes to sandy loam.

Fuquay Series

The Fuquay series consists of well drained soils on Coastal Plain uplands. These soils formed in moderately coarse textured sediment. Slopes range from 0 to 6 percent.

Typical pedon of Fuquay loamy sand, 0 to 6 percent slopes; 1 mile northwest of Lemon Springs, 0.2 mile east of the intersection of State Road 1159 and State Road 1158, 50 feet southwest of State Road 1159, in a field:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine roots; slightly acid; clear smooth boundary.

E—9 to 24 inches; light yellowish brown (2.5Y 6/4) loamy sand; few fine faint strong brown mottles; weak fine granular structure; very friable; slightly acid; clear wavy boundary.

Bt1—24 to 28 inches; light olive brown (2.5Y 5/6) sandy loam; few fine distinct light yellowish brown (2.5Y 6/4) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Bt2—28 to 36 inches; yellowish brown (10YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—36 to 44 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium prominent yellowish red (5YR 5/8) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct clay films on faces of peds; common brittle plinthite nodules; very strongly acid; gradual wavy boundary.

Bt4—44 to 50 inches; mottled yellowish red (5YR 5/8) and brownish yellow (10YR 6/6) sandy clay loam; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few brittle plinthite nodules; very strongly acid; gradual wavy boundary.

Bt5—50 to 68 inches; mottled yellowish red (5YR 5/8), brownish yellow (10YR 6/6), light gray (10YR 7/2), and red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; firm; few distinct clay films on faces of peds; common brittle plinthite nodules; very strongly acid; gradual wavy boundary.

Bt6—68 to 83 inches; mottled yellowish red (5YR 5/8), brownish yellow (10YR 6/6), gray (10YR 6/1), light gray (10YR 7/2), and red (2.5YR 4/6) sandy clay loam, strata of sandy loam; weak coarse subangular blocky structure; firm; common brittle plinthite nodules; very strongly acid.

The sandy and loamy horizons commonly are more than 80 inches thick. Depth to plinthite ranges from 35 to 60 inches. The Fuquay soils are very strongly acid or strongly acid except where lime has been added. Occasionally, a few rounded, rough-surfaced or smooth nodules of iron are on the surface and throughout the A horizon.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3; or it is neutral 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, loamy sand, or loamy fine sand.

Some pedons have a BE horizon that has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. It is loamy sand or loamy fine sand.

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 of the Bt horizon has hue of 2.5YR to 10YR, value of 4 to 8, and chroma of 1 to 8. The Bt horizon is sandy clay loam. The lower part of the Bt horizon may be variegated or have a matrix that contains both high and low chroma mottles. The reddish plinthite is hard and is surrounded by strong brown and yellowish brown soft material. The reddish and brownish parts are sandy clay loam or sandy loam, and the gray parts are sandy clay loam or sandy clay. Generally the redder parts of the plinthic horizons are oriented horizontally.

Some pedons have a C horizon that has variegated colors in hue of 2.5YR to 2.5Y, value of 4 to 8, and chroma of 1 to 8. The C horizon is sandy loam or loamy sand.

Gilead Series

The Gilead series consists of moderately well drained soils on Coastal Plain uplands. These soils formed in fine textured sediment. Slopes range from 2 to 15 percent.

Typical pedon of Gilead loamy sand, 2 to 8 percent slopes; 1.5 miles northwest of the intersection of State Road 1171 and State Road 1172, 0.2 mile west of the intersection of State Road 1171 and a farm path, 150 feet southeast of the farm path:

Ap—0 to 7 inches; brown (10YR 5/3) loamy sand; weak medium granular structure; very friable; common fine roots; medium acid; clear smooth boundary.

Bt1—7 to 14 inches; brownish yellow (10YR 6/6) sandy clay loam; few fine distinct pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; strongly acid; gradual wavy boundary.

Bt2—14 to 20 inches; yellowish brown (10YR 5/8) sandy clay loam; common coarse distinct reddish yellow (7.5YR 6/8) mottles, few medium distinct red (2.5YR 4/8) mottles, and common medium distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—20 to 32 inches; brownish yellow (10YR 6/6) sandy clay; common fine distinct reddish yellow (7.5YR 6/8) mottles, common medium prominent red (2.5YR 4/8) mottles, and common coarse distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg—32 to 52 inches; light gray (10YR 7/1) sandy clay loam, strata of sandy clay; common medium distinct strong brown (7.5YR 5/8) mottles and few fine prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.

Cg—52 to 75 inches; light gray (10YR 7/1) clay; few medium distinct gray (10YR 6/1) mottles and few fine prominent red (2.5YR 4/8) mottles; massive; very firm, sticky and plastic, very strongly acid.

The sandy, loamy, and clayey horizons typically are 30 to 60 inches thick over stratified sediment or discontinuities of clay. The Gilead soils are very strongly acid or strongly acid except where lime has been added.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3.

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is loamy sand, sandy loam, gravelly loamy sand, or gravelly sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 8. In some pedons, the upper part of the Bt horizon is mottled in shades of brown, yellow, or red. The middle and lower parts of the Bt horizon are mottled in shades of gray, red, brown, yellow, or white. The Bt horizon is sandy clay, clay, or clay loam. It has thin layers of sandy clay loam in some pedons.

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 clay loam, clay loam, or sandy loam. Some pedons do not have a Btg horizon.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 1 to 8; is neutral and has value of 4 to 8, or it is layers of high and low chroma mottles. This horizon is clay, sandy loam, and sandy clay loam.

Mayodan Series

The Mayodan series consists of well drained soils on Piedmont uplands. These soils formed from fine textured residuum weathered from Triassic rocks. Slopes range from 2 to 25 percent.

Typical pedon of Mayodan fine sandy loam, 2 to 8 percent slopes; 3 miles west of Sanford on North

Carolina Highway 42, 0.8 mile southwest of the intersection of North Carolina Highway 42 and State Road 1318, 0.4 mile southwest of the intersection of State Road 1318 and State Road 1334, 50 feet south of State Road 1318, in a field:

Ap—0 to 7 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; very friable; common fine roots; medium acid; abrupt smooth boundary.

Bt1—7 to 10 inches; reddish yellow (7.5YR 6/8) clay loam; few fine distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm; strongly acid; clear smooth boundary.

Bt2—10 to 14 inches; red (2.5YR 4/8) silty clay loam; few fine distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.

Bt3—14 to 32 inches; red (2.5YR 4/8) silty clay; common medium distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—32 to 42 inches; yellowish red (5YR 5/8) silty clay; common medium distinct red (2.5YR 4/8) mottles and few fine distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt5—42 to 51 inches; yellowish red (5YR 5/8) silty clay loam; common medium distinct red (2.5YR 4/8) mottles and few fine distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

C—51 to 60 inches; red (2.5YR 5/8) saprolite that crushes to loam; massive; friable; very strongly acid.

The clayey Bt horizon ranges from 15 to 45 inches in thickness. The Mayodan soils are very strongly acid or strongly acid except where lime has been added. Content of gravel-size coarse fragments ranges from 0 to 20 percent in the A, Ap, or E horizons and from 0 to 5 percent in the Bt horizon. Some pedons have few to common flakes of mica.

The A or Ap horizon has hue of 5YR to 2.5Y, value of 2 to 6, and chroma of 2 to 8.

Some pedons have an E horizon that has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is sandy loam or fine sandy loam.

The upper part of the Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 3 to 8. The lower part of the Bt horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 3 to 8. Mottles are in most pedons. The Bt horizon is silty clay, silty clay loam, clay, or clay loam.

The C horizon has hue of 10R to 7.5YR, value of 3 to 6, and chroma of 2 to 8. It is weathered saprolite of Triassic sedimentary rock that crushes to loam, clay loam, or silty clay loam.

Nason Series

The Nason series consists of well drained soils on Piedmont uplands. These soils formed in moderately fine textured residuum weathered from metamorphic rocks. Slopes range from 2 to 15 percent.

Typical pedon of Nason silt loam, 2 to 8 percent slopes; 0.6 mile south of the intersection of State Roads 1466 and 1423, 0.1 mile southwest of the intersection of State Road 1433 and State Road 1423, 50 feet southeast of State Road 1433, in a field:

Ap—0 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak medium granular structure; very friable; common fine roots; few fine rock fragments; slightly acid; clear smooth boundary.

Bt1—6 to 11 inches; yellowish brown (10YR 5/6) silty clay loam; common fine distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; few fine rock fragments; few faint clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—11 to 21 inches; strong brown (7.5YR 5/8) silty clay loam; few fine distinct brownish yellow (10YR 6/6) and yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; 10 percent, by volume, rock fragments; few distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—21 to 46 inches; strong brown (7.5YR 5/8) silty clay loam; common medium prominent red (2.5YR 4/8) and brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; 10 percent, by volume, rock fragments; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

C1—46 to 55 inches; mottled strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), red (2.5YR 4/8), and light gray (10YR 7/1) silt loam, strata of silty clay loam; massive; friable; 10 percent, by volume, rock fragments; very strongly acid; gradual wavy boundary.

C2—55 to 60 inches; mottled red (2.5YR 4/8), brownish yellow (10YR 6/6), strong brown (7.5YR 5/8), and light gray (10YR 7/1) saprolite that crushes to silt loam.

The Bt horizon ranges from 10 to 42 inches in thickness. The Nason soils are very strongly acid or strongly acid except where lime has been added.

The Ap or A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4.

The upper part of the Bt horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 6 to 8. It is silty clay, clay, or silty clay loam. The lower part of the Bt horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 6 to 8, and is mottled in places. It is silt loam or silty clay loam.

The C horizon is commonly mottled with red, brown, light gray, and brownish yellow. It is silt loam or channery silt loam.

Pacolet Series

The Pacolet series consists of well drained soils on Piedmont uplands. These soils formed in residuum weathered from acid crystalline rock. Slopes range from 15 to 40 percent.

Typical pedon of Pacolet fine sandy loam, 15 to 40 percent slopes; 2 miles northeast of the intersection of North Carolina Highway 42 and State Road 1538, 0.1 mile northwest of the intersection of State Road 1538 and State Road 1539, 500 feet north of Chestnut Church, in woods:

Ap—0 to 2 inches; reddish brown (5YR 4/4) fine sandy loam; weak medium granular structure; very friable; few fine roots; few fine pebbles; strongly acid; abrupt smooth boundary.

Bt1—2 to 10 inches; red (2.5YR 4/8) clay loam; weak fine subangular blocky structure; friable; few distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt2—10 to 22 inches; red (2.5YR 4/6) clay; few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—22 to 30 inches; red (2.5YR 4/6) clay loam; common medium distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; few fine black concretions; very strongly acid; gradual wavy boundary.

C1—30 to 44 inches; mottled pinkish white (7.5YR 8/2), reddish yellow (7.5YR 6/8), yellowish red (5YR 5/6), and red (2.5YR 4/6) saprolite that crushes to loam; massive; friable; very strongly acid; gradual wavy boundary.

C2—44 to 60 inches; mottled pinkish white (7.5YR 8/2), reddish yellow (7.5YR 6/8), yellowish red (5YR 5/6), and red (2.5YR 4/6) saprolite that crushes to fine sandy loam; massive; friable; very strongly acid.

The clayey Bt horizon ranges from 10 to 30 inches in thickness. The Pacolet soils range from very strongly acid to medium acid except where lime has been added. Some pedons have few fine flakes of mica.

The A or Ap horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. In some pedons, the lower part of the Bt horizon contains brownish mottles. The Bt horizon is clay, clay loam, or thin layers of sandy clay loam or loam.

The C horizon is mottled saprolite that crushes to sandy loam, fine sandy loam, or loam.

Pinkston Series

The Pinkston series consists of well drained soils on Piedmont uplands. The soils formed in material weathered from Triassic sediment. Slopes range from 2 to 40 percent.

Typical pedon of Pinkston silt loam, 15 to 40 percent slopes; 1 mile southwest of Cumnock, 0.5 mile northwest of the intersection of U.S. Highway 421, State Road 1400, and State Road 1384 on Woods Road, 200 feet north of road:

A—0 to 6 inches; brown (7.5YR 5/4) silt loam; weak fine granular structure; very friable; many fine and medium roots; 12 percent, by volume, coarse fragments; very strongly acid; clear smooth boundary.

Bw1—6 to 13 inches; brown (7.5YR 5/4) silt loam; few medium distinct yellowish red (5YR 4/6) mottles; weak fine subangular blocky structure; friable; common fine and medium roots; 5 percent, by volume, coarse fragments; very strongly acid; clear wavy boundary.

Bw2—13 to 16 inches; light brown (7.5YR 6/4) silt loam; weak fine subangular blocky structure; friable; few fine and medium roots; 5 percent, by volume, coarse fragments; very strongly acid; abrupt wavy boundary.

C—16 to 38 inches; reddish brown (2.5YR 4/4) saprolite that crushes to silt loam; massive; firm; 12 percent, by volume, coarse fragments; very strongly acid; abrupt wavy boundary.

R—38 inches; bedrock.

Content of coarse fragments typically is less than 15 percent but ranges from 5 to 35 percent in the A and Bw horizons. The Pinkston soils are very strongly acid or strongly acid except where lime has been added.

The A horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6. It is silt loam, very fine sandy loam, fine sandy loam, or their gravelly analogs.

The Bw horizon has hue of 5YR to 10YR, value of 4 to 7, and chroma of 2 to 8. It is silt loam, very fine sandy loam, fine sandy loam, or loam. Discontinuous, irregularly shaped areas of sandy clay loam, clay loam, or silty clay loam are also in the Bw horizon.

The C horizon is weathered saprolite that crushes to silt loam, fine sandy loam, or sandy loam. It has hue of 2.5YR to 10YR, value of 4 to 8, and chroma of 1 to 8. Streaks or variegated colors are in some pedons. Some pedons do not have a C horizon.

Roanoke Series

The Roanoke series consists of poorly drained soils that formed in fluvial sediment. These soils are along drainageways and in slight depressions on stream terraces. Slopes are 0 to 2 percent.

Typical pedon of Roanoke silt loam; 2.5 miles south of Moncure, 1.2 miles southeast of the intersection of State Road 1002 and State Road 1500, 0.4 mile southwest of State Road 1500 and farm path:

Ap—0 to 4 inches; dark gray (10YR 4/1) silt loam; weak medium granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

Btg1—4 to 13 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky and slightly plastic; many fine roots; few faint clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Btg2—13 to 25 inches; light brownish gray (10YR 6/2) silty clay; common medium distinct dark gray (10YR 4/1) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; few distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Btg3—25 to 30 inches; light brownish gray (10YR 6/2) silty clay; common fine distinct strong brown (7.5YR 5/6) mottles, common medium faint light gray (10YR 7/2) and dark gray (10YR 4/1) mottles, and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Btg4—30 to 43 inches; gray (10YR 6/1) silty clay; common medium faint light gray (10YR 7/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few distinct clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cg—43 to 65 inches; light gray (10YR 7/2) silty clay loam; common fine distinct strong brown (7.5YR 5/8) mottles and common medium faint gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; massive; firm, slightly sticky and slightly plastic; few fine flakes of mica; very strongly acid.

The clayey Bt horizon ranges from 20 to 50 inches in thickness. Depth to unconforming stratified sediment is more than 40 inches. Few fine flakes of mica are in the B and C horizons. The Roanoke soil is very strongly acid or strongly acid except where lime has been added.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is silty clay, clay, or silty clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is silty clay loam, silty clay, or clay.

State Series

The State series consists of well drained soils on stream terraces. These soils formed in moderately fine textured fluvial sediment. Slopes range from 0 to 3 percent.

Typical pedon of State fine sandy loam, 0 to 3 percent slopes; 6 miles northwest of Sanford, 0.9 mile northeast of Cumnock, 0.4 mile east of the intersection of State Road 1450 and State Road 1401, 50 feet north of State Road 1401, in a field:

Ap—0 to 5 inches; light yellowish brown (10YR 6/4) fine sandy loam; common fine distinct grayish brown (10YR 5/2) mottles; weak medium granular structure; very friable; few fine roots; medium acid; clear smooth boundary.

E—5 to 8 inches; brownish yellow (10YR 6/6) fine sandy loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; strongly acid; clear smooth boundary.

Bt1—8 to 24 inches; strong brown (7.5YR 5/8) sandy clay loam; common fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; slightly sticky and slightly plastic; very strongly acid; gradual wavy boundary.

Bt2—24 to 32 inches; mottled strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), and yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—32 to 40 inches; mottled strong brown (7.5YR 5/8), brownish yellow (10YR 6/6), red (2.5YR 4/8), and yellowish red (5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on

faces of peds; very strongly acid; gradual wavy boundary.

Bt4—40 to 49 inches; brownish yellow (10YR 6/6) sandy clay loam, strata of sandy loam; few fine prominent red (2.5YR 4/8) mottles, common medium prominent yellowish red (5YR 5/8) mottles, and few fine distinct light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

C—49 to 72 inches; variegated light gray (10YR 7/1), yellowish red (5YR 5/8), brownish yellow (10YR 6/6), and red (2.5YR 4/8) strata of sandy loam and sand; massive; friable; very strongly acid.

The loamy horizons range from 35 to 60 inches in thickness. The State soils are very strongly acid or strongly acid except where lime has been added. Flakes of mica are in the B and C horizons in some pedons.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6.

The E horizon 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 loamy fine sand. Some pedons do not have an E horizon.

The Bt horizon has hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8; or it is mottled. It is sandy clay loam or sandy loam.

The C horizon is variegated in shades of gray, red, and brown and is stratified sandy loam and sand.

Tatum Series

The Tatum series consists of well drained soils on the Piedmont uplands. These soils formed in residuum weathered from metamorphic rocks. Slopes range from 2 to 30 percent.

Typical pedon of Tatum silt loam, 2 to 8 percent slopes; 2 miles southwest of Broadway, 0.7 mile southeast of the intersection of U.S. Highway 421 and State Road 1530, 200 feet west of State Road 1530 on logging road:

Ap—0 to 8 inches; brown (7.5YR 4/4) silt loam; weak fine granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.

Bt1—8 to 18 inches; red (2.5YR 4/8) silty clay loam; weak medium subangular blocky structure; firm; few distinct clay films on faces of peds; few fine pebbles; very strongly acid; gradual wavy boundary.

Bt2—18 to 31 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; firm; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—31 to 50 inches; red (2.5YR 4/6) silty clay loam; few fine prominent brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; few distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

C—50 to 60 inches; mottled red (2.5YR 4/6) and brownish yellow (10YR 6/6) saprolite that crushes to silt loam; massive with obvious bedding planes; very strongly acid.

The Bt horizon ranges from 30 to 50 inches in thickness. The Tatum soils are very strongly acid or strongly acid except where lime has been added. Few flakes of mica are in some pedons.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4.

Some pedons have an E horizon that has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 6. It is silt loam, loam, or very fine sandy loam.

The Bt horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is silty clay loam, silty clay, or clay.

The C horizon is mottled red, brownish yellow, or white saprolite that crushes to silt loam.

Tetotum Series

The Tetotum series consists of moderately well drained soils on stream terraces. These soils formed in moderately fine textured fluvial sediment. Slopes range from 1 to 4 percent.

Typical pedon of Tetotum fine sandy loam, 1 to 4 percent slopes; 2.3 miles southeast of the intersection of U.S. Highway 1 and State Road 1466 where State Road 1466 becomes State Road 1500 and intersects with State Road 1002, 1.4 miles southeast of the intersection of State Road 1500 and State Road 1002, 25 feet northeast of State Road 1500, in a field:

Ap—0 to 7 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; very friable; common fine roots; slightly acid; clear smooth boundary.

Bt1—7 to 10 inches; light yellowish brown (10YR 6/4) silty clay loam; common medium faint pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; slightly acid; gradual wavy boundary.

Bt2—10 to 24 inches; brownish yellow (10YR 6/6) silty clay loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; slightly acid; gradual wavy boundary.

Bt3—24 to 35 inches; brownish yellow (10YR 6/6) clay loam; common fine distinct reddish yellow (7.5YR 6/8) mottles and few fine distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt4—35 to 48 inches; light yellowish brown (10YR 6/4) clay loam; common medium distinct reddish yellow (7.5YR 6/8) and light gray (10YR 7/2) mottles and few fine distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—48 to 55 inches; light gray (10YR 7/2) sandy clay loam, strata of sandy loam; few fine prominent yellowish red (5YR 5/8) mottles and common coarse distinct strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Cg—55 to 60 inches; light gray (10YR 7/2) stratified sandy loam; few fine distinct brownish yellow (10YR 6/6) mottles and common coarse distinct strong brown (7.5YR 5/8) mottles; massive; very friable; very strongly acid.

The loamy horizons range from 40 to 60 inches or more in thickness. The Tetotum soils range from extremely acid to strongly acid except where lime has been added.

The A or Ap horizon has hue of 10YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4.

Some pedons have an E horizon that has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is fine sandy loam, loam, or silt 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 of the Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 to 8. It has high and low chroma mottles. In some pedons, the lower part of the Bt horizon is mottled with high and low chroma and does not have a dominant matrix color. The Bt horizon is silty clay loam, clay loam, silt loam, or loam.

The C horizon typically is light gray or gray with high chroma mottles, or it is mottled and does not have a dominant matrix color. It is stratified sand to sandy clay loam.

Vaucluse Series

The Vaucluse series consists of well drained soils on Coastal Plain uplands. These soils formed in moderately fine textured Coastal Plain sediment. Slopes range from 2 to 25 percent.

Typical pedon of Vaucluse gravelly sandy loam, 2 to 8 percent slopes; 1 mile northeast of Broadway, 0.5 mile east of the junction of State Road 1542 and State Road 1538, 200 feet north of State Road 1542, in a cultivated field:

Ap—0 to 9 inches; brown (10YR 4/3) gravelly sandy loam; weak medium granular structure; very friable; many fine roots; 30 percent, by volume, gravel up to 3 inches in diameter; medium acid; clear smooth boundary.

E—9 to 14 inches; light yellowish brown (10YR 6/4) gravelly sandy loam; weak medium granular structure; very friable; common fine roots; 25 percent, by volume, gravel up to 3 inches in diameter; strongly acid; clear smooth boundary.

Bt—14 to 20 inches; strong brown (7.5YR 5/6) sandy loam; few fine prominent red (2.5YR 5/8) mottles; weak fine subangular blocky structure; friable; few faint clay films on faces of peds; 10 percent, by volume, gravel up to 1 inch in diameter; very strongly acid; clear wavy boundary.

Btx—20 to 47 inches; red (2.5YR 5/8) sandy clay loam; many medium strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; very firm, compact and dense; 30 to 40 percent brittleness; few faint clay films on faces of peds; few small rounded quartz fragments; few small ironstone nodules; very strongly acid; gradual wavy boundary.

BCx—47 to 54 inches; mottled red (2.5YR 5/8), yellowish red (5YR 5/8), brownish yellow (10YR 6/8), and very pale brown (10YR 7/3) sandy loam; moderate medium subangular blocky structure; very firm, compact and dense; 30 to 40 percent brittleness; few faint clay films on faces of peds; few small rounded quartz fragments; few small ironstone nodules; very strongly acid; gradual wavy boundary.

Cx—54 to 80 inches; mottled red (2.5YR 5/8), yellowish red (5YR 5/8), brownish yellow (10YR 6/8), and light gray (10YR 7/1) sandy loam; massive; very firm, compact and dense; few quartz fragments and ironstone nodules; very strongly acid.

The Bt horizon ranges from 30 to 50 inches in thickness. Depth to a horizon that has some brittleness ranges from 20 to 35 inches. The Vaucluse soils range from extremely acid to strongly acid except where lime has been added.

The A or Ap horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 2 to 4.

The E horizon has hue of 10YR, value of 4 to 7, and chroma of 3 to 6. It is gravelly sandy loam or gravelly loamy sand.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. Mottles that have high chroma are in most pedons. The Bt horizon is sandy loam or sandy clay loam. Brittle zones are in part of the Bt horizon.

The C horizon has hue of 2.5YR to 10YR, value of 4 to 7, and chroma of 4 to 8 and is mottled or contains variegated colors. It is sandy loam, loamy sand, or gravelly sandy loam.

Wehadkee Series

The Wehadkee series consists of poorly drained soils on flood plains. These soils formed in recent alluvium. Slopes are less than 2 percent.

Typical pedon of Wehadkee fine sandy loam; 2.8 miles southeast of Lemon Springs, 1.1 miles south of the intersection of State Road 1144 and State Road 1162, 25 feet west of Juniper Creek bridge:

A—0 to 6 inches; gray (10YR 5/1) fine sandy loam; weak medium granular structure; very friable; many fine roots; common fine flakes of mica; slightly acid; clear smooth boundary.

Bg1—6 to 24 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium faint gray (10YR 5/1) mottles and few fine distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; very friable; few fine roots; common fine flakes of mica; slightly acid; gradual wavy boundary.

Bg2—24 to 33 inches; light brownish gray (10YR 6/2) sandy clay loam; few fine faint brownish yellow mottles and few medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine flakes of mica; medium acid; gradual wavy boundary.

Bg3—33 to 46 inches; gray (10YR 6/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles, common fine distinct strong brown (7.5YR 5/8) mottles, few fine distinct greenish gray (5GY 5/1) mottles, and few fine faint light gray mottles; weak medium subangular blocky structure; friable; common fine flakes of mica; medium acid; gradual wavy boundary.

Cg—46 to 60 inches; mottled gray (10YR 6/1), greenish gray (5GY 5/1), reddish yellow (7.5YR 6/8), and strong brown (7.5YR 5/8) sandy loam; massive; very friable; many fine flakes of mica; medium acid.

The loamy horizons range from 30 to more than 60 inches in thickness. Flakes of mica are throughout the soil. The Wehadkee soils are medium acid to slightly acid except where lime has been added.

The A or Ap horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 1 or 2.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral and has value of 4 to 6. Mottles generally are in shades of yellow and brown, but some pedons have mottles in shades of red. The Bg horizon is sandy clay loam, clay loam, or loam.

The C horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2; is neutral and has value of 4 to 7; or it is mottled. Mottles are in shades of brown, yellow, or red. The C horizon is commonly sandy loam or loam, but some pedons contain stratified layers of clay loam, sand, and gravel.

White Store Series

The White Store series consists of moderately well drained soils on uplands. These soils formed in fine textured residuum weathered from Triassic rocks. Slopes range from 2 to 15 percent.

Typical pedon of White Store silt loam, 2 to 8 percent slopes; 2.5 miles west of the intersection of North Carolina Highway 42 and State Road 1537, 0.3 mile southwest of the intersection of State Road 1537 and a logging road, 10 feet west of logging road:

Ap—0 to 4 inches; brown (10YR 5/3) silt loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E—4 to 7 inches; light brown (7.5YR 6/4) silt loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

Bt1—7 to 30 inches; red (2.5YR 4/6) clay; strong medium angular blocky structure; very firm, sticky and plastic; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—30 to 35 inches; red (2.5YR 4/6) silty clay loam; few fine prominent very pale brown (10YR 7/3) mottles; moderate medium angular blocky structure; friable; common distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.

C1—35 to 60 inches; mottled red (2.5YR 4/6) and dark reddish brown (2.5YR 3/4) saprolite that crushes to silt loam; massive; very strongly acid; gradual wavy boundary.

C2—60 to 72 inches; dark reddish brown (2.5YR 3/4) saprolite that crushes to silt loam; massive; very strongly acid; abrupt wavy boundary.

Cr—72 to 96 inches; fine grained sandstone and mudstone.

The clayey Bt horizon ranges from 20 to 28 inches in thickness. The White Store soils are very strongly acid or strongly acid except where lime has been added.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 4.

The E horizon has hue of 7.5YR to 10YR, value of 4 to 6, and chroma of 3 to 6. It is silt loam. Some pedons do not have an E horizon.

The Bt horizon has hue of 2.5YR to 5YR, value of 3 to 6, and chroma of 3 to 8. In some pedons, mottles that have chroma of 2 or less are below the top 10 inches of the Bt horizon. The Bt horizon is dominantly clay but can have thin layers of silty clay loam.

The C horizon has hue of 2.5YR or 5YR, value of 3 to 6, and chroma of 3 to 8. It is weathered saprolite from Triassic age mudstone, siltstone, or fine grained sandstone that crushes to silt loam or silty clay loam.

The Cr horizon is fine grained sandstone, mudstone, or siltstone.

Wickham Series

The Wickham series consists of well drained soils on stream terraces. These soils formed in moderately fine textured fluvial sediment. Slopes range from 2 to 8 percent.

Typical pedon of Wickham sandy loam, 2 to 8 percent slopes; 0.7 mile southeast of the intersection of North Carolina Highway 42 and Deep River, 250 feet northwest of the intersection of North Carolina Highway 42 and State Road 1321, 50 feet west of farm path, in a field:

Ap—0 to 5 inches; reddish brown (5YR 5/3) sandy loam; weak medium granular structure; very friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—5 to 23 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; medium acid; gradual wavy boundary.

Bt2—23 to 44 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—44 to 52 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; strongly acid; gradual wavy boundary.

C—52 to 72 inches; red (2.5YR 4/6) sandy loam; pockets of sandy clay loam; massive; friable; very strongly acid.

The loamy horizons range from 45 to more than 55 inches in thickness. The Wickham soils range from very strongly acid to medium acid except where lime has been added. Some pedons contain few flakes of mica throughout the profile.

The A or Ap horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam or sandy clay.

The C horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is sandy loam or sandy clay loam.

Formation of the Soils

Soils are the products of soil-forming processes acting upon materials altered or deposited by geologic forces. The major factors that contribute to the differences among soils are climate, plant and animal life, parent material, relief, and time. Climate and plant and animal life, particularly vegetation, are the active forces in soil formation. Their effect on parent material is modified by relief and by the length of time the parent material has been in place. The relative importance of each factor differs from place to place. in some places one factor dominates in the formation of a soil and determines most of its properties, but normally the interaction of all factors determines the kind of soil that develops in any given place.

Climate

Climate, as a factor of soil formation, affects the physical, chemical, and biological relationships in the soil, primarily through the influence of precipitation and temperature. Temperature and rainfall affect weathering of bedrock and decomposition of organic matter. The amount of leaching in a soil is also related to the amount of precipitation that falls and its subsequent movement through the soil. The effects of climate also control the kinds of plants and animals that can thrive in a region. Temperature influences the kind and growth of organisms and the speed of chemical and physical reactions in the soil.

Lee County has a hot, humid summer and a moderately cold, moist winter. The county is on a low-lying plateau, ranging in elevation from 165 to 503 feet above sea level. The climate favors chemical processes resulting in the rapid decomposition of organic matter and weathering of bedrock. The moderate temperatures and abundant rainfall favor intense leaching of soluble bases and oxidation of organic matter. Because of this, most soils in the county are acidic.

Variations in climate are small and probably have not caused major local differences in soils. The most important effect that climate has had on the formation of soils in Lee County is in the alteration of parent material through fluctuations in temperature, changes in the amount of precipitation, and through influences on plant and animal life.

Plant and Animal Life

Animal life and vegetation are indispensable in soil development; their greatest influence is in the forming and differentiation of soil horizons. The type and amount of organisms in and on the soil are determined in part by climate and in part by the nature of the soil material, relief, moisture conditioning, and the age of the soil. Bacteria, fungi, and other micro-organisms aid in the weathering of rocks and in the decomposition of organic material. The plants and animals that live on a soil are its primary source of organic material. Plants largely determine the kinds, amounts, and ways in which organic material is added to the soil system. Plants are also important in nutrient cycles because they change the base status and the leaching process. Animals convert complex compounds into simpler forms, add their own bodies to the organic matter, and modify a variety of chemical and physical properties.

In Lee County, most of the organic material accumulates on the surface and is acted upon by micro-organisms, fungi, earthworms, and other forms of life, and by direct chemical reaction. The material is then mixed with the upper part of the mineral portion of the soil by the activities of earthworms and other small invertebrates. Rodents have had little effect on the formation of soils in the county.

Organic material decomposes rather rapidly because of the moderate temperature, the abundant moisture supply, and the character of the organic material. Organic matter decays rapidly in well drained soils, such as the Mayodan soils, that have little accumulation in the surface layer. Decomposition is slower in the wetter soils, such as the Wehadkee soils, and there is more accumulation.

In general, the soils in the Piedmont part of Lee County developed under a hardwood forest, and the soils in the Coastal Plain part of the county developed under a pine forest. These trees take up elements from the subsoil and add organic matter to the surface by depositing leaves, roots, twigs, and eventually the whole plant. The material is then acted upon by organisms and undergoes chemical alterations. Under the native forests of this county, not enough bases are brought to the surface by plants to counteract the effects of leaching. This has contributed in part to the formation of dominantly acidic soils.

Parent Material

Parent material is the material from which a soil develops. The character of this material affects the kind of profile that develops and the rate of this development. Although parent material can be the dominant factor in soil development, the degree of profile development depends upon the interaction of parent material with the other soil-forming factors. Parent material largely determines the chemical and mineralogical composition of soils and is one of the most important factors in causing major differences in the soils in Lee County. Parent material differences, such as texture, color, and depth, are easily determined in the field. Less distinct differences, such as mineralogical composition, can be determined only by laboratory analysis.

The broad classes of parent material in Lee County are residual materials found on the Piedmont Plateau; unconsolidated sediments of rock fragments, sand, silt, and clay on the Coastal Plain uplands; and the material washed from the Coastal Plain uplands and lower Piedmont and deposited as alluvium in drainageways and on flood plains or terraces.

About two-thirds of the soils in Lee County formed in residual material, that is, material weathered directly from the underlying rocks. The Mayodan, Creedmoor, White Store, and Pinkston soils have formed in residuum from three geological formations. The largest area of these soils formed in Triassic sandstone, siltstone, and conglomerates in the central, northeastern, and northwestern parts of the county. The second group formed in residuum of metasedimentary and metavolcanic rocks and are at the northern tip of the county along Deep River and on side slopes bordering Upper Little River in the southeast. The Tatum and Nason soils formed in parent material derived from these undifferentiated, metamorphosed sedimentary and igneous rocks. The third group formed in residuum of igneous granite in an area northeast of Broadway along Fall Creek. This group includes the Cecil and Pacolet soils.

The parent material of the remaining areas of Lee County is made up of unconsolidated material that vary in chemical composition and physical makeup. The Blaney, Candor, and Fuquay soils formed in sediment that is mostly sand and has a low percentage of silt. The Gilead and Roanoke soils formed in sediment that has a high percentage of clay and silt. The Gilead soils are on uplands, and the Roanoke soils are on terraces.

The three broad groups of parent material have caused the soils of Lee County to differ greatly in texture, depth over bedrock, clay mineralogy, and the amount of exchangeable cations.

Time

The length of time that soil materials have been exposed to the soil-forming processes accounts for some of the differences in the soils. The length of time required for a soil profile to develop depends upon the other factors of soil formation. Less time is required for a soil profile to develop in coarse textured material than in chemically similar but finer textured material, assuming the environment is the same for both. Less time is required for profile development in a warm, humid area where there is a dense plant cover than in a cold, dry area where the plant cover is sparse.

The age of soils varies considerably, and the length of time that a soil has been forming is generally reflected in the profile development. Old soils generally have better defined horizons than young soils. In Lee County, the effect of time as a soil-forming factor is more apparent in the older soils, such as Mayodan, Cecil, and Tatum soils on broad Piedmont uplands and Dothan, Fuquay, and Candor soils on Coastal Plain uplands. These soils have more distinct horizons than soils on flood plains, which have formed in alluvium and are still acquiring new deposits from the uplands. Such first bottom soils have not been in place long enough to develop distinct horizons. Other soils in the county are considered young because of their topographic position. The Pinkston soils are not as well developed because they are on steep slopes where geologic erosion keeps pace with soil development. This results in a thinner solum.

Relief

The relief, or topography, affects soil formation primarily by controlling surface drainage and the percolation of water through the soil and the underlying material.

In the Piedmont section of Lee County, the relief is largely determined by the kind of bedrock underlying the soil and the magnitude of erosive forces to which the surface is subjected. Soils that formed where slopes are steep are normally shallower than soils that formed on the ridgetops even though they may have the same parent material. Soils in depressional areas and on flood plains generally have impeded drainage resulting in dominantly wet soil conditions. Soils in the more sloping areas generally shed water more quickly and have better drainage, which results in dominantly drier soil conditions. The prevailing moisture conditions greatly influence the kinds of vegetation that flourish in a soil.

In the Coastal Plain sections of Lee County, relief is largely determined by landscape dissection by streams. Steep side slopes are in areas where stream erosion has taken place. In other areas where stream erosion is not as pronounced, relief consists of broad and flat to gently rolling interstream areas. The soils in the interstream areas generally are deeper than those on the steep side slopes. In the southwestern part of the county, seepage areas and soils that have poor drainage generally are at the base of steep side slopes. On the bottom lands along streams and in depressions, the drainage is poorer and ponding occurs during periods of high rainfall.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

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—

	Inches
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.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

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.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Clayey. The soil contains more than 35 percent clay and is clay loam, silty clay loam, silty clay, sandy clay, or clay.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

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.

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.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

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.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dispersion soil. Breaking down or separation of soil aggregates into individual particles.

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.

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 the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess lime (in tables). Excess carbonates in the soil restrict the growth of some plants.

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.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

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.

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.

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 up to 3 inches (2 millimeters to 7.5 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, up to 3 inches (7.5 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.

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 upper case letter represents the major horizons. Numbers or lower case 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.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock 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.

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 Coastal Plain uplands, low marine terraces, and stream terraces.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
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.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

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. Intermediate material between sandy and clayey material. The texture is sandy loam, loam, silt loam, sandy clay loam, silty clay loam, or clay loam. The clay content is less than 35 percent.

Low strength. The soil is not strong enough to support loads.

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.

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. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and 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 the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

No-till planting. A method of planting crops by opening only a thin slice of the soil and placing the seed at the desired depth.

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.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

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.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of 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.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

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 degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium 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

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.

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.

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.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sandy. The soil contains a high percentage of sand. The texture is sandy or loamy sand.

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 two weeks in most years.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

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.

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.

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.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

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.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 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 separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
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

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind 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).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

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."

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.

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."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

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. The part of the soil below the B horizon that is not currently undergoing major changes by biological activity.

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 (in tables). A general term referring to soils that have a seasonal high water table.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1951-78 at Moncure, North Carolina]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- 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----	51.3	25.1	38.2	77	2	28	3.79	2.10	5.27	8	2.1
February---	54.2	26.8	40.5	78	7	20	3.70	2.22	5.03	7	1.4
March------	62.1	34.6	48.4	85	16	95	4.28	3.09	5.38	8	0.7
April------	73.3	43.5	58.4	92	25	259	3.25	2.02	4.44	7	0.0
May--------	80.3	52.5	66.4	95	32	508	3.98	2.61	5.21	8	0.0
June-------	86.5	60.3	73.4	99	43	702	4.34	2.03	6.32	7	0.0
July-------	89.9	64.8	77.4	101	50	849	5.67	3.01	8.00	8	0.0
August-----	88.6	64.4	76.5	99	49	822	5.32	2.93	7.42	8	0.0
September--	83.2	57.5	70.4	96	39	612	3.77	1.50	5.67	5	0.0
October----	73.3	44.4	58.9	90	22	289	3.32	1.16	5.10	5	0.0
November---	63.9	34.0	49.0	83	14	70	3.14	1.46	4.57	5	0.0
December---	54.0	26.9	40.5	76	6	24	3.66	1.91	5.18	7	0.8
Yearly:											
Average--	71.7	44.6	58.2	---	---	---	---	---	---	---	---
Extreme--	---	---	---	103	2	---	---	---	---	---	---
Total----	---	---	---	---	---	4,278	48.22	41.85	54.33	83	5.0

* 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 °F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1951-78
at Moncure, 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--	April 12	April 27	May 7
2 years in 10 later than--	April 7	April 21	May 2
5 years in 10 later than--	March 27	April 10	April 23
First freezing temperature in fall:			
1 year in 10 earlier than--	October 24	October 12	October 6
2 years in 10 earlier than--	October 29	October 16	October 11
5 years in 10 earlier than--	November 7	October 24	October 19

TABLE 3.--GROWING SEASON

[Data recorded in the period 1951-78
at Moncure, 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	200	174	160
8 years in 10	208	182	166
5 years in 10	225	196	178
2 years in 10	241	211	191
1 year in 10	249	218	197

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BaB	Blaney loamy sand, 2 to 8 percent slopes	5,941	9.4
BaD	Blaney loamy sand, 8 to 15 percent slopes	2,675	1.6
CaB	Candor sand, 0 to 8 percent slopes	3,681	2.3
CfB	Cecil fine sandy loam, 2 to 8 percent slopes	3,771	2.3
CfD	Cecil fine sandy loam, 8 to 15 percent slopes	3,348	2.1
Ch	Chewacla silt loam	5,380	3.3
Cp	Congaree silt loam	3,740	2.3
CrB	Creedmoor fine sandy loam, 2 to 8 percent slopes	6,755	4.1
CrD	Creedmoor fine sandy loam, 8 to 15 percent slopes	722	0.4
DoA	Dothan loamy sand, 0 to 2 percent slopes	4,135	2.5
DoB	Dothan loamy sand, 2 to 8 percent slopes	5,333	3.2
DuB	Durham loamy sand, 2 to 8 percent slopes	1,920	1.2
FuB	Fuquay loamy sand, 0 to 3 percent slopes	11,819	7.3
GhB	Gilead loamy sand, 2 to 8 percent slopes	5,522	3.4
GhD	Gilead loamy sand, 8 to 15 percent slopes	1,428	0.9
MfB	Mayodan fine sandy loam, 2 to 8 percent slopes	19,285	11.8
MfD	Mayodan fine sandy loam, 8 to 15 percent slopes	13,729	8.4
MfE	Mayodan fine sandy loam, 15 to 25 percent slopes	1,963	1.2
MrB	Mayodan-Urban land complex, 2 to 8 percent slopes	1,677	1.0
NaB	Nason silt loam, 2 to 8 percent slopes	2,988	1.8
NaD	Nason silt loam, 8 to 15 percent slopes	1,776	1.1
PaF	Pacolet fine sandy loam, 15 to 40 percent slopes	3,616	2.2
PfB	Pinkston silt loam, 2 to 8 percent slopes	7,176	4.4
PfD	Pinkston silt loam, 8 to 15 percent slopes	7,330	4.5
PfF	Pinkston silt loam, 15 to 40 percent slopes	9,609	5.9
Pt	Pits, quarry	200	0.1
Ro	Roanoke silt loam	1,073	0.7
StA	State fine sandy loam, 0 to 3 percent slopes	968	0.6
TaB	Tatum silt loam, 2 to 8 percent slopes	1,908	1.2
TaD	Tatum silt loam, 8 to 15 percent slopes	1,623	1.0
TaE	Tatum silt loam, 15 to 30 percent slopes	2,014	1.2
ToB	Tetotum fine sandy loam, 1 to 4 percent slopes	3,579	2.2
Ud	Udorthents, loamy	1,279	0.8
Ur	Urban land	1,002	0.6
VaB	Vaucluse gravelly sandy loam, 2 to 8 percent slopes	1,148	0.7
VaD	Vaucluse gravelly sandy loam, 8 to 15 percent slopes	710	0.4
VaE	Vaucluse gravelly sandy loam, 15 to 25 percent slopes	321	0.2
Wn	Wehadkee fine sandy loam	6,294	3.9
WsB	White Store silt loam, 2 to 8 percent slopes	2,477	1.5
WsD	White Store silt loam, 8 to 15 percent slopes	1,134	0.7
WwB	Wickham sandy loam, 2 to 8 percent slopes	1,586	1.0
	Water	565	0.3
	Total	163,200	100.0

TABLE 5.--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]

Map symbol and soil name	Corn	Soybeans	Tobacco	Sweet potatoes	Oats	Grass hay	Pasture
	Bu	Bu	Lbs	Bu	Bu	Tons	AUM*
BaB---- Blaney	60	25	---	---	50	---	---
BaD---- Blaney	50	20	---	---	50	---	---
CaB---- Candor	40	15	1,300	---	---	3.5	6.0
CfB---- Cecil	95	---	2,100	---	90	---	8.0
CfD---- Cecil	80	---	1,900	---	75	---	7.0
Ch---- Chewacla	80	30	---	---	40	---	9.0
Cp---- Congaree	140	40	---	---	75	---	---
CrB---- Creedmoor	75	---	2,200	---	75	---	6.0
CrD---- Creedmoor	60	---	2,000	---	65	---	5.8
DoA---- Dothan	120	40	2,800	---	---	6	---
DoB---- Dothan	100	30	---	---	---	5.5	---
DuB---- Durham	85	---	2,200	---	75	---	5.6
FuB---- Fuquay	80	30	2,400	---	60	---	8.5
GhB---- Gilead	75	35	2,200	---	---	4.2	---
GhD---- Gilead	---	---	---	---	---	3.3	---
MfB---- Mayodan	95	---	2,100	---	85	---	8.0
MfD---- Mayodan	75	---	1,900	---	60	---	7.0
MfE---- Mayodan	---	---	---	---	---	---	6.0
MrB---- Mayodan-Urban land	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Corn	Soybeans	Tobacco	Sweet potatoes	Oats	Grass hay	Pasture
	Bu	Bu	Lbs	Bu	Bu	Tons	AUM*
NaB---------- Nason	90	30	---	---	70	---	8.0
NaD---------- Nason	85	30	---	---	65	---	7.5
PaF---------- Pacolet	---	---	---	---	---	---	---
PfB---------- Pinkston	80	---	---	---	80	---	5.0
PfD---------- Pinkston	65	---	---	---	65	---	4.0
PfF---------- Pinkston	---	---	---	---	---	---	---
Pt. Pits							
Ro---------- Roanoke	---	---	---	---	---	---	5.2
StA---------- State	130	45	3,000	---	---	---	---
TaB---------- Tatum	90	30	---	---	70	---	8.0
TaD---------- Tatum	85	30	---	---	65	---	7.5
TaE---------- Tatum	65	---	---	---	60	---	7.0
ToB---------- Tetotum	145	35	---	---	---	---	---
Ud. Udorthents							
Ur. Urban land							
VaB---------- Vaucluse	70	25	---	---	60	---	---
VaD---------- Vaucluse	50	15	---	---	40	---	---
VaE---------- Vaucluse	---	---	---	---	---	---	---
Wn---------- Wehadkee	---	---	---	---	---	---	8.5
WsB---------- White Store	80	---	1,800	---	70	---	6.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Corn	Soybeans	Tobacco	Sweet potatoes	Oats	Grass hay	Pasture
	Bu	Bu	Lbs	Bu	Bu	Tons	AUM*
WsD---------- White Store	60	---	---	---	---	---	5.6
WwB---------- Wickham	115	---	2,600	---	80	---	9.5

* 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.

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)
		Acres	Acres	Acres
I	4,868	---	---	---
II	46,147	44,249	---	1,898
III	42,422	22,112	3,740	16,570
IV	40,696	28,265	5,380	7,051
V	1,073	---	1,073	---
VI	10,046	3,752	6,294	---
VII	13,225	13,225	---	---
VIII	---	---	---	---

TABLE 7.--WOODLAND SITE INDEX VALUES

Indicator forest type or species	1 Very High	2 High	3 Moderately High	4 Moderate	5 Low
	Site Index				
Cottonwood	106+	96-105	86-95	76-85	75-
Yellow poplar	106+	96-105	86-95	76-85	75-
Sweetgum	96+	86-95	76-85	66-75	65-
Water oak	96+	86-95	76-85	66-75	65-
Loblolly pine	96+	86-95	76-85	66-75	65-
Slash pine	96+	86-95	76-85	66-75	65-
Longleaf pine	86+	76-85	66-75	56-65	55-
Southern red oak	86+	76-85	66-75	56-65	55-
Water tupelo	86+	76-85	66-75	56-65	55-
Redcedar	66+	56-65	46-55	35-45	35-

TABLE 8.--POTENTIAL YEARLY GROWTH OR YIELD OF LOBLOLLY PINE

[Potential average yearly growth per acre in board feet international (1/8-inch Rule) for a fully stocked stand 7 inches in diameter, breast high and over]

Age (in years)	Site index in feet						
	60	70	80	90	100	110	120
	Growth (in board feet)						
15	---	3	10	57	120	200	307
20	---	75	150	250	375	500	650
25	80	180	300	440	580	740	940
30	150	283	417	567	733	917	1,100
35	200	357	500	657	829	1,029	1,229
40	250	400	550	712	888	1,075	1,288
45	278	433	578	744	911	1,100	1,300
50	300	440	590	750	910	1,090	1,290
55	318	445	591	736	900	1,073	1,255
60	317	442	575	717	875	1,050	1,217
65	315	438	562	692	846	1,015	1,777
70	314	421	543	671	814	971	1,136
75	307	413	527	647	787	933	1,087
80	300	400	506	625	756	894	1,044

TABLE 9.--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]

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
BaB, BaD---------- Blaney	3s	Slight	Moderate	Moderate	--------	Loblolly pine-------	76	Longleaf pine.
						Longleaf pine-------	76	
CaB---------- Candor	3s	Slight	Moderate	Moderate	--------	Longleaf pine-------	65	Longleaf pine, loblolly pine.
						Loblolly pine-------	75	
CfB, CfD---------- Cecil	3o	Slight	Slight	Slight	--------	Eastern white pine--	80	Eastern white pine, loblolly pine, yellow poplar.
						Loblolly pine-------	80	
						Shortleaf pine------	69	
						Virginia pine-------	73	
						Black oak----------	66	
						Northern red oak----	82	
						Post oak-----------	65	
						Scarlet oak--------	80	
Ch---------- Chewacla	1w	Slight	Moderate	Slight	--------	Loblolly pine-------	96	Loblolly pine, American sycamore, yellow poplar, sweetgum, green ash.
						Yellow poplar-------	100	
						American sycamore---	---	
						Sweetgum-----------	97	
						Water oak----------	86	
						Eastern cottonwood--	---	
						Green ash----------	---	
						Southern red oak----	---	
Cp---------- Congaree	1o	Slight	Slight	Slight	--------	Sweetgum-----------	100	Loblolly pine, yellow poplar, American sycamore, black walnut, cherrybark oak, eastern cottonwood, sweetgum.
						Yellow poplar-------	107	
						Cherrybark oak------	107	
						Loblolly pine-------	90	
						Eastern cottonwood--	107	
						American sycamore---	89	
						Black walnut--------	100	
						Scarlet oak--------	100	
						Willow oak---------	95	
CrB, CrD---------- Creedmoor	3w	Slight	Moderate	Slight	--------	Loblolly pine-------	84	Loblolly pine, sweetgum, yellow poplar.
						Shortleaf pine------	55	
						Sweetgum-----------	---	
						Water oak----------	---	
DoA, DoB---------- Dothan	2o	Slight	Slight	Slight	Moderate	Longleaf pine-------	89	Loblolly pine, longleaf pine.
						Loblolly pine-------	70	
DuB---------- Durham	3o	Slight	Slight	Slight	--------	Loblolly pine-------	80	Loblolly pine, yellow poplar.
						Post oak-----------	70	
						Shortleaf pine------	72	
						Southern red oak----	80	
						Sweetgum-----------	80	
						White oak----------	70	
						Yellow poplar-------	80	
FuB---------- Fuquay	3s	Slight	Moderate	Moderate	--------	Loblolly pine-------	83	Longleaf pine.
						Longleaf pine-------	83	
GhB, GhD---------- Gilead	3o	Slight	Slight	Slight	--------	Loblolly pine-------	83	Loblolly pine.
						Longleaf pine-------	66	
						Sweetgum-----------	---	
						Blackgum-----------	---	

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
MfB, MfD---------- Mayodan	3o	Slight	Slight	Slight	---	Loblolly pine----	82	Loblolly pine, Virginia pine, yellow poplar.
						Shortleaf pine----	---	
						Yellow poplar----	---	
						Sweetgum----------	---	
						Southern red oak---	---	
						Black oak----------	---	
						White oak----------	---	
						Hickory----------	---	
MfE---------- Mayodan	3r	Moderate	Moderate	Moderate	---	Loblolly pine----	82	Loblolly pine, Virginia pine, yellow poplar.
						Shortleaf pine----	---	
						Yellow poplar----	---	
						Sweetgum----------	---	
						Southern red oak---	---	
						Black oak----------	---	
						White oak----------	---	
						Hickory----------	---	
NaB, NaD---------- Nason	3o	Slight	Slight	Slight	Moderate	Northern red oak---	66	Loblolly pine, eastern white pine.
						Virginia pine----	69	
						Shortleaf pine----	66	
						Loblolly pine----	80	
PaF---------- Pacolet	3r	Moderate	Moderate	Slight	---	Loblolly pine----	78	Loblolly pine, shortleaf pine, yellow poplar.
						Shortleaf pine----	70	
						Yellow poplar----	90	
PfB, PfD---------- Pinkston	4d	Slight	Slight	Moderate	Slight	Southern red oak---	60	Loblolly pine, Virginia pine.
						Virginia pine----	60	
PfF---------- Pinkston	4d	Moderate	Moderate	Moderate	Slight	Southern red oak---	60	Loblolly pine, Virginia pine.
						Virginia pine----	60	
Ro---------- Roanoke	2w	Slight	Severe	Severe	Severe	Willow oak----------	76	Yellow poplar, sweetgum.
						Yellow poplar----	90	
						Sweetgum----------	90	
						Red maple----------	---	
StA---------- State	1o	Slight	Slight	Slight	Severe	Southern red oak---	85	Black walnut, yellow poplar, loblolly pine.
						Yellow poplar----	100	
						Virginia pine----	85	
						Loblolly pine----	95	
TaB, TaD---------- Tatum	3o	Slight	Slight	Slight	Moderate	Northern red oak---	72	Loblolly pine, eastern white pine, yellow poplar.
						Virginia pine----	68	
						Shortleaf pine----	68	
						Loblolly pine----	78	
						Yellow poplar----	83	
TaE---------- Tatum	3r	Moderate	Moderate	Slight	Moderate	Northern red oak---	72	Loblolly pine, eastern white pine, yellow poplar.
						Virginia pine----	68	
						Shortleaf pine----	68	
						Loblolly pine----	78	
						Yellow poplar----	83	

TABLE 9.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
ToB---------- Tetotum	2w	Slight	Moderate	Slight	Severe	Loblolly pine----	88	Loblolly pine.
						Sweetgum----------	85	
						Southern red oak---	76	
VaB, VaD, VaE------ Vaucluse	3o	Slight	Slight	Slight	--------	Loblolly pine----	76	Loblolly pine.
						Shortleaf pine----	56	
Wn---------- Wehadkee	1w	Slight	Severe	Severe	--------	Loblolly pine----	102	Loblolly pine, American sycamore, yellow poplar, green ash, sweetgum, eastern cottonwood, cherrybark oak.
						Sweetgum----------	93	
						Yellow poplar----	98	
						Willow oak----------	90	
						Green ash----------	96	
						Water oak----------	86	
						White ash----------	88	
WsB, WsD---------- White Store	4c	Moderate	Moderate	Moderate	--------	Loblolly pine----	75	Loblolly pine, Virginia pine, eastern redcedar.
						Virginia pine----	65	
WwB---------- Wickham	2o	Slight	Slight	Slight	--------	Loblolly pine----	90	Loblolly pine, yellow poplar.
						Yellow poplar----	90	
						Southern red oak---	---	

TABLE 10.--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]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BaB---- Blaney	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----	Severe: droughty.
BaD---- Blaney	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----	Severe: droughty.
CaB---- Candor	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
CfB---- Cecil	Slight----	Slight----	Moderate: slope, small stones.	Slight----	Slight.
CfD---- Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----	Slight.
Ch---- Chewacla	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Cp---- Congaree	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
CrB---- Creedmoor	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness.
CrD---- Creedmoor	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: wetness.	Moderate: wetness, slope.
DoA---- Dothan	Slight----	Slight----	Slight----	Slight----	Moderate: droughty.
DoB---- Dothan	Slight----	Slight----	Moderate: slope.	Slight----	Moderate: droughty.
DuB---- Durham	Slight----	Slight----	Moderate: slope.	Slight----	Moderate: droughty.
FuB---- Fuquay	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
GhB---- Gilead	Moderate: percs slowly, wetness.	Moderate: percs slowly, wetness.	Moderate: slope, percs slowly, wetness.	Moderate: wetness.	Moderate: wetness.
GhD---- Gilead	Moderate: slope, percs slowly.	Moderate: percs slowly, slope.	Severe: slope.	Moderate: wetness.	Moderate: slope.
MfB---- Mayodan	Slight----	Slight----	Moderate: slope.	Slight----	Slight.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MfD--- Mayodan	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.
MfE--- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
MrB: Mayodan---	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
Urban land.					
NaB--- Nason	Slight---	Slight---	Moderate: slope, small stones.	Slight---	Slight.
NaD--- Nason	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
PaF--- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PfB--- Pinkston	Slight---	Slight---	Moderate: slope, small stones.	Slight---	Moderate: droughty.
PfD--- Pinkston	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope, droughty.
PfF--- Pinkston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pt. Pits					
Ro--- Roanoke	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: flooding, wetness.
StA--- State	Slight---	Slight---	Slight---	Slight---	Slight.
TaB--- Tatum	Slight---	Slight---	Moderate: slope, small stones.	Slight---	Slight.
TaD--- Tatum	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
TaE--- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
ToB--- Tetotum	Severe: flooding.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
Ud. Udorthents					

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ur. Urban land					
VaB Vaucluse	Moderate: percs slowly, small stones.	Moderate: percs slowly, small stones.	Moderate: small stones, percs slowly.	Slight	Moderate: small stones, large stones.
VaD Vaucluse	Moderate: slope, percs slowly, small stones.	Moderate: slope, percs slowly, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, large stones, slope.
VaE Vaucluse	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Wn Wehadkee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
WsB White Store	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
WsD White Store	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: wetness, slope.
WwB Wickham	Slight	Slight	Moderate: slope.	Slight	Slight.

TABLE 11.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	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
BaB---------- Blaney	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BaD---------- Blaney	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CaB---------- Candor	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CfB, CfD---------- Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ch---------- Chewacla	Very poor.	Poor	Poor	Good	Good	Fair	Fair	Poor	Good	Fair.
Cp---------- Congaree	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
CrB---------- Creedmoor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CrD---------- Creedmoor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DoA, DoB---------- Dothan	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DuB---------- Durham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FuB---------- Fuquay	Fair	Fair	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
GhB---------- Gilead	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GhD---------- Gilead	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MfB---------- Mayodan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MfD---------- Mayodan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MfE---------- Mayodan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MrB: Mayodan----------	---	---	---	---	---	---	---	---	---	---
Urban land.										
NaB---------- Nason	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 11.--WILDLIFE HABITAT--Continued

Map symbol and soil name	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
NaD---- Nason	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
PaF---- Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PfB---- Pinkston	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
PfD---- Pinkston	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
PfF---- Pinkston	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Pt. Pits										
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.
TaB---- Tatum	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TaD---- Tatum	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TaE---- Tatum	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
ToB---- Tetotum	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ud. Udorthents										
Ur. Urban land										
VaB---- Vaucluse	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
VaD, VaE---- Vaucluse	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Wn---- Wehadkee	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
WsB---- White Store	Fair	Good	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
WsD---- White Store	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
WwB---- Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 12.--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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaB---------- Blaney	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: droughty.
BaD---------- Blaney	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
CaB---------- Candor	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: droughty.
CfB---------- Cecil	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
CfD---------- Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Slight.
Ch---------- Chewacla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Cp---------- Congaree	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
CrB---------- Creedmoor	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
CrD---------- Creedmoor	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope, wetness.
DoA---------- Dothan	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
DoB---------- Dothan	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Moderate: droughty.
DuB---------- Durham	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
FuB---------- Fuquay	Slight---------	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
GhB---------- Gilead	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: low strength.	Moderate: wetness.
GhD---------- Gilead	Severe: wetness.	Moderate: slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MfB--- Mayodan	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
MfD--- Mayodan	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MfE--- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
MrB: Mayodan---	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
Urban land.						
NaB--- Nason	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
NaD--- Nason	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
PaF--- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
PfB--- Pinkston	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Moderate: droughty.
PfD--- Pinkston	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope, droughty.
PfF--- Pinkston	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Pt. Pits						
Ro--- Roanoke	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: flooding, wetness.
StA--- State	Severe: cutbanks cave.	Slight---	Moderate: wetness.	Slight---	Moderate: low strength.	Slight.
TaB--- Tatum	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
TaD--- Tatum	Moderate: slope, too clayey.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TaE---- Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
ToB---- Tetotum	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: low strength, wetness.	Moderate: wetness.
Ud. Udorthents						
Ur. Urban land						
VaB---- Vaucluse	Moderate: dense layer.	Slight----	Slight----	Moderate: slope.	Slight----	Moderate: small stones, large stones.
VaD---- Vaucluse	Moderate: dense layer, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, large stones, slope.
VaE---- Vaucluse	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wn---- Wehadkee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
WsB---- White Store	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
WsD---- White Store	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: wetness, slope.
WwB---- Wickham	Slight----	Slight----	Slight----	Moderate: slope.	Slight----	Slight.

TABLE 13.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BaB---- Blaney	Severe: percs slowly, poor filter.	Severe: seepage.	Slight----	Severe: seepage.	Good.
BaD---- Blaney	Severe: percs slowly, poor filter.	Severe: seepage, slope.	Moderate: slope.	Severe: slope, seepage.	Fair: slope.
CaB---- Candor	Slight----	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: too sandy, seepage.
CfB---- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----	Fair: too clayey, hard to pack.
CfD---- 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.
Cp---- Congaree	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
CrB---- Creedmoor	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
CrD---- Creedmoor	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
DoA---- Dothan	Severe: wetness, percs slowly.	Moderate: seepage.	Moderate: wetness.	Slight----	Good.
DoB---- Dothan	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Slight----	Good.
DuB---- Durham	Moderate: percs slowly.	Moderate: seepage.	Slight----	Slight----	Good.
FuB---- Fuquay	Moderate: percs slowly.	Moderate: slope.	Slight----	Slight----	Fair: too sandy.
GhB---- Gilead	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.

TABLE 13.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
GhD---------- Gilead	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: slope.	Fair: slope, too clayey, wetness.
MfB---------- Mayodan	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
MfD---------- Mayodan	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
MfE---------- Mayodan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MrB: Mayodan----------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey, hard to pack.
Urban land.					
NaB---------- 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.
NaD---------- 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.
PaF---------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PfB---------- Pinkston	Severe: depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim, small stones.
PfD---------- Pinkston	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim, small stones.
PfF---------- Pinkston	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage, depth to rock.	Poor: area reclaim, small stones, slope.
Pt. Pits					
Ro---------- Roanoke	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 13.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
StA---------- State	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Moderate: wetness.	Fair: too clayey, thin layer.
TaB---------- Tatum	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.
TaD---------- Tatum	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.
TaE---------- Tatum	Severe: slope.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
ToB---------- Tetotum	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
Ud. Udorthents					
Ur. Urban land					
VaB---------- Vaucluse	Severe: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
VaD---------- Vaucluse	Severe: percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
VaE---------- Vaucluse	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Wn---------- Wehadkee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
WsB---------- White Store	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
WsD---------- White Store	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
WwB---------- Wickham	Slight----------	Moderate: seepage, slope.	Severe: seepage.	Slight----------	Fair: thin layer.

TABLE 14.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
BaB, BaD---------- Blaney	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
CaB---------- Candor	Good----------	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
CfB, CfD---------- Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Ch---------- Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Cp---------- Congaree	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
CrB, CrD---------- Creedmoor	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
DoA, DoB---------- Dothan	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, thin layer.
DuB---------- Durham	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
FuB---------- Fuquay	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
GhB, GhD---------- Gilead	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, thin layer.
MfB, MfD---------- Mayodan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
MfE---------- Mayodan	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
MrB: Mayodan----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Urban land.				
NaB, NaD---------- Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, area reclaim.
PaF---------- Pacolet	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
PfB, PfD---------- Pinkston	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
PfF---------- Pinkston	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Pt. Pits				
Ro---------- Roanoke	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
StA---------- State	Good----------	Probable----------	Improbable: too sandy.	Good.
TaB, TaD---------- Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
TaE---------- Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
ToB---------- Tetotum	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Ud. Udorthents				
Ur. Urban land				
VaB, VaD---------- Vaucluse	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
VaE---------- Vaucluse	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Wn---------- Wehadkee	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
WsB, WsD---------- White Store	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
WwB---------- Wickham	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 15.--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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
BaB---- Blaney	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Soil blowing---	Droughty, rooting depth.
BaD---- Blaney	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing.	Slope, droughty, rooting depth.
CaB---- Candor	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy------	Droughty.
CfB---- Cecil	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Favorable------	Favorable.
CfD---- Cecil	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
Ch---- Chewacla	Moderate: seepage.	Severe: piping, hard to pack. wetness.	Moderate: slow refill.	Flooding-------	Wetness--------	Wetness.
Cp---- Congaree	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Flooding-------	Erodes easily, wetness.	Erodes easily.
CrB---- Creedmoor	Slight---------	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly.	Percs slowly.
CrD---- Creedmoor	Slight---------	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, percs slowly.
DoA---- Dothan	Moderate: seepage.	Slight---------	Severe: no water.	Deep to water	Favorable------	Droughty.
DoB---- Dothan	Moderate: seepage, slope.	Slight---------	Severe: no water.	Deep to water	Favorable------	Droughty.
DuB---- Durham	Slight---------	Slight---------	Severe: no water.	Deep to water	Favorable------	Droughty.
FuB---- Fuquay	Slight---------	Slight---------	Severe: no water.	Deep to water	Too sandy------	Droughty.
GhB---- Gilead	Moderate: slope.	Moderate: wetness.	Severe: no water.	Percs slowly, slope.	Percs slowly, wetness.	Percs slowly, wetness.
GhD---- Gilead	Severe: slope.	Moderate: wetness.	Severe: no water.	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
MfB---- Mayodan	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable.

TABLE 15.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
MfD---------- Mayodan	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
MfE---------- Mayodan	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
MrB: Mayodan----------	Moderate: seepage.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Favorable.
Urban land.						
NaB---------- Nason	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
NaD---------- Nason	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
PaF---------- Pacolet	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope----------	Slope.
PfB---------- Pinkston	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock	Droughty, depth to rock.
PfD, PfF---------- Pinkston	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock, slope.	Slope, droughty, depth to rock.
Pt. Pits						
Ro---------- Roanoke	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.
StA---------- State	Moderate: seepage.	Moderate: thin layer, piping.	Severe: cutbanks cave.	Deep to water	Soil blowing---	Favorable.
TaB---------- Tatum	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
TaD, TaE---------- Tatum	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
ToB---------- Tetotum	Moderate: seepage.	Severe: wetness.	Severe: cutbanks cave.	Favorable------	Wetness, soil blowing.	Favorable.
Ud. Udorthents						
Ur. Urban land						
VaB---------- Vaucluse	Severe: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Percs slowly, soil blowing.	Droughty, rooting depth.

TABLE 15.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
VaD, VaE---------- Vaucluse	Severe: seepage, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope, percs slowly, soil blowing.	Slope, droughty, rooting depth.
Wn---------- Wehadkee	Moderate: seepage.	Severe: wetness.	Slight---------	Flooding-------	Wetness--------	Wetness.
WsB---------- White Store	Moderate: depth to rock.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
WsD---------- White Store	Moderate: depth to rock.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
WwB---------- Wickham	Moderate: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Favorable------	Favorable.

TABLE 16.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BaB, BaD--------- Blaney	0-28	Loamy sand--------	SM, SP-SM	A-2, A-3	0	95-100	95-100	60-85	8-30	---	NP
	28-49	Sandy clay loam, sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6, A-1-b	0	95-100	90-100	25-85	20-50	<40	NP-20
	49-60	Sandy loam, sandy clay loam, loamy sand.	SM, SC, SM-SC	A-2, A-4, A-6, A-1-b	0	95-100	90-100	24-85	15-50	<36	NP-14
CaB-------------- Candor	0-25	Sand--------------	SM, SP-SM	A-2, A-3	0-2	100	100	55-90	5-15	---	NP
	25-35	Loamy sand--------	SM, SP-SM	A-2	0-2	100	100	65-90	10-25	---	NP
	35-54	Sand--------------	SM, SP-SM	A-2, A-3	0-7	90-100	90-100	55-90	5-15	---	NP
	54-76	Sandy loam, sandy clay loam.	SC, SM-SC, SM	A-2, A-4, A-6, A-7	0-7	90-100	90-100	55-90	25-49	<45	NP-25
	76-99	Stratified sandy loam to clay.	---	---	---	---	---	---	---	---	---
CfB, CfD--------- Cecil	0-6	Fine sandy loam	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
	6-54	Clay--------------	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	54-70	Variable---------	---	---	---	---	---	---	---	---	---
Ch--------------- Chewacla	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	0	98-100	95-100	70-100	55-90	25-49	4-20
	6-26	Silt loam, silty clay loam, clay loam.	ML, CL	A-4, A-6, A-7	0	96-100	95-100	80-100	51-98	30-49	4-22
	26-60	Sandy clay loam, loam, sandy loam.	SM, SM-SC, ML	A-4, A-7-6	0	96-100	95-100	60-96	36-70	20-45	NP-15
Cp--------------- Congaree	0-9	Silt loam--------	CL-ML, ML, CL	A-4	0	95-100	95-100	70-100	51-90	20-35	3-10
	9-80	Silty clay loam, fine sandy loam, loam.	SC, ML, CL, SM	A-4, A-6, A-7	0	95-100	95-100	70-100	40-90	25-50	3-22
CrB, CrD--------- Creedmoor	0-14	Fine sandy loam	SM, SM-SC	A-4, A-2	0-3	98-100	95-100	70-90	30-49	<25	NP-7
	14-46	Clay, silty clay, sandy clay.	CH	A-7	0-3	98-100	95-100	85-97	70-95	51-79	25-49
	46-86	Sandy loam, clay loam, loam.	ML, CL-ML, SM, SM-SC	A-7, A-6, A-4	0-5	98-100	95-100	85-98	45-90	25-49	4-21
	86-96	Weathered bedrock	---	---	---	---	---	---	---	---	---
	96	Weathered bedrock	---	---	---	---	---	---	---	---	---
DoA, DoB--------- Dothan	0-15	Loamy sand-------	SM	A-2	0	95-100	92-100	60-80	13-30	---	NP
	15-45	Sandy clay loam, sandy loam.	SM-SC, SC, SM	A-2, A-4, A-6	0	95-100	92-100	68-90	23-49	<40	NP-16
	45-65	Sandy clay loam, sandy clay.	SM-SC, SC, SM, CL	A-2, A-4, A-6, A-7	0	95-100	92-100	70-95	30-53	25-45	4-23
DuB-------------- Duplin	0-15	Loamy sand-------	SM	A-2	0-3	95-100	90-100	50-85	13-30	<16	NP-3
	15-56	Clay loam, sandy clay, sandy clay loam.	SC, CL	A-6, A-7	0-3	95-100	90-100	70-95	36-70	30-49	13-28
	56-70	Sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0-3	95-100	90-100	50-85	18-49	<20	NP-10

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
FuB---------- Fuquay	0-24	Loamy sand-------	SP-SM, SM	A-2, A-3	0	95-100	90-100	50-83	5-35	---	NP
	24-28	Sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	85-100	85-100	70-90	23-45	<25	NP-13
	28-68	Sandy clay loam	SC, SM-SC, CL-ML	A-2, A-4, A-6, A-7-6	0	95-100	90-100	58-90	28-49	20-49	4-12
	68-83	Variable---------	---	---	---	---	---	---	---	---	---
GhB, GhD--------- Gilead	0-7	Loamy sand-------	SP-SM, SM	A-2	0-5	90-100	75-100	55-85	10-35	---	NP
	7-20	Sandy loam, sandy clay loam.	SM-SC, SC	A-2, A-4, A-6	0-5	95-100	70-100	65-95	30-49	<30	4-16
	20-32	Sandy clay, clay loam, clay.	SC, CL	A-6, A-7	0-5	95-100	85-100	75-98	45-80	30-44	18-30
	32-52	Sandy loam, sandy clay loam.	SC, CL	A-2, A-6	0-5	95-100	85-100	70-98	30-60	20-35	11-20
	52-75	Variable---------	---	---	---	---	---	---	---	---	---
MfB, MfD, MfE---- Mayodan	0-7	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-5	92-100	90-100	49-98	30-70	<36	NP-5
	7-14	Silty clay loam, clay loam, sandy clay loam.	CL, ML, SC	A-4, A-6, A-7-6	0-2	95-100	95-100	90-100	40-98	25-50	7-26
	14-42	Clay, sandy clay, silty clay.	MH, CH, CL, ML	A-7	0-2	95-100	90-100	80-100	40-98	41-80	15-45
	42-60	Variable---------	---	---	---	---	---	---	---	---	---
MrB: Mayodan---------	0-7	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-5	92-100	90-100	49-98	30-70	<36	NP-5
	7-14	Silty clay loam, clay loam, sandy clay loam.	CL, ML, SC	A-4, A-6, A-7-6	0-2	95-100	95-100	90-100	40-98	25-50	7-26
	14-42	Clay, sandy clay, silty clay.	MH, CH, CL, ML	A-7	0-2	95-100	90-100	80-100	40-98	41-80	15-45
	42-60	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
NaB, NaD--------- Nason	0-6	Silt loam--------	ML, CL-ML, SM	A-4	0-5	80-100	75-100	55-95	35-85	<38	NP-10
	6-46	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	46-60	Channery silt loam, silt loam.	CL-ML, SC, GM-GC	A-2, A-4, A-6	0-5	50-80	45-75	40-75	30-70	20-35	4-12
PaF---------- Pacolet	0-2	Fine sandy loam	SM, SM-SC	A-2, A-1-B	0-2	85-100	80-100	42-80	16-35	<28	NP-7
	2-30	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
	30-60	Sandy loam, fine sandy loam, loam	SM, SM-SC	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
PfB, PfD, PfF---- Pinkston	0-6	Silt loam--------	CL, ML, SM-SC	A-4	0-5	69-100	66-100	60-95	45-75	<30	NP-10
	6-16	Loam, sandy loam, silt loam.	SC, CL, ML, SM	A-2, A-4, A-1	0-10	70-100	50-100	35-95	20-75	<30	NP-10
	16-38	Gravelly sandy loam, loam, silt loam.	CL, GM, GP-GM, ML	A-1, A-2, A-4, A-6	0-10	40-100	35-85	20-80	10-60	16-35	3-15
	38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Pt. Pits											
Ro---------- Roanoke	0-4	Silt loam--------	SM-SC, CL-ML, CL, SC	A-4, A-6	0	95-100	85-100	60-100	35-90	20-35	5-16
	4-13	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	85-100	80-100	80-95	35-45	14-20
	13-65	Clay, silty clay, clay loam.	CH, CL	A-7	0	90-100	85-100	85-100	65-95	45-70	22-40
StA---------- State	0-8	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-2, A-4	0	95-100	95-100	45-85	25-55	<28	NP-7
	8-49	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
	49-72	Stratified sand, sandy loam.	SM, SM-SC, SP-SM	A-1, A-2, A-3, A-4	0	85-100	75-100	40-90	5-50	<25	NP-7
TaB, TaD, TaE---- Tatum	0-8	Silt loam--------	ML, CL, SM	A-4	0	85-100	80-100	65-100	40-90	20-34	NP-10
	8-50	Silty clay loam, silty clay, clay.	MH	A-7	0	75-100	70-95	60-95	55-95	50-80	10-36
	50-60	Silt loam, loam, silty clay loam.	CL	A-6, A-7	0	75-100	70-95	60-90	60-85	30-45	12-20
ToB---------- Tetotum	0-7	Fine sandy loam	SM, ML	A-2, A-4	0	85-100	80-100	45-85	25-55	<30	NP-7
	7-48	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6, A-7	0-2	85-100	80-100	60-95	35-85	30-45	10-20
	48-60	Stratified sandy clay loam to loamy fine sand.	SM, SC, ML, CL	A-2, A-4, A-6	0-2	80-100	75-100	50-95	15-75	<30	NP-15
Ud. Udorthents											
Ur. Urban land											
VaB, VaD, VaE---- Vaucluse	0-14	Gravelly sandy loam.	SM	A-1, A-2, A-4	3-10	70-90	60-86	40-60	20-45	<30	NP
	14-80	Sandy clay loam, sandy loam.	SC, SM-SC	A-2, A-4, A-6	0-5	90-100	90-100	51-75	25-50	20-40	5-15
Wn---------- Wehadkee	0-6	Fine sandy loam	SM, SC, SM-SC	A-2, A-4	0	100	95-100	60-90	30-50	<35	NP-10
	6-46	Loam, sandy clay loam, clay loam.	ML, CL, CL-ML	A-6, A-7, A-4	0	100	99-100	85-100	51-90	25-50	7-25
	46-60	Variable---------	---	---	---	---	---	---	---	---	---
WsB, WsD--------- White Store	0-7	Silt loam--------	ML, CL-ML	A-4	0-3	90-100	80-100	75-96	51-80	<25	NP-7
	7-30	Clay-------------	CH	A-7	0-3	95-100	90-100	85-99	80-98	70-92	45-65
	30-96	Variable---------	---	---	---	---	---	---	---	---	---
WwB---------- Wickham	0-5	Sandy loam-------	SM, SM-SC, ML, CL-ML	A-4	0	95-100	90-100	70-100	45-80	<25	NP-7
	5-52	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM-SC	A-2, A-4, A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	5-15
	52-72	Variable---------	---	---	---	---	---	---	---	---	---

TABLE 17.--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. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
BaB, BaD--------- Blaney	0-28 28-49 49-60	>6.0 0.2-0.6 0.2-0.6	0.03-0.06 0.05-0.10 0.03-0.08	4.5-6.0 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	0.15 0.28 0.28	4
CaB-------------- Candor	0-25 25-35 35-54 54-76 76-99	6.0-20 6.0-20 6.0-20 0.6-2.0 ---	0.02-0.06 0.06-0.10 0.02-0.05 0.12-0.16 ---	3.6-6.0 3.6-5.5 3.6-5.5 3.6-5.5 ---	Low---------- Low---------- Low---------- Low---------- ----------	0.10 0.10 0.10 0.20 ----	5
CfB, CfD--------- Cecil	0-6 6-54 54-70	2.0-6.0 0.6-2.0 ---	0.12-0.14 0.13-0.15 ---	4.5-6.0 4.5-5.5 ---	Low---------- Low---------- ----------	0.28 0.28 ----	4
Ch--------------- Chewacla	0-6 6-26 26-60	0.6-2.0 0.6-2.0 0.6-2.0	0.15-0.24 0.15-0.24 0.12-0.20	4.5-6.5 4.5-6.5 4.5-6.5	Low---------- Low---------- Low----------	0.28 0.32 0.28	5
Cp--------------- Congaree	0-9 9-80	0.6-2.0 0.6-2.0	0.12-0.20 0.12-0.20	4.5-7.3 4.5-7.3	Low---------- Low----------	0.37 0.37	5
CrB, CrD--------- Creedmoor	0-14 14-46 46-86 86-96	2.0-6.0 <0.06 <0.06 ---	0.10-0.14 0.13-0.15 0.10-0.14 ---	3.6-5.5 3.6-5.5 3.6-5.5 ---	Low---------- Moderate------- Low---------- ----------	0.28 0.32 0.37 ----	3
DoA, DoB--------- Dothan	0-15 15-45 45-65	2.0-6.0 0.6-2.0 0.2-0.6	0.06-0.10 0.12-0.16 0.08-0.12	4.5-5.5 4.5-5.5 4.5-5.5	Very low------- Low---------- Low----------	0.15 0.28 0.28	5
DuB-------------- Durham	0-15 15-56 56-70	2.0-6.0 0.2-0.6 0.6-2.0	0.06-0.10 0.14-0.18 0.08-0.14	4.5-6.0 4.5-5.5 4.5-5.5	Low---------- Low---------- Low----------	0.17 0.20 0.20	5
FuB-------------- Fuquay	0-24 24-28 28-68 68-83	>6.0 0.6-2.0 0.06-0.2 ---	0.04-0.09 0.12-0.15 0.10-0.13 ---	4.5-6.0 4.5-6.0 4.5-6.0 ---	Low---------- Low---------- Low---------- ----------	0.15 0.20 0.20 ----	5
GhB, GhD--------- Gilead	0-7 7-20 20-32 32-52 52-75	2.0-6.0 0.6-2.0 0.06-0.6 0.2-0.6 ---	0.05-0.09 0.10-0.15 0.12-0.16 0.10-0.15 ---	4.5-5.5 4.5-5.5 4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Low---------- Low---------- Low---------- ----------	0.17 0.24 0.28 0.24 ----	3
MfB, MfD, MfE---- Mayodan	0-7 7-14 14-42 42-60	>6.0 0.6-2.0 0.6-2.0 ---	0.11-0.17 0.12-0.22 0.12-0.18 0.02-0.06	4.5-6.0 4.5-6.0 4.5-5.5 4.5-5.5	Low---------- Low---------- Moderate------- Low----------	0.24 0.32 0.28 ----	4
MrB: Mayodan--------- Urban land.	0-7 7-14 14-42 42-60	>6.0 0.6-2.0 0.6-2.0 ---	0.11-0.17 0.12-0.22 0.12-0.18 0.02-0.06	4.5-6.0 4.5-6.0 4.5-5.5 4.5-5.5	Low---------- Low---------- Moderate------- Low----------	0.24 0.32 0.28 ----	4

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
NaB, NaD--------- Nason	0-6 6-46 46-60	0.6-2.0 0.6-2.0 0.6-2.0	0.14-0.20 0.12-0.19 0.15-0.20	4.5-6.5 4.5-5.5 4.5-5.5	Low---------- Moderate------- Low----------	0.37 0.28 0.28	4
PaF-------------- Pacolet	0-2 2-30 30-60	2.0-6.0 0.6-2.0 0.6-2.0	0.88-0.12 0.22-0.15 0.88-0.15	4.5-6.5 4.5-6.0 4.5-6.0	Low---------- Low---------- Low----------	0.20 0.28 0.28	3
PfB, PfD, PfF---- Pinkston	0-6 6-16 16-38 38	0.6-2.0 2.0-6.0 2.0-6.0 ---	0.12-0.18 0.06-0.18 0.05-0.16 ---	4.5-6.5 4.5-5.5 4.5-5.5 ---	Low---------- Low---------- Low---------- ----------	0.32 0.24 0.24 ----	2
Pt. Pits							
Ro--------------- Roanoke	0-4 4-13 13-65	0.6-2.0 0.2-0.6 0.06-0.2	0.14-0.20 0.16-0.19 0.10-0.19	3.6-5.5 3.6-5.5 3.6-5.5	Low---------- Moderate------- Moderate-------	0.37 0.24 0.24	4
StA-------------- State	0-8 8-49 49-72	0.6-6.0 0.6-2.0 >2.0	0.08-0.15 0.14-0.19 0.02-0.10	4.5-5.5 4.5-5.5 4.5-6.0	Low---------- Low---------- Low----------	0.28 0.28 0.17	5
TaB, TaD, TaE---- Tatum	0-8 8-50 50-60	0.6-2.0 0.6-2.0 0.6-2.0	0.14-0.20 0.10-0.19 0.12-0.18	4.5-5.5 4.5-5.5 4.5-5.5	Low---------- Moderate------- Low----------	0.37 0.28 0.28	4
ToB-------------- Tetotum	0-7 7-48 48-60	2.0-6.0 0.6-2.0 0.6-20	0.08-0.15 0.14-0.19 0.06-0.15	3.6-5.5 3.6-5.5 3.6-5.5	Low---------- Low---------- Low----------	0.28 0.32 0.32	4
Ud. Udorthents							
Ur. Urban land							
VaB, VaD, VaE---- Vaucluse	0-14 14-80	2.0-6.0 0.6-2.0	0.06-0.10 0.10-0.15	4.5-6.0 4.5-5.5	Low---------- Low----------	0.15 0.24	3
Wn--------------- Wehadkee	0-6 6-46 46-60	2.0-6.0 0.6-2.0 ---	0.10-0.15 0.16-0.20 ---	4.5-6.5 4.5-6.5 ---	Low---------- Low---------- ----------	0.24 0.32 ----	5
WsB, WsD--------- White Store	0-7 7-30 30-96	0.6-2.0 <0.06 ---	0.14-0.16 0.15-0.17 ---	5.6-6.0 4.5-5.5 ---	Low---------- Very high------ ----------	0.43 0.37 ----	3
WwB-------------- Wickham	0-5 5-52 52-72	2.0-6.0 0.6-2.0 ---	0.11-0.16 0.12-0.17 ---	4.5-6.0 4.5-6.0 ---	Low---------- Low---------- ----------	0.24 0.24 ----	5

TABLE 18.--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]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
BaB, BaD---------- Blaney	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
CaB---------- Candor	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low.
CfB, CfD---------- Cecil	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Ch---------- Chewacla	C	Frequent----	Brief-----	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	Moderate.
Cp---------- Congaree	B	Frequent----	Brief-----	Nov-Apr	2.5-4.0	Apparent	Nov-Apr	>60	---	Moderate	Moderate.
CrB, CrD---------- Creedmoor	C	None--------	---	---	1.5-2.0	Perched	Jan-Mar	>60	---	High-----	High.
DoA, DoB---------- Dothan	B	None--------	---	---	3.0-5.0	Perched	Jan-Apr	>60	---	Moderate	Moderate.
DuB---------- Durham	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
FuB---------- Fuquay	B	None--------	---	---	4.0-6.0	Perched	Jan-Mar	>60	---	Low------	High.
GhB, GhD---------- Gilead	C	None--------	---	---	1.5-2.5	Perched	Jan-Mar	>60	---	Moderate	High.
MfB, MfD, MfE----- Mayodan	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
MrB: Mayodan----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Urban land.											
NaB, NaD---------- Nason	C	None--------	---	---	>6.0	---	---	40-60	Soft	Moderate	High.
PaF---------- Pacolet	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
PfB, PfD, PfF----- Pinkston	B	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
Pt. Pits											
Ro---------- Roanoke	D	Frequent----	Brief-----	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High-----	High.
StA---------- State	B	None--------	---	---	4.0-6.0	Apparent	Dec-Jun	>60	---	Moderate	High.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
TaB, TaD, TaE----- Tatum	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
ToB---------- Tetotum	C	Rare--------	---	---	1.5-2.5	Apparent	Dec-Apr	>60	---	High-----	High.
Ud. Udorthents											
Ur. Urban land											
VaB, VaD, VaE----- Vaucluse	C	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
Wn---------- Wehadkee	D	Frequent----	Brief-----	Nov-Jun	0-2.5	Apparent	Dec-May	>60	---	High-----	Moderate.
WsB, WsD---------- White Store	D	None--------	---	---	1.0-1.5	Perched	Dec-Mar	48-72	Soft	High-----	High.
WwB---------- Wickham	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.

TABLE 19.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

Soil name, sample number, horizon, and depth (in inches)	Classification		Grain-size distribution							Liquid limit	Plasticity index	Moisture density	
	AASHTO	Unified	Percentage passing sieve--				Percentage smaller than--					Maximum dry density	Optimum moisture
			No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm				
										Pct		Lb/cu ft	Pct
Mayodan fine sandy loam: [S80N C-105-16 (1-4-7)]													
Ap - - - - - - - 0-7	A-4(7)	ML	100	100	99	70	21	9	6	22	NP	107.2	14.5
Bt - - - - - - - 14-32	A-7-6(16)	CL	100	100	100	82	56	43	38	49	25	103.0	20.4
C - - - - - - - 51-60	A-6(7)	ML	100	100	99	70	45	28	21	40	11	109.0	16.9
Pinkston fine sandy loam: [S80NC-105-18 (1-3-4)]													
A - - - - - - - 0-3	A-4(3)	ML	69	66	65	51	19	8	5	28	1	106.9	15.0
Bw - - - - - - - 14-24	A-4(7)	ML	99	97	96	72	32	19	14	26	4	112.6	13.7

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Blaney	Loamy, siliceous, thermic Arenic Hapludults
Candor	Sandy, siliceous, thermic Arenic Paleudults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Congaree	Fine-loamy, mixed, nonacid, thermic Typic Udifluvents
*Creedmoor	Clayey, mixed, thermic Aquic Hapludults
Dothan	Fine-loamy, siliceous, thermic Plinthic Paleudults
Durham	Fine-loamy, siliceous, thermic Typic Hapludults
Fuquay	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Gilead	Clayey, kaolinitic, thermic Aquic Hapludults
Mayodan	Clayey, mixed, thermic Typic Hapludults
Nason	Clayey, mixed, thermic Typic Hapludults
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Pinkston	Coarse-loamy, mixed, thermic Ruptic-Ultic Dystrochrepts
Roanoke	Clayey, mixed, thermic Typic Ochraquults
State	Fine-loamy, mixed, thermic Typic Hapludults
Tatum	Clayey, mixed, thermic Typic Hapludults
Tetotum	Fine-loamy, mixed, thermic Aquic Hapludults
Vaucluse	Fine-loamy, siliceous, thermic Typic Hapludults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents
White Store	Fine, mixed, thermic Vertic Hapludalfs
Wickham	Fine-loamy, mixed, thermic Typic Hapludults

* 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.

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