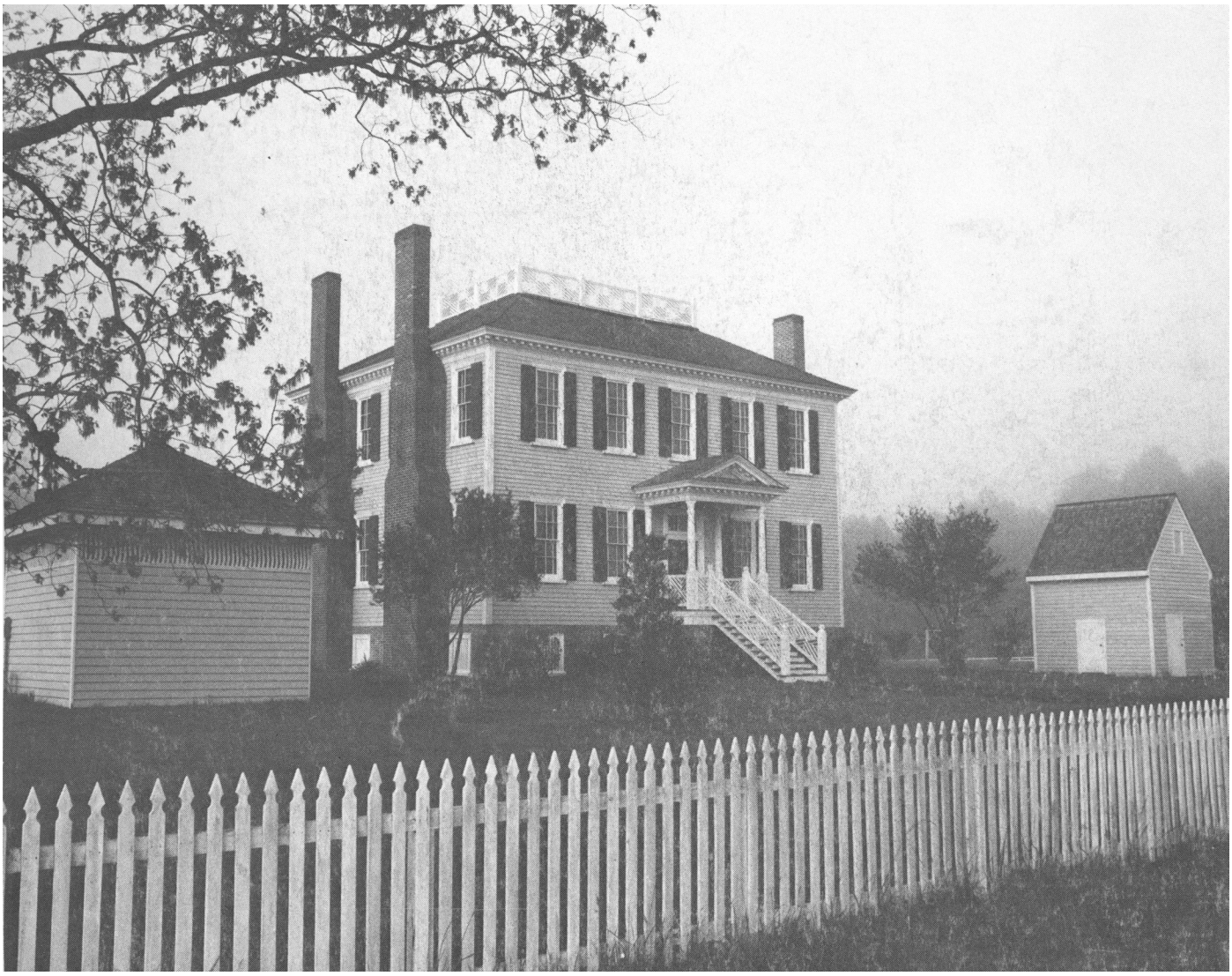
United States
Department of
Agriculture

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
Bertie County Board of
Commissioners

Soil Survey of Bertie County, North Carolina



How To Use This Soil Survey

General Soil Map

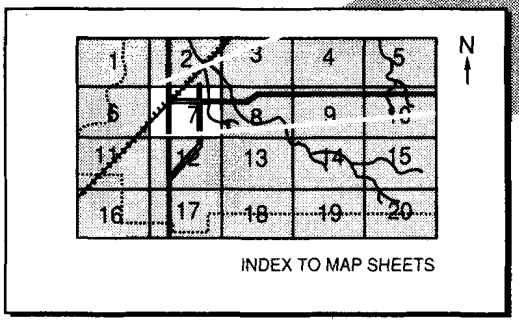
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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.

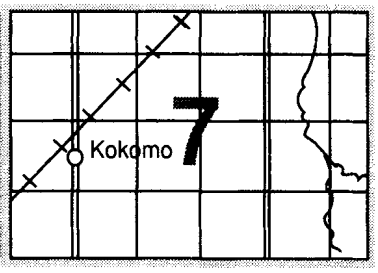
Detailed Soil Maps

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.



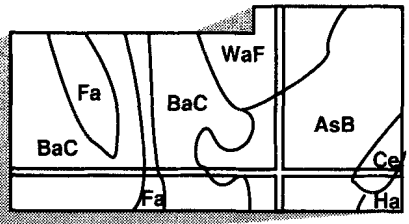
INDEX TO MAP SHEETS



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 1983. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1983. This soil survey was made cooperatively by the Soil Conservation Service and the North Carolina Department of Natural Resources and Community Development, the North Carolina Agricultural Research Service, the North Carolina Agricultural Extension Service, and the Bertie County Board of Commissioners. It is part of the technical assistance furnished to the Bertie 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.

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

Cover: Hope Plantation, which was built near Windsor in about 1803. This plantation made up about 5,000 acres, which was mostly used for corn and wheat. The homesite is in an area of Bonneau loamy sand, 0 to 6 percent slopes.

Contents

Issued June 1990

Index to Map Units

Summary of Tables

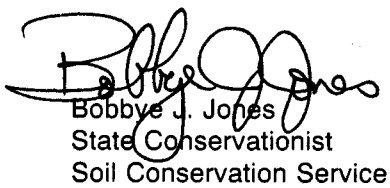
Foreword

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

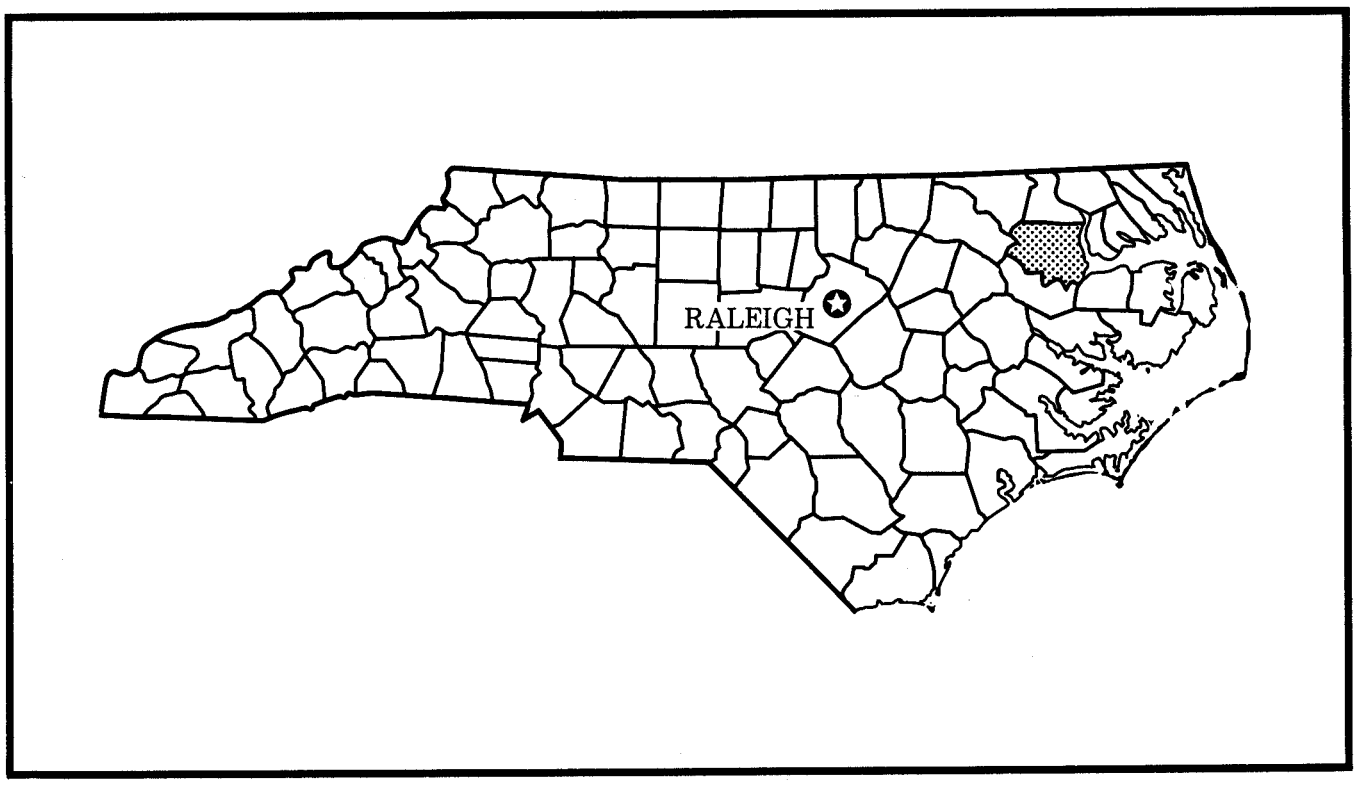
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey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

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to 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 North Carolina Agricultural Extension Service.



Bobbye J. Jones
State Conservationist
Soil Conservation Service



Location of Bertie County in North Carolina.

Soil Survey of Bertie County, North Carolina

By Phillip L. Tant, Robert H. Ranson, John A. Gagnon, and Eugene W. Mellette, Soil Conservation Service; I.M. Allen, Bertie County; and W. Allen Hayes, Jr., 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 Bertie County Board of Commissioners

BERTIE COUNTY is in northeastern North Carolina. The county has a total area of 471,379 acres. The 1980 census reported a population of 21,024. Windsor, the county seat, has a population of 2,200.

This county is in the Coastal Plain physiographic region. The elevation ranges from near sea level at Sans Souci Ferry to 100 feet at Roxobel. The soils in this county are mostly nearly level or gently sloping.

This soil survey updates the survey of Bertie County published in 1920 *(16)*. It provides additional information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section gives general information concerning the county. It describes settlement, water supply, and climate.

Settlement

The settlement of the area that is now Bertie County began as early as 1657. Nathaniel Batts is considered the first homesteader in the area. His land along the Albemarle Sound near the mouth of the Roanoke River is acknowledged as one of the first permanent homesteads in North Carolina. His home has become known as Batt's House. From 1667 to 1700, the English population had grown from about 100 to more than 1,400 *(10)*.

The Indians in the area, especially the Mangoaks of the Tuscarora Tribe, deeply resented the encroachment on their land. They waged a brief war in 1666 that ended with the signing of a treaty. When a general war with the Tuscaroras began throughout North Carolina in 1711, the Tuscaroras under King Tom Blunt remained neutral. In 1717, for remaining peaceful, they were awarded a 40,000-acre tract of land just north of the Roanoke River, which became known as Indian Woods. The Indians lived there in relative peace until 1803, when they moved to New York to live with their Iroquoian kinsmen. Indian Woods was then open to English settlement *(9)*.

Bertie County was formed in 1722 from Chowan County *(6)* and was named in honor of James and Henry Bertie. Windsor, established in 1766, became the county seat in 1774. It was an important trading post before the Civil War. All or part of Tyrrell, Edgecombe, Northampton, and Hertford Counties were formed from Bertie County. In 1759, the current boundaries of Bertie County were established.

Logging and farming have been the primary sources of livelihood in Bertie County since early settlement. Around 1750, Nathaniel Hill and James Castello built a grist mill on what is now called Hoggard's Mill Pond. A sawmill was added several years later. Another sawmill and grist mill on Harden's Mill Pond also operated during that period. Most of the lumber produced was used locally. In 1880, another lumber company began

operations, but most of the lumber they produced was exported to the Northern States. Large tracts of land are still used for logging.

Until the early 1900's, cotton was the most important agricultural crop. At the turn of the century, 15 cotton gins operated in the county. Since then, peanuts have replaced cotton as the main money crop. They have been an important crop since after the Civil War. Corn, soybeans, and tobacco have also become important crops in Bertie County *(7)*.

Water Supply

Ground water is the only source of water in Bertie County. Only Windsor has public water supplies.

The county is underlain by a sequence of sand, clay, and limestone that becomes thicker from west to east. These beds are about 400 feet thick in the west and increase to about 1,900 feet in thickness in the east. The upper sandy aquifer makes up an average of about 100 feet of these deposits. The limestone aquifer is in the southeastern part of the county and is only a few inches thick. The lower sandy aquifer makes up the rest of the deposits. In the western third of the county, these deposits contain only fresh water in all but a few areas. In the center of the county, the depth to brackish water is about 600 feet. The depth decreases eastward, so that brackish water would probably be at a depth of less than 300 feet in the vicinity of the Chowan River estuary.

In the western part of the county, well yields of 500 gallons per minute should be obtainable from the lower sandy aquifer, while in the center of the county, yields of 1,000 gallons or more of fresh water per minute may be obtained from the same aquifer. The potential yields of wells in the eastern part of the county are uncertain but could be as much as several hundred gallons per minute, depending upon the depth to brackish water. The water from deep and shallow wells tends to be soft unless it is derived from the limestone aquifer. Water from the upper sandy aquifer tends to be corrosive and can contain excessive iron. Fresh water from the lower sandy aquifer tends to have a near neutral to high pH level and a moderate to high concentration of dissolved solids and can have an excessive concentration of fluoride *(11)*.

Climate

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

Bertie County is hot and humid in summer, but the coast is frequently cooled by sea breezes. Winter is cool with occasional brief cold spells. Rains occur throughout the year and are fairly heavy. Snowfall is rare. Annual precipitation is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Lewiston, North Carolina, in the period 1954 to 1981. 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 42 degrees F and the average daily minimum temperature is 30 degrees. The lowest temperature on record, which occurred at Lewiston on January 13, 1962, is -1 degree. In summer, the average temperature is 76 degrees and the average daily maximum temperature is 88 degrees. The highest recorded temperature, which occurred on August 1, 1980, is 105 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.

Of the total annual precipitation, about 27 inches 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 5.63 inches at Lewiston on August 12, 1960. Thunderstorms occur on about 45 days each year.

The average seasonal snowfall is about 6 inches. The greatest snow depth at any one time during the period of record was 14 inches. On an average of 3 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 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 southeast. Average windspeed is highest, 9 miles per hour, in spring. Every few years a hurricane crosses the survey area.

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 a considerable degree of accuracy the kind of soil at a specific location on the landscape.

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

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify 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 interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

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 predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will 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 (fig. 1). 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.

1. Goldsboro-Norfolk-Craven

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

These soils are mainly in the northern part of the county. They are mostly on flats and smooth to slightly rounded, low ridges.

This map unit makes up about 12 percent of Bertie County. It is about 40 percent Goldsboro soils, 27 percent Norfolk soils, 10 percent Craven soils, and 23 percent soils of minor extent. The soils of minor extent include Winton, Lynchburg, Lenoir, Exum, and Bonneau soils.

Goldsboro soils are nearly level and are moderately well drained. The surface layer is dark grayish brown sandy loam. The subsurface layer is pale yellow sandy loam. The subsoil is sandy clay loam. It is light yellowish brown in the upper part and light gray in the lower part. The underlying material is light gray loamy sand.

Norfolk soils are nearly level to sloping and are well drained. The surface layer is grayish brown sandy loam. The subsurface layer is light yellowish brown sandy loam. The subsoil is sandy clay loam. The upper part of the subsoil is yellowish brown and brownish yellow, the middle part is strong brown and yellowish brown, and the lower part is brownish yellow.

Craven soils are nearly level to sloping and are moderately well drained. The surface layer is dark grayish brown fine sandy loam. The upper part of the subsoil is light olive brown clay loam or clay, the middle part is mottled yellowish brown, light brownish gray, and red clay, and the lower part is light gray clay.

The soils in this map unit are used mainly as cropland. Some areas are used as woodland or pasture. Surface runoff is a limitation in the gently sloping areas of Norfolk and Craven soils, and erosion is a hazard. Wetness is a limitation in the nearly level areas of Goldsboro and Craven soils.

In areas of Goldsboro soils, wetness is the main limitation affecting urban and recreational development. In areas of Craven soils, the main limitations are wetness, restricted permeability, and low soil strength, which affects roads and streets. Norfolk soils have no major limitations affecting urban and recreational development.

2. Rains-Lynchburg-Goldsboro

Nearly level, poorly drained, somewhat poorly drained, and moderately well drained soils that have a loamy surface layer and a loamy subsoil; on uplands

These soils are mainly in the northeastern and northwestern parts of the county. They are mostly on broad flats and in shallow depressions.

This map unit makes up about 9 percent of Bertie County. It is about 54 percent Rains soils, 13 percent Lynchburg soils, 10 percent Goldsboro soils, and 23 percent soils of minor extent. The soils of minor extent include Pantego, Leaf, Grantham, and Lenoir soils.

Rains soils are poorly drained. The surface layer is very dark gray sandy loam. The upper part of the subsoil is light gray sandy loam, the middle part is gray sandy clay loam, and the lower part is mottled light

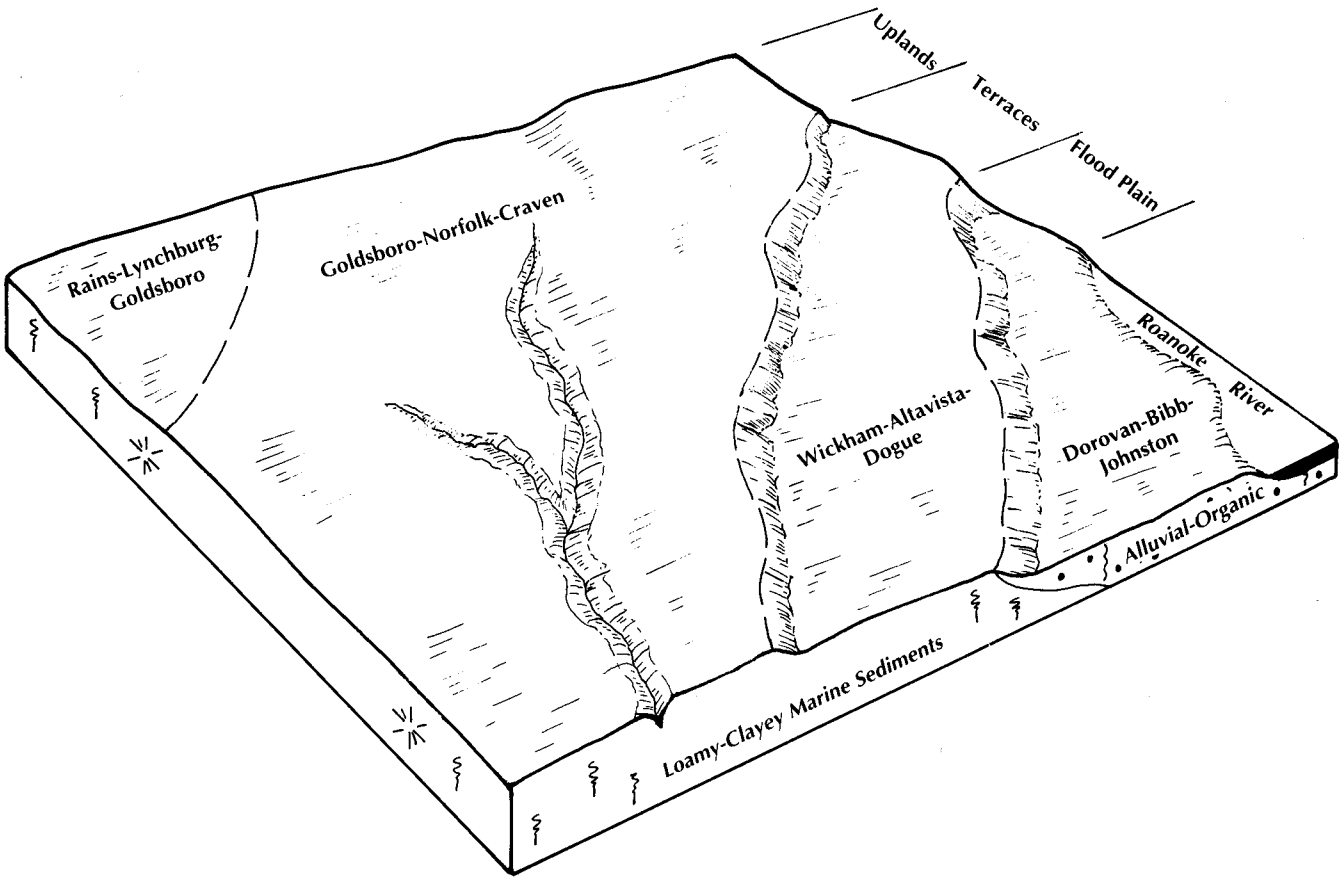


Figure 1.—Landscape positions of four of the general soil map units in Bertie County.

gray, gray, and reddish yellow clay loam.

Lynchburg soils are somewhat poorly drained. The surface layer is dark grayish brown sandy loam. The subsurface layer is light yellowish brown sandy loam. The subsoil is sandy clay loam. It is light yellowish brown in the upper part, light brownish gray in the middle part, and light gray in the lower part.

Goldsboro soils are moderately well drained. The surface layer is dark grayish brown sandy loam. The subsurface layer is pale yellow sandy loam. The subsoil is sandy clay loam. It is light yellowish brown in the upper part and light gray in the lower part. The underlying material is light gray loamy sand.

The soils in this map unit are used mainly as cropland or woodland. Small acreages are used for pasture. Wetness is the main limitation affecting the use of these soils for cropland, woodland, and pasture. It also is the main limitation affecting urban and recreational development.

3. Craven-Lenoir

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

These soils are mainly in the eastern part of the county, but some smaller areas are in the western part. The soils are on ridges and side slopes.

This map unit makes up about 14 percent of Bertie County. It is about 51 percent Craven soils, 24 percent Lenoir soils, and 25 percent soils of minor extent (fig. 2). The soils of minor extent include Leaf, Lynchburg, Exum, Nahunta, and Goldsboro soils.

Craven soils are nearly level to sloping and are moderately well drained. The surface layer is dark grayish brown fine sandy loam. The upper part of the subsoil is light olive brown clay loam or clay, the middle part is mottled yellowish brown, light brownish gray, and red clay, and the lower part is light gray clay.

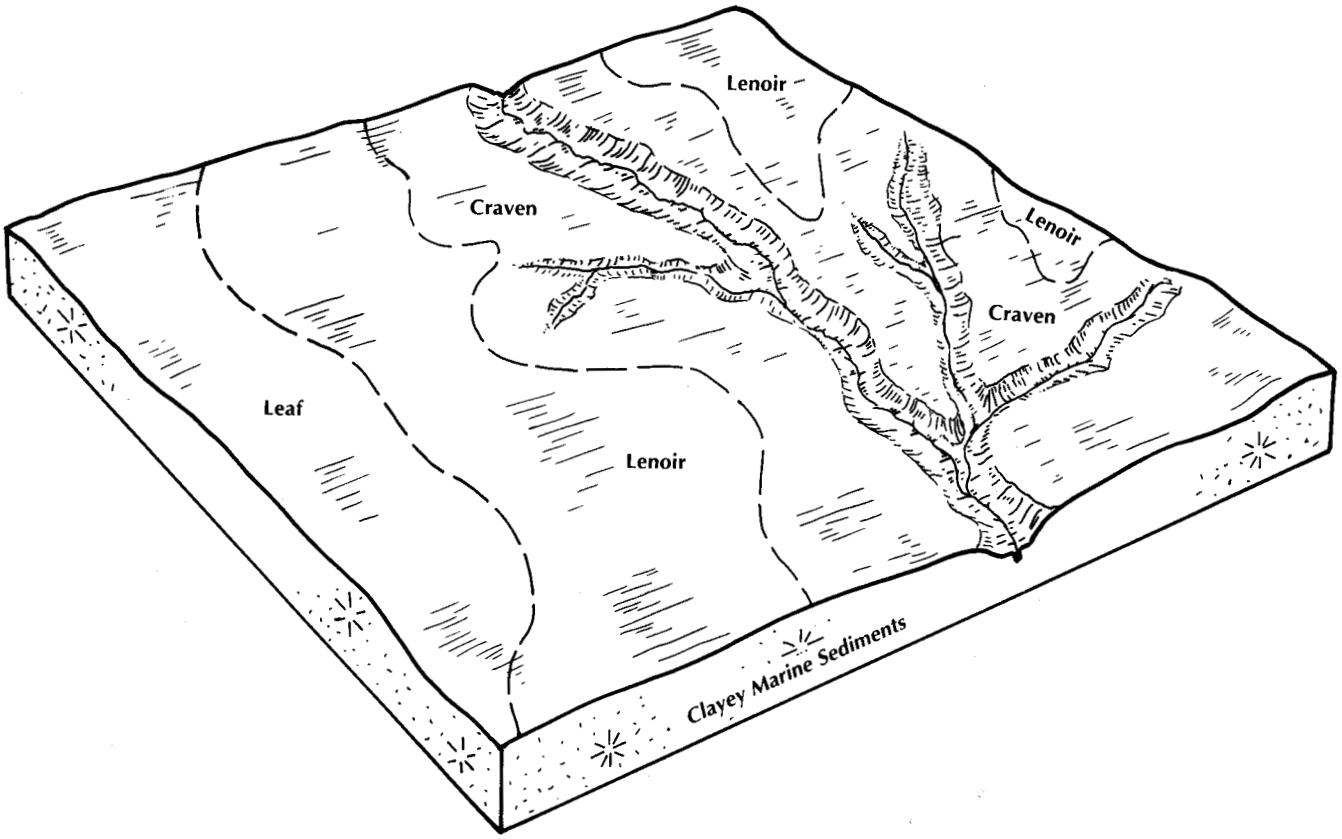


Figure 2.—Pattern of soils and parent material in the Craven-Lenoir general soil map unit.

Lenoir soils are nearly level and are somewhat poorly drained. The surface layer is dark grayish brown fine sandy loam. The upper part of the subsoil is yellowish brown clay loam, the middle part is grayish brown clay, and the lower part is gray and light gray clay.

The soils in this map unit are used mainly as cropland or woodland. Wetness and restricted permeability are limitations in areas of both the major soils. Surface runoff is an additional limitation in the gently sloping and sloping areas of Craven soils, and erosion is a hazard.

The main limitations affecting urban and recreational development are wetness, restricted permeability, and low soil strength, which affects roads and streets.

4. Leaf-Grantham

Nearly level, poorly drained soils that have a loamy surface layer and a loamy or clayey subsoil; on uplands

These soils are in scattered areas throughout the uplands in the county. They are mostly on broad flats and in depressions.

This map unit makes up about 18 percent of Bertie County. It is about 65 percent Leaf soils, 19 percent Grantham soils, and 16 percent soils of minor extent. The soils of minor extent include Rains, Nahunta, Lenoir, and Lynchburg soils.

Leaf soils have a surface layer of dark grayish brown loam. The subsoil is clay. It is dark grayish brown in the upper part and gray and light gray in the lower part.

Grantham soils have a surface layer of very dark gray silt loam. The upper part of the subsoil is light gray loam, and the lower part is gray clay loam.

The soils in this map unit are used mainly as woodland. Wetness and seedling mortality are the main limitations affecting woodland.

Wetness is the main limitation affecting urban and recreational development of Leaf and Grantham soils. Very slow permeability is an additional limitation in areas of Grantham soils.

5. Exum-Nahunta

Nearly level to gently sloping, moderately well drained and somewhat poorly drained soils that have a loamy surface layer and a loamy subsoil; on uplands

These soils are in the north-central part of the county. They are on broad flats, on smooth to slightly rounded ridges, and in shallow depressions.

This map unit makes up about 8 percent of Bertie County. It is about 56 percent Exum soils, 28 percent Nahunta soils, and 16 percent soils of minor extent. The soils of minor extent include Grantham, Craven, Lenoir, Leaf, Goldsboro, and Lynchburg soils.

Exum soils are nearly level to gently sloping and are moderately well drained. The surface layer is brown very fine sandy loam. The upper part of the subsoil is light olive brown loam or clay loam, and the lower part is light yellowish brown clay loam.

Nahunta soils are nearly level and are somewhat poorly drained. The surface layer is very dark gray very fine sandy loam. The upper part of the subsoil is olive yellow and brownish yellow loam, the middle part is light gray clay loam, and the lower part is mottled light gray, yellow, red, and reddish yellow clay loam.

The soils in this map unit are used mainly as cropland. Some areas are used as woodland or pasture. Wetness is the main limitation affecting the use and management of these soils. Runoff is a limitation affecting cropland, woodland, and pasture in the gently sloping areas of Exum soils. Erosion is a hazard in these areas.

Wetness is the main limitation affecting urban and recreational development of the soils in this map unit.

6. Wickham-Altavista-Dogue

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

These soils are on rounded, low ridges and side slopes on the terraces along the Roanoke and Cashie Rivers.

This map unit makes up about 7 percent of Bertie County. It is about 54 percent Wickham soils, 13 percent Altavista soils, 13 percent Dogue soils, and 20 percent soils of minor extent. The soils of minor extent include Augusta, Tomotley, Wahee, Roanoke, Conetoe, Tarboro, and Seabrook soils.

Wickham soils are nearly level to sloping and are well drained. The surface layer is yellowish brown fine sandy loam. The upper part of the subsoil is reddish yellow and yellowish red sandy clay loam, and the lower part is strong brown sandy loam. The underlying material is yellowish brown loamy sand.

Altavista soils are nearly level and are moderately well drained. The surface layer is grayish brown fine sandy loam, and the subsurface layer is very pale brown fine sandy loam. The upper part of the subsoil is light yellowish brown sandy clay loam, the middle part is yellowish brown sandy clay loam, and the lower part is mottled light gray, reddish yellow, yellow, and yellowish red sandy clay loam and sandy loam. The underlying material is mottled very pale brown and yellow loamy sand.

Dogue soils are nearly level to sloping and are moderately well drained. The surface layer is brown sandy loam. The upper part of the subsoil is brownish yellow clay loam and yellowish brown clay, the middle part is mottled pale yellow, light gray, and reddish yellow clay, and the lower part is light gray clay and sandy clay loam. The underlying material is light gray sandy loam and loamy sand.

The soils in this map unit are used mainly as cropland. Some areas are used as woodland or pasture. Surface runoff is a limitation affecting these uses in the gently sloping to sloping areas of Dogue and Wickham soils, and erosion is a hazard. Wetness is a limitation in the nearly level areas of Dogue and Altavista soils.

The nearly level to gently sloping Wickham soils have no major limitations affecting urban and recreational development. The slope is the main limitation in the sloping areas of Wickham soils, and wetness is the main limitation in areas of Altavista soils. The main limitations in areas of Dogue soils are wetness, moderately slow permeability, and low soil strength, which affects local roads and streets. The slope is a limitation in some areas of Dogue soils.

7. Conetoe-Tarboro-Wickham

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

These soils are mainly on smooth to slightly rounded, low ridges on the terraces adjacent to the Roanoke and Cashie Rivers.

This map unit makes up about 2 percent of Bertie County. It is about 50 percent Conetoe soils, 28 percent Tarboro soils, 17 percent Wickham soils, and 5 percent soils of minor extent. The soils of minor extent include

Altavista, Dogue, Augusta, and Seabrook soils.

Conetoe soils are nearly level to gently sloping and are well drained. The surface layer is brown loamy sand. The subsurface layer is yellowish brown loamy sand. The upper part of the subsoil is strong brown sandy loam, and the lower part is reddish yellow loamy sand. The underlying material is brownish yellow and yellow sand.

Tarboro soils are nearly level to gently sloping and are somewhat excessively drained. The surface layer is brown loamy sand. The underlying material is loamy sand. It is yellowish brown in the upper part, brownish yellow in the middle part, and strong brown in the lower part.

Wickham soils are nearly level to sloping and are well drained. The surface layer is yellowish brown fine sandy loam. The upper part of the subsoil is reddish yellow and yellowish red sandy clay loam, and the lower part is strong brown sandy loam. The underlying material is yellowish brown loamy sand.

The soils in this map unit are used mainly as cropland. Some areas are used as pasture or woodland. Droughtiness, low available water capacity, and leaching of plant nutrients in Tarboro and Conetoe soils and slope and runoff in areas of Wickham soils are the main limitations affecting these uses. Soil blowing is a hazard on Tarboro and Conetoe soils. Erosion is a hazard on Wickham soils.

Conetoe soils have no major limitations affecting urban and recreational development. Seepage is a limitation affecting some urban uses in areas of Tarboro soils, but these soils have no major limitations affecting recreational development. The nearly level and gently sloping Wickham soils have no major limitations affecting urban and recreational development. The slope is a limitation in the sloping areas of Wickham soils.

8. Roanoke

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

These soils are on broad flats and in slight depressions on terraces along the Roanoke and Cashie Rivers.

This map unit makes up about 8 percent of Bertie County. It is about 85 percent Roanoke soils and 15 percent soils of minor extent. The soils of minor extent include Wahee, Chewacla, and Tomotley soils.

Roanoke soils have a surface layer of dark grayish brown fine sandy loam. The upper part of the subsoil is light brownish gray loam, the middle part is gray and light gray clay, and the lower part is gray clay loam. The underlying material is gray sandy loam.

The soils in this map unit are used mainly as woodland. Wetness, slow permeability, and a moderate shrink-swell potential are the main limitations affecting woodland. Flooding is a hazard.

The main limitations affecting urban and recreational development of the soils in this map unit are wetness and restricted permeability. Flooding is a hazard.

9. Wehadkee-Chewacla

Nearly level, poorly drained and somewhat poorly drained soils that have a loamy surface layer and a loamy subsoil; on flood plains

These soils are in the southern part of the county. They are on slightly elevated ridges and in depressions and sloughs on flood plains.

This map unit makes up about 10 percent of Bertie County. It is about 47 percent Wehadkee soils, 41 percent Chewacla soils, and 12 percent soils of minor extent. The soils of minor extent include Bibb and Dorovan soils.

Wehadkee soils are poorly drained. The surface layer is gray loam. The subsoil is gray and dark gray loam. The underlying material is dark gray loam and clay loam.

Chewacla soils are somewhat poorly drained. The surface layer is brown loam. The upper part of the subsoil is yellowish brown loam, the middle part is grayish brown loam, and the lower part is gray clay loam.

The soils in this map unit are used mainly as woodland. Wetness is the main limitation affecting woodland. Flooding is a hazard.

The main limitations affecting cropland and urban and recreational development are wetness and low soil strength, which affects roads and streets. Flooding is a hazard.

10. Dorovan-Bibb-Johnston

Nearly level, very poorly drained and poorly drained soils that have a mucky surface layer and sandy underlying material or a loamy surface layer and loamy and sandy underlying material; on flood plains

These soils are mainly in the southeastern part of the county. They are on the flood plains along Albemarle Sound and the Roanoke, Cashie, and Chowan Rivers.

This map unit makes up about 12 percent of Bertie County. It is about 55 percent Dorovan soils, 32 percent Bibb and Johnston soils, and 13 percent soils of minor extent. The soils of minor extent include Wehadkee and Chewacla soils.

Dorovan soils are very poorly drained. The surface layer is black mucky peat and very dark gray muck. The underlying material is gray sand.

Bibb soils are poorly drained. The surface layer is dark grayish brown loam. The upper part of the underlying material is gray sandy loam, and the lower part is dark gray loam.

Johnston soils are very poorly drained. The surface layer is black loam. The underlying material is loamy sand. It is dark gray in the upper part and gray in the lower part.

Because of wetness, frequent flooding, and the position on the landscape, these soils are used mainly as habitat for woodland wildlife.

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, Norfolk sandy loam, 0 to 2 percent slopes, is a phase of the Norfolk series.

Some map units are made up of two or more major soils. These map units are called soil complexes 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. Wickham-Urban land complex, 2 to 10 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Bibb and Johnston loams, frequently flooded, is an undifferentiated group in this survey area.

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.

The map units are 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.

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.

AtA—Altavista fine sandy loam, 0 to 3 percent slopes. This soil is moderately well drained. It is on smooth ridges on stream terraces, mainly along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface layer is grayish brown fine sandy loam about 9 inches thick. The subsurface layer, to a depth of about 14 inches, is very pale brown fine sandy loam. The subsoil extends to a depth of 48 inches. The upper part is light yellowish brown and yellowish brown sandy clay loam. The middle part is mottled light gray, reddish yellow, yellow, and yellowish red sandy clay loam. The lower part is mottled light gray, reddish yellow, and yellow sandy loam. The underlying material to a depth of 60 inches is mottled very pale brown and yellow loamy sand.

Permeability is moderate. The available water capacity also is moderate. This soil ranges from very strongly acid to medium acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of about 1.5 to 2.5 feet from late in winter to early in spring.

Included with this soil in mapping are small areas of Augusta, Wickham, and Dogue soils. Augusta soils are in slight depressions. Wickham soils are well drained. They are in the slightly higher areas. Dogue soils are near the outer edge of the mapped areas. Also included are a few small areas of Altavista soils that are in the lower positions on the landscape and are subject to rare flooding of brief duration. The included soils make up about 10 percent of the map unit.

This Altavista soil is used mainly as cropland. Some areas are used as pasture or woodland.

The main crops are peanuts, tobacco, corn, soybeans, and small grains. Seasonal wetness is the main limitation affecting cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, help to control erosion and conserve moisture.

The dominant native trees are black tupelo, American elm, yellow poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory includes mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras.

Wetness is the main limitation affecting urban and recreational development.

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

Au—Augusta fine sandy loam. This soil is nearly level and somewhat poorly drained. It is in shallow depressions and on low, smooth ridges on stream terraces, mainly along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is yellowish brown fine sandy loam about 6 inches thick. The subsoil extends to a depth of 46 inches. The upper part is light yellowish brown sandy clay loam, the middle part is light brownish gray sandy clay loam, and the lower part is light gray clay loam. The underlying material to a depth of 68 inches is light gray sandy loam.

Permeability is moderate. The available water capacity also is moderate. Reaction ranges from very strongly acid to medium acid unless lime has been added to the soil. The seasonal high water table is 1 to 2 feet from the surface.

Included with this soil in mapping are small areas of Altavista, Tomotley, and Wahee soils. Altavista soils are on slightly elevated ridges. Tomotley soils are in slight depressions. Wahee soils are on the outer edge of the mapped areas. Also included are areas of Augusta soils that are in the lower positions on the landscape and are subject to rare flooding of brief duration. The included soils make up about 10 to 15 percent of the map unit.

This Augusta soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, help to control erosion and conserve moisture.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow poplar, willow oak, water oak, black cherry, and American beech. The understory mainly includes dogwood, sourwood, sweetbay, sassafras, and various briers and reeds. Wetness is the main limitation affecting woodland. It also is the main limitation affecting urban and recreational development.

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

BB—Bibb and Johnston loams, frequently flooded. These soils are poorly drained and very poorly drained. They are on flood plains. The mapped areas generally are long and narrow and range from 5 to 400 acres in size. Slopes range from 0 to 2 percent.

The Bibb soil makes up about 50 percent of this map unit. The Johnston soil makes up about 35 percent.

Included soils make up about 15 percent. The soils were not separated in mapping because use and management are similar.

The Bibb soil is poorly drained. Typically, the surface layer is dark grayish brown loam about 8 inches thick. The upper part of the underlying material, to a depth of 32 inches, is gray sandy loam. The lower part to a depth of about 60 inches is dark gray loam.

Permeability is moderate in the Bibb soil. The available water capacity is high. Reaction is very strongly acid or strongly acid. The seasonal high water table is 0.5 foot to 1.5 feet below the surface. This soil is subject to frequent flooding of brief duration.

The Johnston soil is very poorly drained. Typically, the surface layer is black loam about 28 inches thick. The underlying material to a depth of 60 inches is loamy sand. It is dark gray in the upper part and gray in the lower part.

Permeability is moderately rapid in the surface layer of the Johnston soil and rapid in the underlying material. The available water capacity is high. Reaction is very strongly acid or strongly acid. The seasonal high water table is near or above the surface. This soil is subject to frequent flooding of brief duration.

Included with these soils in mapping are small areas of Dorovan and Wehadkee soils. Dorovan soils are on the downstream side of the map unit. Wehadkee soils are between the edge of the mapped areas and the adjacent uplands.

The Bibb and Johnston soils are used mainly as woodland. The dominant native trees are pond pine, baldcypress, red maple, green ash, hickory, sweetgum, water tupelo, water oak, and willow oak. The understory includes greenbrier, sourwood, and switchcane. Wetness and flooding are the main limitations affecting woodland. They also are the main limitations affecting urban and recreational development.

The land capability classification of the Bibb soil is Vw, and that of Johnston soil is VIIw. Based on loblolly pine as the indicator species, the woodland ordination symbol assigned to the Bibb soil is 9W and that assigned to the Johnston soil is 12W.

BoB—Bonneau loamy sand, 0 to 6 percent slopes. This soil is well drained. It is on slightly rounded ridges and side slopes in the uplands, mainly in the Lewiston-Woodville and Kelford areas. The mapped areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is dark brown loamy sand about 12 inches thick. The subsurface layer, to a depth of 28 inches, is pale yellow loamy sand. The subsoil to a depth of 75 inches is sandy clay loam. The upper part is yellowish brown, the middle part is strong brown, and the lower part is yellowish brown.

Permeability is moderate. The available water capacity is low. Reaction is very strongly acid to medium acid in the surface layer and subsurface layer and very strongly acid or strongly acid in the subsoil. The seasonal high water table is at a depth of 3.5 to 5.0 feet. This soil can be easily tilled throughout a wide range of moisture content but is subject to soil blowing. It is droughty because of the thick, sandy surface layer.

Included with this soil in mapping are small areas of Norfolk and Goldsboro soils. Norfolk soils are in areas where the surface layer is being removed by erosion. Goldsboro soils are in slight depressions. The included soils make up about 10 percent of the map unit.

This Bonneau soil is used mainly as cropland. Some areas are used as woodland.

The main crops are peanuts, corn, tobacco, and soybeans. The main limitations affecting cropland are leaching of plant nutrients, soil blowing, and droughtiness. Soil blowing can damage young plants. Cover crops, conservation tillage, and crop residue management help to maintain the content of organic matter, conserve moisture, and help to control soil blowing and erosion of the surface layer. Conservation practices, such as conservation tillage, windbreaks, and a crop rotation that includes close-growing crops, also help to control erosion and conserve moisture. Fertilizer, particularly nitrogen, should be added in split applications.

Pasture grasses, such as Coastal bermudagrass and bahiagrass, are suited to this soil.

The dominant native trees are loblolly pine, longleaf pine, southern red oak, white oak, red maple, American beech, sweetgum, and hickory. The understory includes mainly dogwood, sourwood, American holly, and sassafras. Droughtiness and the sandy texture are moderate limitations affecting woodland.

Wetness is a limitation affecting urban uses, such as septic tank absorption fields and sanitary landfills. The sandy surface layer is a limitation affecting recreational development.

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

BoC—Bonneau loamy sand, 6 to 10 percent slopes. This soil is well drained. It is on side slopes in the uplands, mainly in the Lewiston-Woodville and Kelford areas. The mapped areas are long and narrow and range from 5 to 30 acres in size.

Typically, the surface layer is dark brown loamy sand about 12 inches thick. The subsurface layer, to a depth of 28 inches, is pale yellow loamy sand. The subsoil to a depth of 75 inches is sandy clay loam. The upper part is yellowish brown, the middle part is strong brown, and the lower part is yellowish brown.

Permeability is moderate. The available water capacity is low. Reaction is very strongly acid to medium acid in the surface layer and subsurface layer and strongly acid or very strongly acid in the subsoil. The seasonal high water table is at a depth of 3.5 to 5.0 feet.

Included with this soil in mapping are small areas of Winton, Bibb, and Johnston soils. Winton soils have slopes of more than 8 percent. Bibb and Johnston soils are in narrow drainageways. The included soils make up about 15 percent of the map unit.

This Bonneau soil is used mainly as woodland. In some areas it is used as cropland.

The main crops are tobacco, peanuts, soybeans, and corn. The short slopes and rapid runoff are limitations affecting cropland. Conservation practices should include contour farming and a close-growing ground cover in the rotation system, both of which help to control erosion.

The dominant native trees are loblolly pine, southern red oak, white oak, red maple, American beech, sweetgum, and hickory. The understory includes mainly dogwood, sourwood, American holly, and sassafras. Droughtiness and the sandy texture are moderate limitations affecting woodland.

The slope is the main limitation affecting urban and recreational development.

The land capability classification is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9S.

Ch—Chewacla loam, frequently flooded. This soil is nearly level and somewhat poorly drained. It is on the flood plains along the Roanoke and Cashie Rivers and their major tributaries. The mapped areas are irregular in shape and range from 10 to 1,000 acres in size.

Typically, the surface layer is brown loam about 4 inches thick. The subsoil extends to a depth of about 65 inches. It is yellowish brown loam in the upper part, grayish brown loam in the middle part, and gray clay loam in the lower part.

Permeability is moderate. The available water capacity is high. Reaction ranges from strongly acid to slightly acid unless lime has been added to the soil. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet. This soil is frequently flooded for brief periods. The frequency and duration of flooding on the flood plain along the Roanoke River are influenced by the dam at Kerr Lake Reservoir.

Included with this soil in mapping are small areas of Wehadkee soils in depressions and sloughs. Also included are soils that are better drained than Chewacla soil and are in the slightly higher areas adjacent to riverbanks. The included soils make up about 10 percent of the map unit.

This Chewacla soil is used mainly as woodland. It generally is not used as cropland because of the frequent flooding.

The dominant native trees are yellow poplar, American sycamore, sweetgum, water oak, green ash, southern red oak, hickory, and loblolly pine. The understory includes greenbrier, sourwood, switchcane, river birch, pawpaw, and hornbean. Wetness and flooding are the main limitations affecting woodland. They also are the main limitations affecting urban and recreational development.

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

CnB—Conetoe loamy sand, 0 to 5 percent slopes. This soil is well drained. It is on stream terraces, mainly along the Cashie and Roanoke Rivers. The mapped areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is brown loamy sand about 6 inches thick. The subsurface layer, to a depth of about 23 inches, is yellowish brown loamy sand. The subsoil extends to a depth of 56 inches. The upper part is strong brown sandy loam. The lower part is reddish yellow loamy sand. The underlying material to a depth of 80 inches is sand. The upper part is brownish yellow, and the lower part is yellow.

Permeability is moderately rapid. The available water capacity is low. Reaction is very strongly acid to medium acid unless lime has been added to the surface layer.

Included with this soil in mapping are scattered small areas of Tarboro and Wickham soils. These soils are in landscape positions similar to those of the Conetoe soil. They make up about 10 to 15 percent of the map unit.

This Conetoe soil is used mainly as cropland. Some areas are used as woodland.

The main crops are peanuts, tobacco, corn, and soybeans. The main limitations affecting cropland are leaching of plant nutrients and droughtiness. Soil blowing is a hazard. Windblown sand can damage young plants. Planting alternating rows of small grains

can prevent damage to young tender plants, such as watermelons. Winter cover crops, conservation tillage, and crop residue management help to maintain the content of organic matter and conserve moisture. Conservation practices, such as no-till planting, windbreaks, and a crop rotation that includes close-growing crops, help to control erosion and conserve moisture. Fertilizer, particularly nitrogen, should be added in split applications.

Pasture grasses, such as Coastal bermudagrass and bahiagrass, are suited to this soil.

The dominant native trees are loblolly pine, longleaf pine, red maple, hickory, sweetgum, black tupelo, southern red oak, white oak, and post oak. The understory includes mainly dogwood, sassafras, American holly, and sourwood. The low available water capacity is the main limitation affecting woodland.

This soil has no major limitation affecting most kinds of urban and recreational development. The thick layers of sandy material provide a good support base for most structures. If rainfall is inadequate and the sandy surface layer is unprotected, however, the soil is droughty and is subject to soil blowing.

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

CrA—Craven fine sandy loam, 0 to 1 percent slopes. This soil is moderately well drained. It is on smooth ridges and flats in the uplands. The mapped areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer, to a depth of about 11 inches, is light yellowish brown fine sandy loam. The upper part of the subsoil is light olive brown clay loam or clay. The middle part is mottled yellowish brown, light brownish gray, and red clay. The lower part to a depth of 67 inches is light gray clay.

Permeability is slow or very slow. The available water capacity is moderate. The shrink-swell potential also is moderate. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of 2 to 3 feet.

Included with this soil in mapping are small areas of Lenoir, Goldsboro, and Exum soils. Lenoir soils are in slight depressions and drainageways. Goldsboro and Exum soils are near the outer edge of the mapped areas. The included soils make up about 10 percent of the map unit.

This Craven soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn, soybeans, tobacco, and peanuts. Seasonal wetness is a limitation affecting the use of this soil for tobacco and peanuts. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, help to control erosion and conserve moisture. The slow or very slow permeability of the subsoil limits the effectiveness of a drainage system.

The dominant native trees are American elm, yellow poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, southern red oak, and loblolly pine. The understory includes mainly dogwood, sourwood, American holly, and sassafras. The clayey subsoil of this soil is the main limitation affecting woodland.

Wetness, the restricted permeability, and low soil strength, which affects roads and steets, are the main limitations if this soil is used for urban development. Wetness is the main limitation affecting recreational development.

The land capability classification is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9C.

CrB—Craven fine sandy loam, 1 to 4 percent slopes. This soil is moderately well drained. It is on slightly rounded ridges near the side slopes of the main drainageways. The mapped areas are oblong or irregular in shape and commonly range from 10 to 50 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer, to a depth of about 11 inches, is light yellowish brown fine sandy loam. The upper part of the subsoil is light olive brown clay loam or clay. The middle part is mottled yellowish brown, light brownish gray, and red clay. The lower part to a depth of 67 inches is light gray clay.

Permeability is slow or very slow. The available water capacity is moderate. The shrink-swell potential also is moderate. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of 2 to 3 feet.

Included with this soil in mapping are small areas of Lenoir, Exum, and Goldsboro soils. Lenoir soils are in slight depressions. Exum and Goldsboro soils are near

the outer edge of the mapped areas. The included soils make up about 10 percent of the map unit.

This Craven soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn, tobacco, peanuts, and soybeans. Seasonal wetness is a limitation affecting the use of this soil for tobacco and peanuts. Because of a moderate erosion hazard on the gentle slopes, additional conservation practices are needed in areas used for cultivated crops. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and crop rotations that include close-growing crops, conserve moisture and help to control erosion. The slow or very slow permeability of the subsoil limits the effectiveness of a drainage system.

The dominant native trees are American elm, yellow poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, southern red oak, and loblolly pine. The understory includes mainly dogwood, sourwood, American holly, and sassafras. Wetness is the main limitation affecting woodland.

The main limitations affecting the use of this soil for urban development are wetness, the restricted permeability, and low soil strength, which affects roads and streets. The clayey subsoil is the main limitation affecting recreational development.

The land capability classification is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9C.

CrC—Craven fine sandy loam, 4 to 8 percent slopes. This soil is moderately well drained. It is on side slopes. The mapped areas are long and narrow and range from 5 to 30 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsurface layer, to a depth of about 11 inches, is light yellowish brown fine sandy loam. The upper part of the subsoil is light olive brown clay loam or clay. The middle part is mottled yellowish brown, light brownish gray, and red clay. The lower part to a depth of 67 inches is light gray clay.

Permeability is slow or very slow. The available water capacity is moderate. The shrink-swell potential also is moderate. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of 2 to 3 feet.

Included with this soil in mapping are small areas of Winton, Bibb, and Johnston soils. Winton soils have slopes of more than 8 percent. Bibb and Johnston soils are in narrow drainageways. The included soils make up about 15 percent of the map unit.

This Craven soil is used mainly as woodland. Some areas are used as cropland.

The main crops are corn, soybeans, tobacco, and peanuts. The short slopes and rapid runoff are limitations affecting cropland. Conservation practices should include contour farming and a crop rotation system that includes close-growing cover crops, both of which help to control erosion.

The dominant native trees are loblolly pine, southern red oak, white oak, red maple, American beech, sweetgum, and hickory. The understory includes mainly dogwood, sourwood, American holly, and sassafras.

The main limitations affecting the use of this soil for urban development are wetness, the restricted permeability, and low soil strength, which affects roads and streets. The clayey subsoil and the slope are the main limitations affecting recreational development.

The land capability classification is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9C.

DgA—Dogue sandy loam, 0 to 2 percent slopes. This soil is moderately well drained. It is on smooth ridges and flats on stream terraces, mainly along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil extends to a depth of 50 inches. The upper part is brownish yellow clay loam and yellowish brown clay. The middle part is mottled pale yellow, light gray, and reddish yellow clay. The lower part is light gray clay and sandy clay loam. The underlying material to a depth of 82 inches is light gray sandy loam and loamy sand.

Permeability is moderately slow. The available water capacity is moderate. The shrink-swell potential also is moderate. This soil is extremely acid to strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of 1.5 to 3.0 feet.

Included with this soil in mapping are small areas of Wickham, Altavista, and Wahee soils. Wickham and Altavista soils are mainly near the outer edge of the mapped areas. Wahee soils are in slight depressions and drainageways. Also included are a few small areas of Dogue soils that are in low positions on the

landscape and that are subject to rare flooding. The included soils make up about 10 percent of the map unit.

This Dogue soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn, tobacco, cotton, peanuts, and soybeans. Wetness is the main limitation affecting cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion. The moderately slow permeability of the subsoil limits the effectiveness of a drainage system.

The dominant native trees are American elm, yellow poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory includes mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras.

The moderately slow permeability of this soil is the main limitation affecting urban development. Wetness is the main limitation affecting recreational development.

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

DgB—Dogue sandy loam, 2 to 6 percent slopes. This soil is moderately well drained. It is on slightly rounded ridges near the side slopes of the main drainageways on stream terraces. Large areas of this soil are along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are oblong or irregular in shape and commonly range from 10 to 50 acres in size.

Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil extends to a depth of 50 inches. The upper part is brownish yellow clay loam and yellowish brown clay. The middle part is mottled pale yellow, light gray, and reddish yellow clay. The lower part is light gray clay and sandy clay loam. The underlying material to a depth of 82 inches is light gray sandy loam and loamy sand.

Permeability is moderately slow. The available water capacity is moderate. The shrink-swell potential also is moderate. Reaction is extremely acid to strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of 1.5 to 3.0 feet.

Included with this soil in mapping are small areas of Wickham, Altavista, and Wahee soils. The included soils are mainly on the outer edge of the mapped areas. They make up about 15 percent of the map unit.

This Dogue soil is used mainly as cropland. Some areas are used as woodland.

The main crops are peanuts, tobacco, cotton, corn, and soybeans. Wetness is the main limitation affecting cropland. Because of a moderate erosion hazard on the gentle slopes, additional conservation measures are needed in areas used for row crops. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion. The moderately slow permeability of the subsoil limits the effectiveness of a drainage system.

The dominant native trees are American elm, yellow poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak, southern red oak, water oak, and loblolly pine. The understory includes mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras.

The main limitations affecting urban development are wetness, the moderately slow permeability, and low soil strength, which affects roads and streets. Wetness is the main limitation affecting recreational development.

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

DgC—Dogue sandy loam, 6 to 12 percent slopes. This soil is moderately well drained. It is on the side slopes of stream terraces, mainly along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are long and narrow and range from 5 to 30 acres in size.

Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil extends to a depth of 50 inches. The upper part is brownish yellow clay loam and yellowish brown clay. The middle part is mottled pale yellow, light gray, and reddish yellow clay. The lower part is light gray clay and sandy clay loam. The underlying material to a depth of 82 inches is light gray sandy loam and loamy sand.

Permeability is moderately slow. The available water capacity is moderate. The shrink-swell potential also is moderate. Reaction is extremely acid to strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of 1.5 to 3.0 feet.

Included with this soil in mapping are small areas of Winton, Bibb, and Johnston soils. Winton soils have slopes of more than 12 percent. Bibb and Johnston

soils are in narrow drainageways. Also included are a few small areas of Dogue soils that are in the lower positions on the landscape and are subject to rare flooding. The included soils make up about 15 percent of the map unit.

This soil is used mainly as woodland. In some areas it is used as cropland.

The main crops are corn and soybeans. The short slopes and rapid runoff are limitations affecting cropland. Conservation practices should include contour farming and a crop rotation system that includes close-growing crops, both of which help to control erosion.

The dominant native trees are loblolly pine, yellow poplar, southern red oak, white oak, willow oak, red maple, American beech, sweetgum, and hickory. The understory includes mainly dogwood, sourwood, American holly, and sassafras.

The main limitations affecting the use of this soil for urban development are wetness, the moderately slow permeability, and low soil strength, which affects roads and streets.

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

Dk—Dorovan mucky peat, frequently flooded. This soil is nearly level and very poorly drained. It is on the flood plains along the Albemarle Sound, the Roanoke, Chowan, and Cashie Rivers, and the major streams and their tributaries. The mapped areas are oblong and range from 50 to 1,000 acres in size.

Typically, the surface layer is black mucky peat about 5 inches thick. Below that layer, to a depth of 85 inches, is very dark gray and black muck. The underlying material to a depth of 95 inches is gray sand.

This soil is highly decomposed organic material. Permeability is moderate. Reaction is extremely acid or very strongly acid. The seasonal high water table is at or near the surface. The soil is frequently flooded for long periods.

Included with this soil in mapping are small areas of Bibb and Johnston soils. These soils are on the upstream edge of the mapped areas. Also included are areas of soils that have muck less than 51 inches thick. The included soils make up about 15 to 20 percent of the map unit.

This Dorovan soil is used mainly as woodland. It is not used as cropland. The landscape position and the wetness are the main limitations affecting cropland. The frequent flooding is a hazard.

The dominant native trees are green ash, pond pine, baldcypress, swamp tupelo, water tupelo, sweetbay, and red maple. The understory includes mainly redbay, greenbrier, and waxmyrtle. Wetness and poor trafficability are the main limitations affecting woodland.

The main limitations affecting urban and recreational development are the frequent flooding and low soil strength, which affects roads and streets.

The land capability classification is VIIw. Based on blackgum as the indicator species, the woodland ordination symbol is 7W.

ExA—Exum very fine sandy loam, 0 to 2 percent slopes. This soil is moderately well drained. It is on smooth ridges and flats in the uplands, mainly in the Askewville and Todds Crossroads areas. The mapped areas are irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is brown very fine sandy loam about 7 inches thick. The upper part of the subsoil is light olive brown loam and clay loam. The lower part to a depth of 65 inches is light yellowish brown clay loam.

Permeability is moderately slow. The available water capacity is high. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of about 2 to 3 feet from late in winter to early in spring.

Included with this soil in mapping are small areas of Craven and Nahunta soils. Craven soils are near side slopes. Nahunta soils are in small depressions. The included soils make up about 10 percent of the map unit.

This Exum soil is used mainly as cropland. Some areas are used as woodland.

The main crops are tobacco, peanuts (fig. 3), corn, and soybeans. Seasonal wetness is a limitation affecting the use of this soil for some specialty crops, such as peanuts and tobacco. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are American elm, yellow poplar, sweetgum, hickory, red maple, willow oak, white oak, southern red oak, water oak, and loblolly pine. The understory includes mainly dogwood, sourwood, American holly, and sassafras.

The main limitation affecting urban and recreational development is wetness.

The land capability classification is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

Figure 3.—A hardy peanut crop on Exum very fine sandy loam, 0 to 2 percent slopes.

ExB—Exum very fine sandy loam, 2 to 5 percent slopes. This soil is moderately well drained. It is on slightly rounded ridges in the uplands, mainly in the Askewville and Todds Crossroads areas. The mapped areas are irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is brown very fine sandy loam about 7 inches thick. The upper part of the subsoil is light olive brown loam and clay loam. The lower part to a depth of 65 inches is light yellowish brown clay loam.

Permeability is moderately slow. The available water capacity is high. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of about 2 to 3 feet from late in winter to early in spring.

Included with this soil in mapping are small areas of Craven and Nahunta soils. These soils are mainly near the outer edge of the mapped areas. They make up about 10 to 15 percent of the map unit.

This Exum soil is used mainly as cropland. Some areas are used as woodland.

The main crops are tobacco, peanuts, corn, and soybeans. Seasonal wetness is a limitation affecting the use of this soil for some specialty crops, such as peanuts and tobacco. Runoff also is a limitation affecting cropland. Erosion is a hazard. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are black tupelo, American elm, yellow poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, post oak,

southern red oak, water oak, and loblolly pine. The understory includes mainly dogwood, sweetbay, sourwood, American holly, waxmyrtle, and sassafras.

The main limitation affecting urban and recreational development is wetness.

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

GoA—Goldsboro sandy loam, 0 to 3 percent slopes. This soil is moderately well drained. It is on smooth ridges and flats in the uplands. The mapped areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 7 inches thick. The subsurface layer, to a depth of about 11 inches, is pale yellow sandy loam. The subsoil to a depth of 72 inches is sandy clay loam. The upper part is light yellowish brown, and the lower part is light gray. The underlying material to a depth of 80 inches is light gray loamy sand.

Permeability is moderate. The available water capacity also is moderate. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer. The seasonal high water table is at a depth of about 2 or 3 feet from late in winter to early in spring.

Included with this soil in mapping are small areas of Craven, Exum, and Lynchburg soils. Craven and Exum soils are near the outer edge of the mapped areas. Lynchburg soils are in small depressions. The included soils make up about 10 percent of the map unit.

This Goldsboro soil is used mainly as cropland. Some areas are used as woodland.

The main crops are tobacco (fig. 4), peanuts, corn, and soybeans. Seasonal wetness is a limitation affecting some specialty crops, such as peanuts and tobacco. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are American elm, yellow poplar, sweetgum, hickory, red maple, willow oak, white oak, southern red oak, and loblolly pine. The understory includes mainly dogwood, sourwood, American holly, and sassafras.

The main limitation affecting urban and recreational development is wetness.

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

Gt—Grantham silt loam. This soil is nearly level and poorly drained. It is on broad flats and in depressions, mainly in the north-central part of the county. The mapped areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is very dark gray silt loam about 4 inches thick. The subsurface layer, to a depth of about 7 inches, is light gray silt loam. The upper part of the subsoil is light gray loam. The lower part to a depth of 60 inches is gray clay loam.

Permeability is moderately slow. The available water capacity is high. Reaction is very strongly acid or strongly acid unless lime has been added to the soil. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Leaf, Rains, Nahunta, and Lenoir soils. Leaf and Rains soils are in landscape positions similar to those of the Grantham soil. Nahunta soils are on small knolls. Lenoir soils are near the outer edge of the mapped areas. The included soils make up about 10 percent of the map unit.

This Grantham soil is used mainly as woodland. Some areas are used as cropland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow poplar, southern red oak, willow oak, white oak, pond pine, and American sycamore. The understory includes dogwood, sourwood, sassafras, and various briers and reeds. Wetness is the main limitation affecting woodland. It also is the main limitation affecting urban and recreational development.

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

Lf—Leaf loam. This soil is nearly level and poorly drained. It is on broad flats and in depressions, mainly in the Greens Cross and Bucklesberry area. The mapped areas are irregular in shape and range from 10 to 3,000 acres in size.

Figure 4.—Tobacco in an area of Goldsboro sandy loam, 0 to 3 percent slopes.

Typically, the surface layer is dark grayish brown loam about 5 inches thick. The subsoil to a depth of 72 inches is clay. The upper part is dark grayish brown, the middle part is gray, and the lower part is light gray.

Permeability is very slow. The available water capacity is moderate. The shrink-swell potential is high. Reaction ranges from extremely acid to strongly acid. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Lenoir, Grantham, and Rains soils. Lenoir soils are on slightly elevated ridges. Grantham and Rains soils are in landscape positions similar to those of the Leaf soil. The included soils make up about 10 percent of the map unit.

This Leaf soil is used mainly as woodland. Some areas are used as cropland.

The main crops are corn, soybeans, and small grains. Wetness is the main limitation affecting cropland. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to maintain tilth and increase productivity. Spring tillage and fall harvesting should be delayed because of seasonal wetness. The very slow permeability limits the effectiveness of a drainage system.

The dominant native trees are loblolly pine, red maple, hickory, sweetgum, American elm, water oak, and willow oak. The understory includes mainly cedar, American holly, sweetbay, sourwood, and reeds. Wetness and seedling mortality are the main limitations affecting woodland.

The main limitations affecting most kinds of urban and recreational development are wetness and very slow permeability.

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

Ln—Lenoir fine sandy loam. This soil is nearly level and somewhat poorly drained. It is on low ridges in the uplands. The mapped areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The upper part of the subsoil is yellowish brown clay loam. The middle part is grayish brown and gray clay. The lower part to a depth of 72 inches is light gray clay.

Permeability is slow. The available water capacity is moderate. The shrink-swell potential also is moderate. Reaction is strongly acid or very strongly acid unless lime has been added to the surface layer. The seasonal high water table is 1 to 2 feet from the surface.

Included with this soil in mapping are small areas of Craven and Leaf soils. Craven soils are on the slightly higher ridges. Leaf soils are in slight depressions. The included soils make up about 10 percent of the map unit.

This Lenoir soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to maintain tilth and increase productivity. Spring tillage and fall harvesting should be delayed because of seasonal wetness. The slow permeability limits the effectiveness of a drainage system.

The dominant native trees are pond pine, loblolly pine, red maple, green ash, hickory, sweetgum, black tupelo, American elm, river birch, American sycamore, water oak, and willow oak. The understory includes mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. Wetness is the main limitation affecting woodland.

The main limitations affecting most kinds of urban and recreational development are wetness, slow permeability, and low soil strength, which affects roads and streets.

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

Ly—Lynchburg sandy loam. This soil is nearly level and somewhat poorly drained. It is on low, smooth ridges and in shallow depressions. The mapped areas are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface layer is dark grayish brown sandy loam about 8 inches thick. The subsurface layer, to a depth of about 10 inches, is light yellowish brown sandy loam. The subsoil to a depth of 65 inches is sandy clay loam. The upper part is light yellowish brown, the middle part is light brownish gray, and the lower part is light gray.

Permeability is moderate. The available water capacity also is moderate. Reaction is extremely acid to strongly acid unless lime has been added to the soil. The seasonal high water table is 0.5 foot to 1.5 feet below the surface.

Included with this soil in mapping are small areas of Goldsboro, Rains, and Lenoir soils. Goldsboro soils are on small knolls. Rains soils are in small depressions. Lenoir soils are near the outer edge of the mapped areas. The included soils make up about 10 percent of the map unit.

This Lynchburg soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow poplar, southern red oak, white oak, and American sycamore. The major understory species include dogwood, sourwood, sassafras, and various briers and reeds. Wetness is the main limitation affecting woodland. It also is the main limitation affecting urban and recreational development.

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

Na—Nahunta very fine sandy loam. This soil is nearly level and somewhat poorly drained. It is on low, smooth ridges and in shallow depressions, mainly in the north-central part of the county. The mapped areas are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface layer is very dark gray very fine sandy loam about 6 inches thick. The upper part of the subsoil is olive yellow and brownish yellow loam. The middle part is light gray clay loam. The lower part to a depth of 64 inches is mottled light gray, yellow, red, and reddish yellow clay loam.

Permeability is moderate. The available water capacity is high. Reaction is extremely acid to strongly acid unless lime has been added to the soil. The seasonal high water table is 1 to 2 feet from the surface.

Included with this soil in mapping are small areas of Exum, Grantham, and Lenoir soils. Exum soils are on small knolls. Grantham soils are in small depressions. Lenoir soils are near the outer edge of the mapped areas. The included soils make up about 10 percent of the map unit.

This Nahunta soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and crop rotations that include close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow poplar, southern red oak, white oak, and American sycamore. The understory includes dogwood, sourwood, sassafras, and various briers and reeds. Wetness is the main limitation affecting woodland. It also is the main limitation affecting urban and recreational development.

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

NoA—Norfolk sandy loam, 0 to 2 percent slopes. This soil is well drained. It is in broad, smooth areas in the uplands. The mapped areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is grayish brown sandy loam about 9 inches thick. The subsurface layer, to a depth of 15 inches, is light yellowish brown sandy loam. The subsoil to a depth of 70 inches is sandy clay loam. It is yellowish brown in the upper part, brownish yellow and strong brown in the middle part, and yellowish brown and brownish yellow in the lower part.

Permeability is moderate. The available water capacity also is moderate. Reaction is very strongly acid or strongly acid unless lime has been added to the soil.

Included with this soil in mapping are small areas of Goldsboro and Bonneau soils. Goldsboro soils are in slight depressions. Bonneau soils are on the outer edge of the mapped areas. The included soils make up about 10 percent of the map unit.

This Norfolk soil is used mainly as cropland. Some areas are used as woodland.

The main crops are tobacco, cotton, peanuts, corn, and soybeans. No major limitations affect cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and the content of organic matter. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, holly, dogwood, hickory, southern red oak, yellow poplar, and white oak.

No major limitations affect urban and recreational development.

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

NoB—Norfolk sandy loam, 2 to 6 percent slopes. This soil is well drained. It is on slightly rounded, low ridges and side slopes in the uplands. The mapped areas are elongated or irregular in shape and range from 5 to more than 60 acres in size.

Typically, the surface layer is grayish brown sandy loam about 9 inches thick. The subsurface layer, to a depth of 15 inches, is light yellowish brown sandy loam. The subsoil to a depth of 70 inches is sandy clay loam. It is yellowish brown in the upper part, brownish yellow and strong brown in the middle part, and yellowish brown and brownish yellow in the lower part.

Permeability is moderate. The available water capacity also is moderate. Reaction is very strongly acid or strongly acid unless lime has been added to the soil.

Included with this soil in mapping are small areas of Goldsboro and Bonneau soils. Goldsboro soils are in slight depressions. The sandy Bonneau soils are on the slightly higher knolls. The included soils make up about 10 percent of the map unit.

This Norfolk soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn, tobacco, cotton, peanuts, and soybeans. Because of a moderate erosion hazard on the gentle slopes, additional conservation measures are needed in areas used for row crops. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and crop rotations that include close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are American elm, yellow poplar, sweetgum, hickory, red maple, American beech, willow oak, white oak, southern red oak, and loblolly pine. The understory includes mainly dogwood, sourwood, American holly, and sassafras.

No major limitations affect urban and recreational development.

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

Pa—Pantego loam. This soil is nearly level and very poorly drained. It is on broad flats and in shallow depressions in the uplands. The mapped areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is black loam about 12 inches thick. The upper part of the subsoil is dark gray loam. The middle part is light brownish gray sandy loam. The lower part to a depth of 72 inches is dark gray sandy clay loam.

Permeability is moderate. The available water capacity also is moderate. Reaction ranges from extremely acid to strongly acid unless lime has been added to the soil. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Rains and Leaf soils. Rains soils are on slightly elevated ridges. Leaf soils are near the outer edge of the mapped areas. The included soils make up about 10 to 15 percent of the map unit.

This Pantego soil is used mainly as woodland. Some areas are used as cropland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and crop rotations that include close-growing crops, conserve moisture and help to control erosion.

This soil is well suited to pasture species.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow poplar, willow oak, water oak, black cherry, water tupelo, and American beech. The understory includes dogwood, sourwood, sweetbay, sassafras, and various briers and reeds. Wetness is the main limitation affecting woodland. It also is the main limitation affecting urban and recreational development.

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

Ra—Rains sandy loam. This soil is nearly level and poorly drained. It is in shallow depressions and on low, smooth ridges in the uplands. The mapped areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is very dark gray sandy loam about 6 inches thick. The upper part of the subsoil is light gray sandy loam. The middle part is gray sandy clay loam. The lower part to a depth of 72 inches is mottled light gray, gray, and reddish yellow clay loam.

Permeability is moderate. The available water capacity also is moderate. Reaction is very strongly acid or strongly acid unless lime has been added to the soil. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Lynchburg, Pantego, and Leaf soils. Lynchburg soils are on slightly elevated ridges. Pantego soils are in slight depressions. Leaf soils are near the outer edge of the mapped areas. The included soils make up about 10 to 15 percent of the map unit.

This Rains soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn, small grains (fig. 5), and soybeans. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow poplar, willow oak, water oak, black cherry, and American beech. The understory includes dogwood, sourwood, sweetbay, sassafras, and various briers and reeds. Wetness is the main limitation affecting woodland. It also is the main limitation affecting urban and recreational development.

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

Ro—Roanoke fine sandy loam, frequently flooded. This soil is nearly level and poorly drained. It is on broad flats and in slight depressions and drainageways on stream terraces. The mapped areas are 10 to more than 500 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsoil extends to a depth of 45 inches. The upper part is light brownish gray loam. The middle part is gray and light gray clay. The lower part is gray clay loam. The underlying material to a depth of 60 inches is gray sandy loam.

Permeability is slow. The available water capacity is moderate. The shrink-swell potential also is moderate. Reaction is strongly acid or very strongly acid unless

Figure 5.—Small grain on Rains sandy loam. If properly managed, this soil can produce good yields of small grains.

lime has been added to the soil. The seasonal high water table is within 1 foot of the surface. This soil is frequently flooded for brief periods.

Included with this soil in mapping are small areas of Chewacla, Tomotley, and Wahee soils. Chewacla and Tomotley soils are near the outer edge of the mapped areas. Wahee soils are on slightly elevated knolls. The included soils make up about 10 percent of the map unit.

This Roanoke soil is used mainly as woodland. Some areas are used as pasture.

Generally, this soil is not used as cropland. Wetness is the main limitation affecting cropland. Flooding is a hazard. Conservation tillage, cover crops, and grasses and legumes in the cropping system help to maintain tilth and increase productivity. Spring tillage can be delayed because of wetness. Because suitable drainage outlets are not available and soil is slowly permeable, the effectiveness of a drainage system is limited.

The dominant native trees are red maple, sweetgum, pond pine, water tupelo, green ash, and water oak. The understory includes mainly cedar, sourwood, reeds, and waxmyrtle. Wetness is the main limitation affecting woodland. Flooding is a hazard.

The main limitations affecting urban and recreational development are wetness, slow permeability, and flooding.

The land capability classification is Vw. Based on sweetgum as the indicator species, the woodland ordination symbol is 7W.

Se—Seabrook loamy sand. This soil is nearly level and moderately well drained. It is on low ridges and flats on stream terraces, mainly along the Roanoke and Cashie Rivers and their tributaries. The mapped areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is brown loamy sand

about 10 inches thick. The upper part of the underlying material is pale brown and yellowish brown loamy sand. The middle part is light gray loamy sand. The lower part to a depth of 65 inches is light gray sand.

Permeability is rapid. The available water capacity is low. Reaction ranges from very strongly acid to slightly acid unless lime has been added to the soil. The seasonal high water table is at a depth of 2 to 4 feet.

Included with this soil in mapping are small areas of Tarboro and Altavista soils. These soils are mainly near the outer edge of the mapped areas. They make up about 10 percent of the map unit.

This Seabrook soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Flooding and soil blowing are hazards. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow poplar, willow oak, water oak, black cherry, and American beech. The understory includes dogwood, sourwood, sweetbay, sassafras, and various briers and reeds.

The main limitation affecting urban and recreational development is wetness.

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

TaB—Tarboro loamy sand, 0 to 5 percent slopes. This soil is somewhat excessively drained. It is on broad ridges on stream terraces, mainly along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface layer is brown loamy sand about 10 inches thick. The underlying material to a depth of 82 inches is loamy sand. It is yellowish brown in the upper part, brownish yellow in the middle part, and strong brown in the lower part.

Permeability is rapid. The available water capacity is very low. Reaction ranges from strongly acid to slightly acid unless lime has been added to the soil.

Included with this soil in mapping are Seabrook and Conetoe soils. Seabrook soils are in small depressions. Conetoe soils are mainly near the outer edge of the mapped areas. The included soils make up about 10 to 15 percent of the map unit.

This Tarboro soil is used mainly as cropland. Some areas are used as woodland.

The main crops are peanuts, corn, and soybeans. This soil does not have sufficient moisture during the growing season for most crops. Leaching of plant nutrients and the very low available water capacity are the main limitations affecting cropland. Soil blowing is a hazard. Windblown sand can damage young plants. Conservation tillage, crop residue management, windbreaks, and a cropping system that includes close-growing grasses and legumes conserve moisture and help to control soil blowing and erosion of the surface layer. Fertilizer, particularly nitrogen, should be added in split applications.

The dominant native trees are loblolly pine, longleaf pine, sweetgum, southern red oak, blackjack oak, white oak, post oak, and red maple. The understory includes mainly dogwood, sassafras, and American holly. The available water capacity is the main limitation affecting woodland.

Seepage is the main limitation affecting urban uses, such as sanitary facilities. No major limitations affect most other urban uses or recreational development.

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

Tm—Tomotley sandy loam. This soil is nearly level and poorly drained. It is on flats and in slight depressions. The mapped areas are irregular in shape and range from 10 to 50 acres in size.

Typically, the surface layer is dark gray sandy loam about 8 inches thick. The subsoil extends to a depth of 50 inches. It is sandy clay loam. It is gray in the upper part, light gray in the middle part, and light brownish gray in the lower part. The underlying material to a depth of 72 inches is sand. It is light olive gray in the upper part and light gray in the lower part.

Permeability is moderate or moderately slow. The available water capacity is moderate. Reaction ranges from extremely acid to strongly acid in the surface layer and subsoil unless lime has been added to the soil. Below a depth of about 50 inches, the soil ranges from extremely acid to medium acid. The seasonal high water table is at or near the surface.

Included with this soil in mapping are small areas of Augusta and Roanoke soils. Augusta soils are on slightly elevated ridges. Roanoke soils are in landscape positions similar to those of the Tomotley soil. Also included are a few small areas of Tomotley soils that are in the lower positions on the landscape and are

subject to rare flooding. The included soils make up about 15 percent of the map unit.

This Tomotley soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Winter cover crops, conservation tillage, and crop residue management help to maintain tilth and increase productivity. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, sweetgum, red maple, yellow poplar, willow oak, water oak, black cherry, and American beech. The understory includes dogwood, sourwood, sweetbay, sassafras, and various briers and reeds. Wetness is the main limitation affecting woodland. It also is the main limitation affecting urban and recreational development.

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

Ud—Udorthents, loamy. This map unit consists of borrow pits from which the surface layer and most of the subsoil have been removed, areas of fill or dredged material, and landfills. Most or all of the natural soil has been disturbed or covered.

The borrow pits are excavated areas from which the soil material has been removed for use as fill material on construction sites. The cuts are 3 to 15 feet deep. The base slope in these cuts is level to gently sloping. Most cuts have two or more short, nearly vertical side slopes. The exposed surface layer consists mainly of loamy marine deposits. The borrow pits range from 2 to about 5 acres in size. Some have been relined and seeded to grass. A few areas have naturally reseeded to wild grasses, weeds, and pine trees. The areas are poorly suited to plant growth because of poor soil properties, low fertility, and a low available water capacity.

The areas of fill material are generally near the built-up areas. Loamy material is generally used to elevate these areas and to improve the site for more intensive uses, such as building sites. Slopes generally are gently sloping.

Landfills are areas that are used for disposal of solid waste. The refuse is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil. When the trench is full, a final cover of fill material is placed over the landfill.

The characteristics of the soil material in the mapped areas vary. As a result, interpretative statements cannot be made without onsite examination of the individual areas.

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

Wa—Wahee sandy loam. This soil is nearly level and somewhat poorly drained. It is on low, smooth ridges and in slight depressions and drainageways on stream terraces. The mapped areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is brown sandy loam about 5 inches thick. The subsoil extends to a depth of 60 inches. The upper part is light olive brown clay loam and light yellowish brown clay. The middle part is light gray clay. The lower part is light gray sandy clay loam and sandy loam. The underlying material to a depth of 72 inches is light gray sand.

Permeability is slow. The available water capacity is moderate. The shrink-swell potential also is moderate. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer. The seasonal high water table is 0.5 foot to 1.5 feet below the surface.

Included with this soil in mapping are small areas of Altavista, Dogue, Augusta, and Roanoke soils. Altavista and Dogue soils are on the slightly higher ridges. Augusta soils are near the outer edge of the mapped areas. Roanoke soils are in depressions. Also included are a few areas of Wahee soils that are in the lower positions on the landscape and are subject to rare flooding. The included soils make up about 10 percent of the map unit.

This Wahee soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn and soybeans. Wetness is the main limitation affecting cropland. Conservation tillage, cover crops, and grasses and legumes in the conservation cropping system help to maintain tilth and increase productivity. Spring tillage and fall harvesting can be delayed because of wetness. The slow permeability limits the effectiveness of a drainage system.

This soil is well suited to pasture species, such as fescue and ladino clover.

The dominant native trees are pond pine, loblolly pine, red maple, green ash, hickory, sweetgum, black tupelo, American elm, river birch, American sycamore, water oak, and willow oak. The understory includes

mainly cedar, American holly, sweetbay, sourwood, waxmyrtle, and reeds. Wetness is the main limitation affecting woodland.

The main limitations affecting urban and recreational development are wetness, slow permeability, and low soil strength, which affects roads and streets.

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

WE—Wehadkee loam, frequently flooded. This soil is nearly level and poorly drained. It is on the flood plains along the Roanoke and Cashie Rivers and their major tributaries. The mapped areas are irregular in shape and range from 10 to 800 acres in size.

Typically, the surface layer is gray loam about 10 inches thick. The subsoil extends to a depth of 45 inches. It is loam. The upper part is gray, and the lower part is dark gray. The upper part of the underlying material is dark gray loam. The lower part to a depth of 65 inches is dark gray clay loam.

Permeability is moderate. The available water capacity is high. Reaction ranges from very strongly acid to neutral. The seasonal high water table is at or near the surface. This soil is frequently flooded for long periods. The frequency and duration of flooding on the flood plain along the Roanoke River are influenced by the dam at Kerr Lake Reservoir.

Included with this soil in mapping are small areas of Chewacla soils on slightly elevated ridges. Also included are some areas of soils that are similar to Wehadkee soil but have more clay in the subsoil. The included soils make up about 10 percent of the map unit.

This Wehadkee soil is used mainly as woodland. Generally, it is not used as cropland because of its position on the landscape and because of the frequent flooding.

The dominant native trees are baldcypress, sweetgum, yellow poplar, willow oak, water oak, green ash, white oak, and water tupelo. The understory includes greenbrier, sourwood, giant cane, river birch, and hornbeam. Wetness is the main limitation affecting woodland. Flooding is a hazard. In some places the high water mark as identified on tree trunks is as high as 5 feet above ground level.

Frequent flooding is the main hazard affecting urban and recreational development.

The land capability classification is VIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 10W.

WkA—Wickham fine sandy loam, 0 to 2 percent slopes. This soil is well drained. It is on smooth, low ridges on stream terraces, mainly along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is yellowish brown fine sandy loam about 8 inches thick. The subsoil extends to a depth of 53 inches. The upper part is reddish yellow and yellowish red sandy clay loam. The lower part is strong brown sandy loam. The underlying material to a depth of 68 inches is yellowish brown loamy sand.

Permeability is moderate. The available water capacity also is moderate. Reaction ranges from very strongly acid to medium acid unless lime has been added to the soil.

Included with this soil in mapping are small areas of Altavista, Conetoe, and Tarboro soils. Altavista soils are in shallow depressions. Conetoe and Tarboro soils are mainly near the outer edge of the mapped areas. The included soils make up about 10 percent of the map unit.

This Wickham soil is used mainly as cropland. Some areas are used as woodland.

The main crops are corn, soybeans, peanuts, tobacco, cotton, and small grains. Winter cover crops, conservation tillage, and crop residue management help to control runoff and erosion and maintain tilth and the content of organic matter. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, red maple, hickory, yellow poplar, black tupelo, American elm, American beech, southern red oak, water oak, and white oak. The understory includes mainly dogwood, sassafras, sourwood, and waxmyrtle. No major limitations affect woodland.

No major limitations affect most kinds of urban and recreational development.

The land capability classification is I. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

WkB—Wickham fine sandy loam, 2 to 6 percent slopes. This soil is well drained. It is on rounded, low ridges on stream terraces, mainly along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is yellowish brown fine sandy loam about 8 inches thick. The subsoil extends to

a depth of 53 inches. The upper part is reddish yellow and yellowish red sandy clay loam. The lower part is strong brown sandy loam. The underlying material to a depth of 68 inches is yellowish brown loamy sand.

Permeability is moderate. The available water capacity also is moderate. Reaction ranges from very strongly acid to medium acid unless lime has been added to the surface layer.

Included with this soil in mapping are small areas of Altavista, Tarboro, and Conetoe soils. Altavista soils are in shallow depressions. Tarboro and Conetoe soils are mainly near the outer edge of the mapped areas. The included soils make up about 15 percent of the map unit.

This Wickham soil is used mainly as cropland. Some areas are used as pasture.

The main crops are corn, cotton, soybeans, peanuts, tobacco, and small grains. Runoff is the main limitation affecting cropland, and erosion is a hazard. Winter cover crops, conservation tillage, and crop residue management help to control runoff and erosion and maintain tilth and the content of organic matter. Conservation practices, such as no-till planting, field borders, and a crop rotation that includes close-growing crops, conserve moisture and help to control erosion.

The dominant native trees are loblolly pine, red maple, hickory, yellow poplar, black tupelo, American elm, American beech, southern red oak, water oak, and white oak. The understory includes mainly dogwood, sassafras, sourwood, and waxmyrtle. No major limitations affect woodland.

No major limitations affect most kinds of urban and recreational development.

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

WkC—Wickham fine sandy loam, 6 to 10 percent slopes. This soil is well drained. It is on side slopes on stream terraces, mainly along the Cashie and Roanoke Rivers and their tributaries. The mapped areas are long and narrow and range from 5 to 30 acres in size.

Typically, the surface layer is yellowish brown fine sandy loam about 8 inches thick. The subsoil extends to a depth of 53 inches. The upper part is reddish yellow and yellowish red sandy clay loam. The lower part is strong brown sandy loam. The underlying material to a depth of 68 inches is yellowish brown loamy sand.

Permeability is moderate. Reaction ranges from very strongly acid to medium acid unless lime has been added to the surface layer.

Included with this soil in mapping are small areas of Winton, Bibb, and Johnston soils. Winton soils have slopes of more than 8 percent. Bibb and Johnston soils are in narrow drainageways. The included soils make up about 15 percent of the map unit.

This Wickham soil is used mainly as woodland. It generally is not used as cropland. The short slopes and rapid runoff are limitations affecting cropland. Conservation practices, such as contour farming and close-growing cover crops, help to control erosion and conserve moisture.

The dominant native trees are loblolly pine, yellow poplar, southern red oak, white oak, willow oak, red maple, American beech, sweetgum, and hickory. The understory includes mainly dogwood, sourwood, American holly, and sassafras.

The main limitation affecting urban and recreational development is the slope.

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

WmB—Wickham-Urban land complex, 2 to 10 percent slopes. This map unit consists of a well drained Wickham soil and areas of Urban land. The Wickham soil is on slightly rounded ridges in the town of Windsor. The mapped areas are irregular in shape and range from 5 to 300 acres in size.

The individual areas of this map unit are too small or too intricately mixed to be mapped separately at the scale used. The Wickham soil makes up about 60 percent of the map unit, and the Urban land makes up about 30 percent. Included soils make up about 10 percent.

Typically, the surface layer of the Wickham soil is yellowish brown fine sandy loam about 8 inches thick. The subsoil extends to a depth of 53 inches. The upper part is reddish yellow and yellowish red sandy clay loam. The lower part is strong brown sandy loam. The underlying material to a depth of 68 inches is yellowish brown loamy sand.

Permeability is moderate in the Wickham soil. The available water capacity also is moderate. Reaction ranges from very strongly acid to medium acid unless lime has been added to the soil.

The Urban land consists of areas where the original soil has been cut, filled, graded, paved, or modified to the extent that most soil properties have been altered and a soil series is not recognized. This land consists of shopping centers, factories, houses, municipal buildings, apartment complexes, parking lots, and other areas where buildings are closely spaced or the soil is covered with pavement. The slopes generally have

been modified. The extent of site modification varies greatly. Many areas have had little disturbance, while other areas have been graded or filled.

Included in mapping are small areas of Dogue, Altavista, and Conetoe soils. Dogue and Altavista soils are in shallow depressions. Conetoe soils are on the outer edge of the mapped areas.

The slope is the main limitation affecting urban and recreational development on the Wickham soil. Onsite investigations are generally needed to determine the use and management requirements of the areas in this map unit.

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

WtD—Winton fine sandy loam, 8 to 15 percent slopes. This soil is moderately well drained. It is on side slopes, mainly along the Chowan River. The mapped areas are long and narrow and range from 10 to 300 acres in size.

Typically, the surface layer is dark gray fine sandy loam about 8 inches thick. The subsurface layer, to a depth of 17 inches, is pale brown and light gray fine sandy loam. The subsoil extends to a depth of 70 inches. The upper part is light yellowish brown clay loam. The middle part is yellowish brown and light yellowish brown sandy clay loam. The lower part is very pale brown sandy loam. The upper part of the underlying material is pale yellow loamy sand. The lower part to a depth of 80 inches is very pale brown fine sand.

Permeability is moderate. The available water capacity also is moderate. Reaction is very strongly acid to medium acid unless lime has been added to the soil. The seasonal high water table is at a depth of 2 to 4 feet. The wetness of the soil is caused by seepage.

Included with this soil in mapping are small areas of Bibb and Johnston soils in narrow drainageways. Also included are some areas of soils that have a thick surface layer. These soils are at the base of the side slopes. The included soils make up about 20 percent of the map unit.

This Winton soil is used mainly as woodland. It generally is not used as cropland. The slope and rapid runoff are limitations affecting cropland. Conservation practices, such as contour farming and close-growing cover crops, help to control erosion and conserve moisture.

The dominant native trees are southern red oak, white oak, sweetgum, American beech, and loblolly pine. The understory includes mainly dogwood, American holly, red maple, and sourwood.

The main limitations affecting urban and recreational development are the slope and wetness.

The land capability classification is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 10A.

WtE—Winton fine sandy loam, 15 to 60 percent slopes. This soil is moderately well drained. It is on side slopes, mainly along the Chowan River. The mapped areas are long and narrow and range from 10 to 300 acres in size.

Typically, the surface layer is dark gray fine sandy loam about 8 inches thick. The subsurface layer, to a depth of 17 inches, is pale brown and light gray fine sandy loam. The subsoil extends to a depth of 70 inches. The upper part is light yellowish brown clay loam. The middle part is yellowish brown and light yellowish brown sandy clay loam. The lower part is very pale brown sandy loam. The underlying material to a depth of 80 inches is pale yellow loamy sand and very pale brown fine sand.

Permeability is moderate. The available water capacity also is moderate. Reaction ranges from very strongly acid to medium acid unless lime has been added to the soil. The seasonal high water table is at a depth of 2 to 4 feet. The wetness of the soil is caused by seepage.

Included with this soil in mapping are small areas of Bibb and Johnston soils in narrow drainageways. Also included are soils that have a thick surface layer. These soils are at the base of the side slopes. The included soils make up about 20 percent of the map unit.

This Winton soil is used mainly as woodland. It generally is not used as cropland. The slope and rapid runoff are limitations affecting cropland.

The dominant native trees are southern red oak, white oak, sweetgum, American beech, and loblolly pine. The understory includes mainly dogwood, American holly, red maple, and sourwood.

The main limitations affecting urban and recreational development are the slope and wetness.

The land capability classification is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 10R.

Prime Farmland

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

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

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

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

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 6 percent.

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

Some soils that have a high water table qualify as prime farmland only in areas where this limitation has been overcome by drainage measures. If applicable, the need for these measures is indicated in parentheses after the map unit name. Onsite evaluation is necessary to determine if the limitation has been overcome by the corrective measures.

The soils identified as prime farmland in Bertie County are:

AtA	Altavista fine sandy loam, 0 to 3 percent slopes
Au	Augusta fine sandy loam (where drained)
CrA	Craven fine sandy loam, 0 to 1 percent slopes
CrB	Craven fine sandy loam, 1 to 4 percent slopes
DgA	Dogue sandy loam, 0 to 2 percent slopes
DgB	Dogue sandy loam, 2 to 6 percent slopes
ExA	Exum very fine sandy loam, 0 to 2 percent slopes
ExB	Exum very fine sandy loam, 2 to 5 percent slopes
GoA	Goldsboro sandy loam, 0 to 3 percent slopes
Gt	Grantham silt loam (where drained)
Lf	Leaf loam (where drained)
Ly	Lynchburg sandy loam (where drained)
Na	Nahunta very fine sandy loam (where drained)
NoA	Norfolk sandy loam, 0 to 2 percent slopes

NoB	Norfolk sandy loam, 2 to 6 percent slopes
Pa	Pantego loam (where drained)
Ra	Rains sandy loam (where drained)
Tm	Tomotley sandy loam (where drained)
WkA	Wickham fine sandy loam, 0 to 2 percent slopes
WkB	Wickham fine sandy loam, 2 to 6 percent slopes

Use and Management of the Soils

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

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 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 used for crop production has changed very little in the last 10 years in Bertie County. Losses of cropland to urban growth and development have been offset by new land clearing operations.

According to the 1982 North Carolina Agriculture Extension Service County Summary, Bertie County had about 91,043 acres in crops and 500 acres in pasture and hayland. The major crop acreages were corn, 42,500 acres; peanuts, 21,271 acres; soybeans, 21,000 acres; small grains, 2,100 acres; tobacco, 3,311 acres; and cotton, 659 acres. The other 202 acres was used for minor crops. The pasture and hayland acreage was planted almost entirely to tall fescue.

Soil erosion is a concern on about 6 percent of the cropland in the county. Soils that have slopes of more than 2 percent, such as Bonneau, Craven, Exum, Norfolk, and Wickham soils, especially require protection against erosion (fig. 6).

Erosion is costly when expensive herbicides, fertilizer, and lime are lost along with valuable topsoil and organic matter. Damage to the environment results when eroded soil is deposited in streams, lakes, and reservoirs. Productivity and soil tilth are decreased when the surface layer is eroded. Effective control of erosion maintains soil productivity and minimizes the cost of maintaining water quality.

Erosion-control practices, such as leaving crop residue on or in the surface layer and planting winter cover crops, provide a protective cover for extended periods, reduce the runoff rate, and increase the rate of water infiltration.

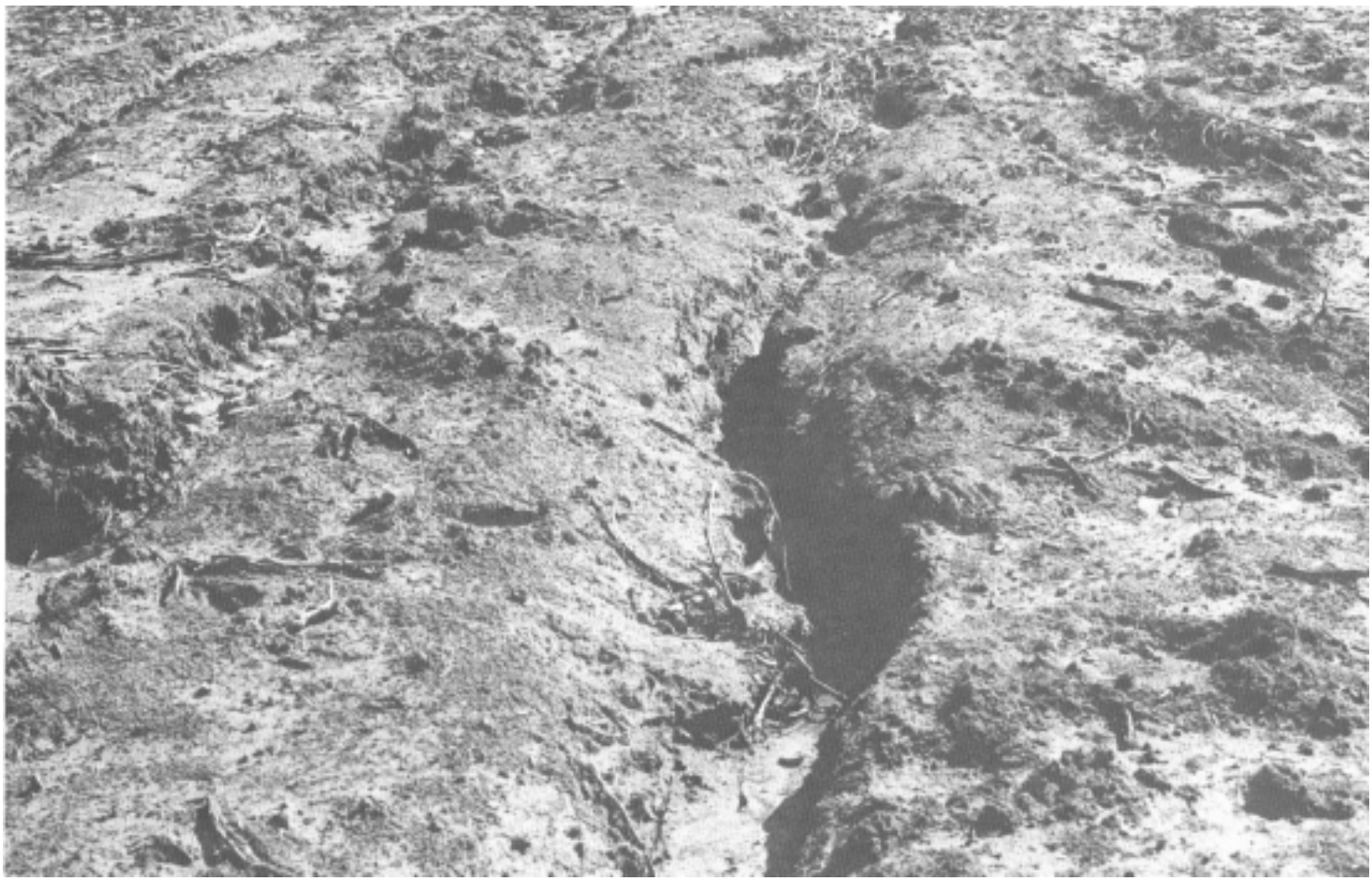


Figure 6.—Erosion in an area of Craven fine sandy loam, 1 to 4 percent slopes.

Conetoe, Craven, Exum, Norfolk, and Wickham soils have short, irregular slopes. Parallel terraces and contour tillage systems generally are not practical on these soils. Conservation tillage, grassed waterways, and field borders of fescue are effective in controlling erosion.

Altavista, Bonneau, Exum, Goldsboro, Norfolk, and Wickham soils have a compacted traffic pan between the topsoil and subsoil. Traffic pans inhibit water infiltration, root penetration, and permeability. They also increase the hazard of erosion. Conservation tillage systems in which rippers, subsoilers, and chisels are used are effective in breaking up traffic pans. Limiting the number of trips across the field and deferring tillage during wet periods help to prevent the formation of a traffic pan.

Terraces and diversions reduce the length of slopes and thus reduce the runoff rate and help to control erosion. These conservation practices are practical and highly effective in areas of Bonneau, Craven, Exum, Norfolk, and Wickham soils where slope patterns are uniform.

Contour tillage is an effective conservation practice on many soils in Bertie County. Like terraces and diversions, contour tillage is more effective on the more uniform slopes but can be adapted to a wide range of slope patterns.

Soil blowing commonly is a hazard on soils that have a sandy surface layer. Each year, many tons of topsoil are lost from Bonneau, Conetoe, Exum, Goldsboro, Norfolk, Seabrook, Tarboro, and Wickham soils. This windblown topsoil is often carried many miles during March, April, and May. Conservation cropping systems, which include cover crops and crop residue management, can greatly reduce the hazard of soil blowing. Windbreaks of tall-growing small grains

commonly are used in row cropped areas to reduce late wind damage to young row crops. Planted windbreaks of pine trees with shrub understories have proven effective in large open areas.

Information about the design and applicability of erosion-control systems for each soil type can be obtained from the local office of the Soil Conservation Service.

Soils that are poorly drained or somewhat poorly drained, such as Grantham, Leaf, Lenoir, Lynchburg, Nahunta, Rains, and Tomotley soils, commonly are drained to obtain optimum yields. If drainage systems consisting of tile drainage or open ditches are installed and maintained and drainage land grading practices are used, corn, soybeans, and small grains can be grown. Peanuts and tobacco are often grown on Altavista, Craven, Exum, Goldsboro, Lynchburg, and Nahunta soils when an adequate surface and subsurface drainage system is installed and maintained. Soils that have a slowly permeable or very slowly permeable subsoil, such as Craven, Leaf, and Lenoir soils, are more difficult to drain. These soils require extensive surface drainage systems of open channels and drainage land grading to maintain acceptable crop production.

Soil tilth is an important factor in crop production because it significantly influences seed germination and water infiltration in the soil. Soils that have good tilth have a granular and porous surface layer.

Most of the soils in Bertie County have a surface layer of loamy sand, sandy loam, silt loam, or fine sandy loam that is low in organic matter content. Soils that have a surface layer of loam or silt loam, such as Exum, Grantham, Leaf, Lenoir, Nahunta, and Roanoke soils, tend to crust after periods of intense rainfall. Conservation tillage practices, such as leaving crop residue on the surface layer, growing cover crops, and adding manure and mulch minimize crusting and improve the overall soil structure and tilth.

Fall plowing generally is not recommended on most soils in Bertie County because in most unprotected areas a surface crust forms after rains. This crust is hard, inhibits water infiltration, and increases the runoff rate and the hazard of erosion during the winter. Leaving crop residue on the surface after harvesting or establishing a winter cover crop helps to control erosion during the winter.

In soils that are poorly drained or somewhat poorly drained, such as Grantham, Leaf, Lenoir, Lynchburg, Nahunta, Rains, and Tomotley soils, tilth tends to be poor because the soils stay cool and wet until late in spring. If these soils are plowed when wet, they tend to be cloddy when dry, making good seedbeds difficult to prepare (fig. 7).

Soil Fertility

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

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

A soil test is used to indicate the amount and kind of lime that should be used. In soils that have a sandy surface layer, magnesium and available calcium levels can be low. The desired pH level may differ, depending on the soil properties and the crop.

Nitrogen fertilizer is required for most crops. Generally, it is not needed, however, for peanuts or clover, in some rotations of soybeans, or for alfalfa that is established. A dependable soil test is not available for predicting nitrogen requirements. Appropriate rates are described in the section "Yields Per Acre." Because nitrogen can be readily leached from sandy soils, applications of nitrogen may be needed more than once during the growing season on these soils.

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

Chemical Weed Control

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

In some areas, the content of organic matter is outside the range shown in table 15. The content can be higher in soils that have received high amounts of animal or manmade waste. Soils that have recently

Figure 7.—Cloddiness in an area of Lenoir fine sandy loam.

been brought into cultivation can have a higher content of organic matter in the surface layer than similar soils that have been cultivated for a long time. Conservation tillage increases the content of organic matter. Lower levels are common where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities. Current soil tests are needed to measure the content of organic matter before the required herbicide rates are determined. The labels on herbicides show specific application rates based on the content of organic matter and texture of the surface layer.

Pasture and Hayland

The major pasture and hayland plant in the county is tall fescue. Other plants, however, are better adapted to some soils in the county. These include perennial grasses, such as hybrid bermudagrass, common bermudagrass, switchgrass, and bahiagrass. The grasses selected for planting should be those that are best adapted to the soil. Selection of the most suitable plants and good management techniques, such as pasture rotation, applications of fertilizer, weed control, and controlled grazing, can increase yields from pasture and hayland.

The deep, moderately well drained or well drained soils, such as Craven, Exum, Goldsboro, and Norfolk soils, are suited to all of the major grasses grown in the county. Fescue, ladino clover, common bermudagrass, and bahiagrass provide 6 to 9 animal unit months of grazing on these soils each year. Hybrid bermudagrass provides an average of 10 animal unit months of grazing. An animal unit month is the amount of feed or forage needed by one animal unit for 1 month.

In areas of deep, sandy soils, such as Bonneau, Conetoe, and Tarboro soils, moisture stress and leaching of fertilizer are common. These soils are not well suited to fescue. They are better suited to grasses, such as bahiagrass, hybrid bermudagrass, and common bermudagrass. These grasses provide 5 to 9 animal unit months of grazing.

The wet soils in Bertie County, such as Grantham, Leaf, Rains, and Roanoke soils, are best suited to fescue or to mixtures of fescue and legumes. These soils provide 5 to 9 animal unit months of grazing per year, depending on the management techniques used.

A well rounded pasture and hayland management program includes summer grasses, such as bermudagrass, and the cool-season grasses or grass-legume mixtures that are adapted to the soils in the county. Pastures that include proper fencing for rotation grazing and an intensive fertilization management program can be grazed from March through November. Hayland crops of hybrid bermudagrass and field gleanings can then be used as livestock feed during the winter. If fields are gleaned, however, a cover crop should be planted to replace the organic matter lost through grazing. These combinations can provide a successful pasture and hayland program for the livestock producer.

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 ensures the smallest possible loss.

Intensive management includes maintaining proper levels of soil reaction and fertility as indicated by standard soil tests. Nitrogen rates for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds of nitrogen per acre. If the yield potential is only 100 bushels per acre, then rates of 100 to 120 pounds of nitrogen per acre should be used. Generally, application of nitrogen in excess of potential yields is not a sound practice. Excess fertilizer causes water pollution as well as an unnecessary expense. If corn or cotton follows harvested soybeans or peanuts, nitrogen rates can be reduced by 20 to 30 pounds per acre.

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

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

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. 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.

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. There are no class VIII soils in Bertie County.

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

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 subclass indicated by *w*.

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

Woodland Management and Productivity

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

Forest managers in Bertie County are faced with the challenge of producing greater yields from smaller areas of forest land. Meeting this challenge requires an intensity of management and silvicultural practices little expected a few decades ago. Many of the silvicultural techniques resemble those long practiced in agriculture. The techniques include establishing, weeding, and thinning a desirable young stand; propagating more productive species and genetic varieties; planning for short rotations and complete fiber utilization; controlling insects, diseases, and weeds; and increasing growth by applications of fertilizer and drainage systems. Even though timber crops require decades to grow, the goal of intensive management is similar to the goal of intensive agriculture—to produce the greatest yield of the most valuable crop as quickly as possible.

Commercial forests make up 318,227 acres in Bertie County, or about 71 percent of the land area *(15)*. Commercial forest is land that is producing or is capable of producing crops of industrial wood and is not withdrawn from timber production. Loblolly pine is the most important timber species in the county because it grows fast, is adapted to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage (fig. 8).

One of the first steps in intensively managing forest land is to determine the productive capacity of the soil for several tree species (fig. 9). The most productive and valued trees are then selected for each parcel of land. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of decisions concerning expenses and profits associated with intensive forest management, land acquisition, or industrial investments.

The productive capacity of forest land depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure,

Figure 8.—A plantation of loblolly pine on Leaf loam. These trees are easy to establish and manage and are a valuable cash crop.

and depth to the water table, affect forest productivity primarily by influencing the available water capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine site productivity. Other site factors, such as steepness and length of slopes, affect water movement and availability. The amount of rainfall and length of the growing season also influence site productivity.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Available water capacity and depth of the root zone have major effects on tree growth. Elevation and aspect are of particular importance in mountainous areas.

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

The first tree listed for each soil under the column "Common trees" is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

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

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *C* indicates a soil that has clay in the upper part. The letter *S* indicates a dry, sandy soil. The letter *A* indicates a soil that has no significant

Figure 9.—A young plantation of sycamore on Chewacla loam, frequently flooded. Sycamore was selected for this soil because of productive capacity and crop value.

restrictions or limitations affecting forest use and management. If a soil has more than one limitation, the priority is as follows: R, W, C, and S.

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

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it

becomes more difficult to use wheeled equipment. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if wetness restricts equipment use from 2 to 6 months per year or if special equipment is needed to prevent or minimize soil compaction. The rating is *severe* if soil wetness restricts equipment use for more than 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to prevent or minimize soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

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

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

For the soils that are commonly used for timber production, the yield is predicted in cubic feet and board feet. It is predicted at the point where mean annual increment culminates. The productivity of the soils in this survey is mainly based on loblolly pine *(5)*, yellow poplar *(3)*, longleaf pine *(14)*, sweetgum *(4)*, and upland oaks *(8)*.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands.

The *productivity class* represents an expected volume produced by the most common trees, expressed in cubic meters per hectare per year. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. Cubic feet can be converted to board feet by multiplying by a factor of about 5. For example, a productivity class of 8 means that the soil can be expected to produce 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 570 board feet per acre per year.

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

Recreation

In table 8, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation 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.

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

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements

and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry. Strong slopes 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 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 firm after rains and is not dusty when dry.

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, are not subject to prolonged flooding during the period of use, and have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John P. Edwards, biologist, Soil Conservation Service, helped prepare this section.

Wildlife habitat in Bertie County is strongly influenced by the Roanoke and Cashie Rivers. The wetness and flooding of the soils near these rivers influence land use patterns (fig. 10). Wildlife populations are generally rated as moderate to high throughout much of the county. The deer, quail, rabbit, squirrel, duck, and dove populations are high during most years, although cycle effects are sometimes observed.

Wild turkey populations are moderate to high on the bottom land along the Roanoke River. The habitat for this species is largely confined to Chewacla soils, on which mixed hardwood plant communities are dominant. In these areas, mixed oaks are prevalent and provide an excellent food source for turkey, deer, and squirrel.

The native and migratory duck populations are high along the two major river systems and their adjacent wetlands. The populations of other aquatic birds and of furbearing wildlife also are high in these areas.

Habitat for small game in the county is good. Agricultural crop fields are relatively small and are well mixed with woodlands. This pattern of land use provides for a maximum of "edge" habitat, which is very favorable to wildlife, such as quail and rabbits. Craven, Dogue, Exum, Goldsboro, Norfolk, and Wickham are the dominant soils associated with this type of habitat.

Hunting clubs control most of the land area throughout Bertie County. These clubs practice varying degrees of wildlife habitat management.

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.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other development 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.

Figure 10.—A wooded area of Wehadkee loam, frequently flooded, which provides good habitat for wetland wildlife.

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, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, sorghum, wheat, oats, barley, millet, and soybeans.

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, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, switchgrass, clover, trefoil, and crownvetch.

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, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are goldenrod, beggarweed, partridge pea, pokeweed, and fescue.

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, dogwood, hickory, and autumn olive.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, and slope. Examples of wetland plants are smartweed, wild millet, cutgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water areas are muskrat marshes, waterfowl feeding areas, beaver ponds, and wildlife 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 many species of songbirds and bobwhite quail, mourning dove, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. The wildlife attracted to these areas include woodpeckers, squirrels, and gray foxes.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are muskrat, raccoons, red-winged blackbirds, and ducks.

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, 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 measures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the 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, shrink-swell potential, and organic layers can cause the movement of footings. Depth to the water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to the water table, flooding, 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 the water table, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the

limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for 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 the water table, and flooding affect absorption of the effluent.

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 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 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to the water table, flooding, 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 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 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of salts and 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, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils 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 the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, 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. 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 depth to the 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. They have at least 5 feet of suitable material, a low shrink-swell potential, 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 a moderate shrink-swell potential and slopes of 15 to 25 percent. 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, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand is a natural aggregate suitable for commercial use with a minimum of processing. It is used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand are gradation of grain sizes (as indicated by the engineering classification of the soil) and the thickness of suitable material. 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 a layer of sand that is up to 12 percent silty fines. This material must be at least 3 feet thick. All other soils are rated as an improbable source.

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 slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope and depth to the water table.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They 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, 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 slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available nutrients as it decomposes.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and aquifer-fed 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 other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table and permeability of the aquifer.

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 layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing 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. Wetness and slope affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

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 classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "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. Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest.

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 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, 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.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a 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.

In table 16, some soils are assigned two hydrologic soil groups, for example, B/D. The first letter is for drained areas, and the second is for undrained areas. Because there are different degrees of drainage and water table control, onsite investigation is needed to determine the hydrologic group of the soil in a particular location.

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 16 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). 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 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 is local information about the extent and levels of flooding and the relation of each soil on

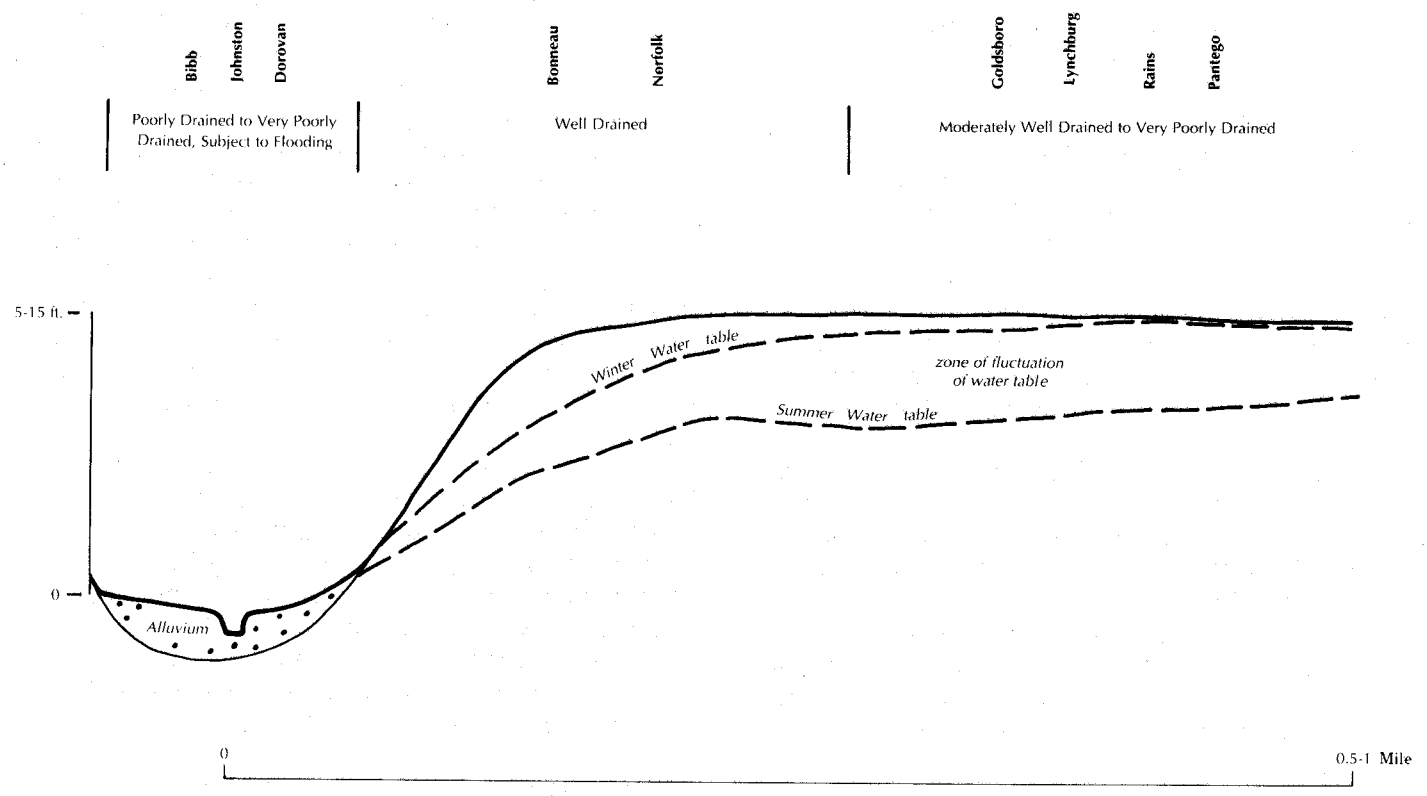


Figure 11.—Depth to the seasonal high water table in some soils on a typical landscape extending from a drainageway to the center of an interstream area.

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 (fig. 11). 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 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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 it is within a depth of 6 feet for less than a month.

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.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(13)*. 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 17 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 Entisol.

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 Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

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 Fluvaquents (*Fluv*, meaning recent alluvium, plus *aquent*, the suborder of the Entisols that has an aquic 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 Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, siliceous, acid, thermic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described (fig. 12). The detailed description of each soil horizon follows standards in the *Soil Survey Manual (12)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (13)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

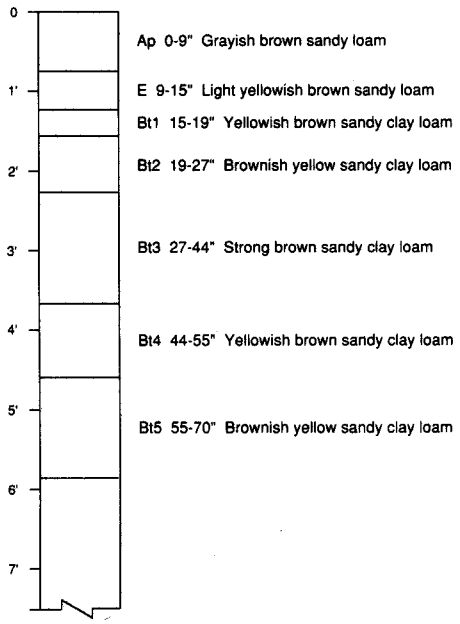
The map units of each soil series are described in the section "Detailed Soil Map Units."

Altavista Series

The Altavista series consists of moderately well drained soils that formed in sandy and loamy fluvial

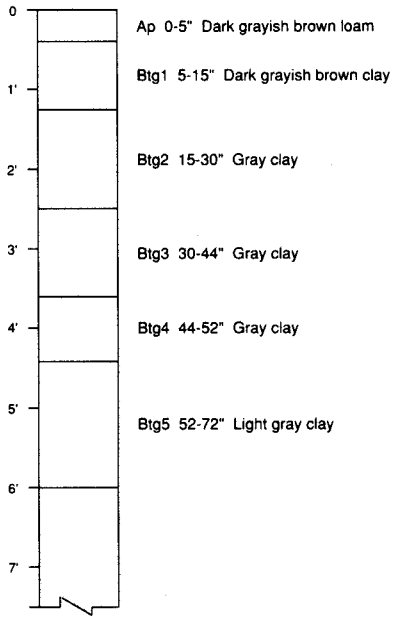
PROFILE OF NORFOLK SERIES

MAIN USE: Tobacco, cotton, peanuts, corn, soybeans
LIMITATIONS: No major limitations



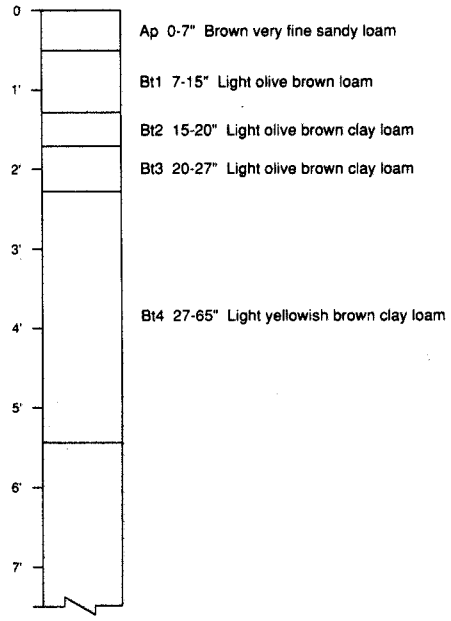
PROFILE OF LEAF SERIES

MAIN USE: Woodland
LIMITATION: Wetness



PROFILE OF EXUM SERIES

MAIN USE: Tobacco, peanuts, corn, soybeans
LIMITATION: Seasonal wetness



PROFILE OF CONETOE SERIES

MAIN USE: Peanuts, tobacco, corn, soybeans
LIMITATIONS: Leaching, wind erosion, drought

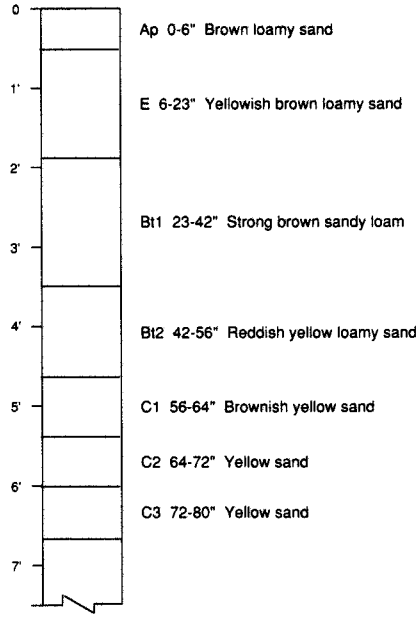


Figure 12.—Profiles of four contrasting soils.

sediments. Slopes range from 0 to 3 percent.

Typical pedon of Altavista fine sandy loam, 0 to 3 percent slopes; about 0.5 mile north of the intersection of secondary roads 1519 and 1518, about 100 feet west of secondary road 1519, in a cultivated field:

Ap—0 to 9 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; medium acid; abrupt smooth boundary.

E—9 to 14 inches; very pale brown (10YR 7/3) fine sandy loam; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

Bt1—14 to 21 inches; light yellowish brown (10YR 6/4) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; medium acid; clear wavy boundary.

Bt2—21 to 31 inches; light yellowish brown (10YR 6/4) sandy clay loam; few fine faint yellow mottles and common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—31 to 35 inches; yellowish brown (10YR 5/8) sandy clay loam; common medium distinct light gray (10YR 7/1), yellow (10YR 7/8), and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; few faint gray (10YR 6/1) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt4—35 to 40 inches; mottled light gray (10YR 7/1), reddish yellow (7.5YR 6/8), yellow (10YR 7/8), and yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few faint gray (10YR 6/1) clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—40 to 48 inches; mottled light gray (10YR 7/1), reddish yellow (7.5YR 6/8), and yellow (10YR 7/8) sandy loam; weak medium subangular blocky structure; some lenses of clayey material; friable; few fine flakes of mica; very strongly acid; clear wavy boundary.

C—48 to 60 inches; mottled very pale brown (10YR 7/4) and yellow (10YR 7/8) loamy sand; massive; friable; few fine flakes of mica; very strongly acid.

The combined thickness of the A and B horizons is 35 to 50 inches. Reaction ranges from very strongly acid to medium acid unless lime has been added to the surface layer.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4. The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. It is fine sandy loam or sandy loam. Some pedons do not have an E horizon.

The Bt horizon generally has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. In some pedons, however, the lower part of this horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. This horizon commonly is sandy clay loam or clay loam, but some pedons have thin layers of fine sandy loam, sandy loam, loam, or loamy sand.

The BC horizon has the same range in color as the Bt2 horizon, has a gray matrix, or is mottled. The texture is sandy loam, loam, sandy clay loam, or loamy sand. Some pedons do not have a BC horizon.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 8 or is mottled. It is dominantly sandy or loamy, but some pedons have thin strata of clay.

Augusta Series

The Augusta series consists of somewhat poorly drained soils that formed in sandy and loamy fluvial sediments. Slopes range from 0 to 2 percent.

Typical pedon of Augusta fine sandy loam; 6 miles south of Windsor on U.S. Highways 13 and 17, east 0.5 mile on secondary road 1523, north 60 feet, in a cultivated field:

Ap—0 to 6 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt—6 to 10 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; few fine faint light brownish gray mottles; weak medium subangular blocky structure; friable, slightly sticky; many fine roots; few faint light olive brown (2.5Y 5/4) clay films on faces of peds; slightly acid; gradual wavy boundary.

Btg1—10 to 19 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky; many fine roots; few faint grayish brown (2.5Y 5/2) clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg2—19 to 24 inches; light brownish gray (2.5Y 6/2) sandy clay loam; many coarse prominent strong brown (7.5YR 5/8) mottles; weak medium

subangular blocky structure; friable, slightly sticky; few faint grayish brown (2.5Y 5/2) clay films on faces of peds; strongly acid; gradual smooth boundary.

Btg3—24 to 46 inches; light gray (2.5Y 7/2) clay loam; many coarse prominent strong brown (7.5YR 5/8) and yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint light brownish gray (2.5Y 6/2) clay films on faces of peds; strongly acid; gradual smooth boundary.

C—46 to 68 inches; light gray (10YR 7/2) sandy loam; common fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; strongly acid.

The loamy material is 35 to 70 inches thick. Reaction ranges from very strongly acid to medium acid unless lime has been added to the surface layer.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. Some pedons have an E horizon. This horizon has hue of 10YR to 5Y, value of 6 or 7, and chroma of 2 to 4. It is fine sandy loam or sandy loam.

The Bt horizon has hue of 10YR to 2.5Y, value of 5 to 7, and chroma of 3 to 6. Some pedons have a few olive yellow, light brownish gray, or brownish yellow mottles. The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It commonly is sandy clay loam or clay loam, but some pedons have thin layers of fine sandy loam, sandy loam, or loamy sand.

The C horizon has hue of 10YR or 5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2. The texture is sand, loamy sand, or sandy loam.

Bibb Series

The Bibb series consists of poorly drained soils that formed in sandy and loamy recent alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Bibb loam, in an area of Bibb and Johnston loams, frequently flooded; about 0.3 mile south of the intersection of secondary roads 1521 and 1522, about 100 feet east of secondary road 1522:

A—0 to 8 inches; dark grayish brown (10YR 4/2) loam; few fine distinct strong brown (7.5YR 5/6) and yellowish red (5YR 4/6) mottles; moderate medium granular structure; friable; many fine roots; very strongly acid; clear wavy boundary.

Cg1—8 to 16 inches; gray (10YR 5/1) sandy loam; few fine distinct strong brown (7.5YR 5/6) mottles; weak medium granular structure; friable; many fine roots; very strongly acid; clear wavy boundary.

Cg2—16 to 32 inches; gray (10YR 5/1) sandy loam; few fine distinct reddish brown (5YR 4/4) mottles; massive; friable; common fine roots; very strongly acid; clear wavy boundary.

Cg3—32 to 60 inches; dark gray (10YR 4/1) loam that has stratified coarse sand lenses; massive; friable; few fine roots; very strongly acid.

The sandy and loamy material is 60 or more inches thick. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 or 2. The Cg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 3 to 7 and chroma of 0 to 2. It has few to many mottles in shades of red, yellow, or brown. This horizon is sand, loamy sand, loamy fine sand, sandy loam, loam, and silt loam, or it is stratified. Some pedons have thin strata of organic material.

Bonneau Series

The Bonneau series consists of well drained soils that formed in loamy marine sediment. Slopes range from 0 to 10 percent.

Typical pedon of Bonneau loamy sand, 0 to 6 percent slopes; about 1.8 miles northwest of the intersection of secondary roads 1139 and 1140, about 200 yards north of secondary road 1140, in a cultivated field:

Ap—0 to 12 inches; dark brown (10YR 3/3) loamy sand; weak medium granular structure; very friable; medium acid; abrupt smooth boundary.

E—12 to 28 inches; pale yellow (2.5Y 7/4) loamy sand; weak medium granular structure; very friable; medium acid; clear smooth boundary.

Bt1—28 to 43 inches; yellowish brown (10YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.

Bt2—43 to 58 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; few faint gray (10YR 6/1) clay films on faces of peds; friable; very strongly acid; gradual wavy boundary.

Bt3—58 to 75 inches; yellowish brown (10YR 5/4) sandy clay loam; few fine distinct strong brown (7.5YR 5/8) and common medium distinct light gray (10YR 7/1) mottles; weak medium subangular blocky structure; very friable; few faint gray (10YR

6/1) clay films on faces of peds; very strongly acid.

The loamy Bt horizon is 45 to 80 inches thick. Reaction ranges from very strongly acid to medium acid in the A horizon and is very strongly acid or strongly acid in the B horizon.

The Ap or A1 horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4. The E horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 2 to 6. It is loamy sand or loamy fine sand.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. The lower part of this horizon has mottles in shades of gray, brown, red, or yellow. Mottles with chroma of 2 or less are within 60 inches of the surface. This horizon is mainly sandy clay loam but ranges from sandy loam to sandy clay.

Chewacla Series

The Chewacla series consists of somewhat poorly drained soils that formed in loamy fluvial sediment. Slopes range from 0 to 2 percent.

Typical pedon of Chewacla loam, frequently flooded; about 0.5 mile east of the Roanoke River drawbridge, 200 feet east of U.S. Highway 17:

A—0 to 4 inches; brown (10YR 5/3) loam; weak medium granular structure; friable; common fine and medium roots; strongly acid; abrupt smooth boundary.

Bw—4 to 20 inches; yellowish brown (10YR 5/4) loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; strongly acid; clear smooth boundary.

Bg1—20 to 30 inches; grayish brown (10YR 5/2) loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few medium roots; strongly acid; gradual smooth boundary.

Bg2—30 to 42 inches; grayish brown (10YR 5/2) loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine black concretions; strongly acid; gradual smooth boundary.

Bg3—42 to 65 inches; gray (10YR 5/1) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; massive, slightly sticky and slightly plastic; few fine black concretions; strongly acid.

The loamy material is 36 to more than 72 inches thick. Reaction ranges from strongly acid to slightly acid unless lime has been added to the surface layer.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 4. The Bw horizon has hue of 5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 6. The Bg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is sandy clay loam, loam, silt loam, clay loam, or silty clay loam.

Conetoe Series

The Conetoe series consists of well drained soils that formed in loamy fluvial and marine sediments. Slopes range from 0 to 5 percent.

Typical pedon of Conetoe loamy sand, 0 to 5 percent slopes; about 0.3 mile south of Sans Souci Ferry Landing, 0.1 mile east of secondary road 1500, in a cultivated field:

Ap—0 to 6 inches; brown (10YR 4/3) loamy sand; weak medium granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

E—6 to 23 inches; yellowish brown (10YR 5/6) loamy sand; weak medium granular structure; very friable; common fine roots; medium acid; clear wavy boundary.

Bt1—23 to 42 inches; strong brown (7.5YR 5/8) sandy loam; weak medium subangular blocky structure; very friable; common distinct yellowish brown clay bridges between mineral grains; few fine roots; very strongly acid; clear wavy boundary.

Bt2—42 to 56 inches; reddish yellow (7.5YR 6/8) loamy sand; weak medium granular structure; very friable; sand grains bridged and coated with clay; few fine roots; very strongly acid; clear wavy boundary.

C1—56 to 64 inches; brownish yellow (10YR 6/8) sand; single grained; loose; very strongly acid; clear smooth boundary.

C2—64 to 72 inches; yellow (10YR 7/8) sand; single grained; loose; very strongly acid; clear smooth boundary.

C3—72 to 80 inches; yellow (10YR 7/6) sand; single grained; loose; very strongly acid.

The loamy and sandy Bt horizon is 25 to 60 inches thick. Reaction ranges from very strongly acid to medium acid unless lime has been added to the surface layer.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8. It is loamy sand or sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 5 to 8. This horizon is dominantly sandy loam or loamy sand. In some pedons, however, it has thin layers of sandy clay loam.

The C horizon has hue of 7.5YR to 10YR, value of 6 or 7, and chroma of 3 to 8. The texture is loamy sand or sand.

Craven Series

The Craven series consists of moderately well drained soils that formed in clayey marine sediment. Slopes range from 0 to 8 percent.

Typical pedon of Craven fine sandy loam, 0 to 1 percent slopes; east of Aulander, about 0.8 mile east of the intersection of North Carolina Highway 11 and secondary road 1231, about 0.4 mile south of secondary road 1231 on a farm road, 20 feet west of the farm road, in a cultivated field:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; friable; common fine roots; medium acid; abrupt wavy boundary.

E—7 to 11 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak medium granular structure; friable; common fine roots; common fine pores; few bodies of material from the Ap horizon; medium acid; abrupt wavy boundary.

Bt1—11 to 14 inches; light olive brown (2.5Y 5/4) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine pores; few faint brown (10YR 5/3) clay films on faces of peds; strongly acid; abrupt wavy boundary.

Bt2—14 to 20 inches; light olive brown (2.5Y 5/4) clay; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; common fine and medium pores; few distinct brown (10YR 5/3) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—20 to 34 inches; light olive brown (2.5Y 5/4) clay; common medium distinct yellowish brown (10YR 5/8), pale brown (10YR 6/3), and light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; firm, sticky and plastic; few fine roots; few fine and medium pores; common distinct brown (10YR 5/3) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—34 to 58 inches; mottled yellowish brown (10YR 5/8), light brownish gray (10YR 6/2), and red (10R 4/8) clay; moderate fine angular blocky structure; very firm, sticky and plastic; few fine pores; common distinct gray (10YR 6/1) clay films on faces of peds; very strongly acid; gradual wavy boundary.

BCg—58 to 67 inches; light gray (10YR 7/1) clay; many medium distinct brownish yellow (10YR 6/6) and red (10R 4/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few coarse grains of quartz; very strongly acid.

The loamy and clayey material is 60 or more inches thick. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3. The E horizon has hue of 10YR to 5Y, value of 6 or 7, and chroma of 2 to 4. It is fine sandy loam or loam. Some pedons do not have an E horizon.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 4 to 8. The lower part has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 to 8. Mottles are in shades of gray, brown, or red. Typically, this horizon is clay, clay loam, or silty clay, but some pedons have thin layers of sandy clay loam, loam, or clay loam.

The BCg horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 to 8. The texture is clay, clay loam, sandy clay loam, or sandy loam.

Dogue Series

The Dogue series consists of moderately well drained soils that formed in clayey fluvial and marine sediments. Slopes range from 0 to 12 percent.

Typical pedon of Dogue sandy loam, 0 to 2 percent slopes; about 0.2 mile east of the intersection of secondary road 1100 and U.S. Highway 13, about 100 feet south of secondary road 1100, in a cultivated field:

Ap—0 to 7 inches; brown (10YR 4/3) sandy loam; weak medium granular structure; friable; few fine roots; very strongly acid; abrupt smooth boundary.

Bt1—7 to 17 inches; brownish yellow (10YR 6/6) clay loam; common medium distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; few distinct yellowish brown (10YR 5/6) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—17 to 22 inches; yellowish brown (10YR 5/6) clay; common medium distinct light gray (10YR 7/1) and reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky

and plastic; few distinct yellowish brown (10YR 5/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3—22 to 30 inches; mottled pale yellow (2.5Y 7/4), light gray (10YR 7/1), and reddish yellow (7.5YR 6/8) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few distinct light gray (10YR 7/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg1—30 to 42 inches; light gray (10YR 7/1) clay; few medium distinct strong brown (7.5YR 5/8) and common medium distinct brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few distinct gray (10YR 6/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—42 to 50 inches; light gray (10YR 7/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and pale yellow (2.5Y 7/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint gray (10YR 6/1) clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.

CBg—50 to 58 inches; light gray (10YR 7/1) sandy loam; common medium distinct yellowish brown (10YR 5/8) and pale yellow (2.5Y 7/4) mottles; massive; friable; many fine flakes of mica; few fine dark opaques; thin lenses of sandy clay loam; very strongly acid; clear smooth boundary.

Cg1—58 to 70 inches; light gray (10YR 7/1) sandy loam; common medium distinct strong brown (7.5YR 5/8) and pale yellow (2.5Y 7/4) mottles; massive; friable; many fine flakes of mica; common fine dark opaques; very strongly acid; clear smooth boundary.

Cg2—70 to 82 inches; light gray (10YR 7/1) loamy sand; common medium distinct strong brown (7.5YR 5/8) and pale yellow (2.5Y 7/4) mottles; massive; friable; many fine flakes of mica; common fine dark opaques; very strongly acid.

The clayey material is 25 to 50 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added to the surface layer.

The Ap or A 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. This horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 6. It is sandy loam, fine sandy loam, or loam.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. The lower part has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8. It has mottles with high and low chroma, or it is mottled without a dominant matrix color. Typically, this horizon is clay or clay loam, but some pedons have thin layers of sandy clay, sandy clay loam, or sandy loam.

The CB horizon has hue of 7.5YR to 2.5Y, value to 4 to 7, and chroma of 1 to 8. The texture is sandy loam, loam, or loamy sand. Some pedons do not have a CB horizon.

The Cg horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8. The texture is loamy sand, sand, sandy loam, sandy clay loam, or clay loam.

Dorovan Series

The Dorovan series consists of very poorly drained, organic soils. The organic layers are more than 51 inches thick. They are underlain by unconsolidated fluvial sediment. Slopes are less than 1 percent.

Typical pedon of Dorovan mucky peat, frequently flooded; about 1.1 miles north of Colerain on North Carolina Highway 45, east 0.9 mile on a farm road to a trail in a cypress forest, 200 feet south of the trail:

Oe—0 to 5 inches; black (10YR 2/1) mucky peat consisting of partly decomposed leaves, roots, and twigs mixed with small amounts of well decomposed organic matter; 60 percent fiber; slightly sticky; extremely acid; gradual wavy boundary.

Oa1—5 to 28 inches; very dark gray (10YR 3/1) muck, broken face and rubbed; about 30 percent fiber, unrubbed, and 4 percent fiber, rubbed, of partly decomposed wood, 1 millimeter to 2 millimeters in size; massive; nonsticky; common roots and partly decomposed limbs; very strongly acid; diffuse wavy boundary.

Oa2—28 to 85 inches; black (10YR 2/1) muck, broken face and rubbed; about 20 percent fiber, unrubbed, and 3 percent fiber, rubbed, of partly decomposed wood, 1 millimeter to 2 millimeters in size; massive; nonsticky; few roots; few logs; woody limbs; very strongly acid; gradual wavy boundary.

2Cg—85 to 95 inches; gray (10YR 5/1) sand; single grained; loose; few partly decayed small fragments of wood; very strongly acid.

The organic material ranges from 51 to more than 80 inches in thickness. It is very strongly acid or extremely acid. It has 0 to 5 percent logs and wood fragments. The organic layers are underlain by sandy and loamy material.

The Oe horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is 40 to 90 percent fiber,

unrubbed, and 20 to 60 percent fiber, rubbed. Some pedons do not have an Oe horizon.

The Oa horizon has hue of 5YR to 2.5Y, value of 2 or 3, and chroma of 1 to 3. It is sapric material. The content of fiber is 15 to 40 percent, unrubbed, and 2 to 6 percent, rubbed. The content of mineral material in the Oa1 horizon ranges from 10 to 30 percent. A few logs and large fragments of wood are in the lower part of this horizon.

The 2C horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2. The texture is sand, loamy sand, loam, or sandy loam.

Exum Series

The Exum series consists of moderately well drained soils that formed in loamy marine sediment. Slopes range from 0 to 5 percent.

Typical pedon of Exum very fine sandy loam, 0 to 2 percent slopes; about 1.3 miles west of the intersection of North Carolina Highway 45 and secondary road 1301, about 500 feet south of secondary road 1301 up a farm path, 50 feet east of the farm path:

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

Bt1—7 to 15 inches; light olive brown (2.5Y 5/6) loam; weak medium subangular blocky structure; friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—15 to 20 inches; light olive brown (2.5Y 5/6) clay loam; weak medium subangular blocky structure; friable, slightly sticky; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3—20 to 27 inches; light olive brown (2.5Y 5/6) clay loam; common medium distinct brownish yellow (10YR 6/6) and grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct gray (10YR 6/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt4—27 to 65 inches; light yellowish brown (2.5Y 6/4) clay loam; common medium distinct light gray (10YR 7/1) and red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct gray (10YR 6/1) clay films on faces of peds; very strongly acid.

The loamy material is 60 to 90 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 1 to 3. If value is 2 or 3 and chroma is 1 to 3, the horizon is less than 7 inches thick.

Some pedons have an E horizon. This horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 2 to 4. The texture is silt loam or loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. Mottles with chroma of 2 or less are within 30 inches of the surface, but they are not in the upper 10 inches of the argillic horizon. This horizon has few to many mottles in shades of yellow, red, or brown. In some pedons the lower part of the horizon has a gray matrix. The texture is dominantly silt loam, silty clay loam, loam, or clay loam. In some pedons, however, the lower part of the horizon is silty clay or clay.

Goldsboro Series

The Goldsboro series consists of moderately well drained soils that formed in loamy marine sediment. Slopes range from 0 to 3 percent.

Typical pedon of Goldsboro sandy loam, 0 to 3 percent slopes; about 0.7 mile north of the intersection of North Carolina Highway 45 and secondary road 1347, about 0.7 mile east of North Carolina Highway 45 on a farm path, 50 feet south of the farm path:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; slightly acid; abrupt smooth boundary.

E—7 to 11 inches; pale yellow (2.5Y 7/4) sandy loam; weak fine granular structure; very friable; many fine and medium roots; slightly acid; clear smooth boundary.

Bt1—11 to 20 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky; few fine roots; few faint light olive brown (2.5Y 5/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—20 to 32 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) and common fine distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable, slightly sticky; few fine roots; many fine pores; few faint light olive brown (2.5Y 5/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—32 to 50 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; common medium distinct brownish

yellow (10YR 6/8), light gray (10YR 7/1), and reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky; many fine pores; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg1—50 to 64 inches; light gray (10YR 7/1) sandy clay loam; common medium distinct reddish yellow (7.5YR 6/8) and strong brown (7.5YR 5/8) and few fine distinct light yellowish brown (2.5Y 6/4) mottles; weak medium subangular blocky structure; friable, slightly sticky; few faint light brownish gray (10YR 6/2) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg2—64 to 72 inches; light gray (10YR 7/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) and few fine distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few faint light brownish gray (10YR 6/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

Cg—72 to 80 inches; light gray (10YR 7/1) loamy sand; common fine distinct light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) mottles; massive; friable; lenses of sandy loam; very strongly acid.

The loamy material is 60 to 90 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2. If the value is 3, the horizon is less than 6 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6. The texture is sandy loam or fine sandy loam.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 3 to 6. The lower part has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 5 and has mottles of high contrast. Low-chroma mottles, which are indicative of wetness, are within 18 to 30 inches of the surface. This horizon is mainly sandy clay loam, loam, or clay loam, but some pedons have thin layers of sandy loam, clay, or sandy clay.

The C horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is stratified sandy, loamy, or clayey sediment.

Grantham Series

The Grantham series consists of poorly drained soils that formed in loamy marine sediment. Slopes range from 0 to 2 percent.

Typical pedon of Grantham silt loam; about 2.2 miles north of Askewville, 2.2 miles north of the intersection of secondary road 1304 and North Railroad, 30 feet east of North Railroad, in a pine plantation:

A—0 to 4 inches; very dark gray (10YR 3/1) silt loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—4 to 7 inches; light gray (10YR 7/1) silt loam; common medium distinct light yellowish brown (2.5Y 6/4) and common fine distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

Btg1—7 to 17 inches; light gray (10YR 7/1) loam; common medium distinct light yellowish brown (2.5Y 6/4) and brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; common medium roots; few faint gray (10YR 6/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—17 to 27 inches; gray (10YR 6/1) clay loam; common medium distinct yellowish brown (10YR 5/8) and yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few medium roots; few faint gray (10YR 5/1) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg3—27 to 37 inches; gray (10YR 6/1) clay loam; common medium distinct light yellowish brown (2.5Y 6/4), strong brown (7.5YR 5/8), and red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few distinct gray (10YR 5/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg4—37 to 60 inches; gray (10YR 5/1) clay loam; common medium faint light gray (5YR 7/1) and common medium distinct red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few distinct grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid.

The loamy material is 60 or more inches thick. Reaction is very strongly acid or strongly acid.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2. If value is 2 or 3 and chroma is 1 or 2, the horizon is less than 7 inches thick.

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The texture is loam or silt

loam. Some pedons do not have an E horizon.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It has high-chroma mottles in most pedons. This horizon commonly is loam or clay loam.

Johnston Series

The Johnston series consists of very poorly drained soils that formed in recent alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Johnston loam, in a wooded area of Bibb and Johnston loams, frequently flooded; about 0.5 mile south of Colerain, 50 feet east of North Carolina Highway 45:

A—0 to 28 inches; black (10YR 2/1) loam; weak fine granular structure; very friable; many fine roots; very strongly acid; clear irregular boundary.

Cg1—28 to 40 inches; dark gray (10YR 4/1) loamy sand; common pockets and lenses of black (10YR 2/1) loam; loose, single grained; many fine roots, very strongly acid; gradual wavy boundary.

Cg2—40 to 60 inches; gray (10YR 5/1) loamy sand; pockets of coarse sand, single grained; loose, very strongly acid.

The loamy and sandy material is 60 or more inches thick. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR to 5Y, value of 2 or 3, and chroma of 1 or 2. The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. This horizon is loamy sand, sandy loam, and sand, or it is stratified with sandy clay loam to sand.

Leaf Series

The Leaf series consists of poorly drained soils that formed in clayey marine sediment. Slopes range from 0 to 2 percent.

Typical pedon of Leaf loam; about 0.6 mile southeast of the intersection of U.S. Highway 17 and secondary road 1502, about 1.6 miles south of the intersection of secondary road 1502 and a timber road, in a young pine plantation:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) loam; weak medium granular structure; friable; few fine and medium roots; very strongly acid; abrupt smooth boundary.

Btg1—5 to 15 inches; dark grayish brown (10YR 4/2) clay; few medium distinct brownish yellow (10YR 6/8) and common medium distinct strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm, sticky and plastic; few medium roots; few distinct dark gray (10YR 4/1) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—15 to 30 inches; gray (10YR 5/1) clay; common medium prominent yellowish red (5YR 5/8) and many medium distinct brownish yellow (10YR 6/8) mottles; moderate fine angular blocky structure; firm, sticky and plastic; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—30 to 44 inches; gray (10YR 5/1) clay; common medium distinct light gray (10YR 7/1) and common medium prominent dark red (10R 3/6) and brownish yellow (10YR 6/8) mottles; moderate fine angular blocky structure; firm, sticky and plastic; few distinct gray (10YR 6/1) clay films on faces of peds; extremely acid; gradual wavy boundary.

Btg4—44 to 52 inches; gray (10YR 5/1) clay; few medium distinct dark red (10R 3/6), few medium faint light gray (2.5Y 7/2), and common medium distinct brownish yellow (10YR 6/8) mottles; moderate fine angular blocky structure; firm, sticky and plastic; few distinct grayish brown (10YR 5/2) clay films on faces of peds; extremely acid; clear wavy boundary.

Btg5—52 to 72 inches; light gray (10YR 7/1) clay; few medium distinct strong brown (7.5YR 5/6) and common medium distinct brownish yellow (10YR 6/8) mottles; moderate fine angular blocky structure; firm, sticky and plastic; few distinct gray (10YR 6/1) clay films on faces of peds; extremely acid.

The clayey Bt horizon is 60 or more inches thick. Reaction ranges from extremely acid to strongly acid.

The A or Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The Btg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 2. It has high-chroma mottles in most pedons. It is silty clay loam, silty clay, or clay.

Lenoir Series

The Lenoir series consists of somewhat poorly drained soils that formed in clayey marine sediment. Slopes range from 0 to 2 percent.

Typical pedon of Lenoir fine sandy loam; about 1.2 miles west of the intersection of secondary roads 1300 and 1001, about 50 feet north of secondary road 1300, in a loblolly pine plantation:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine

sandy loam; weak fine granular structure; very friable; common fine and medium roots; strongly acid; abrupt smooth boundary.

Bt—7 to 16 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct dark gray (10YR 4/1) and yellowish red (5YR 4/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; few distinct light yellowish brown (10YR 6/4) clay films on faces of peds; strongly acid; clear wavy boundary.

Btg1—16 to 24 inches; grayish brown (10YR 5/2) clay; common fine prominent red (2.5YR 4/8) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few distinct dark brown (10YR 4/3) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—24 to 40 inches; gray (10YR 5/1) clay; common medium prominent red (2.5YR 4/8) and few fine distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—40 to 48 inches; light gray (10YR 7/1) clay; common medium prominent yellowish red (5YR 4/6) and reddish yellow (7.5YR 6/8) mottles; weak fine subangular blocky structure; firm, sticky and plastic; few distinct light brownish gray (10YR 6/2) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg4—48 to 72 inches; light gray (10YR 7/1) clay; few medium distinct light yellowish brown (10YR 6/4) and few fine prominent strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; firm, sticky and plastic; few distinct light gray (10YR 7/2) clay films on faces of peds; very strongly acid.

The clayey Bt horizon is 60 to 90 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2. Some pedons have an E horizon, which has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 8. It has few to many mottles with chroma of 2 or less. The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The texture of the Bt and Btg horizons is clay, clay loam, silty clay, or silty clay loam.

Lynchburg Series

The Lynchburg series consists of somewhat poorly drained soils that formed in loamy marine sediment. Slopes range from 0 to 2 percent.

Typical pedon of Lynchburg sandy loam; about 330 feet northeast of the intersection of North Carolina Highway 308 and secondary road 1119, about 30 feet north of secondary road 1119, in a cultivated field:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; very friable; many medium roots; strongly acid; abrupt smooth boundary.

E—8 to 10 inches; light yellowish brown (2.5Y 6/4) sandy loam; few fine distinct brownish yellow (10YR 6/8) mottles; weak medium granular structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bt—10 to 14 inches; light yellowish brown (10YR 6/4) sandy clay loam; few fine distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine roots; few faint brown (10YR 5/3) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg1—14 to 28 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky and plastic; many fine roots; many fine pores; few faint grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg2—28 to 51 inches; light brownish gray (2.5Y 6/2) sandy clay loam; few medium prominent yellowish red (5YR 5/8) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; few faint grayish brown (2.5Y 5/2) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—51 to 65 inches; light gray (10YR 7/1) sandy clay loam; common medium faint yellow (2.5Y 7/8) mottles; weak medium subangular blocky structure; friable; few faint gray (10YR 6/1) clay films on faces of peds; very strongly acid.

The loamy material is more than 60 inches thick. Reaction ranges from extremely acid to strongly acid

unless lime has been added to the surface layer.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. The E horizon has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 2 to 4. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8 and has mottles with chroma of 2 or less. The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. It has high-chroma mottles in most pedons. The texture of the Bt and Btg horizons commonly is sandy clay loam, but in some pedons it is clay loam, loam, sandy loam, or fine sandy loam.

Nahunta Series

The Nahunta series consists of somewhat poorly drained soils that formed in loamy marine sediment. Slopes range from 0 to 2 percent.

Typical pedon of Nahunta very fine sandy loam; about 0.4 mile north of the intersection of secondary road 1361 and North Carolina Highway 45, about 0.4 mile west of North Carolina Highway 45 on paper company road to intersection, 0.2 mile northeast of intersection on the paper company road, 50 feet east of the road:

A—0 to 6 inches; very dark gray (10YR 3/1) very fine sandy loam; weak medium granular structure; friable; common fine and medium roots; extremely acid; clear smooth boundary.

Bt1—6 to 10 inches; olive yellow (2.5Y 6/6) loam; common medium distinct light gray (10YR 7/2) and reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine and medium roots; few faint gray (10YR 6/1) clay films on faces of peds; extremely acid; clear smooth boundary.

Bt2—10 to 17 inches; brownish yellow (10YR 6/6) loam; common medium distinct light gray (10YR 7/1) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct gray (10YR 6/1) clay films on faces of peds; extremely acid; gradual smooth boundary.

Btg1—17 to 31 inches; light gray (10YR 7/1) clay loam; common medium distinct yellow (2.5Y 7/6) and strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct gray (10YR 6/1) clay films on faces of peds; extremely acid; gradual smooth boundary.

Btg2—31 to 48 inches; light gray (10YR 7/1) clay loam; common medium distinct brownish yellow (10YR 6/8) and red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct gray (10YR 6/1) clay films on faces of peds; extremely acid; gradual smooth boundary.

Btg3—48 to 64 inches; mottled light gray (10YR 7/1), yellow (10YR 7/8), red (2.5YR 4/8), and reddish yellow (7.5YR 6/8) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct gray (10YR 6/1) clay films on faces of peds; extremely acid.

The loamy material is 60 to more than 80 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added to the surface layer.

The Ap or A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. If value is 2 or 3 and chroma is 1 or 2, the horizon is less than 7 inches thick.

Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2 to 4. It is loam or silt loam.

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It has few to many mottles with chroma of 2 or less. The lower part of this horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 6 or 7 and chroma of 0 to 2. This horizon has high-chroma mottles in most pedons. It is loam, clay loam, or silty clay loam.

Norfolk Series

The Norfolk series consists of well drained soils that formed in loamy marine sediment. Slopes range from 0 to 6 percent.

Typical pedon of Norfolk sandy loam, 0 to 2 percent slopes; south of Colerain, about 0.4 mile west of the intersection of North Carolina Highway 45 and secondary road 1336, about 100 feet south of the end of a church cemetery road:

Ap—0 to 9 inches; grayish brown (10YR 5/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

E—9 to 15 inches; light yellowish brown (10YR 6/4) sandy loam; weak fine granular structure; very friable; few fine roots; very strongly acid; clear smooth boundary.

Bt1—15 to 19 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky

structure; friable; few fine and medium roots; very strongly acid; clear wavy boundary.

Bt2—19 to 27 inches; brownish yellow (10YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct yellowish brown (10YR 5/8) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—27 to 44 inches; strong brown (7.5YR 5/8) sandy clay loam; few faint prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct yellowish brown (10YR 5/8) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—44 to 55 inches; yellowish brown (10YR 5/8) sandy clay loam; many coarse prominent yellowish red (5YR 4/8) and common fine distinct very pale brown (10YR 7/4) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt5—55 to 70 inches; brownish yellow (10YR 6/8) sandy clay loam; common fine distinct gray (10YR 6/1), common medium prominent yellowish red (5YR 4/8), and many medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few faint yellowish brown (10YR 5/6) clay films on faces of peds; very strongly acid.

The loamy material is 60 to more than 80 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 3. The E horizon has hue of 10YR, value of 6 or 7, and chroma of 3 or 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 3 to 8. The texture commonly is sandy clay loam, but in some pedons it is sandy loam, loam, or clay loam.

Pantego Series

The Pantego series consists of very poorly drained soils that formed in loamy marine sediment. Slopes range from 0 to 2 percent.

Typical pedon of Pantego loam; about 2 miles northwest of the intersection of secondary road 1208 and North Carolina Highway 11, about 100 yards north of the end of a dirt road that crosses a railroad track:

A—0 to 12 inches; black (10YR 2/1) loam; weak fine granular structure; very friable; very strongly acid; abrupt smooth boundary.

BE—12 to 18 inches; dark gray (10YR 4/1) loam; weak fine granular structure; very friable; very strongly acid; clear smooth boundary.

Btg1—18 to 22 inches; light brownish gray (10YR 6/2) sandy loam; common medium faint dark gray (10YR 4/1) mottles; weak medium subangular blocky structure; friable; very strongly acid; gradual smooth boundary.

Btg2—22 to 38 inches; dark gray (10YR 4/1) sandy clay loam; common fine distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg3—38 to 72 inches; dark gray (10YR 4/1) sandy clay loam; common fine distinct strong brown (7.5YR 5/8) and light gray (10YR 7/1) mottles; massive; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid.

The loamy material is 60 to more than 75 inches thick. Reaction ranges from extremely acid to strongly acid unless lime has been added to the surface layer.

The A or Ap horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1.

The BE horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The texture is loam or sandy loam. Some pedons do not have a BE horizon.

The Btg horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2. Common mottles with high chroma are in the lower part of this horizon. The texture is sandy clay loam, sandy loam, clay loam, or sandy clay.

Rains Series

The Rains series consists of poorly drained soils that formed in loamy marine sediment. Slopes range from 0 to 2 percent.

Typical pedon of Rains sandy loam; about 1.4 miles west of Perrytown on secondary road 1344, about 75 feet north of secondary road 1344, in a cultivated field:

Ap—0 to 6 inches; very dark gray (10YR 3/1) sandy loam; weak medium and fine granular structure; very friable; common fine and medium roots; very strongly acid; abrupt wavy boundary.

Btg1—6 to 16 inches; light gray (10YR 7/1) sandy loam; common medium distinct yellowish brown (10YR

5/8), brownish yellow (10YR 6/8), and pale yellow (2.5Y 7/4) mottles; weak medium subangular blocky structure; friable; few faint gray (10YR 6/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—16 to 30 inches; gray (10YR 6/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/8) and few fine prominent reddish yellow (5YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few fine pores; few faint grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Btg3—30 to 62 inches; gray (10YR 6/1) sandy clay loam; common medium distinct strong brown (7.5YR 5/8), yellowish brown (10YR 5/6), and pale yellow (2.5Y 7/4) and few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine pores; few distinct grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg4—62 to 72 inches; mottled light gray (10YR 7/1), gray (5YR 6/1), and reddish yellow (5YR 6/8) clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct gray (10YR 6/1) clay films on faces of peds; very strongly acid.

The loamy material is more than 60 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. If value is 2 or 3 and chroma is 1 or 2, the horizon is less than 7 inches thick.

Some pedons have an E horizon. This horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It is sandy loam or fine sandy loam.

The Btg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 2. It commonly has few to many high-chroma mottles. The texture commonly is sandy clay loam or clay loam, but in some pedons it ranges from sandy clay loam or clay to sandy loam or sandy clay.

Roanoke Series

The Roanoke series consists of poorly drained soils that formed in fluvial sediment. Slopes range from 0 to 2 percent.

Typical pedon of Roanoke fine sandy loam, frequently flooded; about 1 mile south of the intersection of secondary roads 1500 and 1519, 0.1 mile east of secondary road 1519 on a paper company road, 50 feet south of the paper company road:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; slightly acid; abrupt smooth boundary.

Btg1—7 to 11 inches; light brownish gray (10YR 6/2) loam; few fine prominent strong brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Btg2—11 to 28 inches; gray (10YR 5/1) clay; many coarse prominent strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; firm, sticky and plastic; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine flakes of mica; very strongly acid; clear smooth boundary.

Btg3—28 to 38 inches; light gray (10YR 7/1) clay; many medium prominent yellowish red (5YR 5/8) and common medium prominent light red (2.5YR 6/6) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine roots; few distinct gray (10YR 6/1) clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Btg4—38 to 45 inches; gray (10YR 5/1) clay loam; common medium faint brownish yellow (10YR 6/8) mottles; common lenses of sandy clay; weak medium subangular blocky structure; friable; few fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual smooth boundary.

Cg—45 to 60 inches; gray (10YR 5/1) sandy loam; massive; friable; few fine flakes of mica; very strongly acid.

The clayey Bt horizon is 25 to 55 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2. Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is fine sandy loam or loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. Mottles in shades of yellow and brown are common. Typically, the texture is clay, clay loam, or silty clay, but some pedons have thin layers of silty clay loam, loam, or sandy clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4

to 7, and chroma of 1 or 2. This horizon is commonly sandy loam, loamy sand, or sand, or it is stratified with sand to clay.

Seabrook Series

The Seabrook series consists of moderately well drained soils that formed in sandy fluvial sediment. Slopes range from 0 to 2 percent.

Typical pedon of Seabrook loamy sand; about 3.7 miles south of the intersection of U.S. Highway 17 and secondary road 1500, about 0.6 mile north of secondary road 1500 on a private road, 50 feet east of the private road, in a cultivated field:

Ap—0 to 10 inches; brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.
C1—10 to 28 inches; pale brown (10YR 6/3) loamy sand; weak fine granular structure; very friable; few fine roots; strongly acid; gradual wavy boundary.
C2—28 to 34 inches; yellowish brown (10YR 5/8) loamy sand; common medium and coarse distinct light gray (10YR 7/1) mottles; single grained; loose; few fine flakes of mica; slightly acid; gradual wavy boundary.
C3—34 to 40 inches; light gray (10YR 7/1) loamy sand; many medium distinct yellow (10YR 7/8) mottles; single grained; loose; slightly acid; gradual wavy boundary.
C4—40 to 65 inches; light gray (10YR 7/1) sand; many medium distinct yellow (10YR 7/8) mottles; single grained; loose; medium acid.

The sandy material is more than 60 inches thick. Reaction ranges from very strongly acid to slightly acid unless lime has been added to the surface layer.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. The upper part of the C horizon has hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. The lower part has hue of 10YR to 5Y, value of 6 or 7, and chroma of 1 or 2. This horizon is fine sand, sand, or loamy sand.

Tarboro Series

The Tarboro series consists of somewhat excessively drained soils that formed in sandy fluvial sediment. Slopes range from 0 to 5 percent.

Typical pedon of Tarboro loamy sand, 0 to 5 percent slopes; about 0.3 mile east of the intersection of secondary roads 1521 and 1518, 400 feet south of secondary road 1518, in a cultivated field:

Ap—0 to 10 inches; brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.
C1—10 to 14 inches; yellowish brown (10YR 5/4) loamy sand; weak fine granular structure; very friable; few fine roots; strongly acid; gradual wavy boundary.
C2—14 to 40 inches; brownish yellow (10YR 6/6) loamy sand; weak medium granular structure; very friable; few fine roots; strongly acid; gradual wavy boundary.
C3—40 to 53 inches; strong brown (7.5YR 5/8) loamy sand; single grained; loose; few fine flakes of mica; slightly acid; gradual wavy boundary.
C4—53 to 82 inches; strong brown (7.5YR 5/6) loamy sand; many coarse prominent very pale brown (10YR 7/4) mottles; single grained; loose; slightly acid.

The sandy material is more than 80 inches thick. Reaction ranges from strongly acid to slightly acid unless lime has been added to the surface layer.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 or 4. The C horizon has hue of 5YR to 10YR, value of 4 to 8, and chroma of 3 to 8. It is loamy sand or sand.

Tomotley Series

The Tomotley series consists of poorly drained soils that formed in loamy fluvial sediment. Slopes range from 0 to 2 percent.

Typical pedon of Tomotley sandy loam; about 0.3 mile south of the intersection of secondary roads 1500 and 1518, about 50 feet west of secondary road 1518, in a cultivated field:

Ap—0 to 8 inches; dark gray (10YR 4/1) sandy loam; weak medium granular structure; friable; few fine and medium roots; medium acid; abrupt smooth boundary.
Btg1—8 to 18 inches; gray (10YR 5/1) sandy clay loam; weak fine subangular blocky structure; few fine and medium roots; friable; few faint dark gray (10YR 4/1) clay films on faces of peds; very strongly acid; clear smooth boundary.
Btg2—18 to 35 inches; gray (10YR 6/1) sandy clay loam; common fine distinct brownish yellow (10YR 6/8), yellowish brown (10YR 5/8), and olive yellow (2.5Y 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky; few faint grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; clear smooth boundary.
Btg3—35 to 42 inches; light gray (10YR 7/1) sandy clay

loam; common fine faint gray and common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky; few faint light brownish gray (10YR 6/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg4—42 to 50 inches; light brownish gray (2.5Y 6/2) sandy clay loam; common fine prominent yellowish red (5YR 5/8) and common fine distinct brownish yellow (10YR 6/6) mottles; friable, slightly sticky; thin lenses of sandy loam; few faint gray (10YR 6/1) clay films on faces of peds; very strongly acid; clear smooth boundary.

Cg1—50 to 60 inches; light olive gray (5Y 6/2) sand; common fine prominent reddish yellow (7.5YR 6/8) and few fine distinct yellowish brown (10YR 5/8) mottles; single grained; loose; common fine flakes of mica; many fine dark opaques; very strongly acid; clear smooth boundary.

Cg2—60 to 72 inches; light gray (10YR 7/1) sand; single grained; loose; common fine flakes of mica; many fine dark opaques; extremely acid.

The loamy material is 40 to 60 inches thick. Reaction ranges from extremely acid to strongly acid in the upper part of the profile unless lime has been added to the surface layer. At a depth of about 50 inches or more, reaction ranges from extremely acid to medium acid.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2. Some pedons have an E horizon. This horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is sandy loam or fine sandy loam.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. Typically, the texture is sandy clay loam or clay loam, but some pedons have thin layers of sandy loam or fine sandy loam.

The C horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in various shades of red, olive, yellow, brown, or gray. This horizon is commonly sandy loam, loamy sand, or sand, or it is stratified with sand to clay.

Wahee Series

The Wahee series consists of somewhat poorly drained soils that formed in clayey fluvial and marine sediments. Slopes range from 0 to 2 percent.

Typical pedon of Wahee sandy loam; 0.5 mile southeast of the intersection of secondary roads 1500 and 1517, about 200 feet northeast of secondary road 1517, in a cultivated field:

Ap—0 to 5 inches; brown (10YR 5/3) sandy loam; weak medium granular structure; friable; few fine and medium roots; neutral; abrupt smooth boundary.

Bt1—5 to 15 inches; light olive brown (2.5Y 5/4) clay loam; common medium distinct strong brown (7.5YR 5/8) and light gray (10YR 7/1) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; few distinct light brownish gray (2.5Y 6/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—15 to 22 inches; light yellowish brown (2.5Y 6/4) clay; common medium distinct light gray (10YR 7/2) and few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few distinct light brownish gray (2.5Y 6/2) clay films on faces of peds; strongly acid; clear smooth boundary.

Btg1—22 to 35 inches; light gray (10YR 7/2) clay; common medium distinct yellowish brown (10YR 5/8) and few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few distinct light brownish gray (2.5Y 6/2) clay films on faces of peds; strongly acid; clear smooth boundary.

Btg2—35 to 47 inches; light gray (10YR 7/1) sandy clay loam; many medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; few distinct light yellowish brown (2.5Y 6/4) clay films on faces of peds; strongly acid; clear smooth boundary.

BC—47 to 60 inches; light gray (10YR 7/1) sandy loam; few medium prominent strong brown (7.5YR 5/8) mottles; weak fine subangular structure; friable; strongly acid; clear smooth boundary.

C—60 to 72 inches; light gray (10YR 7/2) sand; massive; very friable; few fine flakes of mica; strongly acid.

The clayey Bt horizon is 15 to 45 inches thick. Reaction is very strongly acid or strongly acid unless lime has been added to the surface layer.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It has mottles with chroma of 2 or less. The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture of the Bt and Btg horizons is clay, clay loam, sandy clay loam, or silty clay loam.

The BC horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The C horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2. Some pedons have mottles in shades of red, brown, or yellow. The texture ranges from clay to sand.

Wehadkee Series

The Wehadkee series consists of poorly drained soils that formed in loamy fluvial sediment. Slopes range from 0 to 2 percent.

Typical pedon of Wehadkee loam, frequently flooded; about 2.8 miles northeast of the Roanoke River, 200 feet east of U.S. Highway 17:

A—0 to 10 inches; gray (10YR 5/1) loam; common fine prominent reddish brown (5YR 4/4) mottles; weak medium granular structure; friable; common fine and medium roots; strongly acid; clear smooth boundary.

Bg1—10 to 22 inches; gray (10YR 5/1) loam; many prominent reddish brown (5YR 4/4) mottles; weak fine subangular blocky structure; friable; common fine and medium roots; strongly acid; clear smooth boundary.

Bg2—22 to 45 inches; dark gray (N 4/0) loam; common medium prominent red (2.5YR 4/8) mottles; weak fine subangular blocky structure; friable, slightly sticky; few medium roots; strongly acid; gradual smooth boundary.

Cg1—45 to 52 inches; dark gray (N 4/0) loam; massive; friable, slightly sticky; common fine flakes of mica; strongly acid; gradual smooth boundary.

Cg2—52 to 65 inches; dark gray (N 4/0) clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable, slightly sticky and slightly plastic; common fine flakes of mica; few fine black concretions; strongly acid.

The loamy material is 30 to more than 60 inches thick. Reaction ranges from very strongly acid to neutral.

The A horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 4.

The Bg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. The texture is loam, clay loam, silt loam, silty clay loam, or sandy clay loam.

The Cg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 to 7 and chroma of 0 to 2. The texture is loam, clay loam, sandy loam, or sand.

Wickham Series

The Wickham series consists of well drained soils that formed in loamy marine and fluvial sediments. Slopes range from 0 to 10 percent.

Typical pedon of Wickham fine sandy loam, 2 to 6 percent slopes; about 50 feet south of U.S. Highway 17 bypass, 0.4 mile east of the intersection of business U.S. Highways 13 and 17 near Windsor:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; medium acid; abrupt smooth boundary.

Bt1—8 to 28 inches; reddish yellow (5YR 6/8) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky; common fine roots; few faint reddish brown (5YR 4/4) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—28 to 42 inches; yellowish red (5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few faint reddish brown (5YR 4/4) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—42 to 53 inches; strong brown (7.5YR 5/8) sandy loam; weak medium subangular blocky structure; friable; few distinct reddish brown (5YR 4/4) clay films on faces of peds; common fine flakes of mica; strongly acid; gradual wavy boundary.

C—53 to 68 inches; yellowish brown (10YR 5/8) loamy sand; weak medium granular structure; friable; few fine flakes of mica; very strongly acid.

The loamy material is 36 to more than 60 inches thick. Reaction ranges from very strongly acid to medium acid unless lime has been added to the surface layer.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 4. Some pedons have an E horizon. This horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. It is fine sandy loam, loamy fine sand, or sandy loam.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. The texture commonly is sandy clay loam or clay loam, but some pedons have thin layers of sandy loam, fine sandy loam, clay, or sandy clay.

The C horizon has hue of 5YR to 10YR, value of 5 or 6, and chroma of 3 to 8. It is commonly fine sand, sand, or loamy sand, or it is stratified with sand to sandy clay loam.

Winton Series

The Winton series consists of moderately well

drained soils that formed in loamy marine and fluvial sediments. Slopes range from 8 to 60 percent.

Typical pedon of Winton fine sandy loam, 15 to 60 percent slopes; about 1.1 miles east of North Carolina Highway 45, near Mount Gould on White's Beach Road, 100 feet north of the road:

A—0 to 8 inches; dark gray (10YR 4/1) fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

E1—8 to 13 inches; pale brown (10YR 6/3) fine sandy loam; weak medium granular structure; friable; many medium roots; few weakly cemented nodules; strongly acid; clear smooth boundary.

E2—13 to 17 inches; light gray (10YR 7/2) fine sandy loam; weak medium granular structure; friable; few fine and common medium roots; very strongly acid; clear smooth boundary.

Bt1—17 to 22 inches; light yellowish brown (10YR 6/4) clay loam; weak medium subangular blocky structure; friable, slightly sticky; few fine and medium roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—22 to 29 inches; yellowish brown (10YR 5/4) sandy clay loam; common medium distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; friable, slightly sticky; few medium and coarse roots; few faint brown (10YR 5/3) clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—29 to 54 inches; light yellowish brown (2.5Y 6/4) sandy clay loam; few fine distinct yellowish brown (10YR 5/6) and common medium distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; friable, slightly sticky; few coarse roots; few distinct olive brown (2.5Y 4/4) clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—54 to 70 inches; very pale brown (10YR 7/4) sandy loam; few fine distinct brownish yellow (10YR 6/6) and light gray (10YR 7/1) mottles; weak fine subangular blocky structure parting to weak medium granular; friable; common feldspar grains; common dark mineral grains; very strongly acid; gradual wavy boundary.

C1—70 to 75 inches; pale yellow (2.5Y 7/4) loamy sand; weak medium granular structure; friable; common dark mineral grains; very strongly acid; gradual wavy boundary.

C2—75 to 80 inches; very pale brown (10YR 8/3) fine sand; loose; single grained; common dark mineral grains; very strongly acid.

The loamy Bt horizon is 20 to 40 inches thick. Reaction is very strongly acid to medium acid unless lime has been added to the surface layer.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 4. The E horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 2 to 6. It is fine sandy loam, sandy loam, loamy sand, or loamy fine sand.

The Bt horizon generally has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 2 to 8. In some pedons, however, the lower part of this horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Mottles in shades of red, brown, and yellow are in most pedons. The texture is sandy clay loam, sandy loam, fine sandy loam, or clay loam.

The BC horizon has colors similar to those of the Bt horizon, has a gray matrix, or is mottled. The texture is fine sandy loam, sandy loam, loamy sand, or loamy fine sand.

The C horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 3 to 8 and chroma of 0 to 8. In some pedons it is mottled. This horizon ranges from sand to clay and is commonly stratified.

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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—

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.

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.

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.

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.

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.

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 fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

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.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

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.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

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. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

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.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

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).

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

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

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

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

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.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

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.

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.

Slow intake (in tables). The slow movement of water into 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, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing 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.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

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."

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.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1954-81 at Lewiston, 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-----	51.9	28.3	40.1	76	5	33	4.08	2.54	5.45	8	2.2
February----	54.6	30.0	42.3	77	8	35	3.87	2.43	5.16	7	2.3
March-------	63.2	37.3	50.3	85	18	128	4.00	2.83	5.07	7	.9
April-------	74.0	45.9	60.0	90	26	305	3.09	1.71	4.30	6	.0
May---------	80.1	53.9	67.0	93	33	527	4.53	2.42	6.39	7	.0
June--------	86.1	61.0	73.6	98	42	708	4.08	2.28	5.67	7	.0
July--------	89.1	65.6	77.4	98	49	849	5.87	3.12	8.28	8	.0
August------	88.4	64.8	76.6	97	48	825	5.00	2.19	7.39	7	.0
September---	83.5	58.7	71.1	95	39	633	4.17	1.74	6.23	6	.0
October-----	73.8	47.0	60.4	88	24	330	3.35	1.32	5.04	5	.0
November----	64.7	38.0	51.4	83	17	111	2.75	1.25	4.02	5	.0
December----	55.1	30.9	43.0	77	9	53	3.42	1.89	4.77	6	.9
Yearly:											
Average---	72.0	46.8	59.4	---	---	---	---	---	---	---	---
Extreme---	---	---	---	100	3	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,537	48.21	42.21	54.52	79	6.3

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1954-81 at Lewiston, 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--	Apr. 5	Apr. 18	May 5
2 years in 10 later than--	Mar. 30	Apr. 13	Apr. 29
5 years in 10 later than--	Mar. 20	Apr. 3	Apr. 16
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 24	Oct. 14	Oct. 8
2 years in 10 earlier than--	Oct. 30	Oct. 19	Oct. 13
5 years in 10 earlier than--	Nov. 12	Oct. 30	Oct. 21

TABLE 3.--GROWING SEASON

(Recorded in the period 1954-81 at Lewiston, 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	208	183	165
8 years in 10	218	192	173
5 years in 10	237	210	187
2 years in 10	256	227	202
1 year in 10	266	236	210

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AtA	Altavista fine sandy loam, 0 to 3 percent slopes	5,925	1.3
Au	Augusta fine sandy loam	2,180	0.5
BB	Bibb and Johnston loams, frequently flooded	19,630	4.4
BoB	Bonneau loamy sand, 0 to 6 percent slopes	4,710	1.0
BoC	Bonneau loamy sand, 6 to 10 percent slopes	475	0.1
Ch	Chewacla loam, frequently flooded	18,910	4.2
CnB	Conetoe loamy sand, 0 to 5 percent slopes	5,250	1.2
CrA	Craven fine sandy loam, 0 to 1 percent slopes	12,940	2.9
CrB	Craven fine sandy loam, 1 to 4 percent slopes	19,780	4.4
CrC	Craven fine sandy loam, 4 to 8 percent slopes	5,700	1.3
DgA	Dogue sandy loam, 0 to 2 percent slopes	2,350	0.5
DgB	Dogue sandy loam, 2 to 6 percent slopes	2,450	0.5
DgC	Dogue sandy loam, 6 to 12 percent slopes	550	0.1
Dk	Dorovan mucky peat, frequently flooded	30,375	6.8
ExA	Exum very fine sandy loam, 0 to 2 percent slopes	16,580	3.7
ExB	Exum very fine sandy loam, 2 to 5 percent slopes	4,775	1.1
GoA	Goldsboro sandy loam, 0 to 3 percent slopes	26,390	5.9
Gt	Grantham silt loam	20,790	4.6
Lf	Leaf loam	65,315	14.6
Ln	Lenoir fine sandy loam	21,250	4.7
Ly	Lynchburg sandy loam	11,810	2.6
Na	Nahunta very fine sandy loam	11,030	2.5
NoA	Norfolk sandy loam, 0 to 2 percent slopes	8,690	1.9
NoB	Norfolk sandy loam, 2 to 6 percent slopes	6,615	1.5
Pa	Pantego loam	5,005	1.1
Ra	Rains sandy loam	24,105	5.4
Ro	Roanoke fine sandy loam, frequently flooded	31,720	7.1
Se	Seabrook loamy sand	2,095	0.5
TaB	Tarboro loamy sand, 0 to 5 percent slopes	3,065	0.7
Tm	Tomotley sandy loam	2,225	0.5
Ud	Udorthents, loamy	520	0.1
Wa	Wahee sandy loam	6,175	1.4
WE	Wehadkee loam, frequently flooded	21,965	4.9
WkA	Wickham fine sandy loam, 0 to 2 percent slopes	8,565	1.9
WkB	Wickham fine sandy loam, 2 to 6 percent slopes	9,585	2.1
WkC	Wickham fine sandy loam, 6 to 10 percent slopes	600	0.1
WmB	Wickham-Urban land complex, 2 to 10 percent slopes	315	0.1
WtD	Winton fine sandy loam, 8 to 15 percent slopes	4,640	1.0
WtE	Winton fine sandy loam, 15 to 60 percent slopes	3,545	0.8
	Total	448,595	100.0

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Tobacco	Corn	Soybeans	Peanuts	Wheat	Cotton lint
		Lbs	Bu	Bu	Lbs	Bu	Lbs
AtA---------- Altavista	IIw	2,600	120	42	3,000	55	600
Au---------- Augusta	IIIw	2,400	115	38	2,400	55	575
BB----------		---	---	---	---	---	---
Bibb----------	Vw						
Johnston-------	VIIw						
BoB---------- Bonneau	IIs	2,500	85	30	2,900	---	700
BoC---------- Bonneau	IIIs	2,400	80	25	2,500	---	650
Ch---------- Chewacla	IVw	---	80	30	---	---	---
CnB---------- Conetoe	IIs	2,200	75	25	3,000	---	---
CrA---------- Craven	IIw	2,300	105	30	2,600	55	600
CrB---------- Craven	IIIe	2,200	95	27	2,400	50	500
CrC---------- Craven	IVe	---	90	30	---	45	400
DgA---------- Dogue	IIw	2,300	115	35	3,700	60	---
DgB---------- Dogue	IIe	2,200	110	30	3,500	55	---
DgC---------- Dogue	IIIe	2,000	100	28	3,000	45	---
Dk---------- Dorovan	VIIw	---	---	---	---	---	---
ExA---------- Exum	IIw	2,800	125	45	3,100	58	750
ExB---------- Exum	IIe	2,600	120	43	3,000	55	750
GoA---------- Goldsboro	IIw	2,700	125	45	3,200	60	700
Gt---------- Grantham	IIIw	---	130	45	---	---	---
Lf---------- Leaf	IVw	---	100	30	---	---	---

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS--Continued

Soil name and map symbol	Land capability	Tobacco	Corn	Soybeans	Peanuts	Wheat	Cotton lint
		Lbs	Bu	Bu	Lbs	Bu	Lbs
Ln---------- Lenoir	IIIw	2,200	100	35	2,100	45	525
Ly---------- Lynchburg	IIw	2,600	125	45	2,800	55	675
Na---------- Nahunta	IIw	2,600	125	45	2,800	55	675
NoA---------- Norfolk	I	2,800	120	40	3,600	60	700
NoB---------- Norfolk	IIe	2,700	115	35	3,500	55	650
Pa---------- Pantego	IIIw	---	130	45	---	---	---
Ra---------- Rains	IIIw	---	120	40	---	---	450
Ro---------- Roanoke	Vw	---	---	---	---	---	---
Se---------- Seabrook	IIIs	2,000	75	25	2,200	---	---
TaB---------- Tarboro	IIIs	1,700	60	18	2,000	---	---
Tm---------- Tomotley	IVw	---	125	45	---	---	---
Ud. Udorthents							
Wa---------- Wahee	IIw	---	100	32	---	---	---
WE---------- Wehadkee	VIw	---	---	---	---	---	---
WkA---------- Wickham	I	2,700	120	42	3,300	55	800
WkB---------- Wickham	IIe	2,600	115	38	3,200	50	750
WkC---------- Wickham	IIIe	2,100	105	35	3,100	45	650
WmB. Wickham-Urban land							
WtD---------- Winton	IVe	---	60	18	---	---	---
WtE---------- Winton	VIIe	---	---	---	---	---	---

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	17,255	---	---	---
II	126,585	23,425	93,200	9,960
III	95,047	21,087	68,325	5,635
IV	96,790	10,340	86,450	---
V	43,301	---	43,301	---
VI	26,970	---	26,970	---
VII	41,968	3,545	38,423	---
VIII	157	---	---	157

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
AtA---------- Altavista	9A	Slight	Slight	Slight	Loblolly pine--------	91	9	Loblolly pine, hardwoods**.
					White oak----------	77	4	
					Sweetgum----------	---	---	
					Red maple----------	---	---	
					Yellow poplar--------	---	---	
					Southern red oak-----	---	---	
					Water oak----------	---	---	
					American beech-------	---	---	
					Hickory----------	---	---	
Au---------- Augusta	9W	Slight	Moderate	Slight	Loblolly pine--------	90	9	Loblolly pine, hardwoods**.
					Sweetgum----------	90	7	
					Water oak----------	---	---	
					Red maple----------	---	---	
					Yellow poplar--------	---	---	
					American beech-------	---	---	
					Willow oak----------	---	---	
					Black cherry----------	---	---	
BB:								
Bibb----------	9W	Slight	Severe	Severe	Loblolly pine--------	90	9	Loblolly pine***, hardwoods**.
					Sweetgum----------	90	7	
					Water oak----------	90	6	
					Green ash----------	---	---	
Johnston----------	12W	Slight	Severe	Severe	Loblolly pine--------	106	12	Loblolly pine***, hardwoods**.
					Sweetgum----------	94	8	
					Water oak----------	103	7	
					Water tupelo---------	---	---	
					Baldcypress----------	---	---	
					Pond pine----------	---	---	
BoB, BoC---------- Bonneau	9S	Slight	Moderate	Moderate	Loblolly pine--------	86	9	Loblolly pine, longleaf pine.
					Longleaf pine--------	75	6	
					White oak----------	---	---	
					Hickory----------	---	---	
					Southern red oak-----	---	---	
Ch---------- Chewacla	10W	Slight	Moderate	Slight	Loblolly pine--------	95	10	Loblolly pine***, hardwoods**.
					Yellow poplar--------	95	7	
					Sweetgum----------	97	9	
					Water oak----------	80	5	
					Green ash----------	---	---	
					Southern red oak-----	---	---	
					Willow oak----------	---	---	
					American sycamore----	---	---	
CnB---------- Conetoe	8S	Slight	Moderate	Moderate	Loblolly pine--------	85	8	Loblolly pine, longleaf pine.
					Longleaf pine--------	---	---	
					Southern red oak-----	---	---	
					Post oak----------	---	---	
					White oak----------	---	---	
					Hickory----------	---	---	
					Sweetgum----------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
CrA, CrB, CrC---- Craven	9C	Slight	Moderate	Slight	Loblolly pine----	88	9	Loblolly pine.
					White oak----	90	5	
					Willow oak----	85	6	
					Southern red oak----	90	5	
					Sweetgum----	---	---	
					Red maple----	---	---	
					American elm----	---	---	
DgA, DgB, DgC---- Dogue	9A	Slight	Moderate	Slight	Loblolly pine----	90	9	Loblolly pine.
					Southern red oak----	80	4	
					Sweetgum----	90	7	
					Yellow poplar----	93	7	
					White oak----	80	4	
					American elm----	---	---	
Dk---- Dorovan	7W	Slight	Severe	Severe	Blackgum----	70	7	Baldcypress.
					Sweetbay----	---	---	
					Baldcypress----	---	---	
					Swamp tupelo----	---	---	
					Green ash----	---	---	
					Red maple----	---	---	
					Water tupelo----	---	---	
					Pond pine----	---	---	
ExA, ExB---- Exum	8A	Slight	Slight	Slight	Loblolly pine----	82	8	Loblolly pine, hardwoods**.
					Sweetgum----	---	---	
					Yellow poplar----	---	---	
					Southern red oak----	---	---	
					White oak----	---	---	
					American elm----	---	---	
GoA---- Goldsboro	9A	Slight	Slight	Slight	Loblolly pine----	90	9	Loblolly pine, hardwoods**.
					Sweetgum----	---	---	
					Southern red oak----	---	---	
					White oak----	---	---	
					Willow oak----	---	---	
					Yellow poplar----	---	---	
					American elm----	---	---	
Gt---- Grantham	9W	Slight	Moderate	Moderate	Loblolly pine----	86	9	Loblolly pine***, hardwoods**.
					Sweetgum----	---	---	
					Red maple----	---	---	
					Willow oak----	---	---	
					Yellow poplar----	---	---	
					Pond pine----	---	---	
					American sycamore----	---	---	
Lf---- Leaf	9W	Slight	Moderate	Moderate	Loblolly pine----	90	9	Loblolly pine***, hardwoods**.
					Sweetgum----	90	7	
					Red maple----	---	---	
					Hickory----	---	---	
					American elm----	---	---	
					Water oak----	---	---	
					Willow oak----	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
Ln Lenoir	9W	Slight	Moderate	Slight	Loblolly pine Water oak Sweetgum Red maple Pond pine	87 --- --- --- ---	9 --- --- --- ---	Loblolly pine, hardwoods**.
Ly Lynchburg	9W	Slight	Moderate	Slight	Loblolly pine Yellow poplar Sweetgum Southern red oak White oak American sycamore	86 92 90 --- --- ---	9 6 7 --- --- ---	Loblolly pine, hardwoods**.
Na Nahunta	9W	Slight	Moderate	Slight	Loblolly pine Sweetgum Yellow poplar Southern red oak White oak American sycamore	87 --- --- --- --- ---	9 --- --- --- --- ---	Loblolly pine, hardwoods**.
NoA, NoB Norfolk	8A	Slight	Slight	Slight	Loblolly pine Southern red oak White oak Yellow poplar Hickory American elm	84 --- --- --- --- ---	8 --- --- --- --- ---	Loblolly pine.
Pa Pantego	9W	Slight	Severe	Severe	Loblolly pine Sweetgum Yellow poplar Water oak Willow oak Red maple Water tupelo	91 91 110 --- --- --- ---	9 8 9 --- --- --- ---	Loblolly pine***, hardwoods**.
Ra Rains	10W	Slight	Severe	Severe	Loblolly pine Sweetgum Water oak American beech	94 90 --- ---	10 7 --- ---	Loblolly pine***, hardwoods**.
Ro Roanoke	7W	Slight	Severe	Severe	Sweetgum Pond pine Water oak Water tupelo Green ash	90 --- --- --- ---	7 --- --- --- ---	Hardwoods**.
Se Seabrook	8S	Slight	Moderate	Moderate	Loblolly pine Southern red oak Sweetgum Red maple Yellow poplar Water oak Willow oak American beech	81 --- --- --- --- --- --- ---	8 --- --- --- --- --- --- ---	Loblolly pine.
TaB Tarboro	7S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine Southern red oak White oak Blackjack oak	72 --- --- --- ---	7 --- --- --- ---	Loblolly pine, longleaf pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class*	
Tm---------- Tomotley	10W	Slight	Moderate	Moderate	Loblolly pine--------	97	10	Loblolly pine***.
					Water oak----------	78	5	
					Willow oak----------	86	6	
					Sweetgum----------	---	---	
					Yellow poplar--------	---	---	
					Red maple----------	---	---	
					American beech-------	---	---	
Ud. Udorthents								
Wa---------- Wahee	9W	Slight	Moderate	Moderate	Loblolly pine--------	86	9	Loblolly pine, hardwoods**.
					Sweetgum----------	90	7	
					Water oak----------	---	---	
					Willow oak----------	---	---	
					Southern red oak-----	---	---	
					Pond pine----------	---	---	
WE---------- Wehadkee	10W	Slight	Severe	Moderate	Loblolly pine--------	93	10	Loblolly pine***, hardwoods**.
					Yellow poplar--------	100	8	
					Sweetgum----------	94	8	
					Willow oak----------	110	8	
					Water oak----------	91	6	
					Green ash----------	---	---	
					Baldcypress----------	---	---	
WkA, WkB, WkC------ Wickham	9A	Slight	Slight	Slight	Loblolly pine--------	90	9	Loblolly pine.
					Yellow poplar--------	89	6	
					White oak----------	84	5	
					Southern red oak-----	82	4	
					Sweetgum----------	---	---	
					Red maple----------	---	---	
					Northern red oak-----	---	---	
					Water oak----------	---	---	
					Hickory----------	---	---	
					American elm---------	---	---	
					American beech-------	---	---	
WtD---------- Winton	10A	Slight	Slight	Slight	Loblolly pine--------	93	10	Loblolly pine, hardwoods**.
					Southern red oak-----	---	---	
					Sweetgum----------	---	---	
					White oak----------	---	---	
					American beech-------	---	---	
WtE---------- Winton	10R	Severe	Severe	Slight	Loblolly pine--------	93	10	Loblolly pine, hardwoods**.
					Southern red oak-----	---	---	
					Sweetgum----------	---	---	
					White oak----------	---	---	
					American beech-------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** To establish hardwoods on a forested site, rely on natural reproduction (seeds and sprouts) of acceptable species. Special site preparation may be required. Planting of hardwoods on a specific site should be based upon the recommendations of a forester.

*** Potential productivity is attainable in areas that are adequately drained, bedded, or both.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AtA---------- Altavista	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Au---------- Augusta	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
BB: Bibb----------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding, too sandy.	Severe: wetness.	Severe: wetness, flooding.
Johnston----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
BoB---------- Bonneau	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
BoC---------- Bonneau	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: droughty, slope.
Ch---------- Chewacla	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
CnB---------- Conetoe	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
CrA---------- Craven	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight----------	Slight.
CrB---------- Craven	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight----------	Slight.
CrC---------- Craven	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight----------	Slight.
DgA---------- Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
DgB---------- Dogue	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
DgC---------- Dogue	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Dk Dorovan	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
ExA Exum	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
ExB Exum	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
GoA Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
Gt Grantham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Lf Leaf	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Ln Lenoir	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Ly Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Na Nahunta	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
NoA Norfolk	Slight	Slight	Slight	Slight	Slight.
NoB Norfolk	Slight	Slight	Moderate: slope.	Slight	Slight.
Pa Pantego	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ra Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ro Roanoke	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, flooding, percs slowly.	Severe: wetness.	Severe: flooding, wetness.
Se Seabrook	Moderate: wetness, too sandy.	Moderate: wetness, too sandy.	Moderate: too sandy, wetness.	Moderate: too sandy.	Severe: droughty.
TaB Tarboro	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Tm Tomotley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ud. Udorthents					
Wa Wahee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WE Wehadkee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
WkA Wickham	Slight	Slight	Slight	Slight	Slight.
WkB Wickham	Slight	Slight	Moderate: slope.	Slight	Slight.
WkC Wickham	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
WmB: Wickham	Slight	Slight	Severe: slope.	Slight	Slight.
Urban land.					
WtD Winton	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Slight	Moderate: slope.
WtE Winton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AtA---- Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Au---- Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
BB:										
Bibb----	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Johnston----	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
BoB, BoC---- Bonneau	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Ch---- Chewacla	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
CnB---- Conetoe	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
CrA---- Craven	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CrB---- Craven	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CrC---- Craven	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DgA---- Dogue	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
DgB---- Dogue	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DgC---- Dogue	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Dk---- Dorovan	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Poor	Poor	Good.
ExA---- Exum	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
ExB---- Exum	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GoA---- Goldsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Gt---- Grantham	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Lf---- Leaf	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ln---------- Lenoir	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Ly---------- Lynchburg	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Na---------- Nahunta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
NoA, NoB---------- Norfolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pa---------- Pantego	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Fair.
Ra---------- Rains	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Ro---------- Roanoke	Poor	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Se---------- Seabrook	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Poor.
TaB---------- Tarboro	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Tm---------- Tomotley	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Ud. Udorthents										
Wa---------- Wahee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
WE---------- Wehadkee	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
WkA---------- Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WkB---------- Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WkC---------- Wickham	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WmB: Wickham----------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
WtD---------- Winton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
WtE---------- Winton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AtA---------- Altavista	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, low strength.	Moderate: wetness.
Au---------- Augusta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
BB:						
Bibb----------	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Johnston---------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
BoB---------- Bonneau	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Moderate: droughty.
BoC---------- Bonneau	Severe: cutbanks cave.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Ch---------- Chewacla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
CnB---------- Conetoe	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
CrA, CrB---------- Craven	Severe: wetness, cutbanks cave.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
CrC---------- Craven	Severe: wetness, cutbanks cave.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Slight.
DgA---------- Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
DgB---------- Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
DgC---------- Dogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Dk---------- Dorovan	Severe: excess humus, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, wetness, flooding.	Severe: wetness, flooding, excess humus.
ExA, ExB---------- Exum	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
GoA---------- Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
Gt---------- Grantham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Lf---------- Leaf	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
Ln---------- Lenoir	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
Ly---------- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Na---------- Nahunta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
NoA---------- Norfolk	Moderate: wetness.	Slight---------	Moderate: wetness.	Slight---------	Slight---------	Slight.
NoB---------- Norfolk	Moderate: wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Slight---------	Slight.
Pa---------- Pantego	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ra---------- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ro---------- Roanoke	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: flooding, wetness.
Se---------- Seabrook	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
TaB---------- Tarboro	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
Tm---------- Tomotley	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ud. Udorthents						
Wa---------- Wahee	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WE---------- Wehadkee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
WkA---------- Wickham	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
WkB---------- Wickham	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
WkC---------- Wickham	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
WmB: Wickham----------	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
Urban land.						
WtD---------- Winton	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: slope.
WtE---------- Winton	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AtA Altavista	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness, too clayey.
Au Augusta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
BB: Bibb	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Johnston	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: wetness.
BoB Bonneau	Severe: wetness.	Severe: seepage.	Severe: wetness.	Severe: seepage.	Good.
BoC Bonneau	Severe: wetness.	Severe: seepage, slope.	Severe: wetness.	Severe: seepage.	Fair: slope.
Ch Chewacla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
CnB Conetoe	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
CrA Craven	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
CrB, CrC Craven	Severe: wetness, percs slowly.	Moderate: slope, seepage.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
DgA, DgB Dogue	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
DgC Dogue	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Severe: seepage, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
Dk Dorovan	Severe: subsides, flooding.	Severe: subsides, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: wetness, excess humus.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ExA, ExB---------- Exum	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
GoA---------- Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Gt---------- Grantham	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Lf---------- Leaf	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ln---------- Lenoir	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ly---------- Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Na---------- Nahunta	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
NoA, NoB---------- Norfolk	Moderate: wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
Pa---------- Pantego	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ra---------- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ro---------- Roanoke	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Se---------- Seabrook	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
TaB---------- Tarboro	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
Tm---------- Tomotley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ud. Udorthents					
Wa---------- Wahee	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WE---------- Wehadkee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness, thin layer.
WkA---------- Wickham	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight----------	Fair: too clayey.
WkB---------- Wickham	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
WkC---------- Wickham	Moderate: slope, percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: slope, too clayey.
WmB: Wickham----------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
Urban land.					
WtD---------- Winton	Severe: wetness, percs slowly.	Severe: seepage, slope, wetness.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, wetness, slope.
WtE---------- Winton	Severe: wetness, percs slowly, slope.	Severe: seepage, slope, wetness.	Severe: slope.	Severe: slope.	Poor: slope.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Topsoil
AtA Altavista	Fair: wetness, low strength.	Improbable: excess fines.	Fair: too clayey.
Au Augusta	Fair: low strength, wetness.	Improbable: excess fines.	Fair: too clayey, small stones.
BB: Bibb	Poor: wetness.	Improbable: excess fines.	Poor: wetness, small stones.
Johnston	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
BoB Bonneau	Good	Improbable: excess fines.	Fair: too sandy.
BoC Bonneau	Good	Improbable: excess fines.	Fair: too sandy, slope.
Ch Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Poor: wetness.
CnB Conetoe	Good	Probable	Fair: too sandy.
CrA, CrB, CrC Craven	Fair: wetness.	Improbable: excess fines.	Poor: too clayey.
DgA, DgB, DgC Dogue	Fair: wetness.	Probable	Poor: thin layer.
Dk Dorovan	Poor: wetness.	Probable	Poor: excess humus, wetness.
ExA, ExB Exum	Fair: wetness, low strength.	Improbable: excess fines.	Fair: too clayey.
GoA Goldsboro	Fair: wetness.	Improbable: excess fines.	Fair: too clayey.
Gt Grantham	Poor: low strength, wetness.	Improbable: excess fines.	Poor: wetness.
Lf Leaf	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Poor: too clayey, wetness.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Topsoil
Ln---------- Lenoir	Poor: low strength.	Improbable: excess fines.	Poor: too clayey.
Ly---------- Lynchburg	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Na---------- Nahunta	Poor: low strength.	Improbable: excess fines.	Fair: too clayey.
NoA, NoB---------- Norfolk	Good----------	Improbable: excess fines.	Fair: too clayey, small stones.
Pa---------- Pantego	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Ra---------- Rains	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Ro---------- Roanoke	Poor: wetness.	Improbable: excess fines.	Poor: too clayey, wetness.
Se---------- Seabrook	Fair: wetness.	Probable----------	Fair: too sandy.
TaB---------- Tarboro	Good----------	Probable----------	Fair: too sandy.
Tm---------- Tomotley	Poor: wetness.	Improbable: excess fines.	Poor: wetness.
Wa---------- Wahee	Poor: wetness, low strength.	Improbable: excess fines.	Poor: too clayey, wetness.
WE---------- Wehadkee	Poor: wetness, low strength.	Improbable: excess fines.	Poor: wetness.
WkA, WkB---------- Wickham	Good----------	Improbable: excess fines.	Fair: too clayey, small stones.
WkC---------- Wickham	Good----------	Improbable: excess fines.	Fair: too clayey, small stones, slope.
WmB: Wickham----------	Good----------	Improbable: excess fines.	Fair: too clayey, small stones.
Urban land.			
WtD---------- Winton	Fair: wetness.	Improbable: excess fines.	Fair: slope, too clayey, small stones.
WtE---------- Winton	Poor: slope.	Improbable: excess fines.	Poor: slope.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AtA---------- Altavista	Moderate: seepage.	Moderate: deep to water, slow refill.	Favorable------	Wetness--------	Wetness, soil blowing.	Favorable.
Au---------- Augusta	Moderate: seepage.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness, soil blowing.	Wetness.
BB:						
Bibb----------	Moderate: seepage.	Moderate: slow refill.	Flooding-------	Wetness, flooding.	Erodes easily, wetness.	Erodes easily, wetness.
Johnston---------	Severe: seepage.	Severe: cutbanks cave.	Flooding-------	Wetness, droughty, flooding.	Wetness--------	Wetness.
BoB---------- Bonneau	Severe: seepage.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Soil blowing---	Droughty.
BoC---------- Bonneau	Severe: slope, seepage.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Slope, soil blowing.	Slope, droughty.
Ch---------- Chewacla	Moderate: seepage.	Moderate: slow refill.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
CnB---------- Conetoe	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty, rooting depth.
CrA, CrB---------- Craven	Moderate: seepage.	Severe: slow refill, cutbanks cave.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
CrC---------- Craven	Moderate: seepage, slope.	Severe: slow refill, cutbanks cave.	Percs slowly, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.	Percs slowly.
DgA---------- Dogue	Moderate: seepage.	Severe: slow refill, cutbanks cave.	Favorable------	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
DgB---------- Dogue	Moderate: seepage, slope.	Severe: slow refill, cutbanks cave.	Slope----------	Wetness, soil blowing, slope.	Wetness, soil blowing.	Favorable.
DgC---------- Dogue	Severe: slope.	Severe: slow refill, cutbanks cave.	Slope----------	Wetness, soil blowing, slope.	Slope, wetness, soil blowing.	Slope.
Dk---------- Dorovan	Moderate: seepage.	Severe: cutbanks cave.	Flooding, subsides.	Wetness, soil blowing, flooding.	Wetness, soil blowing.	Wetness.
ExA---------- Exum	Slight---------	Severe: slow refill.	Favorable------	Wetness, erodes easily, soil blowing.	Erodes easily, wetness, soil blowing.	Erodes easily.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
ExB---- Exum	Moderate: slope.	Severe: slow refill.	Slope----	Slope, wetness, erodes easily.	Erodes easily, wetness, soil blowing.	Erodes easily.
GoA---- Goldsboro	Moderate: seepage.	Moderate: deep to water, slow refill.	Favorable----	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
Gt---- Grantham	Slight----	Severe: slow refill.	Favorable----	Wetness, soil blowing, erodes easily.	Erodes easily, wetness, soil blowing.	Wetness, erodes easily.
Lf---- Leaf	Slight----	Severe: slow refill.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ln---- Lenoir	Slight----	Severe: slow refill.	Percs slowly---	Wetness, percs slowly, soil blowing.	Wetness, percs slowly, soil blowing.	Wetness, percs slowly.
Ly---- Lynchburg	Moderate: seepage.	Moderate: slow refill.	Favorable----	Wetness----	Wetness----	Wetness.
Na---- Nahunta	Slight----	Severe: slow refill.	Favorable----	Wetness, erodes easily, soil blowing.	Erodes easily, wetness, soil blowing.	Wetness, erodes easily.
NoA---- Norfolk	Moderate: seepage.	Moderate: deep to water, slow refill.	Deep to water	Favorable----	Soil blowing---	Favorable.
NoB---- Norfolk	Moderate: seepage, slope.	Moderate: deep to water, slow refill.	Deep to water	Slope, soil blowing.	Soil blowing---	Favorable.
Pa---- Pantego	Moderate: seepage.	Moderate: slow refill.	Favorable----	Wetness----	Wetness----	Wetness.
Ra---- Rains	Moderate: seepage.	Moderate: slow refill.	Favorable----	Wetness----	Wetness, soil blowing.	Wetness.
Ro---- Roanoke	Severe: seepage.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly.	Wetness, percs slowly.
Se---- Seabrook	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
TaB---- Tarboro	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty, rooting depth.
Tm---- Tomotley	Moderate: seepage.	Severe: slow refill.	Favorable----	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
Ud. Udorthents						
Wa---- Wahee	Slight----	Severe: slow refill.	Percs slowly---	Wetness, soil blowing.	Wetness, soil blowing, percs slowly.	Wetness, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WE---------- Wehadkee	Moderate: seepage.	Moderate: slow refill.	Flooding-------	Wetness, soil blowing, flooding.	Wetness, soil blowing.	Wetness.
WkA---------- Wickham	Moderate: seepage.	Severe: no water.	Deep to water	Favorable------	Soil blowing---	Favorable.
WkB---------- Wickham	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope----------	Soil blowing---	Favorable.
WkC---------- Wickham	Severe: slope.	Severe: no water.	Deep to water	Slope----------	Slope, soil blowing.	Slope.
WmB: Wickham----------	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope----------	Soil blowing---	Favorable.
Urban land.						
WtD, WtE---------- Winton	Severe: slope.	Severe: no water.	Slope----------	Slope, wetness.	Slope, wetness.	Slope.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments >3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AtA---------- Altavista	0-14	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0	95-100	90-100	65-99	35-60	23	NP-7
	14-40	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	40-60	Variable---------	---	---	---	---	---	---	---	---	---
Au---------- Augusta	0-6	Fine sandy loam	SM, SM-SC, ML	A-2, A-4	0	90-100	75-100	50-98	30-60	25	NP-7
	6-46	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-100	51-80	20-45	5-25
	46-68	Variable---------	---	---	---	---	---	---	---	---	---
BB:											
Bibb----------	0-8	Loam----------	ML, CL-ML	A-4	0-5	95-100	90-100	80-90	50-80	25	NP-7
	8-60	Sandy loam, loam, silt loam.	SM, SM-SC, ML, CL-ML	A-2, A-4	0-10	60-100	50-100	40-100	30-90	30	NP-7
Johnston--------	0-28	Loam----------	ML, SM	A-2, A-4	0	100	100	60-100	18-65	35	NP-10
	28-60	Stratified loamy sand to sand.	SM, SP-SM	A-2, A-3	0	100	100	50-100	5-30	---	NP
BoB, BoC--------- Bonneau	0-28	Loamy sand-------	SM	A-2	0	100	100	50-95	15-35	---	NP
	28-75	Sandy loam, sandy clay loam, fine sandy loam.	SC, SM-SC	A-2, A-6, A-4	0	100	100	60-100	30-50	21-40	4-21
Ch---------- Chewacla	0-4	Loam----------	ML, CL, CL-ML	A-4, A-6, A-7	0	98-100	95-100	70-100	55-90	25-49	4-20
	4-42	Sandy clay loam, loam, sandy loam.	SM, SM-SC, ML, CL	A-4, A-7-6, A-6	0	96-100	95-100	60-100	36-70	20-45	2-15
	42-65	Silt loam, clay loam, silty clay loam.	ML, MH, CL, CH	A-4, A-6, A-7	0	75-100	65-100	60-100	51-98	22-61	4-28
CnB---------- Conetoe	0-23	Loamy sand-------	SM, SP-SM	A-2, A-3	0	100	100	50-99	5-30	20	NP
	23-42	Sandy loam, sandy clay loam, fine sandy loam.	SM, SC, SM-SC	A-2, A-4	0	100	100	50-99	20-40	30	NP-10
	42-80	Loamy sand, sand	SM, SP, SP-SM	A-2, A-3, A-1	0	100	100	40-99	4-30	20	NP
CrA, CrB, CrC---- Craven	0-11	Fine sandy loam	ML, CL, SM, SC	A-4, A-6	0	100	95-100	75-100	45-90	35	NP-15
	11-67	Clay, silty clay, silty clay loam.	CH, CL	A-7	0	100	95-100	90-100	65-98	40-70	24-43
DgA, DgB, DgC---- Dogue	0-7	Sandy loam-------	SM, SC, SM-SC	A-2, A-4	0	95-100	75-100	50-100	20-50	25	NP-10
	7-50	Clay loam, clay, sandy clay loam.	CL, CH, SC	A-6, A-7	0	95-100	75-100	65-100	40-90	35-60	16-40
	50-82	Stratified sand to sandy clay loam.	SM, SC, SP-SM, SM-SC	A-2, A-4, A-1	0	80-100	60-100	35-100	10-40	30	NP-10
Dk---------- Dorovan	0-5	Mucky peat-------	PT	---	0	---	---	---	---	---	---
	5-85	Muck----------	PT	---	0	---	---	---	---	---	---
	85-95	Sand, loamy sand, loam.	SP-SM, SM-SC, SM	A-1, A-3, A-4, A-2-4	0	100	100	5-70	5-49	20	NP-7

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	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	
ExA, ExB--------- Exum	0-7	Very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	95-100	80-100	51-80	25	NP-10
	7-65	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	95-100	90-100	60-90	22-49	8-30
GoA-------------- Goldsboro	0-11	Sandy loam-------	SM, SM-SC, SC	A-2, A-4, A-6	0	95-100	95-100	50-100	15-45	25	NP-14
	11-72	Sandy clay loam, clay loam, sandy clay.	SC, CL, CL-ML, CH	A-4, A-6, A-7-6	0	95-100	90-100	65-95	36-70	25-55	6-32
	72-80	Variable---------	---	---	---	---	---	---	---	---	---
Gt--------------- Grantham	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	55-85	30	NP-7
	7-72	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	90-100	60-95	22-49	8-30
Lf--------------- Leaf	0-5	Loam-------------	ML	A-4, A-6	0	100	95-100	70-95	60-75	28-38	5-12
	5-72	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	95-100	90-100	75-95	42-65	20-38
Ln--------------- Lenoir	0-7	Fine sandy loam	SM-SC, SC, CL-ML, CL	A-4	0	100	100	70-85	40-55	25	NP-10
	7-72	Clay, silty clay, clay loam.	CL, CH	A-6, A-7	0	100	100	85-99	55-95	30-55	11-35
Ly--------------- Lynchburg	0-10	Sandy loam-------	SM, ML, SM-SC, CL-ML	A-2, A-4	0	92-100	90-100	75-100	25-55	30	NP-7
	10-65	Sandy clay loam, sandy loam, clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	0	92-100	90-100	70-100	25-67	15-40	4-18
Na--------------- Nahunta	0-6	Very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	95-100	80-100	51-85	25	NP-10
	6-64	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	95-100	90-100	60-95	22-49	8-30
NoA, NoB--------- Norfolk	0-15	Sandy loam-------	SM, SM-SC, SC	A-2	0	95-100	95-100	50-91	15-33	25	NP-14
	15-19	Sandy loam, sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	95-100	91-100	70-96	30-63	20-38	4-15
	19-70	Sandy clay loam, clay loam, sandy clay.	SC, SM-SC, CL, CL-ML	A-4, A-6, A-7-6	0	100	98-100	65-98	36-72	20-52	4-23
Pa--------------- Pantego	0-18	Loam-------------	SM, ML	A-2, A-4	0	100	95-100	60-95	25-75	35	NP-10
	18-72	Sandy clay loam, sandy loam, clay loam.	SC, CL, SM-SC, CL-ML	A-4, A-6, A-2	0	100	95-100	65-100	30-80	20-40	4-16
Ra--------------- Rains	0-16	Sandy loam-------	SM, ML	A-2, A-4	0	100	95-100	50-85	25-56	35	NP-10
	16-62	Sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	55-98	30-70	18-40	4-20
	62-72	Sandy clay loam, clay loam, sandy clay.	SC, SM-SC, CL, CL-ML	A-4, A-6, A-7	0	100	98-100	60-98	36-72	18-45	4-28

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	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	
Ro---------- Roanoke	0-11	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-2, A-4	0	85-100	80-100	45-85	25-55	25	NP-7
	11-45	Clay, silty clay, clay loam.	CH, CL	A-7	0	90-100	85-100	85-100	65-95	45-70	22-40
	45-60	Stratified sand to clay.	CL-ML, GM-GC, CH, SM	A-1, A-2, A-4	0-5	40-100	35-100	25-95	15-90	10-60	NP-40
Se---------- Seabrook	0-40	Loamy sand-------	SM, SP-SM	A-2, A-3	0	95-100	90-100	85-99	5-25	---	NP
	40-65	Loamy fine sand, fine sand, sand.	SM, SP-SM	A-2, A-3	0	95-100	90-100	85-100	5-25	---	NP
TaB---------- Tarboro	0-82	Loamy sand-------	SM, SP-SM, SW-SM	A-2, A-3, A-1	0	95-100	95-100	40-99	8-35	---	NP
Tm---------- Tomotley	0-8	Sandy loam-------	SM, SM-SC	A-2, A-4	0	98-100	95-100	75-99	25-50	30	NP-7
	8-50	Fine sandy loam, sandy clay loam, clay loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	98-100	95-100	75-100	30-70	20-40	6-23
	50-60	Variable---------	---	---	---	---	---	---	---	---	---
Ud. Udorthents											
Wa---------- Wahee	0-4	Sandy loam-------	SM, SM-SC	A-2, A-4	0	100	95-100	50-98	30-50	28	NP-7
	4-84	Clay, clay loam, silty clay.	CL, CH	A-6, A-7	0	100	100	85-100	51-92	38-81	16-54
WE---------- Wehadkee	0-10	Loam----------	SM, SC, SM-SC	A-2, A-4	0	100	95-100	60-90	30-50	30	NP-10
	10-65	Silt loam, silty clay loam, very fine sandy loam.	CL, CL-ML, ML, SC	A-6, A-7, A-4	0	100	99-100	85-100	45-98	20-58	6-25
WkA, WkB, WkC---- Wickham	0-8	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	95-100	90-100	70-100	45-80	25	NP-7
	8-53	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM	A-2, A-4, A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	3-15
	53-68	Variable---------	---	---	---	---	---	---	---	---	---
WmB: Wickham---------	0-8	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	95-100	90-100	70-100	45-80	25	NP-7
	8-53	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM	A-2, A-4, A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	3-15
	53-68	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
WtD, WtE---------- Winton	0-17	Fine sandy loam	ML, SM, CL, SC	A-2, A-4, A-6	0-3	90-100	90-100	50-99	25-65	30	NP-15
	17-54	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-2	90-100	90-100	45-95	25-70	20-45	8-30
	54-80	Variable---------	---	---	---	---	---	---	---	---	---

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AtA----------	0-14	10-24	1.30-1.50	2.0-6.0	0.12-0.20	3.6-6.5	Low----------	0.24	5	.5-3
Altavista	14-40	18-35	1.30-1.50	0.6-2.0	0.12-0.20	3.6-6.0	Low----------	0.24		
	40-60	---	---	---	---	---	----------	----		
Au----------	0-6	5-20	1.40-1.70	2.0-6.0	0.10-0.15	4.5-6.0	Low----------	0.20	4	.5-2
Augusta	6-46	20-35	1.35-1.60	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.24		
	46-68	---	---	---	---	---	----------	----		
BB:										
Bibb----------	0-8	2-18	1.20-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.28	5	.5-2
	8-60	2-18	1.30-1.60	0.6-2.0	0.12-0.20	4.5-5.5	Low----------	0.37		
Johnston--------	0-28	5-18	1.30-1.55	2.0-6.0	0.10-0.20	4.5-5.5	Low----------	0.20	5	3-8
	28-60	2-12	1.55-1.65	6.0-20	0.02-0.07	4.5-5.5	Low----------	0.17		
BoB, BoC---------	0-28	5-15	1.30-1.70	6.0-20	0.05-0.11	4.5-6.0	Low----------	0.15	5	.5-2
Bonneau	28-75	18-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low----------	0.20		
Ch----------	0-4	10-27	1.30-1.60	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.28	5	1-4
Chewacla	4-42	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.5	Low----------	0.28		
	42-65	18-35	1.30-1.50	0.6-2.0	0.15-0.24	4.5-7.8	Low----------	0.32		
CnB----------	0-23	2-10	1.60-1.75	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.15	5	.5-2
Conetoe	23-42	10-22	1.40-1.60	2.0-6.0	0.10-0.15	4.5-6.0	Low----------	0.15		
	42-80	2-10	1.60-1.70	6.0-20	0.05-0.10	4.5-6.0	Low----------	0.10		
CrA, CrB, CrC----	0-11	7-27	1.30-1.45	0.2-2.0	0.12-0.15	3.6-6.5	Low----------	0.32	5	.5-2
Craven	11-67	35-60	1.30-1.45	0.06-0.2	0.12-0.15	3.6-5.5	Moderate-----	0.32		
DgA, DgB, DgC----	0-7	5-10	1.35-1.50	2.0-6.0	0.08-0.15	3.6-5.5	Low----------	0.28	4	.5-1
Dogue	7-50	35-50	1.45-1.60	0.2-0.6	0.12-0.19	3.6-5.5	Moderate-----	0.28		
	50-82	5-30	1.30-1.50	0.6-6.0	0.05-0.14	3.6-5.5	Low----------	0.17		
Dk----------	0-5	---	0.25-0.40	0.6-2.0	0.20-0.25	3.6-4.4	----------	----	---	20-80
Dorovan	5-85	---	0.35-0.55	0.6-2.0	0.20-0.25	3.6-4.4	----------	----		
	85-95	5-20	1.40-1.65	6.0-20	0.05-0.08	4.5-5.5	Low----------	----		
ExA, ExB---------	0-7	6-18	1.30-1.50	2.0-6.0	0.15-0.20	4.5-6.0	Low----------	0.37	5	.5-2
Exum	7-65	18-35	1.30-1.40	0.2-0.6	0.15-0.20	4.5-5.5	Low----------	0.37		
GoA----------	0-11	5-15	1.40-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low----------	0.20	5	.5-2
Goldsboro	11-72	20-34	1.30-1.40	0.6-2.0	0.11-0.20	3.6-5.5	Low----------	0.24		
	72-80	---	---	---	---	---	----------	----		
Gt----------	0-7	6-18	1.30-1.50	2.0-6.0	0.13-0.20	3.6-5.5	Low----------	0.37	5	2-4
Grantham	7-72	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low----------	0.43		
Lf----------	0-5	12-20	1.30-1.50	0.06-0.2	0.12-0.18	3.6-5.5	Low----------	0.28	4	1-3
Leaf	5-72	35-60	1.50-1.60	0.06	0.18-0.21	3.6-5.5	High---------	0.32		
Ln----------	0-7	6-20	1.40-1.55	2.0-6.0	0.10-0.14	3.6-5.5	Low----------	0.28	5	2-4
Lenoir	7-72	35-60	1.20-1.35	0.06-0.2	0.13-0.15	3.6-5.5	Moderate-----	0.32		
Ly----------	0-10	5-20	1.30-1.60	2.0-6.0	0.09-0.13	3.6-5.5	Low----------	0.20	5	.5-5
Lynchburg	10-65	18-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low----------	0.20		
Na----------	0-6	6-18	1.30-1.50	2.0-6.0	0.15-0.20	4.5-6.0	Low----------	0.43	5	2-4
Nahunta	6-64	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low----------	0.43		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
NoA, NoB--------- Norfolk	0-15 15-19 19-70	5-18 18-35 20-43	1.45-1.65 1.30-1.65 1.20-1.65	2.0-6.0 0.6-2.0 0.6-2.0	0.10-0.15 0.10-0.18 0.12-0.18	3.6-6.0 3.6-5.5 3.6-5.5	Low---------- Low---------- Low----------	0.20 0.24 0.24	5	.5-2
Pa--------------- Pantego	0-18 18-72	5-15 18-35	1.40-1.60 1.30-1.50	2.0-6.0 0.6-2.0	0.12-0.20 0.12-0.20	3.6-5.5 3.6-5.5	Low---------- Low----------	0.15 0.28	5	4-10
Ra--------------- Rains	0-16 16-62 62-72	5-20 18-35 18-40	1.30-1.60 1.30-1.60 1.30-1.50	2.0-6.0 0.6-2.0 0.6-2.0	0.10-0.14 0.11-0.15 0.10-0.15	3.6-6.5 3.6-5.5 3.6-5.5	Low---------- Low---------- Low----------	0.20 0.24 0.28	5	1-6
Ro--------------- Roanoke	0-11 11-45 45-60	10-18 35-60 5-50	1.20-1.50 1.35-1.65 1.20-1.50	2.0-6.0 0.2 0.06-20	0.12-0.18 0.10-0.19 0.04-0.14	3.6-5.5 3.6-5.5 3.6-6.5	Low---------- Moderate----- Moderate-----	0.28 0.24 0.24	4	1-3
Se--------------- Seabrook	0-40 40-65	2-12 2-12	1.30-1.60 1.30-1.60	6.0-20 6.0-20	0.05-0.11 0.02-0.09	4.5-6.5 4.5-6.5	Low---------- Low----------	0.10 0.10	5	.5-2
TaB-------------- Tarboro	0-82	3-12	1.60-1.75	6.0-20	0.05-0.09	4.5-6.5	Low----------	0.10	5	.5-1
Tm--------------- Tomotley	0-8 8-50 50-60	5-20 18-35 ---	1.30-1.60 1.30-1.50 ---	2.0-6.0 0.6-2.0 ---	0.10-0.15 0.12-0.18 ---	3.6-5.5 3.6-5.5 ---	Low---------- Low---------- ----------	0.20 0.20 ----	5	1-6
Ud. Udorthents										
Wa--------------- Wahee	0-4 4-84	5-20 35-60	1.30-1.60 1.40-1.60	0.6-2.0 0.06-0.2	0.10-0.15 0.12-0.20	4.5-6.0 3.6-5.5	Low---------- Moderate-----	0.24 0.28	5	.5-5
WE--------------- Wehadkee	0-10 10-65	5-20 18-35	1.35-1.60 1.30-1.50	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	2-5
WkA, WkB, WkC---- Wickham	0-8 8-53 53-68	8-15 18-35 ---	1.45-1.65 1.30-1.50 ---	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	.5-2
WmB: Wickham--------- Urban land.	0-8 8-53 53-68	8-15 18-35 ---	1.45-1.65 1.30-1.50 ---	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	.5-2
WtD, WtE--------- Winton	0-17 17-54 54-80	7-27 18-35 ---	1.30-1.40 1.30-1.50 ---	2.0-6.0 0.2-2.0 ---	0.12-0.20 0.12-0.20 ---	3.6-6.0 3.6-6.0 ---	Low---------- Low---------- ----------	0.20 0.24 ----	5	.5-3

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
AtA---------- Altavista	C	None--------	---	---	1.5-2.5	Apparent	Dec-Apr	Moderate	Moderate.
Au---------- Augusta	C	None--------	---	---	1.0-2.0	Apparent	Dec-May	High-----	Moderate.
BB:									
Bibb----------	D	Frequent----	Brief to long.	Dec-May	0.5-1.5	Apparent	Dec-Apr	High-----	Moderate.
Johnston---------	D	Frequent----	Brief to long.	Nov-Jul	+1-1.5	Apparent	Nov-Jun	High-----	High.
BoB, BoC---------- Bonneau	A	None--------	---	---	3.5-5.0	Apparent	Dec-Mar	Low------	High.
Ch---------- Chewacla	C	Frequent----	Brief-----	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	High-----	Moderate.
CnB---------- Conetoe	A	None--------	---	---	6.0	---	---	Low------	High.
CrA, CrB, CrC----- Craven	C	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	High-----	High.
DgA, DgB, DgC----- Dogue	C	None--------	---	---	1.5-3.0	Apparent	Jan-Mar	High-----	High.
Dk---------- Dorovan	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	High-----	High.
ExA, ExB---------- Exum	C	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	Moderate	High.
GoA---------- Goldsboro	B	None--------	---	---	2.0-3.0	Apparent	Dec-Apr	Moderate	High.
Gt---------- Grantham	D	None--------	---	---	0-1.0	Apparent	Dec-May	High-----	High.
Lf---------- Leaf	D	None--------	---	---	0.5-1.5	Apparent	Jan-Apr	High-----	Moderate.
Ln---------- Lenoir	D	None--------	---	---	1.0-2.5	Apparent	Dec-May	High-----	High.
Ly---------- Lynchburg	C	None--------	---	---	0.5-1.5	Apparent	Nov-Apr	High-----	High.
Na---------- Nahunta	C	None--------	---	---	1.0-2.5	Apparent	Dec-May	High-----	High.
NoA, NoB---------- Norfolk	B	None--------	---	---	4.0-6.0	Apparent	Jan-Mar	Moderate	High.
Pa---------- Pantego	B/D	None--------	---	---	0-1.5	Apparent	Nov-May	High-----	High.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Ra---------- Rains	B/D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
Ro---------- Roanoke	D	Frequent----	Brief-----	Nov-Jun	0-1.0	Apparent	Nov-May	High-----	High.
Se---------- Seabrook	C	None--------	---	---	2.0-4.0	Apparent	Dec-Mar	Low------	Moderate.
TaB---------- Tarboro	A	None--------	---	---	6.0	---	---	Low------	Moderate.
Tm---------- Tomotley	B/D	None--------	---	---	0-1.0	Apparent	Nov-Apr	High-----	High.
Ud. Udorthents									
Wa---------- Wahee	D	None--------	---	---	0.5-1.5	Apparent	Dec-Mar	High-----	High.
WE---------- Wehadkee	D	Frequent----	Brief-----	Nov-Jun	0-1.0	Apparent	Nov-May	High-----	Moderate.
WkA, WkB, WkC----- Wickham	B	None--------	---	---	6.0	---	---	Moderate	High.
WmB: Wickham----------	B	None--------	---	---	6.0	---	---	Moderate	High.
Urban land.									
WtD, WtE---------- Winton	C	None--------	---	---	2.0-4.0	Perched	Dec-May	Moderate	Moderate.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Augusta	Fine-loamy, mixed, thermic Aeric Ochraquults
Bibb	Coarse-loamy, siliceous, acid, thermic Typic Fluvaquents
Bonneau	Loamy, siliceous, thermic Arenic Paleudults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Conetoe	Loamy, mixed, thermic Arenic Hapludults
Craven	Clayey, mixed, thermic Aquic Hapludults
Dogue	Clayey, mixed, thermic Aquic Hapludults
Dorovan	Dysic, thermic Typic Medisaprists
Exum	Fine-silty, siliceous, thermic Aquic Paleudults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Grantham	Fine-silty, siliceous, thermic Typic Paleaquults
Johnston	Coarse-loamy, siliceous, acid, thermic Cumulic Humaquepts
Leaf	Clayey, mixed, thermic Typic Albaquults
Lenoir	Clayey, mixed, thermic Aeric Paleaquults
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Nahunta	Fine-silty, siliceous, thermic Aeric Paleaquults
Norfolk	Fine-loamy, siliceous, thermic Typic Paleudults
Pantego	Fine-loamy, siliceous, thermic Umbric Paleaquults
Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
Roanoke	Clayey, mixed, thermic Typic Ochraquults
Seabrook	Mixed, thermic Aquic Udipsamments
Tarboro	Mixed, thermic Typic Udipsamments
Tomotley	Fine-loamy, mixed, thermic Typic Ochraquults
Wahee	Clayey, mixed, thermic Aeric Ochraquults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents
Wickham	Fine-loamy, mixed, thermic Typic Hapludults
Winton	Fine-loamy, mixed, thermic Aquic Hapludults

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